**HEAD AND NECK CANCER**

*ALTERNATIVE NAMES: Head and neck cancer is also known by several alternative names, including "head and neck squamous cell carcinoma"*

**DEFINITION / DESCRIPTION**

Head and neck cancer” is a broad category that includes several cancers that start in regions of your head and neck. Most start in squamous cells that make up the moist tissue lining your mouth, throat (pharynx), voice box or nasal cavity. Providers classify them as head and neck squamous cell carcinoma (HNSCC).

If you have head and neck cancer, your oncologist will work with you to determine the best treatment options. The goal is to fight the disease while preserving those parts of your body that help you speak, eat and make facial expressions. The earlier it’s caught and treated, the better your chances of getting rid of the cancer for good.

***Types of head and neck cancers***

Head and neck cancers include cancers in your mouth, parts of your throat (nasopharynx, oropharynx and hypopharynx) and other related structures:

* Oral cancer: Cancer that forms in your lips, gums, tongue, the lining of your cheeks and lips, the top and bottom of your mouth, or behind your wisdom teeth.
* Salivary gland cancer: Cancer of your salivary glands, which produce spit.
* Nasal cavity and paranasal sinus cancer: Cancer that forms in the hollow area inside of your nose (nasal cavity) or the hollow spaces in the bones surrounding your nose (paranasal sinuses).
* Nasopharyngeal cancer: Cancer of the upper part of your throat (nasopharynx).
* Oropharyngeal cancer: Cancer of the middle part of your throat (oropharynx), including your tonsils and the base of your tongue.
* Hypopharyngeal cancer: Cancer of the bottom part of your throat (hypopharynx).
* Laryngeal cancer: Cancer of your voice box (larynx), which contains your vocal cords.

About 4.5% of cancer diagnoses worldwide are head and neck cancers. Most head and neck cancers affect males over 50. But this may be because this group is more likely to have risk factors associated with these cancers, like a history of tobacco use.

In the U.S., instances of tobacco-related head and neck cancers have fallen. Head and neck cancers related to HPV (a type of sexually transmitted infection) are on the rise. Alongside this shift, more people getting diagnosed are under 50.

**CAUSES**

Head and neck cancer starts when a normal cell turns malignant and starts to make copies of itself. The copies form a tumor that can invade tissue and spread throughout your body. Cancer that’s spread is called metastatic cancer.

Researchers have identified several factors that may cause a normal cell to transform into HNSCC.

**RISK FACTORS**

The most common risk factors for head and neck cancer include:

* Tobacco use: Approximately 70% to 80% of head and neck cancers worldwide are linked to tobacco use. This includes smoking cigarettes or cigars and using snuff or any type of chewing tobacco. Exposure to secondhand smoke may also increase your risk.
* Alcohol consumption: Consuming too much alcohol can increase your risk. This is especially the case if you also use tobacco.
* Human papillomavirus (HPV): In developed nations, including the United States, HPV infection is overtaking tobacco use as the greatest risk factor associated with head and neck cancer.
* Betel nut chewing: Chewing betel nuts is a common practice in Southern and Southeast Asia and Polynesia. It accounts for more than half of head and neck cancers in these regions.

***Other risk factors include:***

* Epstein-Barr virus (EBV): An EBV infection can lead to nasopharyngeal cancer or salivary gland cancer.
* Weak immune system: A weakened immune system makes it harder for your body to fight cancer. HIV infection and recent major surgeries (like organ or bone marrow transplants) have both been associated with cancer resulting from weakened immune systems.
* Genetics: Your genes may increase your cancer risk. For example, people with Fanconi anemia inherit genes that increase their risk of head and neck cancers. The risk is greater if you have predisposing genes and you also use tobacco.
* Long-term exposure to cancer-causing substances: Several carcinogens may cause head and neck cancers. These include asbestos, pesticides, wood dust and paint fumes.
* Radiation exposure: Prior radiation therapy to the head and neck has been linked to salivary gland cancer and other head and neck cancers.
* Salt-cured foods: Regularly eating salt-cured meat and fish can increase your risk of nasopharyngeal cancer.
* Poor oral hygiene: Not taking care of your teeth and gums can increase your risk of oral cancer.

**SIGNS / SYMPTOMS**

Head and neck cancer symptoms are often mild. They can mimic less serious conditions like a cold or sore throat. A sore throat that doesn’t get better is the most common sign of head and neck cancer.

***Depending on the type of head and neck cancer, you may experience:***

* A persistent sore throat.
* Persistent ear aches or symptoms of ear infections (especially when your ear looks normal to your healthcare provider).
* Frequent headaches.
* Pain in your face or neck that won’t go away.
* Pain in your upper teeth.
* Pain when you chew or swallow.
* Hoarseness or voice changes.
* Trouble breathing or speaking.

***You may notice:***

* A lump in your throat, mouth or neck.
* A mouth or tongue sore that doesn’t heal.
* Frequent nosebleeds, bloody saliva or phlegm.
* A white or red patch on your gums, tongue or inside your mouth.
* Swelling in your jaw, neck or side of your face (that may cause your dentures to fit poorly).

Check with a healthcare provider immediately if you notice any of these symptoms. They may be signs of something less serious, but you’ll need a thorough exam to be sure.

**DIAGNOSIS METHODS**

Diagnosis usually begins with a physical exam. During the exam, your provider will check your mouth, nasal cavities, throat and neck. They may feel your neck, lips, gums and cheeks for lumps.

Based on your provider’s findings, you’ll likely need tests, which may include:

* An endoscopy: This procedure uses a thin, lighted tube that allows your provider to see inside your nasal cavity, throat or voice box. It’s usually an in-office procedure.
* Imaging tests: X-rays of your head and neck, CT scans, MRIs and PET scans can show tumors inside your body.
* Lab tests: Your provider may do an HPV test to check for the HPV virus as a cause of cancer if they see something concerning.
* A biopsy: A biopsy is the only way to confirm that a tumor is cancerous. Your provider will remove tissue from the tumor, and a pathologist will test it for cancer cells.

***Stages of head and neck cancer***

Cancer staging for head and neck cancers helps healthcare providers determine how advanced cancer is. Providers use the TNM (tumor, node, metastasis) system to stage head and neck cancers.

This system considers:

* A tumor’s size and location (T)
* Whether cancer has spread to lymph nodes (N).
* Whether cancer has spread to other parts of your body, or metastasized (M).

Using this information, your provider will assign a number ranging from I to IV.

The staging specifics differ depending on the type of head and neck cancer. But generally, lower numbers (I and II) mean that the cancer is in the early stages. Early-stage head and neck cancers have the highest treatment success rates.

**TREATMENT OPTIONS**

The main head and neck cancer treatments are:

* Surgery: Whenever possible, surgeons attempt to remove the tumor and a margin of surrounding healthy tissue. Your surgeon may also remove lymph nodes in your neck if they suspect the cancer has spread there or has a reasonably high risk of spreading there.
* Radiation therapy: The most common form of radiation for head and neck tumors uses a machine that directs high-energy X-rays toward cancer cells (EBRT). You may receive radiation alone or alongside other treatments like surgery and chemotherapy.
* Chemotherapy: This uses drugs to kill cancer cells, especially in advanced-stage head and neck cancer. You may receive chemo alongside radiation treatment.

Your healthcare provider may recommend other treatments, especially if your cancer is advanced or if it went away after treatment but then came back:

* Targeted therapy: These drugs are most often used with other treatments for advanced head and neck cancers. The U.S. Food and Drug Administration (FDA)-approved targeted therapy drugs for head and neck cancer include Cetuximab (Erbitux®) and Larotrectinib (Vitrakvi®).
* Immunotherapy: These drugs help your immune system identify and destroy cancer cells. Pembrolizumab (Keytruda®) and nivolumab (Opdivo®) are two immunotherapy drugs that treat certain head and neck cancers that have spread or returned following treatment.
* Clinical trials: A clinical trial is a study that tests the safety and effectiveness of new treatments. Ask your healthcare provider if they recommend you take part in one.

Your healthcare provider may also recommend palliative care. Palliative care providers can complement your cancer care by helping you manage symptoms. They can make living with a cancer diagnosis easier, no matter your cancer stage or prognosis.

***Treatment side effects***

Head and neck cancer treatments can cause side effects. For instance, surgery to remove a large tumor may change your appearance. Some people treated for head and neck cancers have trouble breathing, eating, swallowing or talking afterward.

Ask your healthcare provider about potential side effects, including ways to manage them. For example, reconstructive surgery or prosthetics may help you achieve your desired appearance following treatment. Regular visits with a speech-language pathologist can help with speaking and swallowing difficulties.

**PREVENTION TIPS**

To help prevent head and neck cancers, don't smoke and limit the amount of alcohol you drink. Other steps you can take may depend on the specific type of cancer. Head and neck cancers include cancers that start in the mouth, throat, sinuses and salivary glands.

To lower the risk of head and neck cancer:

* Don't use tobacco: If you don't smoke or use other kinds of tobacco, don't start. If you do use tobacco, make a plan to quit. Talk with a healthcare professional about things that can help you quit.
* Drink alcohol in moderation, if at all: If you choose to drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and up to two drinks a day for men.
* Ask about the HPV vaccine: Receiving a vaccination to prevent HPV infection may reduce the risk of HPV-related cancers. Ask a healthcare professional whether the HPV vaccine is right for you.
* Protect your head and neck from the sun: Wear a hat with a wide brim to shade your head and neck. Use a broad-spectrum sunscreen with an SPF of at least 30, even on cloudy days. Apply sunscreen generously. Reapply every two hours, or more often if you're swimming or sweating.

**OUTLOOK / PROGNOSIS**

Some head and neck cancers are potentially curable. The chance of a cure is best if your healthcare provider finds the cancer early and treats it immediately. Small tumors that haven’t spread are also sometimes curable.

Your outlook depends on many factors, including your cancer type, general health and response to treatment. Ask your healthcare provider about your prognosis based on your unique cancer diagnosis.

***Survival rate for head and neck cancer***

The survival rate for people with Stage I (1) or Stage II (2) oral and throat cancer ranges from approximately 70% to 90%. This means that 70% to 90% of people diagnosed with head and neck cancer at these stages are alive after five years.

But remember, these numbers are general. They don’t account for your cancer type, health or treatment response. They don’t consider the effects of newer treatments on improving the survival rate. Discuss these factors with your healthcare provider to better understand your prognosis.

**POSSIBLE COMPLICATIONS**

***Oral complications of head and neck radiotherapy in elderly patients***

Elderly patients represent a unique subset of patients in whom acute and late adverse sequelae of RT can be particularly challenging. Increasing age is associated with increased risk of severe late toxicity, such as dysphagia, aspiration pneumonia, and long‐term feeding tube dependence on prospective RTOG protocols.

However, there is limited prospective data specifically comparing oral toxicity in elderly patients undergoing RT to what is observed in younger patients. Furthermore, there is no consensus on the definition of elderly with some defining it as 70 years or older while others use a 65‐years cut‐off.

Most comparative data comes from retrospective case series, with conflicting conclusions. In a study of patients enrolled on EORTC trials from 1980 to 1995, those 65 years of age and older had higher grade 3–4 mucositis during radiation than younger patients, but there was no difference in late toxicities including trismus, xerostomia, or dysphagia.

However, other series have reported no difference in acute oral complications for elderly and younger patients undergoing radiotherapy.

Additionally, higher hospitalization rates for elderly patients and unplanned treatment breaks have been reported in some series, but this appears more commonly due to infectious or renal complications rather than oral complications.

In contrast, some major centers have not seen increased hospitalizations or treatment breaks in elderly patients . Thus, further investigation into the impact of age and comorbidity on radiation complications is warranted.

***Complications of Head and Neck Cancer Treatment***

* Eating Problems
* Dry Mouth
* Tooth Loss
* Lymphedema

Head and neck cancers start in or near your lips, tongue, tonsils, mouth, nose, sinuses, throat, salivary glands, or voice box.

Surgery, radiation, and other treatments can fight the cancer in these areas and protect the important jobs they do. But some therapies can also cause long-term health problems, or complications. They might change the way you eat, talk, hear, and breathe. They can also affect the way you look.

It’s common for cancer treatments to have side effects, which get better over time or with help from your care team. But complications can last or even appear months or years after treatment ends.

Your doctor can work with you to plan treatment that saves as much of your healthy tissues as possible while getting rid of the cancer.As you make your treatment decisions, be sure to talk with your doctor about how each treatment can affect your body.

***Eating Problems***

Many people with head and neck cancers have trouble eating and drinking because of the disease itself. But cancer treatments also can cause mouth issues and trouble swallowing.

For example, surgery to remove a tumor may also damage nerves, muscles, and other tissues that help you chew and swallow. Nerve damage may make parts of your jaw, throat, or neck numb. Over time, scar tissue may form and cause problems, too.

Some chemotherapy drugs cause nerve damage, too. Radiation can also damage muscles, nerves, joints, and bones in your jaw. You may notice changes in how food smells and tastes. Other complications, like dry mouth and dental problems, also make it hard to eat and drink enough to get the nutrients and fluids you need.

If you’re already having a hard time getting nutrition, or you’re likely to have trouble eating, you might get a feeding tube before you start treatment. It’s a flexible plastic tube that goes in through your nose or a small cut in your belly to get nutrients to your stomach. You’ll keep it in as long as you can’t eat or drink enough to get the calories and fluids your body needs, or if you lose too much weight.

***Surprising Things That Help Breast Cancer Treatment***

Talk with your care team about how your treatment will affect how you eat. Ask to see a registered dietitian to learn more about your nutrition needs and what you can do to meet them.

Even if you can’t swallow food at some point during treatment, it’s important to keep your swallowing muscles strong and flexible. A speech language therapist can teach you exercises that can help. But you need to do them every day. Stretching exercises and devices that open your mouth can also help keep your jaw working the way it should.

For some people, plastic surgery can rebuild bones or tissues to make swallowing easier. Devices called prostheses, specially made to fit your body, also can help you swallow or talk. Your doctor can tell you about each of these options and what they’ll mean for your health and lifestyle.

***Dry Mouth***

Radiation often damages the glands that make saliva. This causes dry mouth and thick, stringy saliva, which can get worse over time. That means you can have tooth and gum damage, wounds that heal slowly, and painful sores and cracks in your mouth. It can also affect the way you speak and eat.

When you don’t make enough saliva, it’s important to keep your mouth clean and moist. Artificial saliva or saliva replacements, special rinses, and other medicines can help. Using alcohol-free mouthwash, drinking a lot of fluids, and sucking ice chips can ease symptoms.

You may find that sugar-free hard candies or sugarless gum work for you. If some of your salivary glands still work, acupuncture might ease dry mouth, too.

***Tooth Loss***

Radiation can damage your teeth and the bones of your jaw. This can lead to cavities and tooth loss.

It’s very important to see a dentist and address any dental problems at least a month before you start radiation. This gives your mouth time to heal if you have any dental work.

Ask your dentist what you can do to keep your mouth clean and healthy during and after treatment. Regular brushing and flossing can help. You may also get a fluoride rinse or gel to put on your teeth. After cancer treatment, it’s important to see your dentist regularly so they can treat any problems that come up ASAP.

***After Breast Cancer: Things That Might Surprise You***

***Lymphedema***

Your lymph system is a network of vessels and nodes throughout your body. It carries clear fluid with cells that fight infections and other diseases. Radiation and surgery can damage your lymph system.

That means lymph fluid can’t flow back to your heart the way it should. It builds up under your skin. This can lead to swelling in your face, neck, or chest. It can make your neck and shoulders hurt and feel stiff.

It also can change the way you look. Swelling inside your head and neck can also affect how well you hear, breathe, talk, and eat.

Ask your doctor what you can do to prevent lymphedema. Watch for any swelling, tightness, heaviness, or fullness in your face, chin, neck, and shoulders.

Notice if these feelings start inside your mouth, nose, throat, and ears, too. Let your doctor know about it right away because lymphedema tends to get worse if you don’t treat it. Exercises and massage techniques can ease lymphedema and keep it from getting worse.

***Self-Esteem and Body Image***

Head and neck cancer treatments might affect the way you feel about yourself. Surgery, as well as complications like lymphedema and weight loss, can change the way you look.

It might be hard to handle having trouble with the way you eat, hear, and talk because of treatment complications. You might feel stressed, sad, or anxious, or you might shy away from socializing with others.

It’s important to get help for these feelings. Talk to your treatment team about any problems you’re having. Many times, there are treatments and solutions for these complications. For instance, you could get a prosthesis to restore the way you look.

Counseling can help, too -- it can give you and your family a chance to talk about your cancer and treatment and find ways to handle the emotions you might be feeling.

***Less Common Side Effects***

Hypothyroidism. If you get radiation in your neck, it could damage your thyroid gland, affecting how well it can make thyroid hormones. Low levels of these can lead to weight gain and can make you feel tired. If you need radiation in this area, your doctor will keep an eye on your thyroid hormone levels after treatment. If they get too low, you can take pills to replace them.

***5 Common Lung Cancer Tests***

***Hearing problems.*** Surgery, radiation, and some types of chemotherapy can damage the nerves, blood vessels, or structures that allow you to hear.

The amount of hearing loss differs -- for instance, you may not be able to hear certain frequencies, but still hear well enough to get by. For some people, it’s reversible.

Hearing aids help. If you have lost your hearing in both ears, cochlear implants might be an option.

***Jawbone damage.*** Radiation can damage the blood vessels that support your bones. The bone tissue can die and break or get infected. It’s not common, but certain drugs can also cause bone tissue around your mouth to break down. This is called osteonecrosis of the jaw. Pain and infection in your jaw are the most common symptoms. Ask your doctor if your treatment could cause this and what you can do to make it less likely.

***Chronic pain.*** Some people have pain after treatment that lasts a long time, particularly in the neck, jaw, or shoulders. It might be linked to tissue damage or even nerve damage. Your doctor will talk with you about different pain medicines that can help.

***What You Can Do***

After treatment, you will see your care team every few months. Your doctor will use tests and exams to watch for long-term complications and check for signs of problems.

Use these visits to tell your providers about any changes you’ve noticed. Treating complications right away can help keep them from getting worse and causing other problems.

**WHEN TO SEE A DOCTOR / RED FLAG**

Even if your provider removes your tumor, you’ll still need follow-up care to ensure you receive immediate treatment if the cancer returns. Depending on your treatment, you may need physical therapy or speech therapy afterward.

Follow your provider’s guidance on caring for yourself during recovery, scheduling follow-up visits and recognizing signs that the cancer has returned.

**DIFFERENTIAL DIAGNOSIS**

* Metastatic squamous cell carcinoma
  + Most common cause of malignant neck masses in adults
  + Often from primary sites in the oral cavity, oropharynx, hypopharynx, larynx, or nasopharynx
  + May present as firm, fixed lymphadenopathy
* Lymphoma
  + Hodgkin’s or non-Hodgkin’s lymphoma presenting as painless lymph node enlargement
  + May involve extranodal sites (e.g., Waldeyer’s ring, salivary glands)
* Primary salivary gland tumors
  + Benign (e.g., pleomorphic adenoma) or malignant (e.g., mucoepidermoid carcinoma) tumors of parotid, submandibular glands
* Benign neck masses
  + Branchial cleft cysts (typically lateral neck)
  + Thyroglossal duct cysts (midline neck)
  + Dermoid cysts
  + Cystic hygroma (lymphangioma)
* Infectious/inflammatory causes
  + Reactive lymphadenopathy from bacterial or viral infections
  + Tuberculous lymphadenitis
  + Sarcoidosis
* Vascular tumors and anomalies
  + Carotid body tumor (paraganglioma)
  + Hemangioma
* Other malignancies
  + Salivary gland carcinoma
  + Nasopharyngeal carcinoma
  + Thyroid carcinoma with nodal metastasis
  + Skin cancers (e.g., melanoma, squamous cell carcinoma) metastasizing to lymph nodes

***Important Considerations:***

* Age and location:
  + In children and young adults, congenital and inflammatory masses are more common.
  + In adults over 40, neoplastic causes, especially metastatic carcinoma and lymphoma, are more frequent.
* Cystic neck masses:
  + May represent branchial cleft cysts or cystic metastases from HPV-related oropharyngeal squamous cell carcinoma.
* Investigations:
  + Ultrasound with fine needle aspiration biopsy (FNA) is first-line for neck lumps.
  + CT or MRI for further anatomical assessment and staging.
  + PET-CT may be used to identify occult primary tumors in metastatic cases.

**Diagnostic Considerations**

The differential diagnosis of lymphadenopathy; extranodal masses in the salivary glands; retro-orbital, thyroid and oral-pharyngeal masses or lesions encompass a wide range of benign and malignant processes other than lymphoma.

Reactive lymphoid processes, which may appear as pseudolymphomas, may be difficult to distinguish from lymphoma.

Indeed, clonal expansion of benign B or T cells may occur in some reactive conditions. Adequate biopsy is essential for proper diagnosis, but pathologic interpretation must be considered in light of the patient's medical presentation and the biology of the lymphoma subtype.

Differentiation from lymphomas requires the use of clinical features, histology, immunophenotyping, and gene rearrangement studies for monoclonal population detection. Common differential diagnoses to be considered are listed below.

***Other neoplasms***

These include the following:

* Squamous cell carcinoma
* Nasopharyngeal carcinoma
* Thyroid carcinoma

***Generalized lymphadenopathy from infectious etiologies***

These include the following:

* Bacteria
* Viruses (eg, EBV [infectious mononucleosis], cytomegalovirus, HIV)
* Parasites (eg, toxoplasmosis)

***Nasal granulomatous diseases***

These include the following:

* Wegener granulomatosis
* Lymphomatoid granulomatosis
* Infections (eg, leishmaniasis, syphilis)

***Mediastinal presentations***

These include the following:

* Infections (eg, histoplasmosis, tuberculosis)
* Sarcoidosis
* Other neoplasms

***Benign lymphoid hyperplasias***

These include the following:

* B-cell predominant - Cutaneous lymphoid hyperplasia (CLH), angiolymphoid hyperplasia with eosinophilia, Kimura disease, and Castleman disease
* T-cell predominant - T-cell CLH, lymphomatoid contact dermatitis, and lymphomatoid drug eruption

***Differential Diagnoses***

* Otolaryngologic Manifestations of Granulomatosis With Polyangiitis
* Skin Cancer: Squamous Cell Carcinoma

**EPIDEMIOLOGY**

* Global Burden:  
  Head and neck squamous cell carcinoma (HNSCC) accounts for approximately 890,000 new cases and 450,000 deaths annually worldwide. It represents about 4.5% of all cancer diagnoses and deaths globally.
* United States:
  + Around 54,000 new cases of HNSCC were diagnosed in 2022, making up roughly 3% of all malignancies.
  + Estimated 11,230 deaths occurred, about 2% of all cancer deaths.
  + The median age at diagnosis is 64 years, with about half of patients diagnosed between ages 55 and 74.
  + Incidence rates are higher in men (17.2 per 100,000) than women (6.4 per 100,000), with the highest rates among non-Hispanic White and American Indian/Alaska Native populations.
  + The 5-year survival rate is approximately 68.5% overall, varying by stage:
    - Localized disease: 86.6%
    - Locally advanced: 69.1%
    - Metastatic: 39.3%.
* Trends:
  + Overall incidence in the US declined by about 14% since 1975, largely due to reduced tobacco use.
  + However, since 2003, incidence has increased by 15.5%, mainly because of a rise in HPV-related oropharyngeal cancers, which are now surpassing tobacco-related oral cancers.
* United Kingdom:
  + Head and neck cancer is the 8th most common cancer, accounting for about 3% of new cancer cases.
  + Incidence is higher in males (5th most common cancer) than females (13th most common).
  + Rates are projected to increase by about 3% between 2023-2025 and 2038-2040.
* Risk Factors:
  + Tobacco use and alcohol consumption remain the most significant risk factors.
  + Human papillomavirus (HPV) infection, especially HPV-16, is a major cause of oropharyngeal cancers.
  + Other factors include poor oral hygiene, betel nut chewing, certain occupational exposures, and Epstein-Barr virus (for nasopharyngeal carcinoma).
* Survival:
  + The 5-year survival varies by cancer site and stage, with oropharyngeal cancers related to HPV generally having better outcomes.
  + Overall survival rates range from about 60-70% depending on stage and treatment

**PREDEFINED Q & A SETS**

***Question 1: “What’s my cancer type and stage?”***

***Answer: “***Head and neck cancer includes cancers of the mouth, throat, sinuses, salivary glands, and related structures. Your cancer type is determined by the exact location and pathology (most commonly squamous cell carcinoma).

The stage depends on tumor size, lymph node involvement, and distant spread (staging I to IV). Early stages (I-II) are usually localized, while advanced stages (III-IV) involve larger tumors and/or lymph nodes or metastases.

Your oncologist will provide precise staging after imaging and biopsy.***”***

***Question 2: “Who’ll be part of my care team?”***

***Answer: “***Your care team is multidisciplinary, often including:

* Surgical oncologist (head and neck surgeon)
* Radiation oncologist
* Medical oncologist (for chemotherapy, targeted therapy, immunotherapy)
* Pathologist and radiologist (for diagnosis and staging)
* Speech and swallow therapists (rehabilitation)
* Nutritionists (to support eating and weight maintenance)
* Nurses and social workers (supportive care)
* Dentists or oral surgeons (dental health before/after treatment)***”***

***Question 3: “What treatments do you recommend?”***

***Answer: “***Treatment depends on your cancer type, stage, and overall health:

* Early-stage (I-II): Often treated with surgery or radiation therapy, or both.
* Locally advanced (III-IV): Usually treated with surgery followed by radiation and/or chemotherapy, or concurrent chemoradiation as an organ-preservation approach.
* Advanced/metastatic disease: May require chemotherapy, targeted therapy (e.g., cetuximab), immunotherapy (e.g., pembrolizumab, nivolumab), and palliative care.
* Reconstructive surgery may be needed after tumor removal to restore function and appearance.***”***

***Question 4: “What treatment side effects should I expect?”***

***Answer: “***Side effects vary by treatment type but commonly include:

* Surgery: Pain, swelling, changes in appearance, difficulty swallowing or speaking, risk of infection.
* Radiation therapy: Skin irritation, dry mouth (xerostomia), difficulty swallowing, taste changes, fatigue, mucositis (mouth sores).
* Chemotherapy: Nausea, vomiting, fatigue, hair loss, increased infection risk, mouth sores.
* Targeted therapy/immunotherapy: Skin rash, diarrhea, fatigue, immune-related effects (inflammation).***”***

***Question 5: “Some side effects may be temporary; others can be long-lasting.”***

***Answer: “***How can I manage treatment side effects?

* Pain and mucositis: Use prescribed mouthwashes, pain medications, and maintain good oral hygiene.
* Dry mouth: Stay hydrated, use saliva substitutes, and avoid irritants like tobacco or alcohol.
* Nutrition: Work with a nutritionist; consider soft or liquid diets if swallowing is difficult.
* Speech/swallow therapy: Engage with therapists early to maintain and regain function.
* Fatigue: Rest adequately, maintain light activity as tolerated.
* Emotional support: Seek counseling or support groups for coping.
* Regular follow-up: Monitor for side effects and manage complications promptly.***”***

Your healthcare team will tailor treatments and supportive care to your specific needs, aiming to maximize cancer control while preserving quality of life. Discuss all concerns and questions with your oncologist to understand your personalized treatment plan and prognosis.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Thank you for coming in today. I want to talk with you about your diagnosis. You have a head and neck cancer, which means a tumor located in the areas around your mouth, throat, or neck.

Patient: That sounds serious. What does this mean for me?

Doctor: I understand this can be overwhelming. Head and neck cancers vary widely, but many are treatable and some are curable. The exact treatment depends on the tumor’s size, location, and whether it has spread. We have a team of specialists who will work together to provide the best care for you.

Patient: Who will be on my care team?

Doctor: Your care team will include a surgical oncologist who may perform surgery, a radiation oncologist for radiation therapy, and a medical oncologist if chemotherapy is needed. There will also be nurses, speech and swallowing therapists, dietitians, social workers, and possibly a plastic surgeon for reconstruction. We will coordinate all aspects of your care.

Patient: What treatments do you recommend?

Doctor: Based on your tests, we recommend [tailor to patient—e.g., surgery followed by radiation, or chemoradiation]. Each treatment has benefits and potential side effects, which we will discuss in detail. Our goal is to control the cancer while preserving your ability to speak, swallow, and breathe as normally as possible.

Patient: What side effects should I expect?

Doctor: Side effects depend on the treatment but may include fatigue, difficulty swallowing, changes in taste, dry mouth, or changes in your voice. We have specialists who will help manage these side effects and support your recovery.

Patient: How will I know if the treatment is working?

Doctor: We will schedule regular follow-up visits with physical exams and imaging tests to monitor your progress and check for any signs of recurrence. Your oncology team will guide you through this.

Patient: What about my family? How do I talk to them?

Doctor: It’s important to have support. You can share as much as you feel comfortable with them. Many patients find it helpful to explain the diagnosis in simple terms and express what kind of support they need. We can also provide resources and counseling to help you and your loved ones through this.

Patient: Thank you. This helps me feel more prepared.

Doctor: You’re welcome. We are here to support you every step of the way. Please write down any questions you have for future visits, and don’t hesitate to reach out*.*

*REFERENCES:*

<https://www.cancer.org/content/dam/cancer-org/research/cancer-facts-and-statistics/annual-cancer-facts-and-figures/2025/2025-cancer-facts-and-figures-acs.pdf>

<https://www.aacr.org/patients-caregivers/cancer/head-and-neck-cancers/>

[Head and Neck Cancers: Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/14458-head-and-neck-cancer#overview)

[Head and neck cancers - Symptoms and causes - Mayo Clinic](https://www.mayoclinic.org/diseases-conditions/head-and-neck-cancers/symptoms-causes/syc-20354171)

<https://pmc.ncbi.nlm.nih.gov/articles/PMC5727249/>

<https://www.webmd.com/cancer/head-neck-cancer-treatment-complications>

**HERPES**

*ALTERNATIVE NAMES:* Some alternative names for herpes include herpes simplex, herpes simplex virus, sexually transmitted disease, STD, VD, gonorrhoea, gonorrhea, syphilis, and crabs.

**DEFINITION / DESCRIPTION**

Herpes simplex virus (HSV) can infect many different parts of your body, most commonly your mouth area (oral herpes) and genitals (genital herpes). HSV causes fluid-filled blisters that break open and crust over wherever the infection is. This is known as a herpes outbreak. But it’s also possible to have no symptoms and not realize you’re infected.

HSV is highly contagious. It spreads from person to person through skin-to-skin contact. A herpes simplex infection occurs when the virus enters your body through your skin and mucous membranes (mucosa). The virus uses your cells to make copies of itself (replication).

Once you’re infected, the virus stays in your body for life. It’s usually asleep (dormant) but may “wake up” (reactivate) and cause outbreaks. How HSV affects you depends on many factors, including the specific virus type and your overall health.

There’s no cure for HSV. But treatments can help make outbreaks more manageable while lowering the chances that you’ll spread the virus to others.

***Types of herpes simplex virus***

There are two types of herpes simplex virus:

* Herpes simplex virus type 1 (HSV-1).
* Herpes simplex virus type 2 (HSV-2).

Both HSV-1 and HSV-2 can cause oral herpes or genital herpes. They also cause infections in other areas of your body.

***What parts of the body does HSV affect?***

Herpes simplex virus can cause infections in your:

* Mouth and face. An oral herpes infection causes cold sores on your lips and around your mouth. Some people develop herpetic gingivostomatitis (sores inside their mouths and other symptoms) when they first get infected. Rarely, sores develop on or inside your nose (nasal herpes).
* Genitals. A genital herpes infection causes sores in your genital area, including the parts you can see (like your vulva or penis) and those you can’t see (like your cervix).
* Skin on other areas of your body. HSV can infect your fingers (herpetic whitlow) or skin anywhere on your body (herpes gladiatorum). Eczema herpeticum, a widespread skin infection, is a complication of HSV infection that affects people with atopic dermatitis.
* Eyes. HSV can cause a serious eye infection called herpes keratitis (a type of ocular herpes).
* Brain and spinal cord. HSV can infect your brain (herpes simplex encephalitis) or the protective layers surrounding your brain and spinal cord (herpes meningitis). If HSV infects both your brain and its protective layers, you can develop a life-threatening condition called herpes meningoencephalitis.
* Other organs. HSV can affect one or more organs in your chest and belly, including your esophagus (herpes esophagitis), lungs (HSV pneumonia) and liver (HSV hepatitis). These types of infections are more likely to affect people who are immunocompromised.

**CAUSES**

You catch HSV through direct contact with someone who has an HSV infection. This means part of your body needs to touch someone else’s:

* Herpes sores (oral or genital).
* Skin or mucosal surfaces (like mouth, vagina or anus), with or without visible sores.
* Saliva, semen or vaginal discharge, with or without signs of an infection.

Someone with HSV doesn’t transmit (or “shed”) the virus from every part of their body. They only shed it from the area that’s infected. Usually, that’s the part of their body where HSV first entered.

For example, someone with genital herpes can transmit the virus through the skin, mucosa and bodily fluids in their genital area only. They won’t spread HSV through their saliva — the exception, of course, is if they also have oral herpes (we’ll return to this later).

Similarly, if your partner has oral herpes but not genital herpes, then you don’t have to worry about getting HSV from contact with their genitals. You’d only be at risk of catching HSV through contact with your partner’s mouth or saliva.

If your partner has both oral and genital herpes, then it’s possible you could catch HSV from contact with their mouth area or their genital area. But exactly how the virus affects you would depend on which part of your body made that contact. This deserves a closer look.

***How HSV spreads from person to person***

HSV usually spreads in the following ways:

| Type of contact | How HSV spreads |
| --- | --- |
| Genital-to-genital contact | HSV spreads from one person’s genital area to another person’s genital area (giving them genital herpes). |
| Oral-to-oral contact | HSV spreads from one person’s mouth to another person’s mouth (giving them oral herpes). |
| Oral-to-genital contact | HSV spreads from one person’s mouth to another person’s genitals (giving them genital herpes). |
| Genital-to-oral contact | HSV spreads from one person’s genitals to another person’s mouth (giving them oral herpes). |
| Skin-to-sore contact | It’s less common but possible to spread HSV by touching an oral or genital sore or other infected areas. |

***Herpes simplex incubation period***

The incubation period for herpes simplex infections ranges from one to 26 days but is typically six to eight days. This is how long it takes for you to develop symptoms after first getting infected with HSV.

Some people get infected but don’t develop symptoms right away. Instead, symptoms may not appear for months or even years until the virus reactivates.

***What triggers herpes simplex virus?***

Triggers that may cause an oral or genital herpes outbreak include:

* Fever.
* Stress.
* Suppressed immune system (due to medications or an underlying condition).
* Changes in hormones (for example, during menstruation).

Potential triggers specific to oral herpes include:

* Sun exposure.
* Upper respiratory infection.
* Trauma to your mouth area.

Outbreaks can also occur randomly without any obvious trigger.

***Stages of a herpes simplex infection***

An HSV infection has three stages:

* Primary infection.
* Latency.
* Reactivation.

***HSV primary infection***

A “primary infection” is what happens after HSV enters your body. The virus travels to nearby nerve cells, where it starts replicating. When HSV enters your mouth, it typically infects your trigeminal nerves. When it enters your genital area, it typically infects your sacral plexus (a network of nerves in your pelvis).

HSV then travels through your nerves to nearby skin or mucosa.

By this point, your immune system recognizes there’s an invader, and it starts sending out immune cells. This leads to inflammation and the formation of blisters on your skin. You may also notice swollen lymph nodes in that area (for example, underneath your jaw or along your groin).

For some people, a primary infection causes no symptoms and they’re unaware they’re infected with HSV.

***HSV latency***

Within a few weeks, your immune system clears up the primary infection, but HSV stays in the nerve cells it first infected. Healthcare providers refer to this as latency. It means the virus is present in your nerve cells but mostly inactive (you might hear this described as the virus being “asleep”).

During latency, most of the infected cells are sleeping, but a few are awake at any given time. Usually, this doesn’t cause an outbreak. Sometimes, infected cells “wake up” and cause enough of a stir that your immune system notices. This is HSV reactivation.

***HSV reactivation***

Reactivation is when infected cells wake up and trigger an immune response. There are a few possibilities at this point:

* Containment in nerve tissue. There’s brief HSV activity but it begins and ends in your nerve cells. Your immune system contains the virus before it can travel to your skin or mucosa. This happens often in people with HSV — the virus wakes up, has a quick burst of activity (lasting about two to six hours) and then that’s it. You don’t shed the virus or have symptoms, and you don’t spread HSV to others.
* Asymptomatic viral shedding. Some infected cells reach the outer layer of your skin (epidermis). There’s not enough viral activity to cause symptoms, but the virus may “shed.” This means the virus can leave your skin and infect someone else through direct contact. HSV commonly spreads from person to person during this shedding period.
* Symptomatic herpes outbreak. The infected cells replicate enough at your skin’s surface to cause symptoms. This is when you notice blisters on your skin, and it’s what most people associate with a herpes outbreak. The virus can easily spread to others through direct contact.

**RISK FACTORS**

Genital herpes is a common sexually transmitted infection caused by the herpes simplex virus (HSV), and several risk factors increase the likelihood of transmission and infection. These include sexual contact with an infected individual, lack of barrier protection during sexual activity, multiple sexual partners, and anonymous sexual encounters. Additionally, individuals with other sexually transmitted or blood-borne infections (STBBI) are at higher risk.

HSV-1 and HSV-2 can both be transmitted through skin-to-skin contact, and asymptomatic viral shedding plays a significant role in transmission. For instance, 70% of transmissions are attributed to sexual contact during periods of asymptomatic viral shedding. HSV-1 is typically associated with oral infections but can also cause genital infections through receptive oral-genital contact.

Females are at higher risk of acquiring genital herpes from a male partner compared to males acquiring it from females. Studies have shown that the annual transmission rates are 11–17% in couples with a male source partner and 3–4% in couples with a female source partner.

Risk factors for HSV-1 infection vary depending on the type of infection. For orolabial herpes, risk factors include activities that expose individuals to an infected person's saliva, such as sharing drinkware or cosmetics, or mouth-to-mouth contact. For herpetic sycosis, close shaving with a razor blade in the presence of an acute orolabial infection is a major risk factor.

Participation in high-contact sports like rugby, wrestling, MMA, and boxing increases the risk of herpes gladiatorum.

For herpetic whitlow, risk factors include thumb sucking and nail biting in children with orolabial HSV-1 infection, and medical or dental professions in adults (although HSV-2 is more common in adults). Risk factors for herpes encephalitis include mutations in the toll-like receptor (TLR-3) or UNC-93B genes, which may inhibit normal interferon-based responses.

Immunocompromised individuals, such as those with HIV, transplant recipients, or leukemia/lymphoma patients, are at higher risk for severe or chronic HSV infections. Additionally, individuals with skin barrier dysfunction, such as those with atopic dermatitis, Darier disease, Hailey-Hailey disease, mycosis fungoides, or ichthyosis, are at increased risk for eczema herpeticum.

In pregnant women, risk factors for HSV-1 and HSV-2 acquisition include having a partner with a history of oral herpes, a short duration of partnership, and the presence of other sexually transmitted diseases.

In Uganda, multiple sexual partners, polygamous unions, and HIV-positive serostatus were identified as risk factors for HSV-2 seroconversion during pregnancy.

For genital herpes, sociodemographic factors and urogenital comorbidities are associated with higher rates of infection. Women of high family income, young age, Swedish origin, and those with urogenital comorbidities such as cervical neoplasia, cystitis, vaginosis, and vaginitis are at higher risk. Being female increases the risk of genital herpes, with the risk being three to four times greater than that of biological males.

In summary, the risk factors for herpes include sexual behavior, immunocompromised status, and specific comorbidities, with variations depending on the type of HSV and the population studied.

**SIGNS / SYMPTOMS**

Most people with herpes have no symptoms or only mild symptoms. Many people aren’t aware they have the infection and can pass along the virus to others without knowing.

Symptoms can include painful, recurring blisters or ulcers. New infections may cause fever, body aches and swollen lymph nodes.

Symptoms may be different during the first episode (or ‘outbreak’) of infection than during a recurrent episode. If symptoms occur, they often begin with tingling, itching or burning near where the sores will appear.

Common oral herpes symptoms include blisters (cold sores) or open sores (ulcers) in or around the mouth or lips.

Common genital herpes symptoms include bumps, blisters, or open sores (ulcers) around the genitals or anus.

These sores and blisters are typically painful. Blisters may break open, ooze and then crust over.

During their first infection, people may experience:

* fever
* body aches
* sore throat (oral herpes)
* headache
* swollen lymph nodes near the infection.

People can have repeated outbreaks over time (‘recurrences’). These are usually shorter and less severe than the first outbreak.

The symptoms of an HSV infection vary according to the specific type of infection:

* Oral herpes. Blisters on your lips or around your mouth. Skin may tingle, itch or burn up to 48 hours before blisters appear.
* Genital herpes. Blisters on and around your genitals. Symptoms in the 48 hours leading up to blisters appearing include fever, headache, swollen lymph nodes and itching or tingling in your genital area.
* Herpes gladiatorum. Blisters anywhere on your skin but usually your hands, face, ears or chest.
* Herpetic whitlow. Blisters on your fingers, discolored skin around your fingernail, swelling in your finger.
* Herpes keratitis (eye herpes). Eye pain or irritation, feeling like there’s something in your eye, sensitivity to light, blisters on your eyelids or around your eyes.
* HSV encephalitis. Headache, fever, focal seizures, changes in speech or behavior.
* Herpes meningitis. Headache, fever, sensitivity to light.

***How do you get an HSV infection?***

You catch HSV through direct contact with someone who has an HSV infection. This means part of your body needs to touch someone else’s:

* Herpes sores (oral or genital).
* Skin or mucosal surfaces (like mouth, vagina or anus), with or without visible sores.
* Saliva, semen or vaginal discharge, with or without signs of an infection.

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**DIAGNOSIS METHODS**

Healthcare providers diagnose HSV infections by doing a physical exam and testing. During an exam, your provider will look for signs of infection (like sores). They may take a sample from the sores to send for lab testing. If your provider suspects encephalitis and/or meningitis, they may do a spinal tap.

If you don’t have sores, your provider can use a blood test to check for antibodies against HSV-1 or HSV-2. Antibodies are a sign you’ve been infected with the virus in the past. Test results help your provider plan treatment.

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**TREATMENT OPTIONS**

Prescription antiviral medications are the main treatment for HSV infections. These come in different forms, including:

* Pills you swallow.
* Cream or ointment you apply to your skin.
* Medication your provider gives you intravenously (through an IV).
* Drops you put into your eyes (for ocular herpes).

Your provider will tell you which type(s) of medication are best for you based on:

* The type of infection you have.
* Its severity.
* How well your immune system is working.

They’ll also tell you the proper dose and how long you’ll need the medication. Treatment for oral and genital herpes falls into two categories: episodic therapy and chronic suppressive therapy.

***Episodic therapy***

This is short-term treatment that targets a single episode (outbreak). It involves taking antiviral medication when you first notice signs of an outbreak, like skin tingling or itching. The sooner you take it, the better it works. Providers use episodic therapy for primary HSV infections as well as recurrences.

Episodic therapy can:

* Make symptoms less severe.
* Help pain go away faster.
* Help sores heal faster.
* Lower the amount of virus that sheds from your skin.

Treating a single outbreak does not affect future outbreaks. Episodic therapy won’t stop you from having future outbreaks or affect their severity. To do that, you need chronic suppressive therapy.

***Chronic suppressive therapy***

This is when you take antiviral medications long-term. Providers recommend this approach for people who have genital herpes and:

* Experience frequent or severe outbreaks.
* Are immunocompromised.
* Have multiple sexual partners or partners who don’t have genital herpes.

Providers also recommend chronic therapy for people who have severe oral herpes outbreaks and/or at least six outbreaks per year. Specific medications your provider may prescribe include:

* Acyclovir.
* Valacyclovir.
* Famciclovir.

Providers typically use chronic suppressive therapy for people with genital HSV-2. They don’t recommend it often for genital HSV-1 because this type causes fewer outbreaks.

Chronic suppressive therapy can:

* Lower the number of outbreaks you experience by 70% to 80%.
* Make symptoms less severe.
* Reduce viral shedding when you don’t have symptoms. This may help protect sexual partners.

**PREVENTION TIPS**

HSV is a common virus that spreads easily between people. So, it’s hard to prevent it. But you can lower your risk by:

* Avoiding close contact with people who have an HSV outbreak. For example, don’t kiss someone who has a cold sore or have sexual contact with someone who has genital sores.
* Asking partners to get tested for sexually transmitted infections (STIs), including herpes. You can catch HSV from someone who’s asymptomatic (no sores). Knowing a partner has HSV helps you to take precautions.
* Using protection (like condoms or dental dams) for all sexual activity. These will not protect you 100%. But they’ll lower the risk of HSV spreading between partners. Protection doesn’t cover all areas where HSV may shed. But they do cover some areas. Plus, they’ll help protect you against other STIs.

If you have oral herpes or genital herpes, have an open conversation with sexual partners about their risk. Both forms of HSV can spread through various forms of sexual activity. Make sure you and your partner are on the same page about precautions and testing.

**OUTLOOK / PROGNOSIS**

No, herpes simplex is a lifelong infection. The virus may reactivate and cause periodic outbreaks. How often it does this varies widely from person to person.

Most people with oral herpes have fewer outbreaks as they get older, particularly after age 35. Similarly, the frequency of genital herpes outbreaks typically goes down over time. Genital HSV-1 causes fewer outbreaks than genital HSV-2.

**POSSIBLE COMPLICATIONS**

***HSV-2 and HIV infection***

HSV-2 infection increases the risk of acquiring HIV infection by approximately three-fold. Additionally, people with both HIV and HSV-2 infection are more likely to spread HIV to others. HSV-2 infection is among the most common infections in people living with HIV.

***Severe disease***

In immunocompromised people, including those with advanced HIV infection, herpes can have more severe symptoms and more frequent recurrences. Rare complications of HSV-2 include meningoencephalitis (brain infection) and disseminated infection. Rarely, HSV-1 infection can lead to more severe complications such as encephalitis (brain infection) or keratitis (eye infection).

***Neonatal herpes***

Neonatal herpes can occur when an infant is exposed to HSV during delivery. Neonatal herpes is rare, occurring in an estimated 10 out of every 100 000 births globally. However, it is a serious condition that can lead to lasting neurologic disability or death. The risk for neonatal herpes is greatest when a mother acquires HSV for the first time in late pregnancy.

**WHEN TO SEE A DOCTOR / RED FLAG**

Contact a provider if you have symptoms of an HSV infection or were exposed to HSV. Your provider will tell you if you need an exam or testing.

**DIFFERENTIAL DIAGNOSIS**

* Behcet Syndrome  
  Noninfectious vasculitic condition characterized by orogenital aphthous ulcers, skin and ocular lesions, and other distant organ involvement - CNS, gastrointestinal, and joint
* Candidiasis
* Chancroid
* Cytomegalovirus (CMV)
* Fixed Drug Eruptions
* Granuloma Inguinale (Donovanosis)
* Hand-Foot-and-Mouth Disease (HFMD)
* Herpes Zoster
* Lymphogranuloma Venereum (LGV)
* Syphilis

**RECENT GUIDELINES OR UPDATES**

Recent updates on the treatment and management of genital herpes include guidelines from the World Health Organization (WHO) and other medical sources. These guidelines emphasize evidence-based treatment recommendations and the importance of adapting global guidance to local epidemiological situations. Additionally, the WHO has provided updated guidelines for the treatment of genital herpes simplex virus, which include recommendations for antiviral medications such as acyclovir, famciclovir, and valacyclovir.

* World Health Organization (WHO) Guidelines: The WHO has updated its guidelines for the treatment of genital herpes simplex virus, providing evidence-based recommendations for managing the infection. These guidelines are part of a broader effort to update national protocols and adapt them to local conditions.
* Antiviral Treatments: The use of antiviral medications such as acyclovir, famciclovir, and valacyclovir is highlighted in the guidelines. These medications can reduce the duration and severity of symptoms and are effective in both episodic treatment and suppressive therapy.
* Diagnosis and Management: The guidelines also emphasize the importance of accurate diagnosis, including the use of type-specific serologic assays, and the need for adequate counseling. Clinical diagnosis should be confirmed by viral culture, especially due to the frequent atypical presentation of the disease.

**EPIDEMIOLOGY**

***Frequency***

***United States***

HSV is the most common cause of genital ulcers in the United States. HSV-1 is usually acquired in childhood by contact with oral secretions that contain the virus. The presence of HSV-2 can be used as an indirect measure of sexual activity.

Seroprevalence rates do not reflect how many of these individuals have or will have symptomatic episodes of HSV recurrence, as the presence of antibodies is poorly correlated with disease protection.

Epidemiology of HSV-1 infection in the US is undergoing a remarkable and subtle transition, with less exposure in childhood and more in adulthood, and less oral acquisition but more genital acquisition.

HSV-1 could be overtaking HSV-2 as the main cause of first episode of genital herpes in the United States and elsewhere.In a study of college students in the US, the percentage of genital herpes attributed to HSV-1 (as opposed to HSV-2) increased from 31% in 1993 to 78% in 2001.

***Seroprevalence:***

Based on the National Health and Nutrition Examination Survey (NHANES) during 2015–2016, prevalence of herpes simplex virus type 1 (HSV-1) was 47.8%, and prevalence of herpes simplex virus type 2 (HSV-2) was 11.9%.

Prevalence of both HSV-1 and HSV-2 increased with age. Antibodies to HSV-1 increase with age starting in childhood and correlate with socioeconomic status, race, and cultural group. By age 30 years, 50% of individuals in a high socioeconomic status and 80% in a lower socioeconomic status are seropositive.

Antibodies to HSV-2 begin to emerge at puberty, correlating with the degree of sexual activity. More than 90% of adults have antibodies to HSV-1 by the fifth decade of life.​A slight crossover of immunity occurs between HSV-1 and HSV-2, allowing for milder subsequent infection by the partner virus type.

***International***

HSV is well distributed worldwide, with over 23 million new cases per year. An increase in seroprevalence of antibodies to HSV-2 has been documented throughout the world (including the United States) over the last 20 years.

***Mortality/Morbidity***

Morbidity and mortality rates associated with HSV infections are discussed in Complications. Overall, the mortality rate associated with herpes simplex infections is related to 3 situations: [perinatal infection](https://emedicine.medscape.com/article/964866-overview), [encephalitis](https://emedicine.medscape.com/article/1165183-overview), and infection in the immunocompromised host.

***Race***

HSV-2 is most prevalent among non-Hispanic blacks (40.3%) compared with the members of other US racial/ethnic groups; 13.7% among non-Hispanic whites and 11.9% among Mexican Americans.

***Sex***

Seropositivity to HSV-2 is more common in women (25%) than in men (17%).

***Age***

HSV-1 infections transmitted via saliva are common in children, although primary herpes gingivostomatitis can be observed at any age. HSV-2 infections are clustered perinatally (from a maternal episode at delivery) and primarily once sexual activity begins. HSV-2 genital infections in children can be an indication of sexual abuse. Increased age (after onset of sexual activity) and total number of sexual partners are independent factors associated with increased seroprevalence of HSV-2 antibodies.

***Procedures***

***Tzanck preparation***

Tzanck preparation is a time-honored procedure for assisting in the diagnosis of cutaneous herpesvirus infections. However, it does not easily distinguish HSV-1, HSV-2, and [varicella-zoster virus](https://emedicine.medscape.com/article/231927-overview).

Typically, an intact vesicle is used from which the vesicular fluid is aspirated by puncture with a sterile tuberculin syringe. This fluid can be used for viral culture or PCR.

Aspiration should facilitate complete collapse of the vesicle because it is not multiloculated as cutaneous [poxvirus infections](https://emedicine.medscape.com/article/226239-overview) can be.

After aspiration, the vesicle should be unroofed aseptically.

Using a sterile instrument, the floor of the newly produced ulcer can then be scraped. The obtained material can be spread on a glass microscope slide and then dried and fixed for staining.

Staining can be performed with a Papanicolaou smear stain or, alternatively, whatever is available will suffice (eg, Gram, Giemsa, or Wright stain).

A positive result is the finding of multinucleate giant cells.

***Direct fluorescent antigen***

Using appropriate immunofluorescent antibody reagents, the smear can be used to distinguish different herpesviruses and nonherpesviruses that may be present (eg, vaccinia, [smallpox](https://emedicine.medscape.com/article/237229-overview)). Viral inclusion bodies appear in UV microscope as bright green intranuclear particles.

***Herpes Treatment Drugs and Their Side Effects***

The mainstay of herpes simplex virus (HSV) treatment is antiviral medications, which help reduce the severity and duration of outbreaks, as well as suppress recurrences.

1. Acyclovir

* Form: Oral tablets, topical cream, intravenous
* Uses: Initial and recurrent oral/genital herpes, suppressive therapy
* Typical Dosage:
  + Initial infection: 400–800 mg orally 3–5 times daily for 7–10 days
  + Episodic treatment: 800 mg twice daily for 5 days or 800 mg three times daily for 2 days
  + Suppressive therapy: 400 mg twice daily
* Common Side Effects:
  + Headache
  + Nausea
  + Diarrhea
  + Fatigue
  + Rash
* Serious Side Effects (rare):
  + Kidney toxicity (especially with IV use)
  + Neurological symptoms (confusion, seizures) in severe cases

2. Valacyclovir (Valtrex)

* Form: Oral tablets
* Uses: Similar to acyclovir but with better bioavailability; used for initial, recurrent, and suppressive therapy
* Typical Dosage:
  + Initial infection: 1 g twice daily for 7–10 days
  + Episodic treatment: 1 g once daily for 5 days or 500 mg twice daily for 3 days
  + Suppressive therapy: 500 mg to 1 g once daily
* Common Side Effects:
  + Headache
  + Nausea and vomiting
  + Dizziness
  + Stomach pain
* Serious Side Effects (seek immediate care):
  + Rash or itching
  + Yellowing of skin or eyes (jaundice)
  + Fever, confusion
  + Blood in urine

3. Famciclovir (Famvir)

* Form: Oral tablets
* Uses: Initial and recurrent oral/genital herpes, shingles
* Typical Dosage:
  + Initial infection: 250 mg three times daily for 7–10 days
  + Episodic treatment: Various regimens, e.g., 1 g twice daily for 1 day or 125 mg twice daily for 5 days
  + Suppressive therapy: 250 mg twice daily
* Common Side Effects:
  + Headache
  + Nausea
  + Diarrhea
  + Fatigue
  + Rash
* Precautions:
  + Use cautiously in patients with kidney or liver impairment

4. Docosanol (Abreva)

* Form: Topical cream (OTC)
* Use: Applied at the first sign of cold sores to shorten healing time
* Side Effects:
  + Mild skin irritation or redness

Managing Side Effects

* Hydration: Drink plenty of fluids to help prevent kidney toxicity.
* Take with food: To reduce nausea and stomach upset.
* Report severe symptoms: Such as rash, jaundice, confusion, or blood in urine immediately.
* Adjust doses: In patients with kidney or liver problems, dose adjustments may be necessary.
* Avoid nephrotoxic drugs: When on antivirals, avoid other medications that can harm kidneys.

**PREDEFINED Q & A SETS**

***Question 1: “What is herpes?”***

***Answer: “***Herpes is a common viral infection caused by herpes simplex virus (HSV). There are two types: HSV-1, which most often causes oral herpes (cold sores), and HSV-2, which most often causes genital herpes. Both types can infect the mouth or genitals.***”***

***Question 2: “How is genital herpes transmitted?”***

***Answer: “***Genital herpes is primarily transmitted through sexual contact—vaginal, anal, or oral sex—with someone who has the virus. It can be spread even when no symptoms or sores are visible. Oral herpes (cold sores) can be transmitted to the genitals through oral sex, and vice versa.***”***

***Question 3: “Can I get genital herpes from non-sexual contact, like a toilet seat?”***

***Answer: “***No, it is nearly impossible to get genital herpes from a toilet seat or other non-sexual contact. The virus is transmitted through direct skin-to-skin contact during sexual activity.***”***

***Question 4: “How is genital herpes diagnosed?”***

***Answer: “***Diagnosis is usually made by a healthcare provider based on physical exam and sexual history. A sample from an active sore can be tested in a lab to confirm HSV infection and determine the type (HSV-1 or HSV-2). Blood tests can detect antibodies to HSV but are less commonly used for initial diagnosis.***”***

***Question 5: “Is there a cure for herpes?’***

***Answer: “***There is currently no cure for herpes. However, antiviral medications can help manage symptoms, speed healing of sores, reduce the frequency of outbreaks, and lower the risk of transmission to partners.***”***

***Question 6: “What treatments are available?”***

***Answer: “***Common antiviral medications prescribed include acyclovir, valacyclovir, and famciclovir. These drugs are most effective when started early in an outbreak and can be taken daily to suppress outbreaks and reduce transmission risk.***”***

***Question 7: “How can I prevent spreading herpes to my partner?”***

***Answer: “***

* Use latex condoms or dental dams consistently during sexual activity, although they do not cover all infected areas.
* Avoid sexual contact during outbreaks or when symptoms are present.
* Daily antiviral therapy for the infected partner can significantly reduce transmission risk.
* Communicate openly with your partner about herpes and sexual health.***”***

***Question 8: “Can I have sex if I have herpes?”***

***Answer: “***Yes, people with herpes can have sex, but they should inform their partners and take precautions to reduce transmission risk. Avoid sexual contact during outbreaks, use protection, and consider suppressive antiviral therapy.***”***

***Question 9: “What emotional impact can a herpes diagnosis have?”***

***Answer: “***A herpes diagnosis can cause feelings of embarrassment, shame, anger, or anxiety. It is important to communicate openly, seek support from healthcare providers or counselors, educate yourself about the condition, and consider joining support groups to cope effectively.***”***

***Question 10: “Can herpes be transmitted from a partner who has no symptoms?”***

***Answer: “***Yes, herpes can be contagious even when there are no visible symptoms or sores. This is called asymptomatic viral shedding.***”***

***Question 11: “Does having herpes mean my partner was unfaithful?”***

***Answer: “***Not necessarily. Many people with herpes have mild or no symptoms and may not know they are infected. The virus can remain dormant for years before causing symptoms. Transmission can also occur through oral sex from a partner with oral herpes.***”***

***Question 12: “Is HPV herpes simplex?”***

***Answer: “***No, HPV and herpes simplex are two different viruses. HPV stands for human papillomavirus, and it’s not part of the herpes family of viruses. But both HPV and HSV:

* Are very common.
* Are highly contagious.
* Spread through skin-to-skin contact.
* Can affect your genitals.***”***

***Question 13: “Does everyone have herpes simplex?”***

***Answer: “***No, but HSV is a very common virus. Researchers estimate that in 2016, about 3.7 billion people around the world carried antibodies for HSV-1 (this means blood tests showed evidence of a prior HSV-1 infection). That same year, almost 500 million people carried antibodies for HSV-2.***”***

***Question 14: “Can you donate blood if you have herpes simplex?”***

***Answer: “***Yes, but only if all the following are true:

* You’re not experiencing an outbreak.
* Any recent sores (oral or genital) are dry and almost healed.
* You meet other eligibility requirements for donating.

Talk to your healthcare provider or the place where you intend to donate blood to learn more about eligibility.***”***

**Herpes Simplex Virus (HSV) Genomic Data**

* Genome Type:  
  HSV-1 has a linear, double-stranded DNA genome approximately 152,000 base pairs (152 kb) in length.
* Genome Organization:  
  The genome is divided into two unique regions:
  + Unique Long (UL) region
  + Unique Short (US) region  
    Each region is flanked by terminal and internal inverted repeats (TRL/IRL and TRS/IRS), allowing the genome to form different isomeric configurations.
* Gene Content:  
  The HSV-1 genome encodes about 75 to 81 proteins, including:
  + Immediate early proteins (e.g., ICP0, ICP4) that regulate viral gene expression
  + Early proteins involved in DNA replication
  + Late proteins that mostly form structural components of the virus.
* Latency and Gene Expression:  
  During neuronal latency, the HSV genome circularizes and expresses a limited set of RNAs, including latency-associated transcripts (LATs) and several microRNAs (miRNAs) that help maintain latency by inhibiting expression of immediate early proteins such as ICP0, ICP4, and ICP34.5.
* Genomic Features and Complexity:  
  HSV-1 DNA contains nicks and gaps randomly distributed across the genome, which may influence viral replication and host antiviral responses.  
  The genome has a high GC content (70-85% in some regions), especially in repeat areas, making sequencing and assembly challenging

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I understand you have some questions about your herpes diagnosis. Let’s talk about what this means and how we can manage it.

Patient: Yes, I’m worried. What exactly is herpes?

Doctor: Herpes simplex virus is a very common infection. Many people have it, often without symptoms. It causes recurrent outbreaks of painful blisters or sores, usually on the mouth or genitals. The good news is that it’s manageable with medication and precautions.

Patient: Is it contagious? How can I avoid passing it on?

Doctor: Herpes is most contagious when you have active sores or blisters. During outbreaks, it’s best to avoid any skin-to-skin contact in the affected area. Using condoms or dental dams reduces but does not completely eliminate the risk of transmission. Also, antiviral medications can lower the chance of passing the virus to others.

Patient: What treatments are available?

Doctor: We have antiviral drugs like acyclovir, valacyclovir, and famciclovir. These can shorten outbreaks and reduce symptoms if started early, ideally within 72 hours of symptom onset. For frequent outbreaks, daily suppressive therapy can reduce how often outbreaks happen and lower transmission risk.

Patient: How long do outbreaks last?

Doctor: Without treatment, outbreaks usually last 2 to 10 days. With antiviral medication started early, they can be shorter.

Patient: How should I talk to my partner about this?

Doctor: It’s best to be honest and share accurate information calmly. You can explain that herpes is common and manageable. Choose a private, comfortable setting and give your partner time to process the information. Using neutral, fact-based language helps reduce stigma.

Patient: Can I still have a normal sex life?

Doctor: Yes, you can. Avoid sexual contact during outbreaks, use protection, and consider suppressive therapy if outbreaks are frequent. Communication with your partner is key.

Patient: Will I have herpes forever?

Doctor: The virus stays in your body for life, but many people have mild or infrequent symptoms. Treatment and lifestyle adjustments help you manage it well.

Doctor: Do you have any other questions or concerns?

Patient: Not right now, but I appreciate the information and support.

*REFERENCES:*

<https://www.who.int/news-room/fact-sheets/detail/herpes-simplex-virus>

<https://my.clevelandclinic.org/health/diseases/22855-herpes-simplex>

<https://www.ncbi.nlm.nih.gov/books/NBK482197/>

<https://emedicine.medscape.com/article/218580-differential>

**GENITAL HERPES**

*ALTERNATIVE NAMES:* Alternative Names for Genital Herpes

* Herpes - genital: A sexually transmitted infection caused by the herpes simplex virus.
* Herpes simplex - genital: Another term for genital herpes, referring to the virus that causes the infection.
* Herpesvirus 1: Refers to HSV-1, which can cause genital herpes through oral sex.
* HSV-1: A type of herpes simplex virus that can cause genital herpes.
* Herpesvirus 2: Refers to HSV-2, which is primarily responsible for genital herpes.
* HSV-2: A type of herpes simplex virus that causes genital herpes.
* HSV - antivirals: Refers to treatments used for herpes simplex virus infections.

**DEFINITION / DESCRIPTION**

Genital herpes is a common sexually transmitted infection (STI). The herpes simplex virus (HSV) causes genital herpes. Genital herpes can often be spread by skin-to-skin contact during sexual activity.

Some people infected with the virus may have very mild symptoms or no symptoms. They can still able to spread the virus. Other people have pain, itching and sores around the genitals, anus or mouth.

There is no cure for genital herpes. Symptoms often show up again after the first outbreak. Medicine can ease symptoms. It also lowers the risk of infecting others. Condoms can help prevent the spread of a genital herpes infection.

**CAUSES**

Genital herpes is caused by two types of herpes simplex virus. These types include herpes simplex virus type 2 (HSV-2) and herpes simplex virus type 1 (HSV-1). People with HSV infections can pass along the virus even when they have no visible symptoms.

***HSV-2***

HSV-2 is the most common cause of genital herpes. The virus can be present:

* On blisters and ulcers or the fluid from ulcers
* The moist lining or fluids of the mouth
* The moist lining or fluids of the vagina or rectum

The virus moves from one person to another during sexual activity.

***HSV-1***

HSV-1 is a version of the virus that causes cold sores or fever blisters. People may be exposed to HSV-1 as children due to close skin-to-skin contact with someone infected.

A person with HSV-1 in tissues of the mouth can pass the virus to the genitals of a sexual partner during oral sex. The newly caught infection is a genital herpes infection.

Recurrent outbreaks of genital herpes caused by HSV-1 are often less frequent than outbreaks caused by HSV-2. Neither HSV-1 nor HSV-2 survives well at room temperature. So the virus is not likely to spread through surfaces, such as a faucet handle or a towel. But kissing or sharing a drinking glass or silverware might spread the virus.

**RISK FACTORS**

A higher risk of getting genital herpes is linked to:

* Contact with genitals through oral, vaginal or anal sex. Having sexual contact without using a barrier increases your risk of genital herpes. Barriers include condoms and condom-like protectors called dental dams used during oral sex. Women are at higher risk of getting genital herpes. The virus can spread more easily from men to women than from women to men.
* Having sex with multiple partners. The number of people you have sex with is a strong risk factor. Contact with genitals through sex or sexual activity puts you at higher risk. Most people with genital herpes do not know they have it.
* Having a partner who has the disease but is not taking medicine to treat it. There is no cure for genital herpes, but medicine can help limit outbreaks.
* Certain groups within the population. Women, people with a history of sexually transmitted diseases, older people, Black people in in the United States and men who have sex with men diagnosed with genital herpes at a higher than average rate. People in groups at higher risk may choose to talk to a health care provider about their personal risk.

**SIGNS / SYMPTOMS**

Most people infected with HSV don't know they have it. They may have no symptoms or have very mild symptoms.

Symptoms start about 2 to 12 days after exposure to the virus. They may include:

* Pain or itching around the genitals
* Small bumps or blisters around the genitals, anus or mouth
* Painful ulcers that form when blisters rupture and ooze or bleed
* Scabs that form as the ulcers heal
* Painful urination
* Discharge from the urethra, the tube that releases urine from the body
* Discharge from the vagina

During the first outbreak, you may commonly have flu-like symptoms such as:

* Fever
* Headache
* Body aches
* Swollen lymph nodes in the groin

***Differences in symptom location***

Sores appear where the infection enters the body. You can spread the infection by touching a sore and then rubbing or scratching another area of your body. That includes your fingers or eyes.

Sore can develop on or in the:

* Buttocks
* Thighs
* Rectum
* Anus
* Mouth
* Urethra
* Vulva
* Vagina
* Cervix
* Penis
* Scrotum

***Repeat outbreaks***

After the first outbreak of genital herpes, symptoms often appear again. These are called recurrent outbreaks or recurrent episodes.

How often recurrent outbreaks happen varies widely. You'll usually have the most outbreaks the first year after infection. They may appear less often over time. Your symptoms during recurrent outbreaks usually don't last as long and aren't as severe as the first.

You may have warning signs a few hours or days before a new outbreak starts. These are called prodromal symptoms. They include:

* Genital pain
* Tingling or shooting pain in the legs, hips or buttocks

**WHEN TO SEE A DOCTOR / RED FLAG**

If you suspect you have genital herpes, or any other STI, see your health care provider.

You should call your healthcare provider if you experience:

* Genital irritation or itching.
* Genital or anal blisters.
* Painful intercourse (dyspareunia).
* Painful urination (dysuria).
* Unusual or foul-smelling penile or vaginal discharge.
* Vaginal or penile redness, soreness or swelling.

**DIAGNOSIS METHODS**

Your health care provider can usually make a diagnosis of genital herpes based on a physical exam and a history of your sexual activity.

To confirm a diagnosis, your provider will likely take a sample from an active sore. One or more tests of these samples are used to see if you have herpes simplex virus (HSV)infection and show whether the infection is HSV-1 or HSV-2.

Less often, a lab test of your blood may be used for confirming a diagnosis or ruling out other infections.

Your care provider will likely recommend that you get tested for other STIs. Your partner should also be tested for genital herpes and other STIs.

**TREATMENT OPTIONS**

There's no cure for genital herpes. Treatment with prescription antiviral pills may be used for the following:

* Help sores heal during a first outbreak
* Lower the frequency of recurrent outbreaks
* Lessen the severity and duration of symptoms in recurrent outbreaks
* Reduce the chance of passing the herpes virus to a partner

Commonly prescribed medicines used for genital herpes include:

* Acyclovir (Zovirax)
* Famciclovir
* Valacyclovir (Valtrex)

Your health care provider will talk to you about the right treatment for you. Treatment depends on the severity of disease, the type of HSV, your sexual activity and other medical factors. The dose will vary depending on whether you currently have symptoms. Long-term use of the antiviral drugs is considered safe.

**POSSIBLE COMPLICATIONS**

Complications associated with genital herpes may include:

* Other sexually transmitted infections. Having genital sores raises your risk of giving or getting other STIs, including HIV/AIDS.
* Newborn infection. A baby can be infected with HSV during delivery. Less often, the virus is passed during pregnancy or by close contact after delivery. Newborns with HSV often have infections of internal organs or the nervous system. Even with treatment, these newborns have a high risk of developmental or physical problems and a risk of death.
* Internal inflammatory disease. HSV infection can cause swelling and inflammation within the organs associated with sexual activity and urination. These include the ureter, rectum, vagina, cervix and uterus.
* Finger infection. An HSV infection can spread to a finger through a break in the skin causing discoloration, swelling and sores. The infections are called herpetic whitlow.
* Eye infection. HSV infection of the eye can cause pain, sores, blurred vision and blindness.
* Swelling of the brain. Rarely, HSV infection leads to inflammation and swelling of the brain, also called encephalitis.
* Infection of internal organs. Rarely, HSV in the bloodstream can cause infections of internal organs.

**PREVENTION TIPS**

Prevention of genital herpes is the same as preventing other sexually transmitted infections.

* Have one long-term sexual partner who has been tested for STIs and isn't infected.
* Use a condom or dental dam during sexual activity. These reduce the risk of disease, but they don't prevent all skin-to-skin contact during sex.
* Don't have sex when a partner with genital herpes has symptoms.

***Pregnancy precautions***

If you are pregnant and know you have genital herpes, tell your health care provider. If you think you might have genital herpes, ask your provider if you can be tested for it.

Your provider may recommend that you take herpes antiviral medicines late in pregnancy. This is to try to prevent an outbreak around the time of delivery. If you have an outbreak when you go into labor, your provider may suggest a cesarean section. That is a surgery to remove the baby from your uterus. It lowers the risk of passing the virus to your baby.

***At-home care for genital herpes***

If you have mild symptoms or infrequent outbreaks, you might not need or want treatment.

During an outbreak, these steps can ease your symptoms:

* Apply an ice pack to your genitals. Wrap the ice pack in a washcloth or apply it over your underwear.
* Keep your genitals dry. Wear cotton or other nonsynthetic underpants and avoid tight-fitting clothes. Moist sores take longer to heal.
* Soak in a warm bath.
* Take nonsteroidal anti-inflammatory drugs (NSAIDs) to relieve pain.
* Wear loose-fitting clothing.
* Apply topical 1% or 2% lidocaine to numb the area.

Wash your hands after contact with any genital herpes sore. Try not to touch the sores, as this just increases the risk of spreading it to other parts of your body.

***How long does it take for genital herpes to go away?***

It depends on if it’s your first outbreak or a recurring outbreak. Your first outbreak tends to last longer than recurrent outbreaks. You can expect to have symptoms of a first outbreak for up to four weeks. In subsequent outbreaks, your symptoms may go away after two weeks.

Keep in mind that genital herpes doesn’t ever go away. You may not have visible sores or blisters, but you’ll always have HSV, the virus that causes genital herpes.

***Can your body get rid of herpes?***

No. Once you have HSV, the virus that causes genital herpes, you have it for life.

**OUTLOOK / PROGNOSIS**

Many people who find out they have herpes feel embarrassed or ashamed knowing they’ll always have the virus and can give it to others. But you aren’t alone. Herpes is one of the most common STIs, both in the U.S. and worldwide. If you have herpes, you should:

* Learn all you can about it. Information will help you to manage your disease and feel better about yourself.
* Join a support group in your area or online. You can learn from other people who have the disease and share ways to cope.
* Talk about your illness with your healthcare provider or a counselor. They may have other ideas about ways to cope or how to discuss genital herpes with your partner.
* Be open and honest with your partner about your diagnosis. While it may be difficult to share this information, it’s a way to build trust in your relationship.

If you have herpes, you can still:

* Have sex if you use a condom (and/or have your partner use a condom). Some couples, who have sexual relations only with each other, may choose not to use condoms even though one partner has herpes. Because each situation is different, you should ask your provider if this is the right choice for you in your relationship.
* Have children. People with herpes can still give birth to healthy babies. If you have herpes and plan to have children, discuss your illness with your healthcare provider.
* Have a fulfilling life. A genital herpes diagnosis can make you feel unworthy and affect your confidence. Don’t let the virus trick you into believing you’re not worthy. This virus is common, and the right partner will accept you no matter what.

***How long does genital herpes last?***

Your first outbreak may last up to four weeks. Recurrent outbreaks usually last between one to two weeks.

**PREDEFINED Q AND A SETS**

***Question 1: “How does genital herpes spread?”***

***Answer: “***The herpes virus that causes genital herpes spreads through saliva, semen and vaginal secretions. It’s possible to get genital herpes from someone who doesn’t have visible symptoms. You can have the infection, not know it and infect someone else.

Genital herpes can spread through:

* Intercourse, including anal, vaginal-penile and vaginal-vaginal.
* Oral sex (giving or receiving) with someone who’s infected.
* Skin-to-skin genital contact.
* Touching open sores, including while breastfeeding.
* Childbirth (if you give birth while having an active infection).

You can’t get genital herpes from objects like toilet seats. It’s not likely that you’ll get genital herpes from surfaces like towels or clothing, either. But you could pass genital herpes through shared sex toys. To stay safe, wash sex toys before and after using them, and don’t share them. If you do, protect them with a condom.***”***

***Question 2: “How contagious is genital herpes?”***

***Answer: “***Genital herpes is highly contagious. You’re most contagious when you have an open sore. Even if you don’t have open sores or symptoms of an outbreak, it’s still possible to infect another person with the herpes virus. This is called asymptomatic shedding.***”***

***Question 3: “Can you get genital herpes from someone who has cold sores?”***

***Answer: “***Yes. Both HSV-1 and HSV-2 can infect your mouth and your genitals. You can get herpes sores on your genitals if you receive oral sex from someone who has a cold sore from HSV-1.***”***

***Question 4: “Can I get genital herpes more than once?”***

***Answer: “***There isn’t a cure for HSV-1 and HSV-2, the virus that causes genital herpes. Because the virus lives dormant (or inactive) in your body, you can get a genital herpes outbreak again (called a recurrence or flare-up).

There’s no rhyme or reason as to why some people get more outbreaks and others get fewer. But healthcare providers know that certain activities tend to reactivate the virus.

These include:

* Stress.
* Illness.
* Menstruation.
* Sun exposure.
* Surgery.***”***

***Question 5: “How did I get herpes if my partner doesn’t have it?”***

***Answer: “***Some people never develop symptoms. They don’t know they have the virus that causes genital herpes. They may unknowingly infect others. You can have the herpes virus for years and not have symptoms, so it’s hard to know when or from whom you got it.***”***

***Question 6: “Can my partner have genital herpes and not me?”***

***Answer: “***Yes. If your partner has genital herpes and takes precautions not to spread it to you (like wearing condoms and taking medication), it’s possible that you won’t get it.***”***

***Question 7: “What is genital herpes?”***

***Answer: “***Genital herpes is a common viral infection caused by the herpes simplex virus (HSV), usually HSV-2 but sometimes HSV-1. It is transmitted through intimate sexual contact with an infected person.***”***

***Question 8: “How is genital herpes diagnosed?”***

***Answer: “***Diagnosis is usually made by a healthcare provider based on a physical exam and sexual history. Confirmation involves taking a sample from an active sore for lab testing to detect HSV and determine the type (HSV-1 or HSV-2). Blood tests can also detect antibodies to HSV to confirm infection or rule out other conditions.***”***

***Question 9: “What are the symptoms of genital herpes?”***

***Answer: “***Symptoms include painful blisters or sores on or around the genitals, rectum, or mouth. Some people have mild symptoms or none at all. Initial outbreaks tend to be more severe, while recurrent outbreaks are usually milder.***”***

***Question 10: “Can I have genital herpes and not know it?”***

***Answer: “***Yes. Many people with genital herpes have very mild or no symptoms and may be unaware they are infected.***”***

***Question 11: “Is there a cure for genital herpes?”***

***Answer: “***No, there is no cure. However, antiviral medications can help manage symptoms, speed healing of sores, reduce the frequency and severity of outbreaks, and lower the risk of transmission to partners.***”***

***Question 12: “What treatments are available?”***

***Answer: “***Common antiviral drugs include acyclovir, famciclovir, and valacyclovir. Treatment can be episodic (started at outbreak onset) or suppressive (daily medication to reduce recurrences and transmission risk). Long-term antiviral use is safe for most people.***”***

***Question 13: “How can I reduce the risk of transmitting genital herpes to my” partner?***

***Answer: “***

* Use latex condoms consistently and correctly.
* Avoid sexual contact during outbreaks when sores are visible.
* Even without symptoms, the virus can shed, so condoms should be used at all times.
* Daily suppressive antiviral therapy can significantly reduce transmission risk.
* Open communication with partners and testing for other STIs is important.***”***

***Question 14: “Can I get genital herpes from a toilet seat or casual contact?”***

***Answer: “***No. Genital herpes is transmitted through sexual contact. It is nearly impossible to get it from toilet seats, towels, or casual non-sexual contact.

How can I cope with a genital herpes diagnosis?

Feelings of embarrassment, shame, or anger are common. Healthy coping includes:

* Open communication with your partner.
* Educating yourself about the condition and treatment.
* Seeking support from healthcare providers or support groups.
* Remembering that herpes is common and manageable.***”***

***Recommended Regimens\****

Acyclovir† 400 mg orally 3 times/day for 7–10 days  
***OR***  
Famciclovir 250 mg orally 3 times/day for 7–10 days  
***OR***  
Valacyclovir 1 gm orally 2 times/day for 7–10 days

\* Treatment can be extended if healing is incomplete after 10 days of therapy.

†Acyclovir 200 mg orally five times/day is also effective but is not recommended because of the frequency of dosing.

***Suppressive Therapy for Recurrent HSV-2 Genital Herpes***

Suppressive therapy reduces frequency of genital herpes recurrences by 70%–80% among patients who have frequent recurrences (469–472). Persons receiving such therapy often report having experienced no symptomatic outbreaks.

Suppressive therapy also is effective for patients with less frequent recurrences. Long-term safety and efficacy have been documented among patients receiving daily acyclovir, valacyclovir, and famciclovir (474). Quality of life is improved for many patients with frequent recurrences who receive suppressive therapy rather than episodic treatment (475).

Providers should discuss with patients on an annual basis whether they want to continue suppressive therapy because frequency of genital HSV-2 recurrence diminishes over time for many persons. However, neither treatment discontinuation nor laboratory monitoring is necessary because adverse events and development of HSV antiviral resistance related to long-term antiviral use are uncommon.

Treatment with valacyclovir 500 mg daily decreases the rate of HSV-2 transmission for discordant heterosexual couples in which a partner has a history of genital HSV-2 infection (473). Such couples should be encouraged to consider suppressive antiviral therapy as part of a strategy for preventing transmission, in addition to consistent condom use and avoidance of sexual activity during recurrences.

Suppressive antiviral therapy for persons with a history of symptomatic genital herpes also is likely to reduce transmission when used by those who have multiple partners.

HSV-2 seropositive persons without a history of symptomatic genital herpes have a 50% decreased risk for genital shedding, compared with those with symptomatic genital herpes (476).

No data are available regarding efficacy of suppressive therapy for preventing HSV-2 transmission among discordant couples in which a partner has a history of asymptomatic HSV-2 infection identified by a positive HSV-2 serologic test.

Among HSV-2 seropositive persons without HIV infection, oral TDF/FTC and intravaginal tenofovir are ineffective at reducing the risk for HSV-2 shedding or recurrences (477).

***Recommended Regimens***

Acyclovir 400 mg orally 2 times/day  
***OR***  
Valacyclovir 500 mg orally once a day\*  
***OR***  
Valacyclovir 1 gm orally once a day  
***OR***  
Famciclovir 250 mg orally 2 times/day

\* Valacyclovir 500 mg once a day might be less effective than other valacyclovir or acyclovir dosing regimens for persons who have frequent recurrences (i.e., ≥10 episodes/year).

***Episodic Therapy for Recurrent HSV-2 Genital Herpes***

Episodic treatment of recurrent herpes is most effective if therapy is initiated within 1 day of lesion onset or during the prodrome that precedes some outbreaks.

The patient should be provided with a supply of drug or a prescription for the medication with instructions to initiate treatment immediately when symptoms begin.

Acyclovir, famciclovir, and valacyclovir appear equally effective for episodic treatment of genital herpes (466–470).

***Recommended Regimens for Episodic Therapy for Recurrent HSV-2 Genital Herpes\****

Acyclovir 800 mg orally 2 times/day for 5 days  
***OR***

Acyclovir 800 mg orally 3 times/day for 2 days  
***OR***

Famciclovir 1 gm orally 2 times/day for 1 day  
***OR***

Famciclovir 500 mg once, followed by 250 mg 2 times/day for 2 days  
***OR***

Famciclovir 125 mg 2 times/day for 5 days  
***OR***

Valacyclovir 500 mg orally 2 times/day for 3 days  
***OR***

Valacyclovir 1 gm orally once daily for 5 days

\*Acyclovir 400 mg orally 3 times/day is also effective, but are not recommended because of frequency of dosing

***Drug Allergy, Intolerance, or Adverse Reactions***

Allergic and other adverse reactions to oral acyclovir, valacyclovir, and famciclovir are rare. Desensitization to acyclovir has been described (500).

HIV Infection

Immunocompromised patients can have prolonged or severe episodes of genital, perianal, or oral herpes. Lesions caused by HSV are common among persons with HIV infection and might be severe, painful, and atypical (501). HSV shedding is increased among persons with HIV infection (502). Whereas ART reduces the severity and frequency of symptomatic genital herpes, frequent subclinical shedding still occurs (503,504).

Clinical manifestations of genital herpes might worsen during immune reconstitution early after initiation of ART. HSV-2 type-specific serologic testing can be considered for persons with HIV infection during their initial evaluation, particularly among those with a history of genital symptoms indicative of HSV infection.

Recommended therapy for first-episode genital herpes is the same as for persons without HIV infection, although treatment courses might need to be extended for lesion resolution. Suppressive or episodic therapy with oral antiviral agents is effective in decreasing the clinical manifestations of HSV infection among persons with HIV (503,504).

The risk for GUD increases during the first 6 months after starting ART, especially among persons who have a CD4+ T-cell count <200 cell/mm3. Suppressive antiviral therapy reduces the risk for GUD among this population and can be continued for 6 months after ART initiation (504) when the risk for GUD returns to baseline levels. Suppressive antiviral therapy among persons with HIV and HSV infection does not reduce the risk for either HIV transmission or HSV-2 transmission to susceptible sex partners (88,505). Suppressive antiviral therapy does not delay HIV disease progression and is not associated with decreased risk for HIV-related inflammation among persons taking ART (506). For severe HSV disease, initiating therapy with acyclovir 5–10 mg/kg IV every 8 hours might be necessary.

***Recommended Regimens for Daily Suppressive Therapy Among Persons with HIV***

Acyclovir 400–800 mg orally 2-3 times/day  
***OR***  
Famciclovir 500 mg orally 2 times/day  
***OR***  
Valacyclovir 500 mg orally 2 times/day

***Recommended Regimens for Episodic Infection Among Persons with HIV***

Acyclovir 400 mg orally 3 times/day for 5–10 days  
***OR***  
Famciclovir 500 mg orally 2 times/day for 5–10 days  
***OR***  
Valacyclovir 1 gm orally 2 times/day for 5–10 days

**DIFFERENTIAL DIAGNOSIS**

* Vulvo-vaginal candidiasis
  + Commonly mistaken for HSV, presents with itching, discharge, and irritation but lacks vesicular lesions.
* Syphilis (Primary chancre)
  + Typically a single, painless, well-demarcated ulcer with indurated edges; diagnosed by serology and darkfield microscopy.
* Chancroid
  + Painful genital ulcers caused by *Haemophilus ducreyi*, often with tender inguinal lymphadenopathy.
* Lymphogranuloma venereum (LGV)
  + Caused by *Chlamydia trachomatis* serovars L1-L3; presents with small painless ulcers followed by painful inguinal lymphadenopathy.
* Fixed drug eruption
  + Recurrent, well-demarcated erythematous or ulcerative lesions triggered by medications.
* Behçet’s syndrome
  + Recurrent painful oral and genital ulcers with systemic symptoms (eye inflammation, skin lesions).
* Herpes zoster (shingles)
  + Dermatomal vesicular rash, usually unilateral and painful, rarely involves genital region.
* Sexual trauma
  + May cause ulcerations or erosions resembling herpes lesions.
* Other sexually transmitted infections (STIs)
  + Molluscum contagiosum, HPV-related lesions, or bacterial infections causing ulcerations.
* Non-infectious causes
  + Crohn’s disease (perianal ulcers), psoriasis, or other inflammatory dermatoses.

**EPIDEMIOLOGY**

Herpes genitalis remains among the most common sexually transmitted infections (STI).While the majority of cases are due to HSV-2, rare but increasing cases have been found due to herpes simplex virus type 1 (HSV-1).The primary mode of transmission of both HSV-1 and HSV-2 is via direct contact with open lesions. Sixteen percent of patients aged 14 to 49 were reported to be seropositive for HSV-2 from 2005 to 2010. Antibodies to HSV-2 are often present by the time of puberty, and their presence often correlates with the degree of sexual activity of that individual. More women than men have been reported to be infected, and as expected, the prevalence increases with an increasing number of sexual partners. Ethnically, non-Hispanic African Americans have greater rates of infection than non-Hispanic Whites. About 85% to 90% of infections are unrecognized and remain undiagnosed.

In the United States, HSV remains one of the most common causes of genital ulcers; internationally, more than 23 million new cases are reported annually.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I want to talk with you about your test results. You have genital herpes, which is a common viral infection caused by the herpes simplex virus.

Patient: Oh, I wasn’t expecting that. What does it mean?

Doctor: It means you have a lifelong infection that can cause episodes of painful sores or blisters in the genital area. Many people have herpes, and some don’t even know because they have very mild or no symptoms. The good news is that it’s manageable with medication and precautions.

Patient: Is it contagious? How do I avoid spreading it?

Doctor: Yes, herpes is contagious, especially when you have active sores or blisters. You can reduce the risk of passing it to your partner by avoiding sexual contact during outbreaks, using condoms consistently, and taking antiviral medications daily if outbreaks are frequent. Even when you don’t have symptoms, the virus can sometimes be shed and transmitted, so precautions are important.

Patient: What treatments are available?

Doctor: We have antiviral drugs like acyclovir, valacyclovir, and famciclovir. They can shorten outbreaks, reduce symptoms, and with daily suppressive therapy, lower how often outbreaks occur and decrease transmission risk.

Patient: How do I tell my partner?

Doctor: It’s best to be honest and choose a calm, private time to talk. You can explain that genital herpes is common and manageable. Avoid using negative or scary language. If you want, I can provide you with resources and tips on how to have this conversation. Many people find that being straightforward and factual helps reduce anxiety for both partners.

Patient: Will this affect my sex life?

Doctor: You can have a healthy sex life. Avoid sex during outbreaks, use protection, and communicate openly with your partner. Taking suppressive therapy can also help. Many people with herpes lead normal relationships and intimate lives.

Patient: What else should I know?

Doctor: It’s normal to feel upset or worried. Support is available, including counseling if you want it. Also, maintaining good general health can help your immune system keep the virus in check.

Patient: Thank you. I feel better knowing there’s treatment and support.

***REFERENCES***

[Screening for Genital Herpes | Genital Herpes | CDC](https://www.cdc.gov/herpes/testing/index.html)

[Genital herpes - Diagnosis and treatment - Mayo Clinic](https://www.mayoclinic.org/diseases-conditions/genital-herpes/diagnosis-treatment/drc-20356167)

[Genital Herpes: Causes, Symptoms, Treatment & Prevention](https://my.clevelandclinic.org/health/diseases/genital-herpes#symptoms-and-causes)

<https://www.ncbi.nlm.nih.gov/books/NBK554427/#article-688.s4>

**HYPOSMIA**

ALTERNATIVE NAMES: Alternative names for hyposmia include “microsmia”, which refers to a reduced ability to smell and detect odors. Another related term is “hiposmia”, which is often used interchangeably with “hyposmia”. Additionally, “hyposmia” is sometimes referred to as a decreased sensitivity to some or all smells.

**DEFINITION / DESCRIPTION**

Hyposmia (pronounced “hi-POSE-mee-uh”) refers to a decreased sense of smell. People with the condition have difficulty detecting and identifying odors and scents.

Hyposmia is a smell disorder, but it’s different from anosmia, which refers to a total loss of sense of smell, and parosmia, which refers to an abnormal sense of smell.

While over 12% of the U.S. population has some form of smell dysfunction, about 3% of Americans have hyposmia. Your risk for hyposmia and other types of smell disorders increases with age.

**CAUSES**

Hyposmia causes include certain health conditions, environmental factors and neurological issues. The most common cause of hyposmia is inflammation inside your nose. Additionally, neurological issues can affect the part of your brain responsible for your sense of smell.

***Causes of Hyposmia***

Some people are born with this disorder, but the most common cause of hyposmia is nasal blockage.

Other causes include:

* Allergies
* Infections such as flu or cold.
* Chronic sinus problems
* A head injury
* Nasal polyps (small growths in the nose)
* A deviated nasal septum
* Smoking
* Dental problems
* Hormonal imbalance
* Exposure to some chemicals
* Recreational drugs, such as cocaine
* Radiation treatment for head and neck cancer

***The following medications can also cause loss of smell:***

* Antibiotics such as ampicillin and tetracycline
* Some antidepressants such as amitriptyline
* Antihistamines such as fluticasone and prednisone

***Health conditions that may contribute to hyposmia include:***

* Allergies.
* Bacterial infections, including rhinosinusitis, nasal vestibulitis or chronic sinus infections.
* Viral infections, including COVID, flu or the common cold.
* Nasal polyps.
* Deviated septum.
* Hormonal imbalances.
* Type 1 diabetes.
* Malnutrition.
* Dental issues like extensive tooth decay or gum disease.

***Environmental factors that can cause hyposmia include:***

* Smoking.
* Certain medications, including some antibiotics, antihistamines and antidepressants.
* Long-term exposure to certain chemicals, like lead and other heavy metals.
* Head and neck radiation therapy.
* Using cocaine.
* Neurological issues linked to hyposmia include:
* Parkinson’s disease.
* Alzheimer’s disease.
* Multiple sclerosis (MS).

***Hyposmia and COVID-19***

Hyposmia is a common symptom of COVID-19. In many cases, it’s one of the first noticeable warning signs. Having hyposmia doesn’t necessarily mean you have COVID-19. But if you develop a sudden decrease in your sense of smell, let a healthcare provider know.

Your sense of smell may have changed due to a variety of possible causes. The most common reasons include

* nasal blockage or
* inflammation caused by allergies,
* infections such as
* colds
* flu,
* chronic sinus problems,
* nasal polyps.

Other factors include:

* deviated nasal septum,
* smoking,
* head injury,
* dental problems,
* hormonal imbalances,
* exposure to certain chemicals, or
* side effects from medications like some:
* antibiotics,
* antidepressants, and
* antihistamine

**RISK FACTORS**

The risk factors for hyposmia include a variety of underlying conditions, environmental exposures, and lifestyle choices.

* Age is a significant factor, as the sense of smell naturally declines with age, making older adults more susceptible to hyposmia.
* Chronic conditions such as diabetes, neurological disorders (e.g., Parkinson's disease),
* Head injuries can also increase the risk of developing hyposmia.

1. Environmental factors, such as prolonged exposure to strong odors from cleaning products or industrial chemicals, can damage the olfactory system and lead to hyposmia.
2. Additionally, exposure to pollutants, allergens, and toxins like cigarette smoke and chemical fumes can irritate the nasal passages and olfactory system, contributing to hyposmia.
3. Lifestyle choices, including smoking and excessive alcohol consumption, can damage the olfactory system over time, increasing the risk of hyposmia. Nutritional deficiencies, particularly in vitamins A, B12, and zinc, can also impair olfactory function.
4. Genetic factors may play a role, as some individuals may have a hereditary predisposition to olfactory dysfunction due to genetic mutations affecting olfactory receptor genes. Autoimmune disorders, such as Sjögren's syndrome or lupus, can affect the mucous membranes, including those in the nasal cavity, leading to reduced smell sensitivity.
5. Neurological issues, such as those affecting the part of the brain responsible for the sense of smell, can also contribute to hyposmia. Conditions like Parkinson's disease, Alzheimer's disease, and multiple sclerosis can impair the olfactory pathways, leading to sensorineural hyposmia.
6. Medications, including antihistamines, antidepressants, and chemotherapy drugs, can affect the sense of smell. Radiation therapy for head and neck cancers may also damage the olfactory nerves.
7. Infections, such as upper respiratory infections, including the common cold, flu, and COVID-19, can cause temporary or permanent damage to the olfactory system, resulting in hyposmia.
8. Bacterial infections, including rhinosinusitis, nasal vestibulitis, or chronic sinus infections, can also contribute to hyposmia.

Other factors include a

* history of asthma or cancer,
* low family income,
* low educational attainment,
* high alcohol consumption, which have been associated with a greater prevalence of smell impairment.
* Additionally, individuals of African descent may be more likely to experience hyposmia compared to those of Caucasian descent.

**SIGNS / SYMPTOMS**

Hyposmia symptoms can develop suddenly or gradually over time and may include:

* A diminished sense of smell overall.
* Trouble detecting certain odors.
* Difficulty distinguishing between certain smells.

Up to 80% of taste is due to the sense of smell. As a result, you may also notice changes to your sense of taste (dysgeusia) in addition to a decreased sense of smell.

***Symptoms of Hyposmia***

Symptoms of hyposmia can manifest gradually or suddenly. They range from a reduced ability to smell to a complete inability to smell anything. You may also experience a loss of taste, including an inability to tell whether something is sweet, sour, bitter, or salty. Normally pleasant smells or tastes may become unpleasant.

**DIAGNOSIS METHODS**

Apart from a multidimensional assessment ruling out neurological causes and COVID-19, a consultation with an ear, nose and throat specialist will examine your sinuses and the inside of your nose to check for infection, growths or polyps. They may also recommend diagnostic tests, including:

* Nasal endoscopy.
* Imaging tests, including CT (computed tomography) scans and MRI (magnetic resonance imaging).
* Sense of smell tests.

Your doctor will examine the inner side of your nose using special equipment to check if a polyp or some other growth is interfering with your ability to smell or if there's a present infection. This inspection will likely be performed by an ear, nose, and throat (ENT) specialist or otolaryngologist.

In addition to a physical exam, other diagnostic tests include:

* Comparing smells of different chemicals
* Scratch and sniff test
* Sip, spit, and rinse test (chemicals are applied to some areas of your tongue, measuring the lowest chemical strength that you can recognize)

**TREATMENT OPTIONS**

Hyposmia treatment involves identifying and addressing the underlying cause. Treatments may include:

* Lifestyle changes.
* Sense of smell training.
* Medication.
* Surgery.

Every case is unique, so treatments vary widely. For neurological causes and COVID-19-related smell loss, ask your healthcare provider which options are right for you.

***Lifestyle changes***

People who develop hyposmia because of environmental factors may be able to reverse their symptoms by removing the trigger. For example, if smoking causes hyposmia, you might regain your sense of smell if you quit. Occasionally, occupational exposure could result in an irreversible sense of smell loss, so avoidance of these may be of value to avoid a further decrease in the sense of smell.

***Medication***

Prescribing medication to treat the underlying cause can also reduce hyposmia symptoms. For example, if you developed hyposmia because of allergies, your provider may recommend antihistamines or corticosteroids. Or they may prescribe antibiotics for sinusitis-related hyposmia.

***Surgery***

In severe cases, you may need surgery to treat hyposmia. But the type of surgery you need depends on the condition that caused it. If you have a deviated septum that caused hyposmia, you may need septoplasty. Or if you have nasal polyps, a surgeon may need to remove them.

***Treatment of hyposmia may vary depending on the following:***

* Age
* Medical history
* The severity of the condition
* Your ability to handle specific medicines, therapies, or procedures
* How long the condition will last
* Your opinion or preference

After a formal diagnosis and identification of the cause, your ENT specialist may treat nasal inflammation using oral medications to reduce inflammation, recommending antibiotics, or performing surgery inside the nose.

If a polyp is present, surgery may be considered to remove the blockage and return your sense of smell.

Other treatments for both temporary and permanent loss of smell may include:

* Counseling
* Quitting smoking
* Correcting the underlying medical condition
* Change of medications contributing to the disorder
* Surgical removal of obstructions causing the disorder

**PREVENTION TIPS**

You can’t always prevent hyposmia because many of the underlying causes are unavoidable. But there are things you can do to reduce your risk:

* Wear proper protective gear if you work in an environment with harmful chemicals.
* Keep existing health conditions in check.
* Practice good oral hygiene.
* Eat a well-balanced diet.
* If you smoke, consider quitting.
* Avoid insufflating (snorting) cocaine, opioids or other substances.

**OUTLOOK / PROGNOSIS**

It depends on what caused it. Some people only notice a reduced sense of smell for a few days. Others may notice lingering symptoms for months or years. In some cases, hyposmia can be permanent.

To ease hyposmia symptoms as quickly as possible, schedule an appointment with a healthcare provider. Once they determine the cause, they can recommend appropriate treatment.

**POSSIBLE COMPLICATIONS**

Hyposmia can have a significant negative impact on your quality of life. Most notably, it can prevent you from detecting odors that tell you you’re in danger, like:

* Fire or smoke.
* Gas leaks.
* Spoiled food.
* Poisonous chemicals.

**WHEN TO SEE A DOCTOR / RED FLAG**

A decreased sense of smell usually goes away on its own when it results from allergies, colds or infections. But if you have hyposmia symptoms that linger for more than a couple of weeks, tell a healthcare provider.

In addition, if you develop sudden and severe hyposmia for no apparent reason, seek medical care right away. It could indicate a more serious health concern.

**DIFFERENTIAL DIAGNOSIS**

1. Infectious Causes:
   * Viral upper respiratory infections (common cold, influenza, COVID-19)
   * Chronic sinusitis and rhinosinusitis
   * Nasal vestibulitis
2. Nasal and Sinus Structural Causes (Conductive):
   * Nasal polyps
   * Deviated nasal septum
   * Sinonasal tumors or masses
   * Allergic rhinitis
   * Chronic inflammation or edema of nasal mucosa
3. Neurological Causes (Sensorineural):
   * Neurodegenerative diseases (Parkinson’s disease, Alzheimer’s disease, dementia with Lewy bodies)
   * Head trauma causing olfactory nerve injury
   * Brain tumors affecting olfactory pathways
   * Multiple sclerosis and other CNS disorders
4. Genetic and Congenital Disorders:
   * Kallmann syndrome (congenital anosmia/hyposmia with hypogonadism)
   * Autism spectrum disorders (associated with altered olfaction)
5. Autoimmune Disorders:
   * Sjögren’s syndrome
   * Systemic lupus erythematosus (SLE)
6. Environmental and Toxic Causes:
   * Exposure to pollutants, chemicals, or toxins (e.g., formaldehyde, organic solvents)
   * Smoking and tobacco use
   * Recreational drug use (e.g., cocaine)
   * Radiation therapy to head and neck
7. Medication-Induced:
   * Antibiotics (ampicillin, tetracycline)
   * Antidepressants (amitriptyline)
   * Antihistamines (loratadine)
   * Other drugs affecting olfaction
8. Endocrine and Metabolic Disorders:
   * Hypothyroidism
   * Diabetes mellitus
   * Hormonal imbalances
9. Other Causes:
   * Aging (natural decline in olfactory function)
   * Dental problems affecting oral sensory input
   * Lifestyle factors such as poor diet with vitamin deficiencies (A, B12, zinc)

**RECENT GUIDELINES OR UPDATES**

Hyposmia, or reduced ability to smell, has been recognized as a potential indicator for SARS-CoV-2 infection, with recent guidelines and updates highlighting its significance in the diagnosis and management of COVID-19.

The American Academy of Otolaryngology – Head and Neck Surgery (AAO-HNS) and other international societies have emphasized the importance of considering hyposmia as part of the screening protocol for SARS-CoV-2, especially in asymptomatic patients.

This recommendation is supported by anecdotal reports and studies indicating that hyposmia and dysgeusia (reduced ability to taste) are commonly reported in individuals with SARS-CoV-2 infection, often in the absence of other symptoms.

A study involving 259 French patients found that hypogeusia and hyposmia were strongly linked to a COVID-19 diagnosis, both separately and in combination, in patients with or without a history of ENT disorders. The study noted that these symptoms could serve as discriminant clinical features for the diagnosis of COVID-19 in patients with influenza-like illness.

Despite the growing evidence, the exact pathophysiology of hyposmia in the context of SARS-CoV-2 is not fully understood. It is believed to be related to post-viral olfactory dysfunction (PVOD), where nasal mucosal inflammation and swelling from a viral infection can obstruct airflow and affect the olfactory mucosa.

Current guidelines recommend that patients presenting with hyposmia, especially those without known head trauma or allergic symptoms, should be advised to self-isolate, social distance, or undergo testing for SARS-CoV-2. Additionally, healthcare providers are encouraged to use full personal protective equipment when evaluating patients with hyposmia to reduce the risk of transmission.

While there is no consensus on the treatment for hyposmia caused by SARS-CoV-2, the use of corticosteroids is generally contraindicated due to the potential risk of escalating the infection.

Further research is needed to establish more definitive therapeutic approaches for managing hyposmia, dysgeusia, and dysosmia associated with SARS-CoV-2.

**EPIDEMIOLOGY**

* In the United States, an estimated 9.8 million people aged 40 and older had hyposmia in 2012, with an additional 3.4 million experiencing anosmia or severe hyposmia.
* The prevalence of hyposmia increases with age, from about 3.7% in people aged 40–49 to 25.9% in those aged 80 and above.
* Overall, about 13.5% to 20.5% of adults over 40 have some degree of smell impairment (hyposmia or anosmia).
* Hyposmia is more common in men than women and tends to be more prevalent in individuals of African descent compared to Caucasians.
* Other factors associated with higher prevalence include low socioeconomic status, high alcohol consumption, asthma, cancer, and certain chronic diseases.
* Hyposmia is also a common symptom in COVID-19 infection, affecting approximately 33% of patients, sometimes without nasal congestion.
* Population studies in Sweden found an overall olfactory dysfunction prevalence of about 19.1%, with 13.3% having hyposmia.
* The prevalence rises sharply with age, with up to 58% of people aged 80+ experiencing olfactory impairment.
* Hyposmia is linked with increased risk of cognitive impairment and reduced quality of life in older adults.

**PREDEFINED Q & A SETS**

***Question 1: “What’s the underlying cause?”***

The underlying cause could be related to inflammation in your nasal passages or sinuses, which affects airflow and the ability of odor molecules to reach the olfactory receptors. Alternatively, neurological issues affecting the brain areas responsible for smell, such as after head trauma or in neurodegenerative diseases, can also cause hyposmia. Infections like COVID-19 are known to cause sudden smell loss as well.

To determine the cause, your healthcare provider will likely recommend:

* A detailed medical history and physical examination, including an ENT (ear, nose, and throat) specialist evaluation to inspect your nasal passages for polyps, inflammation, or structural abnormalities.
* Imaging studies such as a CT scan of the sinuses or MRI if neurological causes are suspected.
* Olfactory testing to quantify the degree of smell loss.
* Possibly laboratory tests to check for infections, allergies, or hormonal imbalances.

Your smell loss may also be a symptom of another health condition, such as chronic sinusitis, allergic rhinitis, head injury, or neurodegenerative diseases like Parkinson’s or Alzheimer’s. Sometimes, it can be related to medications you are taking or environmental exposures. Identifying and treating the underlying condition is key to managing hyposmia.

If you experience sudden or severe loss of smell, especially with other symptoms like fever or neurological changes, seek prompt medical evaluation.

Would you like information on specific tests or treatment options based on your symptoms?

***Related***

Question 2: “Could allergies or sinus issues be causing my smell change and how to confirm”

Question 3: “Are there specific tests like imaging or smell tests I should consider for diagnosis”

Question 4: “Might be a neurological condition or medication be affecting my sense of smell”

***Question 5: “How can I differentiate between temporary and permanent causes of hyposmia”***

***Question 6: “What lifestyle changes could help improve or protect my sense of smell”***

***Question 7: “What tests do you recommend?”***

To determine the cause, your healthcare provider will likely recommend:

* A detailed medical history and physical examination, including an ENT (ear, nose, and throat) specialist evaluation to inspect your nasal passages for polyps, inflammation, or structural abnormalities.
* Imaging studies such as a CT scan of the sinuses or MRI if neurological causes are suspected.
* Olfactory testing to quantify the degree of smell loss.
* Possibly laboratory tests to check for infections, allergies, or hormonal imbalances

***Question 8: “Do I have another health condition causing this?”***

Your smell loss may also be a symptom of another health condition, such as chronic sinusitis, allergic rhinitis, head injury, or neurodegenerative diseases like Parkinson’s or Alzheimer’s.

Sometimes, it can be related to medications you are taking or environmental exposures. Identifying and treating the underlying condition is key to managing hyposmia.

If you experience sudden or severe loss of smell, especially with other symptoms like fever or neurological changes, seek prompt medical evaluation.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I understand you’ve noticed a decrease in your sense of smell. Can you tell me when this started and if anything else has changed?

Patient: It started a few weeks ago. I just don’t seem to smell things as well as before. It’s a bit worrying.

Doctor: That’s understandable. A reduced sense of smell, called hyposmia, can happen for several reasons. Common causes include allergies, colds, sinus infections, or nasal blockages like polyps. Sometimes medications or even viral infections like COVID-19 can affect smell.

Patient: Could it be something serious?

Doctor: In most cases, it’s due to something temporary like a cold or allergies and improves with treatment. However, if the loss is sudden, severe, or lasts more than a couple of weeks, we want to investigate further to rule out other causes such as nasal structural problems or neurological conditions.

Patient: What tests will I need?

Doctor: We’ll start with a physical exam, including looking inside your nose for any blockages or inflammation. I may recommend imaging like a CT scan of your sinuses if needed. There are also smell tests to assess how much your sense of smell is affected. If we suspect neurological causes, further evaluation may be necessary.

Patient: Could this be related to another health problem?

Doctor: Yes, sometimes smell loss can be linked to other conditions like Parkinson’s disease or Alzheimer’s, especially if you have other symptoms. It can also be a side effect of certain medications or related to environmental exposures. We’ll review your medical history carefully to look for any clues.

Patient: What can I do to improve my sense of smell?

Doctor: Treating the underlying cause is key. For example, if allergies or sinus issues are involved, medications or nasal sprays can help. Avoiding smoking and irritants is important. In some cases, smell training exercises may be beneficial. We’ll tailor the treatment based on what we find.

Patient: Thank you, that helps me understand what’s going on.

Doctor: You’re welcome. Please let me know if you notice any new symptoms or if your sense of smell changes further. We’ll work together to manage this.

*REFERENCES:*

<https://my.clevelandclinic.org/health/diseases/25166-hyposmia>

<https://pmc.ncbi.nlm.nih.gov/articles/PMC8264728/>

<https://www.webmd.com/brain/what-is-hyposmia>

**HYPOGEUSIA**

*ALTERNATIVE NAMES:* Alternative names for hypogeusia include hypogeusia. Other related terms mentioned in the context are ageusia (complete loss of taste) , dysgeusia (distorted sense of taste) , and phantogeusia (tasting something that isn’t there).

**DEFINITION / DESCRIPTION**

Hypogeusia (pronounced *hi-po-GYOU-see-uh*) is a reduced or diminished sense of taste. People with hypogeusia have difficulty telling the difference between certain tastes or flavors. Or, they may have trouble detecting certain tastes, like sweetness or saltiness.

Hypogeusia can be mild or severe and appear gradually or suddenly. Hypogeusia is different from dysgeusia, which refers to a distorted sense of taste, and ageusia, which refers to total loss of sense of taste.

**SIGNS / SYMPTOMS**

Hypogeusia symptoms vary from person to person. You might experience:

* A weakened sense of taste overall.
* An inability to detect certain tastes.
* Difficulty distinguishing between tastes (like sweet, sour, salty and bitter).

***Hypogeusia and COVID***

People with COVID-19 might develop hypogeusia early on, often before other symptoms appear. Because of the close link between taste and smell, many people also develop hyposmia, a decreased sense of smell.

Having hypogeusia or other taste disorders doesn’t necessarily mean you have COVID. But if you develop a sudden diminished sense of taste, tell your healthcare provider.

**RISK FACTORS**

The risk factors for hypogeusia include a variety of health conditions, lifestyle factors, and environmental exposures. Key risk factors include:

* Zinc deficiency: Zinc deficiency is a significant risk factor for hypogeusia, as it can lead to taste perception abnormalities.
* Systemic illnesses: Conditions such as diabetes, liver disease, kidney disease, and thyroid disorders can contribute to hypogeusia.
* Medications: Certain medications, including antihypertensives, anti-inflammatory analgesics, and others, can cause hypogeusia due to their effects on zinc levels or taste function.
* Oral cavity diseases: Oral candidiasis and salivary gland hypofunction are associated with hypogeusia.
* Smoking: Cigarette smoking can damage taste buds and reduce taste sensitivity.
* Dry mouth (xerostomia): Reduced saliva production, often due to aging, medications, or conditions like Sjögren's syndrome, can lead to hypogeusia.
* Aging: The risk of hypogeusia increases with age, as salivary secretion decreases and taste sensitivity declines.
* Head trauma or neurological disorders: Injuries to the head or conditions affecting the nervous system, such as Bell’s palsy, multiple sclerosis, and Parkinson’s disease, can impair taste function.
* Infections: Viral infections, including the common cold, flu, and COVID-19, can temporarily affect taste perception.
* Radiation therapy: Head and neck radiation can damage taste buds and salivary glands, leading to taste disturbances.
* Poor oral hygiene: Poor dental health and conditions like gum disease can contribute to hypogeusia.
* Nutritional deficiencies: Deficiencies in vitamins such as B12, niacin, and copper can also affect taste function.
* Autoimmune diseases: Conditions like Sjögren's syndrome can damage salivary glands, leading to hypogeusia.

These factors highlight the multifaceted nature of hypogeusia, with both physiological and environmental influences.

**CAUSES**

Possible hypogeusia causes include certain health conditions, environmental factors and neurological issues. Sometimes, hypogeusia develops as a secondary symptom of hyposmia (decreased sense of smell).

Health conditions that may cause hypogeusia include:

* Allergies.
* Nasal polyps.
* Viral infections, including the flu, common cold and COVID-19.
* Bacterial infections, including strep throat and sinusitis.
* Dental issues like tooth decay and gum disease.
* Diabetes.
* Thyroid disease.
* Liver disease.
* Kidney disease.
* Vitamin B12 deficiency.

Environmental factors that may contribute to hypogeusia include:

* Smoking.
* Poor oral hygiene.
* Certain medications, including carbamazepine, diltiazem and levodopa.
* Exposure to certain chemicals and toxins, like acids and heavy metals.
* Head and neck radiation therapy.
* Aging (hypogeusia is more common as you get older).

Neurological issues linked to hypogeusia include:

* Head trauma.
* Bell’s palsy.
* Stroke.
* Multiple sclerosis (MS).
* Parkinson’s disease.
* Alzheimer’s disease.

**DIAGNOSIS METHODS**

During a physical examination, an otolaryngologist (ENT) will ask about your symptoms and review your medical history. They may also recommend tests that determine:

* The level of taste quality you can detect or recognize.
* Whether you can tell the difference between certain tastes.
* Whether you can distinguish between sweet, salty, sour, bitter or umami (savory) tastes.
* If your taste improves when flavor concentration increases.

**TREATMENT OPTIONS**

To treat hypogeusia, a healthcare provider needs to address any underlying conditions. Hypogeusia treatments may include:

* Lifestyle changes.
* Medications.
* Surgery (less common).

In some cases, hypogeusia goes away on its own.

***Lifestyle changes***

Depending on the underlying cause or condition, you may be able to make certain lifestyle changes to improve your sense of taste. These might include:

* Quitting smoking.
* Improving your oral hygiene.
* Wearing proper protective equipment when handling or working around harmful chemicals.
* Asking your healthcare provider to change any medications that could affect your sense of taste.

***Medication***

Certain illnesses may contribute to hypogeusia, particularly those that also affect your sense of smell. Because of the close link between taste and smell, you might improve both senses by treating underlying conditions like allergies, nasal congestion and sinus infections. In these cases, certain medications may help, including:

* Antibiotics.
* Decongestants.
* Antihistamines.
* Corticosteroids.

***Surgery***

You probably won’t need surgery for hypogeusia unless you have a condition that also affects your sense of smell. In some cases, treating your loss of sense of smell can also improve your sense of taste. This is especially true if you have growths or structural abnormalities that block your nasal passages, like nasal polyps or a deviated septum. In these instances, you might benefit from:

* Surgery to remove nasal polyps.
* Sinus surgery to treat chronic sinus infections.
* Septoplasty to correct a deviated septum.

***What can I do at home to improve my sense of taste?***

You can try things at home to improve your sense of taste:

* Prepare food using a variety of spices and herbs. (Avoid adding more salt or sugar, though.)
* Experiment with different food textures.
* Avoid casseroles and other “combo dishes” that can dilute and hide flavors.

**PREVENTION TIPS**

You can’t always avoid things that cause hypogeusia. As a result, you can’t always prevent the condition. But there are things you can do to reduce your risk of hypogeusia, like avoiding smoking, eating a well-balanced diet and keeping existing health conditions in check.

**OUTLOOK / PROGNOSIS**

In most cases, hypogeusia goes away once the underlying condition does. For example, if a cold or sinus infection causes a weakened sense of taste, your taste should come back once you feel better. Hypogeusia due to COVID-19 can linger, sometimes for several weeks or months.

Less commonly, hypogeusia can last for years. In rare cases, your sense of taste may never fully come back. This is most common in people with neurological conditions like Parkinson’s disease.

**POSSIBLE COMPLICATIONS**

A diminished sense of taste can negatively impact your quality of life. Foods that once tasted delicious to you may not bring you pleasure anymore. This can cause a lack of appetite and may result in malnutrition.

Additionally, your sense of taste can help you detect spoiled foods and drinks. In some cases, it can even help you identify allergens. For example, if you’re allergic to nuts, your sense of taste can tell you to stop eating foods that contain them.

**WHEN TO SEE A DOCTOR / RED FLAG**

It’s normal for your sense of taste to change when you have a cold or another type of infection. But these changes usually go away once you recover from your illness. If you have hypogeusia that lasts for more than a couple of weeks, or if you develop a sudden loss of taste, let your healthcare provider know.

**DIFFERENTIAL DIAGNOSIS**

* Infectious Causes:
  + Upper respiratory viral infections (common cold, influenza, COVID-19)
  + Viral hepatitis
  + Oral infections or stomatitis
* Neurological Disorders:
  + Parkinson’s disease
  + Alzheimer’s disease
  + Multiple sclerosis
  + Head trauma affecting cranial nerves involved in taste (VII, IX, X)
  + Central nervous system tumors
* Nutritional Deficiencies:
  + Zinc deficiency
  + Vitamin B12 deficiency
  + Folate deficiency
* Medications:
  + Antibiotics (e.g., ampicillin, tetracycline)
  + Antihistamines
  + Antidepressants (e.g., amitriptyline)
  + Chemotherapy agents
  + Antihypertensives
* Autoimmune and Systemic Diseases:
  + Sjögren’s syndrome (dry mouth affecting taste)
  + Diabetes mellitus
  + Chronic rhinosinusitis
* Oral and Dental Conditions:
  + Poor oral hygiene
  + Gingivitis or periodontitis
  + Oral cancer or tumors affecting taste buds or nerves
* Environmental and Lifestyle Factors:
  + Smoking and alcohol use
  + Exposure to toxins or chemicals
  + Radiation therapy to head and neck
* Aging:
  + Natural decline in taste bud number and function with age

**RECENT GUIDELINES OR UPDATES**

Hypogeusia, a reduced sense of taste, can be caused by various factors such as medications, dental issues, or underlying health conditions, and it is also a common early symptom of COVID-19. Recent guidelines emphasize the importance of addressing underlying conditions to treat hypogeusia, which may involve lifestyle changes, medications, or surgery in some cases.

* Causes: Hypogeusia can be caused by health conditions, environmental factors, and neurological issues, including viral infections like COVID-19, allergies, and dental problems.
* Diagnosis: Healthcare providers diagnose hypogeusia through physical examinations and tests that assess taste detection and differentiation.
* Treatment: Treatment involves addressing the underlying cause, which may include lifestyle changes, medications, or surgical interventions if necessary.
* Prognosis: In most cases, hypogeusia resolves once the underlying condition is treated. However, it can persist for years in rare cases, particularly in individuals with neurological conditions.

**EPIDEMIOLOGY**

* Prevalence:  
  Approximately 5.3% to 19% of adults report some form of taste alteration, including hypogeusia, in population studies of adults aged 40 and older in the US. Self-reported taste problems are less common than smell problems but still affect a significant portion of the population.
* Age-related increase:  
  The prevalence of taste dysfunction increases with age, reaching up to 27% in those aged 80 and above. Older adults are more likely to experience hypogeusia due to natural decline in taste receptor function and other age-related factors.
* Gender and sociodemographic factors:  
  Taste alterations are more common in individuals with lower educational attainment and poorer general health. Xerostomia (dry mouth) is a strong independent risk factor for taste problems.
* Associated conditions:  
  Hypogeusia is frequently reported in viral infections such as COVID-19, where taste loss occurs in about 19-33% of cases, though objective testing sometimes shows lower prevalence than self-reports. Other systemic illnesses, nutritional deficiencies, and medication side effects contribute to hypogeusia prevalence.
* Global variation:  
  Studies show variability in prevalence across populations, partly due to differences in assessment methods and underlying health conditions.

**PREDEFINED Q & A SETS**

Question: “Why did my sense of taste change?”

Answer: “Your sense of taste may have changed due to several possible reasons. Common causes of hypogeusia (reduced taste sensitivity) include:

* Medications: Certain drugs such as antihistamines, antibiotics, antihypertensives, and chemotherapy agents can alter taste perception.
* Medical conditions: Nutritional deficiencies (especially zinc, vitamin B12, folate), neurological disorders (like Parkinson’s or Alzheimer’s disease), infections (upper respiratory infections including COVID-19), and oral health problems (dental issues, gingivitis) can impair taste.
* Aging: Natural decline in the number and function of taste buds with age.
* Environmental factors: Smoking, alcohol use, and exposure to chemicals or toxins.
* Other causes: Head trauma, surgeries involving the mouth or head and neck, radiation therapy, and autoimmune diseases such as Sjögren’s syndrome.

Question : “What’s the underlying cause?”

Answer: “The underlying cause may be related to damage or dysfunction of the taste buds, nerves that transmit taste signals, or brain areas that process taste. It could also be due to reduced saliva production or nasal problems affecting smell, which influences taste.”

Question : “Do I need diagnostic tests?”

Answer: “Yes, your healthcare provider may recommend:

* A thorough medical history and physical examination, including oral and nasal inspection.
* Taste tests to objectively assess the degree of taste loss.
* Blood tests to check for nutritional deficiencies or underlying systemic diseases.
* Imaging studies (CT or MRI) if neurological causes or structural abnormalities are suspected.
* Review of medications to identify potential contributors.”

Question : “Do I have another health condition causing this?”

Answer: “Hypogeusia can be a symptom of other health conditions such as viral infections (including COVID-19), neurological diseases (Parkinson’s, Alzheimer’s), autoimmune disorders, or nutritional deficiencies. Identifying and managing any underlying health issues is important for improving your taste function.

If you experience sudden or severe taste loss, or if it is accompanied by other symptoms like smell loss, neurological changes, or difficulty swallowing, seek prompt medical evaluation.”

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I understand you’ve noticed a reduced sense of taste recently. Can you tell me more about when this started and how it’s affecting you?

Patient: It began a few weeks ago. Food just doesn’t taste the same, and sometimes I can barely tell what I’m eating. It’s quite frustrating.

Doctor: That must be difficult. A reduced sense of taste, or hypogeusia, can happen for several reasons. Sometimes it’s related to infections like a cold or COVID-19, certain medications, or even dental issues. Other times, it can be linked to nutritional deficiencies or underlying health conditions.

Patient: Could it be something serious?

Doctor: In many cases, it’s temporary and improves with treatment of the underlying cause. However, if it persists or is accompanied by other symptoms like numbness, weakness, or difficulty swallowing, we would investigate further to rule out neurological or other systemic causes.

Patient: What tests will I need?

Doctor: I’ll start with a thorough examination of your mouth, nose, and throat. We may do some taste tests to objectively measure how much your sense of taste is affected. Blood tests might be needed to check for vitamin deficiencies or other medical issues. If necessary, imaging studies can help us look for any structural problems.

Patient: Is there anything I can do to improve my taste now?

Doctor: Yes, maintaining good oral hygiene is important. Also, trying foods with varied textures, colors, and aromas can help make eating more enjoyable. Avoid adding too much salt or sugar. If a medication is causing the problem, we can review it together to see if changes are possible.

Patient: How long does it usually take to get better?

Doctor: It depends on the cause. Some people recover within weeks, especially if it’s related to an infection. Others may take longer, particularly if it’s due to chronic conditions. We will monitor your progress and adjust treatment as needed.

Patient: Thank you. I feel better knowing there’s a plan.

Doctor: You’re welcome. Please keep me informed of any changes or new symptoms. We’re here to support you through this.

*REFERENCES:*

<https://www.nidcd.nih.gov/health/taste-disorders>

[Hypogeusia: Causes, Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/25113-hypogeusia#overview)

**HEARING LOSS**

*ALTERNATIVE NAMES:* Alternative names for hearing loss include deafness, hearing impairment, and hearing loss itself. Deafness refers to a partial or complete loss of hearing. Hearing impairment is another term used to describe a decrease in the ability to hear. Additionally, terms such as "hard of hearing" and "deaf" are also used to describe individuals with hearing loss. The term "anacusis" is a medical term that specifically refers to complete deafness. Other synonyms for hearing loss include "deafened," "unhearing," "tone-deaf," "unable to hear," "deaf as a post," "mutton," "Mutton Jeff," and "without hearing".

**DEFINITION / DESCRIPTION**

Hearing loss happens when something affects your hearing system. If you have hearing loss, you may have trouble understanding, following or participating in conversations. It may be hard for you to hear telephone conversations, to take part in online meetings or follow dialogue when you’re watching television.

Hearing loss can affect your ability to work, communicate with others and generally enjoy life. Most often, hearing loss can’t be reversed. But audiologists — healthcare providers who specialize in diagnosing and treating hearing loss — can help. They can recommend treatments like hearing aids or cochlear implants that reduce hearing loss.

***Is hearing loss common?***

Yes, it is. More than 1 in 10 people in the United States have some degree of hearing loss:

* An estimated 60,000 people have hearing loss in one ear (unilateral hearing loss).
* About 1 in 3 adults over 65 and nearly half adults 75 and older have age-related hearing loss.
* About 2 in 1,000 babies are born with some type of hearing loss.

***Types of hearing loss***

There are three types of hearing loss:

* Conductive hearing loss: In this hearing loss, something keeps sound from passing through your outer ear (ear canal) or your middle ear.
* Sensorineural hearing loss: This hearing loss happens when something damages your inner ear over time. Rarely, sensorineural hearing loss happens very quickly. This is sudden sensorineural hearing loss (SSHL), or sudden deafness. SSHL may happen all at once or over a few days.
* Mixed: This happens when you have issues in your middle or outer ear (conductive hearing loss) and your inner ear (sensorineural hearing loss).

**CAUSES**

Many things can cause hearing loss. For example, short-term or sudden exposure to very loud noise — like attending a loud concert — can affect your hearing.

Conductive hearing loss causes include:

* Earwax that’s built up in your ear.
* Fluid in your middle ear from colds or allergies.
* Middle ear infection (otitis media).
* Swimmers’ ear (otitis externa).
* Eustachian tube issues that traps fluid in your middle ear.
* Ruptured eardrum.
* Ear tumors.
* Something stuck in your ear. For example, your child, faced with a side dish of peas, may decide to put one in their ear.
* Congenital conditions (conditions present at birth) that affect how babies’ middle or outer ears are formed.

Sensorineural hearing loss causes include:

* Aging.
* Illnesses like coronary artery disease (heart disease), high blood pressure (hypertension), strokes or diabetes.
* Ototoxicity.
* Certain genetic (inherited) conditions.
* Being hit in the head.
* Noise-induced hearing loss. Long-term exposure to loud noise, like working in a very noisy environment like factories and construction sites.
* Congenital infections like cytomegalovirus (CMV).

Mixed hearing loss in a combination of conductive and sensorineural hearing loss. That means it affects your outer and middle ear as well as your inner ear. For example, if you take medications that affect your inner ear and you accidentally rupture your eardrum in your middle ear, you have mixed hearing loss.

**RISK FACTORS**

Factors that damage or lead to loss of the hairs and nerve cells in the inner ear include:

* Aging. The inner ear breaks down over time.
* Loud noise. Being around loud sounds can damage the cells of the inner ear. Damage can happen by being around loud noises over time. Or the damage can come from a short blast of noise, such as from a gunshot.
* Heredity. Your genes may make you more likely to have ear damage from sound or from aging.
* Noises on the job. Jobs where loud noise is constant, such as farming, construction or factory work, can lead to damage inside the ear.
* Noises at play. Exposure to explosive noises, such as from firearms and jet engines, can cause immediate, permanent hearing loss. Other activities with dangerously high noise levels include snowmobiling, motorcycling, carpentry or listening to loud music.
* Some medicines. These include the antibiotic gentamicin, sildenafil (Viagra) and certain medicines used to treat cancer, which can damage the inner ear. Very high doses of aspirin, other pain relievers, antimalarial drugs or loop diuretics can cause short-term effects on hearing. These include ringing in the ears, also known as tinnitus, or hearing loss.
* Some illnesses. Illnesses such as meningitis that cause high fever can harm the cochlea.

***Comparing loudness of common sounds***

The chart below lists common sounds and their decibel levels. A decibel is a unit used to measure how loud sound is. The Centers for Disease Control and Prevention says noise above 70 decibels over time can start to damage hearing. The louder the noise, the less time it takes to cause lasting hearing damage.

| ***Sound levels of common noises*** | |
| --- | --- |
| Decibels | Noise source |
|  | Safe range |
| 30 | Whisper |
| 40 | Refrigerator |
| 60 | Normal conversation |
| 75 | Dishwasher |
|  | Risk range |
| 85 | Heavy city traffic, school cafeteria |
| 95 | Motorcycle |
| 100 | Snowmobile |
| 110 | Chain saw |
| 110 | Jackhammer, rock concert, symphony |
| 115 | Sandblasting |
| 120 | Ambulance siren, thunder |
| 140-165 | Firecracker, firearms |

***Longest amount of time to be around loud sounds***

Below are the loudest noise levels people can be around on a job without hearing protection and for how long.

| ***Maximum job-noise exposure allowed by law*** | |
| --- | --- |
| Sound level, decibels | Duration, daily |
| Based on The National Institute for Occupational Safety and Health (NIOSH), 2018. | |
| 90 | 8 hours |
| 92 | 6 hours |
| 95 | 4 hours |
| 97 | 3 hours |
| 100 | 2 hours |
| 102 | 1.5 hours |
| 105 | 1 hour |
| 110 | 30 minutes |
| 115 | 15 minutes or less |

**SIGNS / SYMPTOMS**

Most people lose their hearing gradually. They may not even notice that it’s happening. In general, you may be developing hearing loss if:

* You often ask people to repeat themselves.
* You have trouble following a conversation, especially when you’re talking on the telephone or in a noisy environment like a restaurant.
* You think people are mumbling.
* You can’t hear certain high-pitched sounds, like birds singing.
* You need to turn up the volume on your television, computer or tablet.
* You have tinnitus (ringing in your ears).
* Your ear hurts (earache).
* You feel as if there’s pressure or fluid inside your ear.
* You have balance problems or dizziness.

What are symptoms of hearing loss in babies and children?

Babies with hearing loss may seem to hear some sounds but not others. They may:

* Not startle to loud noises.
* Not turn to the source of a sound after 6 months of age.
* Not say single words like “mama” or “dada” by age 1.
* Not reacting when you say their name.

Older children with hearing loss may:

* Say “huh” a lot.
* Be slower to learn to speak than other children their age.
* Have unclear speech.
* Not follow directions.
* Turn up the volume on television or tablets.

**DIAGNOSIS METHODS**

Your healthcare provider will ask about your symptoms and do a physical exam. They’ll check for signs of infection or other issues that could cause hearing loss. They may do a CT scan (computed tomography scan) or MRI (magnetic resonance imaging) if you hurt your ear or they think you may have a tumor. Your provider may refer you to an audiologist (or you may contact one on your own) who’ll do specific hearing tests.

Common hearing tests include:

* Pure-tone testing: This common hearing test finds the quietest volume you can hear at each pitch. You’ll wear headphones or earplugs to hear the sounds and speech. You’ll also wear a device on your head for bone conduction testing. The combination of testing with headphones/earplugs and bone conduction testing helps your audiologist determine which type of hearing loss you have.
* Otoacoustic emissions test (OAE): Audiologists use this test to check your inner ear function.
* Tympanometry: This test checks how well your eardrum moves. Audiologists may do tympanometry tests to see if you have a ruptured eardrum, fluid in your middle ear or wax in your ear canal.

***Stages of hearing loss***

If you have a hearing test, your audiologist will share test results and explain what they mean. Often, hearing loss is classified as the degree of loss. The degree of loss is how loud sounds need to be for you to hear them. According to the American Speech-Language-Hearing Association, the degrees of loss are:

* Normal.
* Slight.
* Mild.
* Moderate.
* Moderately severe.
* Severe.
* Profound.

**TREATMENT OPTIONS**

Treatments are different depending on the type of hearing loss you have.

Conductive hearing loss

* Medications, like antibiotics, to treat ear infections.
* Surgeries, including tympanoplasty, to repair a ruptured eardrum, tympanostomy to insert ear tubes or surgery to remove tumors.
* Procedures to remove earwax or other objects in your ear canal.

Sensorineural hearing loss

* Medications, like corticosteroids, to reduce swelling in your cochlea hair cells. (You can damage your cochlea hair cells if you’re exposed to loud noise.)
* Management like hearing aids and cochlear implants.

Mixed hearing loss

* Treatments vary based on the specific issues affecting your outer, middle and inner ear.

***Treatment side effects***

Side effects vary, but surgeries likely have the most significant side effects:

* Tympanoplasty complications include graft failure, when surgery doesn’t fix your ruptured eardrum.
* Tympanostomy side effects may include tympanosclerosis (scarring of eardrum), repeated ear infections or otorrhea (fluid continuously draining from your ear).
* Ear tumor treatments may cause hearing loss, balance issues and facial weakness.
* Cochlear implant surgery may affect your sense of balance or affect residual hearing, which is hearing you have despite having severe or profound hearing loss. Rarely, cochlear implant surgery causes nerve damage or cerebrospinal leaks.

**PREVENTION TIPS**

There are some types of hearing loss you can’t prevent. For example, many people develop hearing loss as they grow older. That said, noise is the most common cause of hearing loss. You can help prevent noise-induced hearing loss by avoiding situations and environments where you’re bound to encounter very loud noise. If you can’t avoid noisy situations, protect your hearing by:

* Use hearing protection (earplugs or earmuffs) during loud activities like concerts, riding motorcycles or snowmobiles, or working with loud machinery.
* Lower the volume. When listening to music through headphones or earbuds, keep the volume level low enough that you can hear people speaking around you. Another good rule is not to exceed 80% of volume level for more than 90 minutes a day.
* Don’t stick anything into your ear canal, including cotton swabs or hairpins. These objects could become lodged in your ear canal or cause an eardrum rupture.
* Avoid smoking, which can impair circulation and affect your hearing.
* Get regular exercise to help prevent health issues that can cause hearing problems, like diabetes or high blood pressure.
* Manage any chronic illnesses to prevent further damage.

**OUTLOOK / PROGNOSIS**

That depends on your situation. Some hearing loss is temporary, like hearing loss that happens because you have a cold, swimmer’s ear, or there’s something stuck in your ear. Sensorineural and age-related hearing loss is usually permanent, but hearing aids or cochlear implants may restore most of your hearing.

**POSSIBLE COMPLICATIONS**

Having hearing loss can make you feel disconnected from the world around you. You may become frustrated, irritable or angry. People with severe hearing loss can become anxious or depressed. Children with hearing loss may struggle in school and get poor grades. Studies also show a link between hearing loss in older adults and dementia.

**Living With**

It can be challenging to live with hearing loss, even if you’re already receiving treatment like using hearing aids or cochlear implant surgery.

There may be times when you can’t hear as well as you’d like. If that’s your situation, you may want to let people know you have hearing loss.

Hearing loss can affect your emotional health. Even with treatment, you may feel depressed or anxious. If you do, consider sharing your feelings with a healthcare provider.

**WHEN TO SEE A DOCTOR / RED FLAG**

Contact your healthcare provider if you think your hearing loss is getting worse. You may need a different kind of hearing support.

***Diagnostic Considerations***

No differential diagnosis for confirmed deafness is known, though differential diagnoses are generally considered in determining the etiology of hearing impairment. Alternatively, the differential diagnosis for children who present with language, behavioral, and school difficulties should include hearing loss.

**RECENT GUIDELINES OR UPDATES**

Recommendations included the following:

* All newborns and infants with confirmed hearing loss should undergo a comprehensive evaluation that includes patient-focused medical and birth histories and a three-generation pedigree and family medical history are obtained, as well as a physical examination focusing on dysmorphic physical findings; evaluation of children and young adults with hearing loss should follow a similar approach.
* Elements of medical and birth histories focused on hearing loss include prenatal history (eg, maternal infections and illnesses or medication or drug exposures); neonatal history (eg, premature birth, low birth weight, birth hypoxia, hyperbilirubinemia, sepsis, and exposure to ototoxic medications); postnatal history (eg, viral illnesses, bacterial meningitis, head trauma, noise exposure, and exposure to ototoxic medications); and audiometric assessment of the hearing loss.
* The pedigree and family medical history should focus on identifying the following: first- and second-degree relatives with hearing loss or with features commonly associated with hearing loss (eg, pigmentary, branchial, or renal anomalies) or sudden cardiac death; a pattern of inheritance; ethnicity and country of origin; common origin from ethnically or geographically isolated areas; and consanguinity.
* The physical examination should focus on dysmorphic and other physical findings (eg, unusual facial appearance, with attention to asymmetry; pigmentary anomalies; neck, skin, facial, or ear anomalies; neurologic abnormalities; balance disturbances; and skeletal abnormalities).
* For individuals with findings that suggest a syndromic genetic etiology for their hearing loss, pretest genetic counseling should be provided, and, with informed consent, genetic testing, if available, should be ordered to confirm the diagnosis; appropriate studies should be undertaken to determine whether other organs are involved; appropriate near-term and long-term screening and management should be arranged as indicated by the associated manifestations of the particular syndrome.
* For individuals lacking physical findings suggestive of a known syndrome and having medical and birth histories that do not suggest an environmental cause of hearing loss, a tiered approach is advisable; pretest genetic counseling should be provided, and, with informed consent, genetic testing should be ordered; temporal bone imaging by CT or MRI should be considered as a complement to genetic testing; cytomegalovirus (CMV) should be done at the same time as genetic testing for infants with congenital hearing loss (for later-onset or progressive hearing loss, the likelihood that a positive CMV test result is due to postnatal exposure increases with age).
* Referral to a multidisciplinary care center, when available, is recommended; a team approach that includes otolaryngologists, clinical geneticists, genetic counselors, audiologists, speech and language specialists, early hearing intervention and family support specialists, and other appropriate specialists is optimal.
* When genetic evaluation has failed to identify an underlying cause, periodic follow-up care every 3 years with a geneticist may be appropriate.
* Regardless of whether genetic test results are positive, negative, or inconclusive, results should be communicated through the process of genetic counseling.

**EPIDEMIOLOGY**

***United States and international statistics***

Hearing loss occurs in approximately 5-10 per 1000 children in the United States. Roughly 1-3 in 1000 children are born with profound hearing loss, and 3-5 in 1000 are born with mild-to-moderate hearing loss that may affect language acquisition unless hearing, language, or both are aided.The prevalence of hearing loss requiring intervention among graduates from neonatal intensive care units (NICUs) is 1-4%. Acquired hearing loss in children may add another 10-20% to these numbers.

The prevalence of hearing loss in adolescents aged 12-19 years appears to be increasing in the United States. A 2010 study found that this increase in prevalence was approximately one third greater from 2005 to 2006 than from 1988 to 1994.

Interestingly, significant hearing loss (≥25 dB) was particularly increased, to the point where approximately 1 in 20 adolescents has this type of hearing loss. Noise-induced hearing loss contributes substantially to the increased incidence of hearing loss in adolescents.

Data from the United States Census show that almost 3% of the population in the workforce reports having some hearing loss, including CHL, SNHL, or mixed loss.

Worldwide, SNHL occurs in 9-27 per 1000 children.

***Age- and sex-related demographics***

Most hearing loss in children is congenital or acquired perinatally.However, hearing loss may occur at any age. Approximately 10-20% of all cases of deafness are acquired postnatally, though some genetic causes of deafness result in hearing loss that begins during childhood or adolescence or is slowly progressive and therefore diagnosed in childhood or adolescence.

No sex predilection is known. Some hereditary causes of deafness or acquired deafness may occur more frequently in one sex than in the other. However, the overall prevalence of deafness is equal in male and female individuals.

**PREDEFINED Q & A SETS**

Question: “What’s the difference between hearing loss and deafness?”

Answer: The difference is someone with hearing loss still hears sounds well enough to take part in conversations. They can improve their hearing ability through hearing aids or other treatments. Someone who’s deaf can hear very little or nothing at all. Hearing aids and devices don’t help. A person who’s deaf may use sign language to communicate.

Question: “Is hearing loss a disability?”

Answer: The Americans with Disabilities Act (ADA) protects people with disabilities from discrimination. The ADA considers certain medical conditions to be disabilities if the conditions limit people’s abilities to do everyday activities. Hearing loss is one such medical condition, but the level of hearing loss factors into whether it’s a disability under federal law.

* Genes and Variants:
  + Over 326 HL-related genes have been identified, with detailed genetic and clinical data compiled in databases like Gene4HL, integrating thousands of studies and variant data.
  + The Hereditary Hearing Loss Homepage lists 156 known genes associated with nonsyndromic hearing loss:
    - 64 autosomal dominant
    - 88 autosomal recessive
    - 7 X-linked
    - 9 mitochondrial
    - 5 genes linked to auditory neuropathy.
  + The Deafness Variation Database catalogs and classifies genetic variants related to both syndromic and nonsyndromic hearing loss.
* Types of Genetic Hearing Loss:
  + Nonsyndromic hearing loss (NSHL): Hearing loss without other clinical features, caused by mutations in genes affecting cochlear function or auditory nerve pathways.
  + Syndromic hearing loss: Hearing loss accompanied by other systemic or developmental abnormalities.
* Genetic Testing Advances:
  + Whole-genome sequencing (WGS) and whole-exome sequencing (WES) are increasingly used to identify causative variants, including rare mutations, copy number variants, mitochondrial DNA mutations, and regulatory region variants.
  + WGS has detected pathogenic mitochondrial mutations (e.g., m.1555A>G and m.7444G>A) linked to hearing loss, which are often missed by WES.
  + Structural variants such as deletions in the STRC gene have been identified as causes of autosomal recessive hearing loss.
* Inheritance Patterns:  
  Hearing loss can be inherited in autosomal dominant, autosomal recessive, X-linked, or mitochondrial patterns, with variable expressivity and penetrance depending on the gene and mutation.

***Hearing Loss Treatment Drugs and Their Side Effects***

1. Corticosteroids

* Use:
  + Often prescribed for sudden sensorineural hearing loss (SSNHL) to reduce inflammation and swelling in the cochlea and auditory nerve.
  + Can be given orally or via intratympanic injection.
* Common Side Effects:
  + Increased blood sugar levels
  + Mood changes
  + Weight gain
  + Insomnia
  + Increased risk of infections
* Serious Side Effects (rare):
  + Osteoporosis (with long-term use)
  + Hypertension
  + Gastrointestinal bleeding

2. Antibiotics and Ototoxic Drugs

* Use:
  + Antibiotics like aminoglycosides (e.g., gentamicin, amikacin) are used for serious infections but can cause ototoxicity leading to permanent hearing loss.
  + Platinum-based chemotherapies (e.g., cisplatin) are also ototoxic and cause irreversible damage to cochlear hair cells.
* Side Effects:
  + Irreversible sensorineural hearing loss, especially affecting high frequencies first
  + Tinnitus
  + Vestibular dysfunction (balance problems)
* Management:
  + Monitoring hearing during treatment
  + Using less ototoxic alternatives when possible
  + Early audiometric screening

3. Diuretics (e.g., Furosemide)

* Use:
  + Sometimes used in Meniere’s disease to reduce inner ear fluid pressure.
* Side Effects:
  + Electrolyte imbalance
  + Hearing loss (rare, usually reversible) if given rapidly or in high doses

Non-Pharmacologic Treatments

* Hearing Aids:
  + Amplify sound for patients with mild to moderate hearing loss.
  + Digital hearing aids are customizable and come in various styles (behind-the-ear, in-the-ear).
  + Side effects: Ear irritation, feedback noise, discomfort initially.
* Cochlear Implants:
  + For severe to profound sensorineural hearing loss not helped by hearing aids.
  + Bypass damaged cochlea to stimulate the auditory nerve directly.
  + Risks include surgical complications, device failure, and need for rehabilitation.
* Assistive Listening Devices:
  + Include FM systems, amplified telephones, and TV listening devices to improve communication.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, [Patient’s Name]. Before we begin, I want to make sure you can hear me clearly. If at any point you have trouble understanding, please let me know, and I can repeat or write things down for you.

Patient: Thank you, I appreciate that.

Doctor: Can you tell me about your hearing difficulties? When did you first notice them?

Patient: It started gradually over the last year. I have trouble hearing in noisy places and sometimes miss parts of conversations.

Doctor: That’s quite common. Hearing loss can happen for many reasons, including age, noise exposure, or infections. We’ll work together to understand your specific situation and find the best way to help you.

Patient: What kind of tests will I need?

Doctor: We’ll start with a hearing test called an audiogram to measure your hearing levels. Depending on the results, we might do imaging or other tests to check the health of your ear structures.

Patient: Will I need hearing aids?

Doctor: Possibly. Hearing aids can significantly improve your ability to communicate, especially in difficult listening environments. We’ll discuss options based on your test results and preferences.

Patient: Sometimes I find it hard to follow what people say, especially in busy places.

Doctor: That’s understandable. To help, I’ll make sure to speak clearly and face you directly during our conversations. It’s also helpful to reduce background noise when possible. If you want, I can provide written summaries of our discussions or use other communication aids.

Patient: That would be helpful.

Doctor: Great. Also, if you use any hearing devices, please bring them to your appointments. And if you prefer, we can arrange for a sign language interpreter or other support services.

Patient: Thank you. I feel more comfortable knowing you’re aware of my needs.

Doctor: You’re welcome. Our goal is to make sure you get the best care with clear communication. Please tell me anytime if you need me to repeat or explain something differently.

*REFERENCES:*

<https://www.mayoclinic.org/diseases-conditions/hearing-loss/diagnosis-treatment/drc-20373077>

<https://www.aafp.org/pubs/afp/issues/2003/0915/p1125.html>

<https://my.clevelandclinic.org/health/diseases/17673-hearing-loss>

<https://emedicine.medscape.com/article/856313-medication>

**HOARSENESS**

*ALTERNATIVE NAMES:* Alternative names for hoarseness include gruffness, huskiness, throatiness, roughness, croakiness, gutturalness, harshness, rasping, raucousness, and a frog in the throat. Other related terms are dysphonia, roughness, raspiness, and hoarse voice.

**DEFINITION / DESCRIPTION**

Hoarseness (dysphonia) is when your voice sounds rough, raspy, strained or breathy. Hoarseness may affect how loud you speak or your voice’s pitch (how high or low your voice sounds). Many things cause hoarseness, but it’s rarely a sign of a serious illness.

Is hoarseness common?

Hoarseness is very common. About 1 in 3 people will have it at some point in their lives. It often affects people who smoke and those who use their voices professionally like teachers, singers and actors, sales representatives and call center employees.

**CAUSES**

To understand why you get hoarse, it may help to know how your voice works. You can speak thanks to your vocal folds (vocal cords) and larynx (voice box). Your larynx sits above your trachea (windpipe) — a long tube that connects your larynx to your lungs.

Your vocal cords are two bands of tissue inside your larynx that open and close. When you speak, air from your lungs makes your vocal cords vibrate and create sound waves. Anything that affects your vocal cords and larynx can make you sound hoarse, including:

* Laryngitis. This is the most common hoarseness cause. It happens when allergies, upper respiratory infections or sinus infections make your vocal cords swell.
* Using your voice more than usual or in different ways. For example, you can become hoarse after making a long speech. Cheering or yelling can affect your voice. So can speaking in a pitch that’s higher or lower than your normal pitch.
* Age. Your vocal cords get thin and limp as you age, which can affect your voice.
* GERD (chronic acid reflux). Also known as heartburn, GERD is when your stomach acids go up into your throat. Sometimes the acids can go as high as your vocal cords, and that’s known as laryngopharyngeal reflux (LPR).
* Vocal cord hemorrhage. This happens when a blood vessel on a vocal cord ruptures, filling the muscle tissues with blood.
* Vocal nodules, cysts and polyps. Nodules, polyps and cysts are noncancerous growths on your vocal cords.
* Vocal cord paralysis. Vocal cord paralysis means that one or both of your vocal cords don’t open or close as they should.
* Recurrent respiratory papillomatosis (RRP/laryngeal papillomatosis). This condition creates benign (noncancerous) warts on and around your vocal cords.
* Spasmodic dysphonia. This chronic neurological speech disorder changes the way your voice sounds.
* Muscle tension dysphonia. This occurs when you put too much stress on your vocal cords and the muscles get tight. It can also be the result of an injury to the neck, shoulders or chest.
* Neurological diseases and disorders. If you have a stroke or Parkinson’s disease, your condition may affect the part of your brain that controls the muscles in your larynx.
* Cancer. Cancers including laryngeal cancer, lung cancer and throat cancer may make you sound hoarse.

**RISK FACTORS**

The risk factors for hoarseness include a variety of factors that can affect the vocal cords and larynx. These include having a respiratory infection, such as a cold, bronchitis, or sinusitis. Exposure to irritating substances, such as cigarette smoke, excessive alcohol intake, stomach acid, or workplace chemicals, can also contribute to hoarseness. Overusing the voice, by speaking too much, speaking too loudly, shouting, or singing, is another significant risk factor.

Smoking is a major risk factor for laryngeal cancer and can also cause permanent changes to the vocal cords, leading to swelling and potential airway blockage. Excess alcohol consumption and gastro-oesophageal reflux are additional risk factors. Professional voice use, such as in teachers, actors, and singers, increases the likelihood of developing hoarseness. Environmental factors, such as poor acoustics, atmospheric irritants, and low humidity, can also contribute to hoarseness.

Other risk factors include type 2 diabetes, which can lead to neuropathy and poor glycaemic control. Neurological conditions such as Parkinson's disease, stroke, and other focal brain lesions can also cause hoarseness. Vocal cord paralysis, which can result from nerve injury due to surgery, injury to the chest or neck, cancer, nerve disorders, or other health conditions, is another risk factor.

In addition, autoimmune diseases, endocrine disorders, and rare conditions such as sarcoidosis and laryngeal amyloidosis can affect the larynx and contribute to hoarseness. Patients with risk factors for dysplasia, such as tobacco use, heavy alcohol use, or hemoptysis, should have their hoarseness evaluated promptly.

**SIGNS / SYMPTOMS**

The following symptoms may mean you have hoarseness:

* Your voice sounds as if you’re having a hard time talking.
* Your voice sounds raspy or breathy.
* You’re speaking more quietly or softer than usual.
* Your voice sounds higher or lower than usual.

***When should I be worried about hoarseness?***

Most hoarseness happens because you overuse your voice; and it usually goes away on its own. But you should talk to a healthcare provider if your voice is hoarse for three weeks or longer or if there are other concerning signs. Contact a provider right away if you notice that:

* It hurts when you speak or swallow.
* It’s hard to breathe or swallow.
* You’re coughing up blood.
* There’s a lump in your neck.
* You’ve lost your voice.

**DIAGNOSIS METHODS**

Depending on your symptoms, your usual healthcare provider may refer you to an otolaryngologist, a provider who specializes in treating ear, nose and throat conditions. After getting your medical history and a list of your medications, your provider may ask the following questions:

* How long have you had hoarseness?
* Did your symptoms start suddenly or come on gradually?
* Did you have an upper respiratory infection recently?
* Do you have other symptoms?
* Do you smoke? If so, for how long?
* Do you drink alcohol?

***What tests will be done to diagnose hoarseness?***

Your provider will listen to your voice and examine your head and neck for lumps. They may do the following tests:

* Laryngoscopy.
* Videostroboscopy.
* Computed tomography (CT) scan.
* Magnetic resonance imaging (MRI).
* Biopsy.

**TREATMENT OPTIONS**

Treatment depends on the reason why you’re hoarse:

| Cause | Treatment |
| --- | --- |
| Vocal fold hemorrhage or muscle tension dysphonia. | Resting your voice or voice therapy with a speech-language pathologist (SLP). |
| Colds and sinus infections. | Over-the-counter (OTC) medications or antibiotics for bacterial infections. |
| Laryngitis. | Antibiotics or corticosteroids. |
| GERD. | Antacids, proton pump inhibitors and/or lifestyle modifications. |
| Vocal nodules, cysts and polyps, or papillomas. | Surgery and/or voice therapy. |

Some types of cancer or neurological diseases may cause hoarseness. If you’re hoarse because you have cancer or neurological issues, a healthcare provider who specializes in those issues will treat the underlying cause.

**PREVENTION TIPS**

Sometimes hoarseness is linked to medical conditions that you may not be able to prevent. But you can prevent hoarseness by taking care of your voice, particularly if you use it every day for a long time.

(Think teaching, singing or public speaking.) Here are some suggestions:

* Quit smoking (your provider can provide resources to help with this). Stay away from secondhand smoke.
* Avoid beverages that have alcohol and/or caffeine.
* Drink plenty of water.
* Use a humidifier.
* Avoid spicy foods.
* Avoid activities that strain your voice, like speaking for a long time, speaking loudly or shouting.
* Use an amplifying device like a microphone or megaphone when you do activities that could strain your voice.

**OUTLOOK / PROGNOSIS**

In general, you can expect to have your voice back after resting it or receiving treatment for the underlying cause. Rarely, hoarseness is a symptom of serious illnesses like cancer or a neurological disorder.

**WHEN TO SEE A DOCTOR / RED FLAG**

You should contact your provider if you’re still hoarse despite treatment or you notice your symptoms are getting worse

**DIFFERENTIAL DIAGNOSIS**

Common Causes of Hoarseness

* Acute laryngitis (viral or bacterial infection)
* Chronic laryngitis (often due to smoking, reflux, or irritants)
* Muscle tension dysphonia (functional dysphonia)
* Vocal fold nodules, polyps, cysts
* Reinke’s edema (smoker’s voice)
* Presbylarynx (age-related vocal cord atrophy)
* Laryngopharyngeal reflux (LPR)
* Vocal fold hemorrhage
* Voice overuse or misuse

Uncommon or Serious Causes

* Vocal cord paralysis or paresis (neurological injury or disease)
* Spasmodic dysphonia (adductor or abductor types)
* Recurrent respiratory papillomatosis (benign tumors caused by HPV)
* Vocal fold scarring or sulcus vocalis
* Granulomas or contact ulcers
* Laryngeal cancer or malignancies
* Systemic diseases affecting the larynx (e.g., rheumatoid arthritis, sarcoidosis, amyloidosis)
* Neurological disorders (Parkinson’s disease, stroke, multiple sclerosis)
* Trauma or iatrogenic injury (intubation injury, neck surgery)
* Psychogenic dysphonia (conversion disorder)

Red Flags Indicating Possible Serious Disease

* Hoarseness lasting more than 3 weeks
* History of smoking or alcohol use
* Presence of neck lymphadenopathy
* Symptoms like dysphagia, odynophagia, hemoptysis, unexplained weight loss, dyspnea
* Neurological symptoms or hoarseness after trauma or surgery

**RECENT GUIDELINES OR UPDATES**

The most recent guidelines for the management of hoarseness (dysphonia) were published in 2018 by the American Academy of Otolaryngology–Head and Neck Surgery Foundation (AAO-HNSF). These updated guidelines provide evidence-based recommendations for healthcare providers on when to refer patients for laryngoscopy, when to avoid empirical treatments, and how to manage hoarseness effectively.

* Key recommendations from the 2018 guidelines:
  + Patients with hoarseness that does not improve within four weeks should be referred for laryngoscopy to identify the underlying cause.
  + Early laryngoscopy is recommended for patients with "alarm symptoms" such as recent head, neck, or chest surgery, respiratory distress, a neck mass, a history of tobacco use, or professional voice use.
  + Empirical treatment with antireflux medications, antibiotics, or corticosteroids is discouraged before laryngoscopy, as there is limited evidence of benefit and potential harm.
  + Voice therapy is recommended for patients whose hoarseness is caused by conditions amenable to this treatment.
  + Surgery is considered for patients with conditions such as suspected malignancy or symptomatic benign vocal fold lesions.
  + Botulinum toxin injections are recommended for the treatment of spasmodic dysphonia and other types of laryngeal dystonia.
* Changes from previous guidelines:
  + The 2018 update shortened the timeframe for conservative management of hoarseness from 90 days to four weeks before laryngoscopy is recommended.
  + The guidelines now emphasize the importance of laryngoscopy before initiating treatment for suspected reflux or other causes of hoarseness.
  + The 2018 guidelines include a more specific algorithm for determining when to escalate care and refer patients for laryngoscopy.

**EPIDEMIOLOGY**

* Prevalence:  
  Hoarseness affects approximately 3% to 9% of the general population at any given time, with a lifetime prevalence around 30%.  
  In specific populations, such as teachers or professional voice users, prevalence can be higher due to vocal strain.
* Age and Gender:  
  Studies show a slight male predominance with male-to-female ratios ranging from 1.3:1 to 1.5:1.  
  Hoarseness occurs across all ages but is more common in adults aged 50 to 79 years, with some studies reporting up to 41% prevalence in this age group.
* Common Causes:  
  The most frequent causes include laryngeal inflammation (acute and chronic laryngitis), benign vocal cord lesions (nodules, polyps), and laryngeal malignancies.  
  Voice abuse, gastroesophageal reflux disease (GERD), and smoking are significant predisposing factors.
* Occupational Risk:  
  Voice professionals (teachers, singers, actors) have higher risk due to vocal load, but most affected individuals are non-professional voice users.
* Geographical Variation:  
  Prevalence rates vary by region and study setting, with some hospital-based studies in Nigeria reporting about 2.4% to 3% prevalence among patients.
* Impact:  
  Hoarseness can adversely affect physical, social, and work-related activities, especially in professional voice users

**PREDEFINED Q & A SETS**

Question: “Why am I hoarse?”

Answer: Hoarseness occurs when your voice sounds raspy, weak, breathy, or strained. It is usually caused by a problem with your vocal cords in the larynx (voice box), such as inflammation, swelling, or injury. Common causes include:

* Viral infections like colds or upper respiratory infections (most common cause)
* Voice overuse or misuse (shouting, singing, talking loudly for long periods)
* Acid reflux (GERD) causing irritation of the vocal cords
* Allergies or inhaling irritants such as smoke or chemicals
* Growths on vocal cords like nodules, polyps, or cysts
* Smoking and alcohol use
* Neurological conditions affecting the nerves controlling the vocal cords (e.g., Parkinson’s disease, stroke)
* Injury or trauma to the larynx
* Thyroid problems
* Rarely, cancer of the larynx or throat

If hoarseness lasts more than three weeks, it is important to see a doctor to rule out serious causes such as cancer or neurological disorders.

Is the cause a serious medical issue?

Most hoarseness cases are due to temporary and benign causes like infections or voice strain and improve within two weeks. However, persistent hoarseness lasting longer than three weeks, especially if accompanied by other symptoms such as difficulty swallowing, breathing problems, or a lump in the neck, may indicate a more serious condition such as:

* Laryngeal or throat cancer
* Neurological diseases affecting voice control
* Recurrent respiratory papillomatosis (noncancerous tumors in the larynx)

Therefore, persistent or unexplained hoarseness warrants prompt medical evaluation.

Question: “What treatments do you recommend?”

Answer: Treatment depends on the underlying cause:

* Voice rest and hydration: Essential for viral laryngitis or voice strain.
* Medications:
  + Antibiotics if bacterial infection is present.
  + Corticosteroids to reduce severe inflammation.
  + Proton pump inhibitors or antacids for acid reflux-related hoarseness.
* Voice therapy: Working with a speech-language pathologist to correct voice misuse or strain.
* Surgery: May be needed to remove vocal cord nodules, polyps, cysts, or papillomas.
* Treatment of underlying conditions: Such as thyroid disease or neurological disorders.
* Avoid irritants: Stop smoking and avoid exposure to harmful chemicals.

Question: “What can I do to take care of myself?”

Answer:

* Rest your voice: Avoid yelling, whispering, or talking loudly for extended periods.
* Stay hydrated: Drink plenty of water to keep your vocal cords moist.
* Avoid irritants: Stay away from smoke, allergens, and pollutants.
* Manage acid reflux: Avoid spicy, fatty foods, caffeine, and alcohol; eat smaller meals and avoid lying down after eating.
* Humidify the air: Use a humidifier to prevent dryness in your throat.
* Practice good vocal hygiene: Warm up your voice before heavy use and avoid throat clearing or coughing harshly.
* Seek medical advice: If hoarseness lasts more than 2-3 weeks or worsens, see a healthcare provider for evaluation.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I understand you’ve been experiencing hoarseness. Can you tell me how long it has lasted and if you have any other symptoms like difficulty swallowing or a lump in your neck?

Patient: It started about three weeks ago. My voice sounds rough and weak, but I don’t have pain or trouble swallowing.

Doctor: Thank you for sharing that. Hoarseness is often caused by common things like a viral infection or voice strain, and usually improves within a few weeks. However, since it’s been three weeks, it’s important we take a closer look to rule out anything more serious.

Patient: What kind of tests will I need?

Doctor: The best way to evaluate your vocal cords is with a procedure called laryngoscopy, where we use a small camera to look at your voice box. This helps us identify inflammation, nodules, polyps, or other issues. We generally recommend this if hoarseness lasts more than four weeks or if there are any concerning symptoms.

Patient: Should I take any medications now?

Doctor: We usually don’t start antibiotics, steroids, or reflux medications without seeing the vocal cords first, because these medicines often don’t help if the cause isn’t clear and might cause side effects. Instead, I recommend voice rest, staying hydrated, and avoiding irritants like smoking or shouting.

Patient: What if it’s something serious like cancer?

Doctor: Persistent hoarseness can sometimes be a sign of cancer, especially if you have risk factors like smoking or heavy alcohol use. That’s why early evaluation with laryngoscopy is important. Most cases turn out to be benign, but if we find anything suspicious, we’ll arrange further tests and a specialist referral promptly.

Patient: Can voice therapy help?

Doctor: Yes, if your hoarseness is due to voice misuse or strain, working with a speech-language pathologist can be very effective. But we want to be sure of the diagnosis before starting therapy.

Patient: What can I do to take care of my voice now?

Doctor: Drink plenty of water, avoid whispering or yelling, and try to rest your voice as much as possible. Using a humidifier can also help if the air is dry.

Patient: Thank you, that helps me understand what to expect.

Doctor: You’re welcome. We’ll schedule the laryngoscopy soon, and please come back if your symptoms worsen or if you develop new symptoms like difficulty breathing or swallowing.

*REFERENCES:*

<https://www.aafp.org/pubs/afp/issues/2010/0515/p1292.html>

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/hoarseness>

[Hoarseness (Dysphonia): Causes & Treatment](https://my.clevelandclinic.org/health/diseases/17105-hoarseness#overview)

**(HPV) HUMAN PAPILLOMAVIRUS**

ALTERNATIVE NAMES:Human papillomavirus is also known by several alternative names, including HPV, HPV Virus, Human Papillomavirus, and Wart Virus.

**DEFINITION / DESCRIPTION**

More than 30 strains of the human papillomavirus (HPV) can affect your genitals. These include harmless forms of HPV, like those that cause genital warts. Only some types of HPV are “high risk” because they can progress to cancer. You can take preventive measures, including the HPV vaccine and getting regular screenings, to reduce your risk.

***Human papillomavirus (HPV)***

Human papillomavirus (HPV) is a common virus that can affect different parts of your body. There are over 200 types of HPV and related viruses, including strains of HPV that cause warts on your hands, feet and face.

Some of them are spread through sexual contact. Most people have been exposed to HPV. Usually, your immune system control HPV infections, and they go away on their own and don’t cause any health problems, but some need treatment.

About 30 HPV strains can affect your genitals, including your vulva, vagina, cervix, penis and scrotum, as well as your rectum and anus. This includes the type of HPV that causes genital warts.

HPV is the most common viral sexually transmitted infection (STI) in the United States. Roughly 14 million people get the infection each year. HPV is so common that most sexually active people who aren’t vaccinated against HPV will become infected at some point in their lives. Most never know they have it.

Some strains of HPV are high-risk and can lead to cancers, like cervical, vulvar and vaginal cancers. Early detection (with a Pap smear or HPV screening) and treatment of precancerous cells can usually prevent this from happening.

***How is HPV related to cervical cancer?***

Certain strains of HPV (most often types 16 and 18) can cause changes in the cells of your cervix, a condition called cervical dysplasia. Left untreated, cervical dysplasia sometimes advances to cervical cancer.

If you’re under 30, most HPV infections clear up on their own. By age 30, finding HPV during a Pap smear can determine how often you should receive follow-up testing. If you test positive, you may be at a higher risk and need more frequent testing.

Getting regular Pap smears to screen for cervical cancer is important (usually beginning at age 21). But it’s important to remember that just because you have HPV or cervical dysplasia doesn’t mean you’ll get cancer.

***How long does it take for HPV to turn into cancer?***

The virus itself doesn’t turn into cancer. But high-risk strains of HPV infection can cause precancerous cell changes. These cell changes can eventually lead to cancer if they aren’t managed.

This process, though, can take years or decades to happen. Screenings, like Pap smears, can help detect these precancerous cells before they turn to cancer.

HPV infection is a viral infection. There are more than 100 types of human papillomavirus (HPV). Some types of HPV infection cause skin growths called warts and some types of HPV infection can cause cancer.

Most HPV infections don't lead to cancer. But some types of genital HPV can cause cancer of the lower part of the uterus that connects to the vagina, called the cervix.

Other types of cancers have been linked to HPV infection. These include cancers of the anus, penis, vagina, vulva and back of the throat. Cancer at the back of the throat is called oropharyngeal cancer.

These infections are often passed through sex or through other skin-to-skin contact. Vaccines can help protect against the strains of HPV most likely to cause genital warts or cervical cancer.

**CAUSES**

HPV infection occurs when the virus enters the body, usually through a cut or other damage to skin. The virus spreads mainly by skin-to-skin contact.

Genital HPV infections are contracted through having sex, anal sex and other skin-to-skin contact of the genitals. Some HPV infections spread through oral sex.

People who are pregnant and have an HPV infection with genital warts can give the infection to the baby. Rarely, the infection may cause a noncancerous growth in the baby's voice box, called the larynx.

Warts spread easily. This means that warts are contagious and can spread through direct contact with a wart. Warts also can spread by touching something that has touched a wart.

***How do you spread HPV?***

Genital HPV spreads through skin-to-skin contact during intercourse, oral sex and anal sex. You can get the infection if your genitals — including your vulva, vagina, penis and scrotum, as well as your rectum and anus — come into contact with these same body parts on an infected partner.

It’s possible to spread the virus through hand-to-genital contact, like fingering and handjobs. This type of transmission is less likely, and less is known about it than genital-to-genital contact.

***How easy is it to spread HPV?***

HPV is highly contagious, in part because it’s transmitted through skin-to-skin contact. You don’t have to exchange body fluids with someone for you to contract the virus or spread it to someone else. You can infect your partner, or your partner can infect you even if no one ejaculates.

***Who does HPV affect?***

Anyone can become infected with HPV if they have sex or close skin-to-skin genital contact with a partner with the virus. Similarly, anyone with the virus can spread it to their partner during intercourse, oral sex, anal sex or other close genital contact.

If you have HIV, your immune system may have a harder time fighting HPV infections. Men who have sex with men may be at greater risk of contracting high-risk HPV strains that can progress to cancer.

In this case, your provider may recommend an anal Pap test. Anal Pap tests don’t test for HPV, but they can test for cell changes that may lead to cancer. Ask your healthcare provider if you should get tested.

Regardless of your reproductive anatomy, it’s important to prevent the spread of HPV by getting vaccinated and by practicing safer sex (correct and consistent use of condoms or dental dams).

***HPV in females***

In general, HPV poses the greatest risk to females because high-risk HPV can progress to cervical cancer if it’s not treated. Pap smears and HPV tests can detect precancerous cell changes early to prevent cancer in your cervix. HPV can also cause genital warts in females.

***HPV in males***

HPV poses fewer health risks to males than females. HPV can cause genital warts in males, but most infections clear on their own. HPV can lead to cancers of your penis, anus, head and neck, but these cancers are rare. As a result, HPV tests and Pap tests aren’t generally recommended for males.

**RISK FACTORS**

HPV infections are common. Nearly sexually active people are infected with HPV soon after they become sexually active. Risk factors for HPV infection include:

* Number of sex partners. The more sex partners, the higher the risk of getting a genital HPV infection. Having sex with a partner who has had multiple sex partners also increases the risk.
* Age. Common warts occur mostly in children. Genital warts occur most often in adolescents and young adults.
* Weakened immune system. HIV/AIDS or certain medicines used after organ transplants can weaken immune systems. People who have weakened immune systems are at greater risk of HPV infections.
* Damaged skin. Areas of skin that have been injured are more likely to develop common warts.
* Personal contact. Touching someone's warts might increase the risk of HPV infection. So can touching surfaces that have been infected with HPV, such as public showers or swimming pools.

**SIGNS / SYMPTOMS**

HPV that affects your genitals doesn’t usually cause symptoms. When symptoms do occur, the most common sign of the virus is warts in your genital area. Genital warts are rough, cauliflower-like lumps that grow on your skin.

They may also appear like skin tags. They may appear weeks, months or even years after you’ve been infected with low-risk HPV. Genital warts are contagious (like all forms of HPV). They can also be itchy and very uncomfortable.

Some people get warts from certain low-risk HPV infections, but the other types (including the high-risk types) have no symptoms.

If a high-risk HPV infection lasts for many years and causes cell changes, you may have symptoms. You may also have symptoms if those cell changes develop into cancer. Which symptoms you have depends on which part of your body is affected.

High-risk forms of HPV often don’t cause symptoms until they’ve progressed to cancer.

Usually, the body's immune system defeats an HPV infection before it creates warts. Different types of HPV produce different warts, including:

* Genital warts. Some appear flat. Others look like small cauliflower-like bumps or tiny stemlike bumps. In women, genital warts appear mostly on the vulva. But they also can occur near the anus, on the cervix or in the vagina.  
  In men, genital warts appear on the penis and scrotum or around the anus. Genital warts rarely cause discomfort or pain. But they might itch or feel tender.
* Common warts. Common warts appear as rough, raised bumps. They usually occur on the hands and fingers. Most common warts are simply not attractive. But they also can be painful. And it's easy for them to get injured or bleed.
* Plantar warts. Plantar warts are hard, grainy growths that usually appear on the heels or balls of the feet. These warts might cause discomfort.
* Flat warts. Flat warts are flat-topped, slightly raised sores called lesions. They can appear anywhere on the body. But children usually get them on the face, men tend to get them in the beard area, and women tend to get them on the legs.

***Common warts***

Common warts can grow on hands or fingers. They're small, grainy bumps that are rough to the touch. They're usually flesh-colored, white, pink or tan.

***Plantar warts***

Plantar warts are caused by the same type of virus that causes warts on the hands and fingers. But, because of where they are, they can be painful.

***Flat warts***

Flat warts are smaller and smoother than other warts. They generally occur on the face or legs. They're more common in children and teens than in adults.

***Female genital warts***

Genital warts are a common sexually transmitted infection. They can appear on the genitals, in the pubic area or in the anal canal. Genital warts also can grow inside the vagina.

***Male genital warts***

Genital warts are a common sexually transmitted infection. They can appear on the genitals, in the pubic area or in the anal canal.

***Cervical cancer***

HPV infections cause almost all cervical cancers. But cervical cancer may take 20 years or longer to develop after an HPV infection. The HPV infection and early cervical cancer typically don't cause symptoms. Getting vaccinated against HPV infection is the best way to protect against cervical cancer.

Because early cervical cancer doesn't cause symptoms, it's vital that women have regular screening tests. These tests can find changes in the cervix that might lead to cancer.

Current guidelines recommend that women ages 21 to 29 have a test that checks cervical cells for cancer, called a Pap test, every three years.

Women ages 30 to 65 are advised to keep having Pap tests every three years. Or the Pap test can be every five years for women who also get an HPV DNA test at the same time.

Women over 65 can stop testing if they've had three regular Pap tests in a row, or two HPV DNA and Pap tests with no irregular results.

***Are all warts HPV?***

Yes. And this can be confusing — especially when you’re trying to understand the difference between the HPV that causes the wart on your finger or genitals and the HPV that may lead to cervical cancer.

The HPV strains that cause warts, including genital warts, are nuisances. After all, no one wants warts, least of all on their genitals. Still, these types of HPV are harmless. HPV types 6 and 11 most often cause genital warts. Other types of HPV cause warts on other parts of your body. These warts are:

* Flat warts
* Plantar warts
* Periungal and subungual warts

All warts are caused by HPV, but not all strains or types of HPV cause warts. The type of HPV that can progress to cancer doesn’t cause warts.

**DIAGNOSIS METHODS**

Health care providers can usually find out if you have warts by looking at them.

Nearly all cervical cancers are caused by a long-lasting infection with a high-risk type of HPV. Screening can prevent cancer by finding out if you need treatment for changes that might happen before cancer, called precancer.

Screening tests for HPV can include:

* For women, there are cervical cancer screening tests that can find changes in the cervix that might lead to cancer. As part of the screening, women may have Pap tests (sometimes called a Pap smear), HPV tests, or both. HPV tests use a sample of cervical cells.
* Your provider may also suggest a colposcopy to check for abnormal cells.

***What tests can be done to diagnose an HPV infection?***

A healthcare provider will typically be able to diagnose genital warts and other bodily warts just by looking.

High-risk forms of HPV don’t cause symptoms, which means you’ll likely learn about an infection through a routine Pap smear or HPV test.

* Pap smear: A Pap smear screens for cervical cancer and precancerous cells that may become cancer if left untreated. Cervical cancer is almost always caused by high-risk HPV.
* HPV test: HPV tests can detect the high-risk strains of the virus that may lead to cervical cancer if left untreated.

Other procedures that can detect abnormal cells likely caused by an HPV infection include:

* Colposcopy: Your provider may order a colposcopy if your Pap smear shows signs of abnormal cells or if you tested positive for HPV. During this procedure, a lighted instrument called a colposcope magnifies your cervix, bringing abnormal cells into view. Your provider may remove the cells and have them tested in a lab for signs of precancer or cancer (biopsy).
* Visual inspection with acetic acid (VIA): Providers may use VIA if they provide care in areas without access to Pap smears or HPV tests. With VIA, your provider places a vinegar-based solution on your cervix. The solution turns abnormal cells white so that they’re easier to identify.

A healthcare professional might be able to diagnose HPV infection by looking at the warts.

If genital warts don't show, one or more of the following tests can find them:

* Vinegar, called acetic acid, solution test. A vinegar solution applied to HPV-infected genital areas turns them white. This may help flat lesions show up.
* Pap smear. A sample of cells from the cervix or vagina go to a lab to look for changes that can lead to cancer.
* DNA test. Testing cells from the cervix can identify the DNA of the types of HPV that are linked to genital cancers. It's recommended that women 30 and older have this test with a Pap test.

**TREATMENT OPTIONS**

Treatments can’t rid your body of the virus. They can remove any visible warts on your genitals or other body parts, and abnormal cells in your cervix. Treatments may include:

* Cryosurgery: Freezing warts or destroying abnormal cells with liquid nitrogen.
* Loop electrosurgical excision procedure (LEEP): Using a special wire loop to remove warts or abnormal cells on your cervix.
* Electrocautery: Burning warts off with an electrical current.
* Laser therapy: Using an intense light to destroy warts or any abnormal cells.
* Cold knife cone biopsy: Removing a cone-shaped piece of cervical tissue that contains abnormal cells.
* Prescription cream: Applying medicated cream directly to your warts to destroy them. These creams may include imiquimod (Aldara®) and podofilox (Condylox®).
* Trichloroacetic acid (TCA): Applying a chemical treatment that burns off warts.

Only a small number of people with high-risk HPV will develop abnormal cervical cells that require treatment to prevent the cells from becoming cancer.

Warts often go away without treatment, particularly in children. But there's no cure for the virus. So the warts can come back in the same place or other places.

***Medications***

Medicines to get rid of warts usually go directly on the warts. These medicines might need to be used many times before the warts go away. Examples include:

* Salicylic acid. Treatments without a prescription that contain salicylic acid work by removing layers of a wart a little at a time. For use on common warts, salicylic acid can irritate skin. Salicylic acid isn't for use on the face.)
* Imiquimod (Zyclara). This prescription cream might help the immune system fight HPV. Common side effects include swelling where the cream is applied.
* Podofilox (Condylox). Another prescription applied to the skin, podofilox works by killing genital wart tissue. Podofilox may cause burning and itching where it's applied.
* Trichloroacetic acid. This chemical treatment burns off warts on the palms, soles and genitals. It might cause irritation where it's applied.

***Surgical and other procedures***

If medicines don't work, one of these methods can remove warts:

* Freezing with liquid nitrogen, called cryotherapy.
* Burning with an electrical current, called electrocautery.
* Surgical removal.
* Laser surgery.

***Treatment for HPV in the cervix***

A procedure called a colposcopy can remove HPV from the cervix. A healthcare professional uses a tool, called a coloscope, to see the cervix and take tissue samples, called a biopsy, of areas that look atypical.

Precancerous lesions need to be removed. Options include freezing, called cryosurgery, and laser surgical removal. Another method called loop electrosurgical excision procedure (LEEP) uses a thin looped wire charged with an electric current to remove a thin layer of a section of the cervix. And cold knife conization is a surgical procedure that removes a cone-shaped piece of the cervix.

**PREVENTION TIPS**

The only way to prevent HPV is to abstain from sex. For many people, more realistic goals include reducing the risk of contracting HPV and preventing cervical cancer while still enjoying a healthy sex life.

You can reduce your risk if you:

* Get vaccinated against HPV. The HPV vaccine works best if you get it before becoming sexually active (around age 11 or 12). It may protect you from HPV strains you haven’t been exposed to even after becoming sexually active. Talk to your provider about your options.
* Get screened and tested regularly. Early detection of HPV and abnormal cells prevents cervical cancer. You should begin getting regular Pap smears at age 21. Talk to your provider about the screening schedule that makes sense for you.
* Practice safer sex. Condoms and dental dams are less effective at preventing HPV than protecting against STIs that spread through semen or vaginal fluid. Still, using them correctly each time you have sex can reduce your risk of an HPV infection.
* Protect your partner(s). Let your partner know if you have HPV so that they can get tested, too. You may need to stop having sex while you’re getting treated for genital warts or high-risk forms of HPV. Talk to your provider about the precautions you should take with an HPV infection.

***Common warts***

It's hard to prevent HPV infections that cause common warts. If you have a common wart, you can prevent the spread of the infection and keep new warts from forming by not picking at a wart and not biting your nails.

***Plantar warts***

To lower the risk of contracting HPV infections that cause plantar warts, wear flip-flops or other shoes on public pool decks and in locker rooms.

***Genital warts***

Lower the risk of getting genital warts and other HPV-related genital sores by:

* Having only one sex partner who's not having sex with anyone else. This is a monogamous relationship.
* Using a latex condom during sex, which might lower the risk of HPV.

***HPV vaccines***

Gardasil 9 is an HPV vaccine approved by the U.S. Food and Drug Administration and can be used for males and females to protect against cervical cancer and genital warts.

The vaccine works best if a person gets it before having the first sexual contact. Once someone has HPV, the vaccine might not work as well or at all. Also, younger people respond better to the vaccine than older people do. If given before someone has HPV infection, the vaccine can prevent most cervical cancers.

Two doses of the HPV vaccine are recommended for children ages 11 and 12, but these vaccines can be given as young as 9 years of age. The two-dose series is given until age 14.

The doses are given at least five months apart. Teens and young adults who begin the vaccine series at ages 15 through 26 should get three doses of the vaccine.

**OUTLOOK / PROGNOSIS**

The outlook for HPV is generally very good. It depends on what strain of HPV you have and how able your body is to fight off the infection.

If you have a lower-risk strain of HPV and you’re in good health, chances are your body will clear the infection within 12 to 24 months.

Certain strains are more likely to lead to cancer. Your healthcare provider will monitor these strains and recommend further testing or treatment.

Early detection of high-risk strains and follow-up screenings such as frequent Pap tests can prevent HPV from causing cervical cancer.

***Is HPV curable?***

No. There isn’t a cure for HPV. Still, your immune system is incredibly efficient at getting rid of the virus for you. Most HPV infections (about 90%) are cleared within a year or two.

***Is HPV contagious for life?***

Not necessarily. You’re contagious for as long as you have the virus — regardless of whether or not you have symptoms. For example, even if your genital warts have disappeared, you can still spread the HPV that caused them if the virus is still in your body.

**POSSIBLE COMPLICATIONS**

The most serious complication of HPV is cancer. Cervical cancer is the most common type of HPV-related cancer. Other types of cancer are much rarer. They include:

* Anal cancer
* Penile cancer
* Throat cancer
* Vaginal cancer
* Vulvar cancer

It’s important to remember that having HPV — even a high-risk strain — doesn’t mean that you’ll develop these cancers.

Genital warts are another complication of HPV. Genital warts can be itchy and uncomfortable and interfere with your daily life. Other than those symptoms, genital warts don’t cause much harm.

* Oral and upper respiratory sores, called lesions. Some HPV infections cause lesions on the tongue, tonsils or soft palate, or within the larynx and nose.
* Cancer. Certain strains of HPV can cause cervical cancer. These strains also might play a part in cancers of the genitals, anus, mouth and upper respiratory tract.

**WHEN TO SEE A DOCTOR / RED FLAG**

Contact your healthcare provider If you or your child has any of these warts that cause embarrassment, discomfort or pain:

* Genital warts. These are cauliflower-like warts that may appear on your vagina, anus or mouth.
* Abnormal pap smear results. Getting abnormal results on a Pap may indicate you need further testing for HPV.

You should also ask your healthcare provider about how frequently you should have tests that may indicate an HPV infection like Pap smears.

Discuss any concerns you have about HPV with your healthcare provider, especially if you have a health condition that weakens your immune system. This can make it harder for your body to fight the virus.

***What questions should I ask my healthcare provider?***

It’s natural to have some questions about HPV. You may want to ask:

* Do I need treatment for HPV?
* Is this type of HPV a high-risk strain?
* Should I get screened for HPV more often?
* Can I spread HPV to others?
* Can I get the HPV vaccine?

***Additional Common Questions***

Question: “Should my partner be worried if I have HPV?”

Answer: HPV is very common. Almost everyone has had or will have HPV at some point in their life. Most HPV infections clear up on their own because your body fights the virus.

It’s hard to say if your partner got HPV from you or someone else, as it can take years to show symptoms of HPV (if you show symptoms at all). The best thing you can do is be proactive about getting regular health screenings and then share your health history with your partner.

***Diagnostic Considerations***

Failure to diagnose genital warts correctly can result in considerable morbidity. Confusing condylomata lata for genital warts will miss the diagnosis of syphilis and will lead to inappropriate therapy.

Confusing pearly penile papules or Fordyce spots with genital warts will result in unnecessary treatment and likely unwarranted psychosocial concern. Missing a diagnosis of verrucous carcinoma or squamous cell carcinoma is likely to delay appropriate therapy and may lead to needless morbidity or even mortality.

Most papillomas are sufficiently distinct to be clinically recognizable. Bowenoid papulosis may be mistaken for lichen planus, psoriasis, seborrheic keratoses, or condylomata acuminata.

In additions to the conditions listed in the differential diagnosis, other problems to be considered include the following:

* Acanthosis nigricans
* Acrochordon
* Actinic keratoses
* Anogenital malignancy
* Anogenital warts in children
* Bowenoid papulosis
* Carbon dioxide laser surgery for intraepithelial cervical neoplasms
* Cervical polyp
* Condyloma latum
* Corns and calluses
* Dermatitis papillaris
* Endoscopic gynecologic surgery
* Epidermodysplasia verruciformis
* Fordyce spots
* Hymenal remnants
* Hypopigmentation
* Keloid and hypertrophic scar
* Keratoacanthoma
* Laryngeal papillomatosis of neonates and infants
* Malignant tumors of the mobile tongue
* Micropapillomatosis labialis
* Nevi
* Pap test
* Pityriasis versicolor
* Psoriasis (plaque)
* Recurrent respiratory papillomatosis
* Seborrheic keratosis
* Sinonasal papillomas, treatment
* Skin tags (fibroepithelial polyps)
* Verrucous carcinoma
* Vestibular papillomatosis

***Differential Diagnoses***

* Basal Cell Carcinoma
* Benign Cervical Lesions
* Benign Vulvar Lesions
* Bowen Disease
* Carbon Dioxide Laser Surgery of the Lower Genital Tract
* Cervical Cancer
* Chancroid
* Conization of Cervix
* Erythroplasia of Queyrat (Bowen Disease of the Glans Penis)
* Giant Condylomata Acuminata of Buschke and Lowenstein
* Gynecologic Cryosurgery
* Gynecologic Laparoscopy
* Head and Neck Cutaneous Squamous Cell Carcinoma
* Hemorrhoids
* Herpes Simplex
* Lichen Planus
* Malignant Dermatologic Diseases of the Male Genitalia
* Malignant Vulvar Lesions
* Molluscum Contagiosum
* Nonmalignant Dermatologic Diseases of the Male Genitalia
* Pearly Penile Papules
* Pediatric Syphilis
* Penile Cancer
* Rectal Cancer
* Recurrent Respiratory Papillomatosis
* Rehabilitation for Paget Disease
* Sebaceous Hyperplasia
* Surgical Treatment of Vulvar Cancer
* Urethral Warts
* Vaginal Cancer

**RECENT GUIDELINES OR UPDATES**

Recent updates and guidelines for human papillomavirus (HPV) have focused on improving vaccination schedules, cervical cancer screening, and addressing health disparities. The World Health Organization (WHO) updated its recommendations in 2022 to include a single-dose HPV vaccination schedule, which provides comparable efficacy to a two-dose regimen, aiming to improve global vaccination coverage. In 2024, the WHO also updated its cervical cancer prevention guidelines to include the dual-stain cytology test, CINtec PLUS Cytology, which helps identify HPV-positive individuals at higher risk of developing cervical precancer and cancer.

The US Preventive Services Task Force (USPSTF) has updated cervical cancer screening guidelines, recommending age-specific screening options for women. Women aged 21 to 29 years should undergo Pap tests every 3 years, while women aged 30 to 65 years have three options: co-testing with Pap and HPV every 5 years, Pap testing alone every 3 years, or HPV testing alone every 5 years. These guidelines aim to enhance the effectiveness and accessibility of screening, particularly for vulnerable populations.

Additionally, the American Cancer Society (ACS) endorses the ACIP recommendations for HPV vaccination, emphasizing routine vaccination for children at ages 11 and 12 years to protect against HPV infections that lead to several cancers and precancers. The 9-valent HPV vaccine is recommended for both females and males, covering additional HPV types beyond the quadrivalent and bivalent vaccines.

Screening guidelines for the prevention and early detection of cervical cancer by the American Cancer Society (ACS), American Society for Colposcopy and Cervical Pathology (ASCCP), and the American Society for Clinical Pathology (ASCP) were published in 2012. Guidelines on screening for cervical cancer were published by the US Preventive Services Task Force (USPSTF) in 2018.

In April 2020, the American College of Obstetricians and Gynecologists (ACOG) published the 2019 ASCCP Risk-Based Management Consensus Guidelines for

Abnormal Cervical Cancer Screening Tests and Cancer Precursors. The 2019 consensus guidelines replace ASCCP guidance first published in 2001 and updated in 2006 and 2012, as well as interim guidance for primary HPV screening published by ASCCP in 2015.

Thirteen medical professional societies, four patient advocacy organizations, and two federal agencies participated in developing the guidelines.

In July 2020, the American Cancer Society published guidelines on cervical cancer screening for individuals at average risk. Those guidelines had four significant changes from the previous guidelines.

In April 2021, ACOG joined ASCCP and the Society of Gynecologic Oncology (SGO) in endorsing the USPSTF cervical cancer screening recommendations; ACOG reaffirmed the recommendations in April 2024.

The USPSTF recommendations replace ACOG Practice Bulletin No. 168, Cervical Cancer Screening and Prevention, as well as the 2012 ASCCP cervical cancer screening guidelines. Management of abnormal cervical cancer screening results should follow ASCCP guidelines.

The Advisory Committee on Immunization Practices (ACIP) published updated guidelines on HPV vaccination in 2016. In 2020, the American Cancer Society (ACS) updated its guidelines to largely agree with ACIP's but with adaptations to three of ACIP's recommendations.

**EPIDEMIOLOGY**

Human papillomavirus (HPV) is the most common sexually transmitted infection, with over 120 different types identified, of which more than 40 infect the anogenital tract and other mucosal areas. Most HPV infections are transient and asymptomatic, with the majority resolving within 2 years.

However, persistent infections can lead to anogenital warts, precancers, and various cancers, including cervical, anal, and oropharyngeal cancers.

The prevalence of HPV infection varies widely, with estimates ranging from 2% to 44% among women globally. In the United States, the prevalence is highest among women aged 20–24 years, with 44.8% of this age group affected.

HPV infection is strongly associated with cervical cancer, which is the second most common cancer in women worldwide. Over 99.7% of cervical cancer cases test positive for HPV DNA, highlighting its critical role in the development of this cancer.

Risk factors for HPV infection include the number of lifetime sex partners, with a higher number of partners increasing the likelihood of infection. Other factors include immune status, nutrition, hormonal influences, tobacco smoking, parity, and co-infections with other sexually transmitted agents such as HIV, herpes simplex virus type 2, and Chlamydia trachomatis.

HPV vaccination is a key preventive measure, with current vaccines protecting against 2 of the 15 high-risk HPV types. However, these vaccines do not cover all high-risk types, and it will take several years before all women at risk are protected. Vaccination programs should be part of universal coverage to ensure equitable access and effectiveness.

The economic burden of HPV-related diseases is substantial, with significant direct medical costs associated with HPV infection and related conditions. Despite the availability of effective vaccines, challenges such as cost, cold chain requirements, and the need for awareness programs persist.

**PREDEFINED Q & A SETS**

1. What is HPV?  
HPV is a group of more than 200 related viruses, some of which can cause health problems including genital warts and cancers such as cervical cancer. It is one of the most common sexually transmitted infections worldwide.

2. How is HPV transmitted?  
HPV is primarily spread through intimate skin-to-skin contact, most often through sexual activity. It can also be transmitted from mother to child during childbirth, though this is less common.

3. How many types of HPV are there?  
There are over 200 types of HPV. About 40 types infect the genital area. Some types cause warts, while others (high-risk types) can lead to cancer.

4. What health problems does HPV cause?  
HPV can cause genital warts, cervical cancer, and other anogenital cancers (vulva, vagina, penis, anus), as well as oropharyngeal cancers. Most HPV infections clear on their own without symptoms.

5. Can HPV infection be prevented?  
Yes. HPV infection can be prevented by vaccination, safe sexual practices (e.g., condom use), and regular cervical cancer screening for women.

6. What vaccines are available for HPV?  
There are three licensed HPV vaccines (bivalent, quadrivalent, and 9-valent) that protect against the most common cancer-causing HPV types and some that cause genital warts. The 9-valent vaccine protects against nine HPV types and offers the broadest protection.

7. Who should get the HPV vaccine?  
HPV vaccination is recommended for preteens (boys and girls) aged 9-14 years, ideally before exposure to HPV through sexual activity. Catch-up vaccination is recommended up to age 26 or even later based on clinical decision.

8. How many doses of HPV vaccine are needed?  
For most adolescents starting before age 15, two doses are recommended, spaced 6 to 12 months apart. Those starting vaccination at age 15 or older typically require three doses.

9. Does natural HPV infection provide immunity?  
Natural infection does not always lead to immunity, and people can be infected with multiple HPV types over their lifetime. Vaccination provides stronger and longer-lasting protection.

10. How long does it take for HPV infection to cause cancer?  
It usually takes many years (often 10-20 years) for persistent HPV infection to progress to cervical cancer or other HPV-related cancers.

11. How is HPV infection diagnosed?  
HPV infection itself is often not diagnosed directly. Cervical cancer screening via Pap smears and HPV DNA tests detect precancerous changes caused by HPV.

12. What is the recommended cervical cancer screening?  
Screening guidelines vary by country but generally include Pap smears starting at age 21 and/or HPV DNA testing starting at age 30, repeated at intervals depending on results.

13. Can HPV infection be treated?  
There is no treatment for the virus itself. However, health problems caused by HPV, such as genital warts and precancerous lesions, can be treated.

14. Is the HPV vaccine safe?  
Yes. HPV vaccines have been extensively studied and are safe and effective. Side effects are generally mild, such as soreness at the injection site.

15. Why is it important to vaccinate girls against HPV?  
Vaccinating girls before exposure to HPV significantly reduces the risk of cervical cancer and other HPV-related diseases, improving public health outcomes.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning. How have you been doing lately?

Patient: I’m doing well, thanks. I wanted to discuss something about cervical cancer screening and HPV.

Doctor: Of course. Are you familiar with HPV, the human papillomavirus?

Patient: I’ve heard about it, but I’m not very clear on what it means or if I need to be tested.

Doctor: HPV is a very common virus that is typically spread through sexual contact. Most people get it at some point, but often it clears up by itself. Some types can increase the risk of cervical cancer.

Patient: Should I be worried? I’ve only had one partner.

Doctor: It’s understandable to feel concerned, but HPV can affect anyone who is sexually active. The important part is regular screening, which helps detect changes early and prevent cancer.

Patient: What tests do I need?

Doctor: We usually do a Pap smear and an HPV test together. The HPV test checks for the presence of the virus. If the test is negative, you might not need screening as often.

Patient: Is the test uncomfortable?

Doctor: It’s similar to the Pap smear, so you may feel some mild discomfort but it’s quick.

Doctor: Have you received the HPV vaccine?

Patient: No, not yet.

Doctor: The vaccine is recommended and helps protect against the types of HPV most likely to cause cancer. It’s most effective before becoming sexually active but can still offer protection later.

Patient: What about my children? Should they be vaccinated?

Doctor: Yes, vaccination is recommended for preteens. It’s safe and effective in preventing HPV-related diseases.

Patient: Thank you for explaining. I’ll consider the vaccine and screening schedule.

Doctor: Great. Feel free to ask any questions at any time. We’re here to support your health.

*REFERENCES:*

<https://my.clevelandclinic.org/health/diseases/11901-hpv-human-papilloma-virus>

<https://www.mayoclinic.org/diseases-conditions/hpv-infection/diagnosis-treatment/drc-20351602>

<https://www.mayoclinic.org/diseases-conditions/hpv-infection/symptoms-causes/syc-20351596>

<https://emedicine.medscape.com/article/219110-differential>

<https://emedicine.medscape.com/article/219110-guidelines>

**HYPERACUSIS**

*ALTERNATIVE NAMES:* Alternative names for hyperacusis include hyperacousis, auditory hyperesthesia, phonophobia, and misophonia. It is also sometimes referred to as "supersonic hearing" in the context of loudness hyperacusis. Additionally, hyperacusis may be associated with conditions such as vestibular hyperacusis, which affects the vestibular (balance) system.

**DEFINITION / DESCRIPTION**

Hyperacusis is a rare hearing disorder where sounds others perceive as normal seem uncomfortably — and often unbearably — loud. It’s also described as decreased sound tolerance, or DST. People with normal hearing experience a range of sounds with varying degrees of loudness. In contrast, people with hyperacusis experience sound in general with the volume turned too high.

Some examples of common sounds in everyday life that may feel intolerable to someone with hyperacusis include:

* People are chatting.
* A car engine running.
* Water running in the kitchen sink.
* Household electrical appliances running.
* Someone turning the pages of a book or newspaper.
* Many other soft sounds.

The experience can take a toll on your mental health, causing you to feel irritable and anxious. Hyperacusis can impact your social life, too. Some people with hyperacusis avoid social situations to reduce the risk of experiencing intense loudness.

Hyperacusis often accompanies tinnitus, a condition often associated with hearing loss that involves ringing, whistling, clicking or roaring sounds in your ears. Still, not all cases of hyperacusis involve tinnitus or hearing loss.

There’s still a lot that doctors don’t know about hyperacusis, including how common it is. Researchers estimate that 3.2% to 17.1% of children and adolescents have hyperacusis, while the range for adults is from 8% to 15.2%.

It’s hard to know for sure how common it is, though. People with hyperacusis describe their symptoms differently based on their unique experiences. Also, there isn’t a single, widely accepted way to screen for or measure hyperacusis. Researchers are still learning about hyperacusis, including how many people have it.

**CAUSES**

Researchers are still trying to understand what causes hyperacusis. It’s likely that the structures in your brain that control how you perceive stimulation make sounds seem louder. With hyperacusis, your brain perceives sounds as loud regardless of their frequency — or whether the sound falls in the low range (like thunder rumbling), medium range (like human speech) or high range (like a siren or whistle).

Various theories exist. It’s possible that damage to parts of your auditory nerve causes hyperacusis. Your auditory nerve carries sound signals from your inner ear to your brain so you can hear. Another theory is that damage to the facial nerve causes hyperacusis. The facial nerve controls the stapedius muscle, which regulates sound intensity in your ear. Many conditions associated with hyperacusis (Bell’s palsy, Ramsay Hunt syndrome and Lyme disease) involve facial nerve damage.

Still, there isn’t a single cause that explains all cases of hyperacusis. Instead, it’s associated with multiple possible contributing factors and conditions.

Contributing factors include:

* Long-term exposure to loud noises: Hyperacusis is more common in people exposed to loud music for long periods, like rock musicians, or who work in loud settings, like construction workers.
* Sudden exposure to loud noise: Some people with hyperacusis develop it after hearing a sudden, loud noise, like a gunshot or fireworks.

Hyperacusis often accompanies conditions like tinnitus (up to 86% of people) and Williams syndrome (as many as 90% of people). Nearly half of the people diagnosed with hyperacusis also have a behavioral health condition, like anxiety.

Conditions associated with hyperacusis include:

* Anxiety.
* Autism.
* Bell’s palsy.
* Depression.
* Down syndrome.
* Ear infections (otitis media).
* Head injury.
* Lyme disease.
* Ménière’s disease.
* Migraines.
* Post-traumatic stress disorder (PTSD).
* Ramsay Hunt syndrome.
* Superior Canal Dehiscence Syndrome (SCDS).
* Temporomandibular joint syndrome (TMJ).
* Tinnitus.
* Williams syndrome.

Some people develop hyperacusis symptoms following surgery or as a reaction to a medication.

**SIGNS / SYMPTOMS**

With hyperacusis, you may experience sounds other people consider normal as uncomfortable, unbearably loud, painful or even frightening. The loudness may be mildly annoying or so intense that it causes you to struggle with your balance or experience seizures.

Other symptoms may include:

* Ringing in your ears.
* Ear pain.
* A feeling of fullness or pressure in your ears (similar to being in an airplane, before your ears “pop”).

These symptoms can negatively impact your mental health and social life. The constant experience of feeling overwhelmed with intense, unpleasant sounds can lead to:

* Anxiety.
* Depression.
* Relationship issues.
* Social isolation and avoidance.

Symptoms may intensify if you feel stressed or tired or if you anticipate having to interact in spaces that you fear will be unpleasantly loud.

**DIAGNOSIS METHODS**

Getting diagnosed can be difficult because not all healthcare providers are familiar with hyperacusis. You may need to see an ear, nose and throat specialist and/or an audiologist to help identify the problem.

Diagnosis may include:

* Medical history: A healthcare provider will consider any risk factors, like behavioral health issues (including anxiety or depression), exposure to loud sounds or damage to your hearing.
* Exam: They’ll look for structural issues in your ear that may relate to your hyperacusis. They may perform tests to see how your eardrum moves, like tympanometry. They may examine your cranial nerves to see if there are problems with how your facial nerve is functioning.
* Hearing tests: They’ll perform hearing tests to determine your hearing levels. They may also evaluate your loudness discomfort level, or LDL. The LDL shows at what levels you perceive noise as uncomfortably loud. The healthcare provider may also ask that you complete a questionnaire about your hearing to assess how severe your experience of hyperacusis is. These questions can show the extent that hyperacusis interferes with your everyday life.

Your healthcare provider may order imaging procedures if they suspect your hyperacusis results from a structural issue like facial nerve paralysis. They may also order lab work if they suspect that your hyperacusis relates to a condition like Lyme disease.

**TREATMENT OPTIONS**

Treatment for hyperacusis can broadly be categorized into those which target the physical symptoms, and those which aim to reduce the psychological burden of the condition.

Cognitive-behavioral therapy (CBT) is one of the most effective components of hyperacusis therapy alongside counseling and education. By providing patients with the techniques required to manage the emotional reaction to sound, CBT has been shown to increase LDL and reduce hyperacusis severity as assessed by the HQ. Directive counseling uses a similar approach of identifying and discussing repressed behaviors, although much of the literature is directed towards its use in tinnitus.

Tinnitus retraining therapy (TRT) involves educating the patient about their condition alongside gradual sound enrichment, and its use in hyperacusis is becoming increasingly popular.Prolonged low-level noise exposure has been shown to have a reversing effect on the enhanced neural gain, which is thought to be the underlying mechanism of hyperacusis.Significant improvements in LDL have been seen after 6 months of sound generator therapy. Increasing the mean level of the acoustic environment (i.e. greater auditory stimulation) has been reported to have a beneficial symptomatic effect.

Surgery may be indicated in select cases, including those refractory to the above treatments or in conductive hyperacusis secondary to superior semi-circular canal dehiscence syndrome.Round and oval window reinforcement is a simple, reversible procedure that has been shown to have a high success rate and a sustainable reduction in symptoms.

Alternative treatments often are given special attention for chronic pain and may include supplements and vitamins, acupuncture, exercise, yoga, meditation, massage, relaxation therapy, and hypnosis.

**OUTLOOK / PROGNOSIS**

Healthcare providers and medical researchers are still studying the long-term effects of hyperacusis. For many people, hyperacusis is a long-term condition they learn to manage with treatment. Others experience symptom relief following surgery or once the underlying condition resolves.

**WHEN TO SEE A DOCTOR / RED FLAG**

Many people with hyperacusis symptoms start by trying to drown out the sounds around them with earplugs or headphones. They may avoid social settings. But these options can make things worse. People who wear headphones or earplugs may experience sound even more intensely once they remove them, and social isolation can lead to (or worsen) behavioral health issues.

Don’t try to manage symptoms on your own. Instead, see a healthcare provider if you’re experiencing hyperacusis symptoms. It may take a while to identify what’s likely causing the issue, but there are therapies that can help.

**DIFFERENTIAL DIAGNOSIS**

The main differential diagnoses to consider in a patient presenting with a decreased tolerance to sound are misophonia and phonophobia.

The underlying conditions that need to be excluded are:

* Bell palsy
* Ramsay-Hunt syndrome
* Migraine
* Lyme disease
* Neurosyphilis
* Williams syndrome
* Post-traumatic stress disorder
* Depression
* Superior canal dehiscence syndrome
* Autism
* Cri-du-Chat syndrome
* Tay–Sach disease
* Temporomandibular disorders
* Fibromyalgia

**EPIDEMIOLOGY**

The prevalence of hyperacusis amongst children and adolescents is estimated to be between 3.2% to 17.1%, with the large variability accounted for by differences in age and hearing status. In adults, studies have demonstrated prevalence rates of between 8% to 15.2%.There is a suggestion that the prevalence of hyperacusis increases with advancing age and in females with higher educational attainment.

Fully understanding the prevalence of hyperacusis is challenging. The presentation is highly subjective and therefore relies upon a carefully defined set of screening questions.As with tinnitus, the limited research that does exist has considerable inconsistencies in study design and methodology, making comparisons across studies difficult.

**PREDEFINED Q & A SETS**

***Question 1: “Is hyperacusis a mental illness?”***

Answer: No, hyperacusis isn’t a mental illness. Hyperacusis is a hearing disorder commonly associated with mental health conditions, including anxiety and depression. Living with the excessive loudness characteristic of hyperacusis can affect your mental health. Anxiety about encountering sound and isolating yourself to spare your hearing can worsen hyperacusis symptoms.

***Question 2: “What is Hyperacusis?”***

Answer: Hyperacusis is a rare hearing disorder characterized by an increased sensitivity or decreased tolerance to everyday sounds, causing them to seem uncomfortably loud or even painful.

***Question 3: “What are the symptoms of Hyperacusis?”***

Answer: Common symptoms include:

* Ordinary sounds appearing too loud
* Discomfort or pain in ears, jaw, or neck
* Headaches and difficulty concentrating
* Anxiety, poor sleep, and fatigue due to sound sensitivity
* Severe cases may involve pain from sudden noises and fear of social situations.

***Question 4: “Who can develop Hyperacusis?”***

Answer: It can affect people of all ages though adults, especially those with tinnitus, are more commonly affected. Children can also experience hyperacusis, sometimes expressed as crying or screaming in response to sounds.

***Question 5: “What causes Hyperacusis?”***

Answer: Causes include:

* Exposure to loud noise or a sudden loud sound
* Head injuries or ear damage
* Viral infections affecting the inner ear or facial nerves
* Certain medical conditions like Bell’s palsy, TMJ disorder, Lyme disease, migraines, PTSD, and depression
* Some medications and toxins.

***Question 6: “How is Hyperacusis diagnosed?”***

Answer: Diagnosis involves:

* Medical history review
* Physical and audiological examinations including hearing tests (audiograms)
* Notably, many patients have normal hearing tests, but still experience sound sensitivity.

***Question 7: “What are the complications of Hyperacusis?”***

Answer: It may cause social isolation, anxiety, depression, and reduced quality of life due to avoidance of noisy environments and fear of sounds (phonophobia).

***Question 8: “How is Hyperacusis treated?”***

Answer: Treatment options typically include:

* Sound therapy to gradually desensitize the ears
* Counseling to manage anxiety and stress
* Avoidance of loud noises and use of ear protection when necessary
* Addressing underlying causes if identified

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you’ve been experiencing sensitivity to everyday sounds. Can you tell me more about how this affects you?

Patient: Yes, normal sounds feel unbearably loud, and sometimes even painful. It’s affecting my daily activities and mood.

Doctor: That sounds distressing. Hyperacusis is a condition where the ears become overly sensitive to ordinary sounds. It can cause discomfort, anxiety, and interfere with social or work life.

Patient: What causes this? Is there any treatment?

Doctor: Causes vary—sometimes it's due to noise exposure, head injury, infections, or underlying neurological conditions. Diagnosing involves detailed interviews and hearing tests, although hearing may appear normal.

Doctor: We often use specialized questionnaires and assessments to understand how much it impacts you, including any psychological distress.

Patient: What can be done to help?

Doctor: Treatment usually includes sound therapy: gentle exposure to calming sounds to retrain your auditory system and reduce sensitivity. Cognitive Behavioral Therapy (CBT) can also help manage the emotional effects like anxiety.

Patient: How long does treatment take?

Doctor: Typically, audiologist-led CBT involves six weekly sessions. Progress varies per person, but many patients find significant relief.

Patient: Should I avoid all loud sounds?

Doctor: We recommend avoiding very loud noises, but overprotection can worsen sensitivity. Controlled and gradual sound exposure is important.

Doctor: We will work with you to create a personalized management plan that addresses both the physical and emotional sides of hyperacusis.

Patient: Thank you. It’s reassuring to know there’s help.

Doctor: You're welcome. We’ll support you through recovery. Please feel free to discuss any concerns anytime.

*REFERENCES:*

[Hyperacusis: Hearing Sensitivity Causes and Treatment](https://my.clevelandclinic.org/health/diseases/24320-hyperacusis)

**HYPERTHYROIDISM**

ALTERNATIVE NAMES: Alternative names for hyperthyroidism include thyrotoxicosis, overactive thyroid, Graves disease - hyperthyroidism, thyroiditis - hyperthyroidism, toxic goiter - hyperthyroidism, thyroid nodules - hyperthyroidism, and thyroid hormone - hyperthyroidism.

**DEFINITION / DESCRIPTION**

Hyperthyroidism happens when the thyroid gland makes too much thyroid hormone. This condition also is called overactive thyroid. Hyperthyroidism speeds up the body's metabolism. That can cause many symptoms, such as weight loss, hand tremors, and rapid or irregular heartbeat.

Several treatments are available for hyperthyroidism. Anti-thyroid medicines and radioiodine can be used to slow the amount of hormones the thyroid gland makes. Sometimes, hyperthyroidism treatment includes surgery to remove all or part of the thyroid gland. In some cases, depending on what's causing it, hyperthyroidism may improve without medication or other treatment.

**CAUSES**

Hyperthyroidism can be caused by several medical conditions that affect the thyroid gland. The thyroid is a small, butterfly-shaped gland at the base of the neck. It has a big impact on the body. Every part of metabolism is controlled by hormones that the thyroid gland makes.

The thyroid gland produces two main hormones: thyroxine (T-4) and triiodothyronine (T-3). These hormones affect every cell in the body. They support the rate at which the body uses fats and carbohydrates. They help control body temperature. They have an effect on heart rate. And they help control how much protein the body makes.

Hyperthyroidism happens when the thyroid gland puts too much of those thyroid hormones into the bloodstream. Conditions that can lead to hyperthyroidism include:

* **Graves' disease.** Graves' disease is an autoimmune disorder that causes the immune system to attack the thyroid gland. That prompts the thyroid to make too much thyroid hormone. Graves' disease is the most common cause of hyperthyroidism.
* **Overactive thyroid nodules.** This condition also is called toxic adenoma, toxic multinodular goiter and Plummer disease. This form of hyperthyroidism happens when a thyroid adenoma makes too much thyroid hormone. An adenoma is a part of the gland that is walled off from the rest of the gland. It forms noncancerous lumps that can make the thyroid bigger than usual.
* **Thyroiditis.** This condition happens when the thyroid gland becomes inflamed. In some cases, it's due to an autoimmune disorder. In others, the reason for it is unclear. The inflammation can cause extra thyroid hormone stored in the thyroid gland to leak into the bloodstream and cause symptoms of hyperthyroidism.

**RISK FACTORS**

Risk factors for hyperthyroidism include:

* A family history of thyroid disease, particularly Graves' disease.
* A personal history of certain chronic illnesses, including pernicious anemia and primary adrenal insufficiency.
* A recent pregnancy, which raises the risk of developing thyroiditis. This can lead to hyperthyroidism.

**SIGNS / SYMPTOMS**

Hyperthyroidism sometimes looks like other health problems. That can make it hard to diagnose. It can cause many symptoms, including:

* Losing weight without trying.
* Fast heartbeat, a condition called tachycardia.
* Irregular heartbeat, also called arrhythmia.
* Pounding of the heart, sometimes called heart palpitations.
* Increased hunger.
* Nervousness, anxiety and irritability.
* Tremor, usually a small trembling in the hands and fingers.
* Sweating.
* Changes in menstrual cycles.
* Increased sensitivity to heat.
* Changes in bowel patterns, especially more-frequent bowel movements.
* Enlarged thyroid gland, sometimes called a goiter, which may appear as a swelling at the base of the neck.
* Tiredness.
* Muscle weakness.
* Sleep problems.
* Warm, moist skin.
* Thinning skin.
* Fine, brittle hair.

Older adults are more likely to have symptoms that are hard to notice. These symptoms may include an irregular heartbeat, weight loss, depression, and feeling weak or tired during ordinary activities.

**DIAGNOSIS METHODS**

The diagnostic process for hyperthyroidism may involve multiple steps, including:

* A physical exam: To start, your healthcare provider will do a physical exam to check for signs of hyperthyroidism, like an enlarged thyroid, rapid heart rate and warm, moist skin.
* Thyroid blood tests: Blood tests can check your thyroid hormone levels. When you have hyperthyroidism, levels of the thyroid hormones T3 and T4 are above normal and thyroid-stimulating hormone (TSH) is often (but not always) lower than normal.
* Thyroid antibody blood test: This test can check if Graves’ disease is the cause.
* Imaging tests: Various imaging tests of your thyroid can help diagnose hyperthyroidism and its cause. They include a radioactive iodine uptake (RAIU) test and scan and a thyroid ultrasound. Your provider will go over the options and processes with you and recommend the test they think is best.

**TREATMENT OPTIONS**

There are many treatment options for hyperthyroidism. Depending on the cause, some options may be better for you than others. Your healthcare provider will discuss each option with you and help you determine the best treatment plan.

***Antithyroid medications***

Methimazole (Tapazole®) and propylthiouracil (PTU) block the ability of your thyroid to make hormones. These medications are the most common treatment for hyperthyroidism. They can usually control thyroid function within two to three months. Your symptoms may get better within days to weeks.

***Radioactive iodine (RAI) therapy***

RAI therapy involves taking radioactive iodine by mouth in a single capsule or liquid dose. The radioactive iodine targets your thyroid cells specifically and destroys them. RAI usually leads to permanent destruction of your thyroid, which will cure hyperthyroidism. Most people who receive this treatment must take thyroid hormone medication (levothyroxine) for the rest of their lives to maintain normal thyroid hormone levels.

***Surgery***

A surgeon may remove all or part of your thyroid gland through surgery (thyroidectomy). This will correct hyperthyroidism but will usually cause hypothyroidism, requiring lifelong thyroid hormone medication.

***Beta-blockers***

Beta-blockers are medications that can help manage hyperthyroidism symptoms like rapid heartbeat, nervousness and shakiness. But they don’t change the level of hormones in your blood. Your provider may recommend beta-blockers alongside another treatment.

Each of these treatments has specific side effects and risks. Your provider will go over them with you. Don’t hesitate to ask questions.

***LIFESTYLE AND HOME REMEDIES***

Once you begin treatment, symptoms of hyperthyroidism likely will get better. Along with your treatment, your health care provider might suggest that you reduce iodine in your diet. It can make hyperthyroidism worse. Kelp, dulse and other types of seaweed contain a lot of iodine. Cough syrup and multivitamins also may contain iodine.

***Graves' disease***

If you have Graves' disease that causes eye or skin problems, taking the following steps may help ease symptoms:

* **Don't smoke.** Smoking has been linked to the development of thyroid eye disease. It also can make that condition worse. And smoking can cause symptoms to come back after treatment.
* **Keep your eyes lubricated.** Eye drops may help relieve dryness and scratchiness. A cool compress also can provide moisture. If your eyes don't completely close, a lubricating gel at bedtime may help keep the cornea from drying out. Some people also tape their eyelids shut while they sleep.
* **Protect your eyes.** Wear sunglasses to help protect your eyes from the sun and wind.
* **Keep your head up.** Raising the head of your bed may lessen swelling and ease pressure on your eyes.
* **Use creams for swollen skin.** Creams containing hydrocortisone that you can buy without a prescription (Cortizone 10, others) may help ease swollen skin on the shins and feet. For help finding these creams, ask a pharmacist.

**OUTLOOK / PROGNOSIS**

Hyperthyroidism is a treatable condition. Most people do well with treatment. While some forms of treatment require you to take medication for the rest of your life, this will help keep your thyroid hormone levels in a healthy range.

Untreated hyperthyroidism caused by Graves’ disease may get worse over time and cause complications, like Graves’ eye disease (Graves’ ophthalmopathy). If you have Graves’ disease, ask your healthcare provider how you can best manage the condition.

Complications from untreated or undertreated hyperthyroidism include:

* Atrial fibrillation (Afib).
* Congestive heart failure.
* Infertility.
* Ischemic stroke.
* Osteoporosis.

A rare and life-threatening complication of hyperthyroidism is thyroid storm (thyroid crisis or thyrotoxic crisis). It happens when your thyroid makes and releases a large amount of thyroid hormone in a short amount of time. It’s an emergency that requires immediate medical attention.

Untreated or inadequately treated hyperthyroidism can cause thyroid storm. Stressors like infection, injury or surgery may trigger it.

**POSSIBLE COMPLICATIONS**

Hyperthyroidism can lead to the following complications.

***Heart problems***

Some of the most serious complications of hyperthyroidism involve the heart, including:

* A heart rhythm disorder called atrial fibrillation that increases the risk of stroke.
* Congestive heart failure, a condition in which the heart can't circulate enough blood to meet the body's needs.

***Brittle bones***

Untreated hyperthyroidism can lead to weak, brittle bones. This condition is called osteoporosis. The strength of bones depends, in part, on the amount of calcium and other minerals in them. Too much thyroid hormone makes it hard for the body to get calcium into bones.

***Vision problems***

Some people with hyperthyroidism develop a problem called thyroid eye disease. It's more common in people who smoke. This disorder affects the muscles and other tissues around the eyes.

Symptoms of thyroid eye disease include:

* Bulging eyes.
* Gritty sensation in the eyes.
* Pressure or pain in the eyes.
* Puffy or retracted eyelids.
* Reddened or inflamed eyes.
* Light sensitivity.
* Double vision.

Eye problems that go untreated may cause vision loss.

### **Discolored, swollen skin**

In rare cases, people with Graves' disease develop Graves' dermopathy. This causes the skin to change colors and swell, often on the shins and feet.

### **Thyrotoxic crisis**

This rare condition also is called thyroid storm. Hyperthyroidism raises the risk of thyrotoxic crisis. It causes severe, sometimes life-threatening symptoms. It requires emergency medical care. Symptoms may include:

* Fever.
* Fast heartbeat.
* Nausea.
* Vomiting.
* Diarrhea.
* Dehydration.
* Confusion.
* Delirium.

**WHEN TO SEE A DOCTOR / RED FLAG**

If you’re experiencing signs and symptoms of hyperthyroidism, it’s important to see your healthcare provider so they can assess your condition and recommend treatment.

If you already have a diagnosis, you’ll likely need to see your provider regularly to make sure your treatment is working.

If you’re experiencing signs of thyroid storm, like a high fever and very fast heart rate, get to the nearest hospital as soon as possible.

**DIFFERENTIAL DIAGNOSIS**

Diagnostic considerations include factitious hyperthyroidism, which is hyperthyroidism secondary to intentional consumption of thyroid hormone. In this condition, thyroid hormone consumption causes suppression of thyroglobulin secretion by the thyroid. Factitious hyperthyroidism is common in medical personnel, who have easy access to medication containing thyroid hormone and may abuse it for weight loss or an energy boost.

***Differential Diagnoses***

* Diffuse Toxic Goiter (Graves Disease)
* Euthyroid Hyperthyroxinemia
* Goiter
* Graves Disease
* Struma Ovarii
* Thyrotoxicosis Imaging

**RECENT GUIDELINES OR UPDATES**

The following are a sampling of the 124 evidence-based recommendations included in the guideline update:

* Beta-adrenergic blockade is recommended in all patients with symptomatic thyrotoxicosis, especially elderly patients and thyrotoxic patients with resting heart rates in excess of 90 beats per minute or coexistent cardiovascular disease
* Patients with overt Graves hyperthyroidism should be treated with any of the following modalities: radioactive iodine therapy, antithyroid drugs, or thyroidectomy
* If methimazole is chosen as the primary therapy for Graves disease, the medication should be continued for approximately 12-18 months and then discontinued if the serum thyrotropin and thyrotropin receptor antibody levels are normal at that time
* If surgery is chosen as the primary therapy for Graves disease, near-total or total thyroidectomy is the procedure of choice
* If surgery is chosen as treatment for toxic multinodular goiter, near-total or total thyroidectomy should be performed
* If surgery is chosen as the treatment for toxic adenoma, a thyroid sonogram should be done to evaluate the entire thyroid gland; an ipsilateral thyroid lobectomy (or isthmusectomy, if the adenoma is in the thyroid isthmus), should be performed for isolated toxic adenomas
* Children with Graves disease should be treated with methimazole, radioactive iodine therapy, or thyroidectomy; radioactive iodine therapy should be avoided in very young children (< 5 years); radioactive iodine therapy in children is acceptable if the activity is over 150 μCi/g (5.55 MBq/g) of thyroid tissue and for children between ages 5 and 10 years if the calculated radioactive iodine administered activity is under 10 mCi (< 473 MBq); thyroidectomy should be chosen when definitive therapy is required, the child is too young for radioactive iodine, and surgery can be performed by a high-volume thyroid surgeon
* If methimazole is chosen as the first-line treatment for Graves disease in children, it may be tapered in those children requiring low doses after 1-2 years to determine if a spontaneous remission has occurred, or it may be continued until the child and caretakers are ready to consider definitive therapy, if needed
* If surgery is chosen as therapy for Graves disease in children, total or near-total thyroidectomy should be performed
* Euthyroidism should be expeditiously achieved and maintained in hyperthyroid patients with Graves orbitopathy or risk factors for the development of orbitopathy
* In patients with Graves hyperthyroidism who have mild active ophthalmopathy and no risk factors for deterioration of their eye disease, radioactive iodine therapy, antithyroid drugs, and thyroidectomy should be considered equally acceptable therapeutic options
* In Graves disease patients with mild Graves orbitopathy who are treated with radioactive iodine, steroid coverage is recommended if there are concomitant risk factors for Graves orbitopathy deterioration

Guidelines pertaining to the diagnosis and management of thyroid disease in women during pregnancy and the postpartum period, as well as prior to conception. Recommendations regarding thyrotoxicosis in pregnancy included the following ] :

* When a suppressed serum TSH is detected in the first trimester (TSH less than the reference range), a medical history, physical examination, and measurement of maternal serum free thyroxine (FT4) or total thyroxine (T4) concentrations should be performed; measurement of thyroid-stimulating antibody (TSab) and maternal total triiodothyronine (T3) may prove helpful in clarifying the etiology of thyrotoxicosis
* Radionuclide scintigraphy or radioiodine uptake determination should not be performed in pregnancy
* The appropriate management of abnormal maternal thyroid tests attributable to gestational transient thyrotoxicosis and/or hyperemesis gravidarum includes supportive therapy, management of dehydration, and hospitalization if needed; antithyroid drugs are not recommended, though beta blockers may be considered
* In all women of childbearing age who are thyrotoxic, the possibility of future pregnancy should be discussed; women with Graves disease seeking future pregnancy should be counseled regarding the complexity of disease management during future gestation, including the association of birth defects with antithyroid drug use; preconception counseling should review the risks and benefits of all treatment options and the patient’s desired timeline to conception
* Thyrotoxic women should be rendered stably euthyroid before attempting pregnancy; several treatment options exist, each of which is associated with risks and benefits; these include 131I ablation, surgical thyroidectomy, and antithyroid drug therapy
* Women taking methimazole or propylthiouracil should be instructed to confirm potential pregnancy as soon as possible; if the pregnancy test is positive, pregnant women should contact their caregiver immediately
* In pregnant women with a high risk of developing thyrotoxicosis if antithyroid drugs were to be discontinued, continued antithyroid medication may be necessary; factors predicting high clinical risk include being currently hyperthyroid or requirement of >5-10 mg/d methimazole or >100-200 mg/d propylthiouracil to maintain a euthyroid state; in such cases, propylthiouracil is recommended for the treatment of maternal hyperthyroidism through 16 weeks of pregnancy, and when shifting from methimazole to propylthiouracil, a dose ratio of approximately 1:20 should be used (e.g., methimazole 5 mg/d = propylthiouracil 50 mg twice daily)
* In women being treated with antithyroid drugs in pregnancy, free thyroxine (FT4)/total thyroxine (T4) and TSH should be monitored approximately every 4 weeks; antithyroid medication during pregnancy should be administered at the lowest effective dose of methimazole or propylthiouracil, targeting maternal serum free thyroxine (FT4)/total thyroxine (T4) at the upper limit of or moderately above the reference range.
* A combination regimen of levothyroxine (LT4) and an antithyroid drug should not be used in pregnancy, except in the rare situation of isolated fetal hyperthyroidism
* Thyroidectomy in pregnancy may be indicated for unique scenarios; if required, the optimal time for thyroidectomy is in the second trimester of pregnancy; if maternal thyroid-stimulating antibody (TSab) concentration is high (>3 times the upper reference for the assay), the fetus should be carefully monitored for development of fetal hyperthyroidism throughout pregnancy, even if the mother is euthyroid postthyroidectomy
* The ATA concurs with the American College of Obstetricians and Gynecologists’ Committee on Obstetric Practice consensus guidelines (written in 2011 and revised in 2015), which state the following: ‘‘1) A pregnant woman should never be denied indicated surgery, regardless of trimester. 2) Elective surgery should be postponed until after delivery. 3) If possible, nonurgent surgery should be performed in the second trimester when preterm contractions and spontaneous abortion are least likely.’’ In the setting of a patient with Graves disease undergoing urgent, nonthyroid surgery, if the patient is well controlled on antithyroid medication, no other preparation is needed; beta blockade should also be utilized if needed
* If the patient has a past history of Graves disease treated with ablation (radioiodine or surgery), a maternal serum determination of thyroid-stimulating antibodies (TSabs) is recommended at initial thyroid function testing during early pregnancy
* If maternal thyroid-stimulating antibody (TSab) concentration is elevated in early pregnancy, repeat testing should occur at weeks 18-22
* If the patient requires treatment with antithyroid drugs for Graves disease through midpregnancy, a repeat determination of thyroid-stimulating antibody (TSab) concentration is again recommended at weeks 18-22
* If elevated thyroid-stimulating antibody (TSab) is detected at weeks 18-22 or the mother is taking antithyroid medication in the third trimester, a TSab measurement should again be performed in late pregnancy (weeks 30-34) to evaluate the need for neonatal and postnatal monitoring
* Fetal surveillance should be performed in women who have uncontrolled hyperthyroidism in the second half of pregnancy and in women with high thyroid-stimulating antibody (TSab) levels detected at any time during pregnancy (>3 times the upper limit of normal); a consultation with an experienced obstetrician or maternal–fetal medicine specialist is recommended; monitoring may include ultrasonography to assess heart rate, growth, amniotic fluid volume, and the presence of fetal goiter
* If antithyroid drug therapy is given for hyperthyroidism caused by autonomous nodules, the fetus should be carefully monitored for goiter and signs of hypothyroidism during the second half of pregnancy; a low dose of antithyroid medication should be administered with the goal of maternal free thyroxine (FT4) or total thyroxine (T4) concentration at the upper limit of or moderately above the reference range

**EPIDEMIOLOGY**

Graves disease is the most common form of hyperthyroidism in the United States, causing approximately 60-80% of cases of thyrotoxicosis. The annual incidence of Graves disease was found to be 0.5 cases per 1000 population during a 20-year period, with the peak occurrence in people aged 20-40 years.

Toxic multinodular goiter (15-20% of thyrotoxicosis) occurs more frequently in regions of iodine deficiency. Most persons in the United States receive sufficient iodine, and the incidence of toxic multinodular goiter in the US population is lower than that in areas of the world with iodine deficiency.

Toxic adenoma is the cause of 3-5% of cases of thyrotoxicosis.

The incidences of Graves disease and toxic multinodular goiter change with iodine intake. Compared with regions of the world with less iodine intake, the United States has more cases of Graves disease and fewer cases of toxic multinodular goiters.

***Race-, sex-, and age-related demographics***

Autoimmune thyroid disease occurs with the same frequency in Caucasians, Hispanics, and Asians but at lower rates in African Americans.

All thyroid diseases occur more frequently in women than in men. Graves autoimmune disease has a male-to-female ratio of 1:5-10. The male-to-female ratio for toxic multinodular goiter and toxic adenoma is 1:2-4. Graves ophthalmopathy is more common in women than in men.

Autoimmune thyroid diseases have a peak incidence in people aged 20-40 years. Toxic multinodular goiters occur in patients who usually have a long history of nontoxic goiter and who therefore typically present when they are older than age 50 years. Patients with toxic adenomas present at a younger age than do patients with toxic multinodular goiter.

***Mortality and morbidity***

A literature review by Varadharajan and Choudhury indicated that the rate of thyroid cancer associated with hyperthyroidism is not insignificant. In patients who underwent surgery for Graves disease, toxic adenoma, or toxic multinodular goiter, the mean overall rate of thyroid cancer was found to be 8.5%.

The mean rates, specifically, for malignancy in Graves disease, toxic adenoma, and toxic multinodular goiter were 5.9%, 6.5%, and 12%, respectively.

Regarding cancer subtype, the mean rates for papillary thyroid cancer, micropapillary carcinoma, and follicular thyroid cancer were 3.1%, 5.1%, and 0.8%, respectively.

A study by Kim et al reported hyperthyroidism to be a risk factor for myocardial infarction and ischemic stroke in females, persons aged 50 years or older, and nonobese individuals, independent of cardiovascular risk factors. However, hyperthyroidism was not found to significantly impact mortality secondary to cardiovascular events.

A prospective observational study by Watanabe et al indicated that in about 20% of patients with thyrotoxicosis, high-sensitivity cardiac troponin I levels (hsTnI) are increased. It was also found that these troponin levels decreased as thyroid function improved and brain natriuretic peptide (BNP) concentrations fell.

(Elevated BNP is associated with secondary cardiac complications in thyrotoxicosis.)

None of the patients with elevated hsTNI were found on electrocardiogram to have definitive evidence of myocardial ischemia, indicating that levels rise in persons with thyrotoxicosis even in the absence of overt myocardial infarction.

**PREDEFINED Q & A SETS**

Does hyperthyroidism cause weight gain?

Hyperthyroidism doesn’t typically cause weight gain. In fact, some people experience weight loss — even with an increased appetite. This is because hyperthyroidism speeds up your metabolic rate, causing your body to use more calories for energy than usual.

Hypothyroidism (underactive thyroid) slows down your metabolism, which may lead to weight gain.

Can I develop hyperthyroidism during pregnancy?

During early pregnancy, your body needs to produce more thyroid hormones than normal to help the developing fetus. Having thyroid hormone levels that are a little higher than normal is OK, but if your levels increase dramatically, your healthcare provider may need to form a treatment plan. High levels of thyroid hormones can impact not only you but also the fetus.

It can be difficult to diagnose hyperthyroidism during pregnancy because your thyroid hormone levels naturally increase and the other symptoms of pregnancy can mask signs of the condition.

What foods should I avoid with hyperthyroidism?

Eating too many iodine-rich or iodine-fortified foods may cause hyperthyroidism or make it worse in some cases.

If you have hyperthyroidism, your healthcare provider may recommend certain changes to your diet. Always consult your provider or a registered dietitian before making drastic changes to your diet. Know that diet changes alone often can’t fix hyperthyroidism. You’ll likely need medical treatment.

If your provider recommends a low-iodine diet, try to avoid the following foods:

* Fish.
* Seaweed and kelp.
* Crab and lobster.
* Sushi.
* Prawns.
* Algae and alginate
* Milk and dairy products, like cheese.
* Egg yolks.
* Iodized salt.

**Drug information and their common side effects**

1. Antithyroid Medications

These drugs reduce thyroid hormone production by blocking the thyroid’s ability to use iodine.

| Medication | Description | Common Side Effects | Notes |
| --- | --- | --- | --- |
| Methimazole (Tapazole) | Usually first-choice. Taken once daily. Prevents thyroid hormone synthesis. | Skin rash, itching, nausea, headache, joint pain, rare agranulocytosis (low white blood cells), rare liver damage | Preferred due to lower liver toxicity. Avoid in first trimester pregnancy. |
| Propylthiouracil (PTU) | Less commonly used; blocks hormone synthesis and peripheral conversion of T4 to T3. | Similar to methimazole but higher risk of severe liver injury, rash, nausea, arthralgia, agranulocytosis (rare) | Reserved for patients intolerant of methimazole or in first trimester pregnancy. Requires multiple daily doses. |

* Duration: Treatment generally lasts 12 to 18 months. Some patients achieve long-term remission; others relapse and may need additional treatment.
* Rare but serious: Agranulocytosis requires immediate medical attention if fever or sore throat develops.

2. Beta Blockers

Used adjunctively to relieve symptoms caused by excess thyroid hormone but do not alter hormone levels.

| Medication | Benefits | Side Effects | Notes |
| --- | --- | --- | --- |
| Propranolol | Controls rapid heart rate, tremors, anxiety | Fatigue, dizziness, sexual dysfunction | Avoid in asthma or bradycardia |
| Atenolol, Metoprolol | Similar benefits | Similar side effects | Cardioselective beta blockers |

* Prescribed temporarily until antithyroid meds take effect or before definitive treatment.

3. Radioactive Iodine (RAI) Therapy

* Taken orally, destroys overactive thyroid tissue, often leading to hypothyroidism requiring lifelong thyroid hormone replacement.
* Side effects may include temporary worsening of hyperthyroid symptoms, dry mouth, neck tenderness.
* Not recommended during pregnancy or breastfeeding.

4. Surgery (Thyroidectomy)

* Reserved for large goiters, suspicion of cancer, or intolerance/failure of other treatments.
* Risks include damage to vocal cords, hypoparathyroidism.

**Key Genetic Factors and Genes Involved**

* Genetic predisposition accounts for about 79% of individual susceptibility to Graves’ disease, based on twin and familial studies.
* Several genes linked to immune system regulation and thyroid function are associated with hyperthyroidism, including:
  + HLA (human leukocyte antigen) genes involved in immune response regulation
  + CTLA4 (cytotoxic T-lymphocyte-associated protein 4)
  + FCRL3 (Fc receptor-like 3)
  + RNASET2 (ribonuclease T2)
  + TSHR (thyroid-stimulating hormone receptor), mutations here can cause nonimmune hyperthyroidism and congenital forms
  + PTPN22 and thyroglobulin genes also implicated in autoimmune thyroid disease susceptibility
* GNAS gene mutations cause McCune-Albright syndrome, a rare genetic disorder that includes hyperthyroidism among its features.

Types of Genetic Hyperthyroidism

* Autoimmune hyperthyroidism (Graves’ disease): Resulting from genetic variants triggering immune attack on thyroid tissue, activating TSH receptors excessively.
* Hereditary autosomal dominant hyperthyroidism: Germline mutations (e.g., in TSHR gene) cause constitutive receptor activation independent of immune mechanisms.
* Sporadic congenital hyperthyroidism: May arise from de novo mutations.

Genetic Studies and Research

* Genome-wide association studies (GWAS) and candidate gene analyses have identified numerous single-nucleotide polymorphisms (SNPs) linked to early-onset Graves’ disease, involving loci such as HLA-I, HLA-II, BTNL2, NOTCH4, TNFAIP3, CXCR4, and FOXP3.
* These findings underscore that besides genetic susceptibility, environmental triggers (infections, stress, smoking) play a role in disease onset.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello! What brings you in today?

Patient: I’ve been feeling really anxious, my heart races a lot, and I’ve lost some weight without trying. Also, I’m sweating more than usual.

Doctor: Those symptoms can be signs of an overactive thyroid, called hyperthyroidism. Have you noticed any other changes, like feeling restless or difficulty sleeping?

Patient: Yes, actually. I do have trouble sleeping, and my hands tremble sometimes.

Doctor: These are common symptoms. Hyperthyroidism means your thyroid gland is producing too much hormone, which speeds up your body’s functions. We’ll do some blood tests to check your thyroid hormone levels.

Patient: Is it serious?

Doctor: It can be if untreated, but the good news is it’s manageable with medication or other therapies.

Patient: What treatments are available?

Doctor: Usually, we start with antithyroid medications that reduce hormone production. Sometimes beta blockers are used to help control symptoms like rapid heartbeat. In certain cases, radioactive iodine therapy or surgery may be recommended.

Patient: Are the medications safe?

Doctor: Yes, they’re generally safe but can have side effects like rash or, rarely, low white blood cells. We monitor you regularly with follow-up labs.

Patient: How long does treatment usually last?

Doctor: Typically one to two years of medication, and some people go into remission. If not, other treatments can be considered.

Patient: Will I have to take medication forever?

Doctor: Not always. Many patients stop medications after remission, but some need long-term therapy or other options.

Patient: Is there anything I should avoid?

Doctor: It’s good to avoid excessive iodine and certain supplements. Also, remember to keep your appointments and report any new symptoms.

Patient: Thank you for explaining everything clearly.

Doctor: You’re welcome! Feel free to ask anytime you have questions.

REFERENCES:

<https://www.mayoclinic.org/diseases-conditions/hyperthyroidism/diagnosis-treatment/drc-20373665>

<https://www.nhs.uk/conditions/overactive-thyroid-hyperthyroidism/treatment/>

<https://my.clevelandclinic.org/health/diseases/14129-hyperthyroidism>

<https://emedicine.medscape.com/article/121865-treatment>

**Hyposmia and anosmia**

**DEFINITION / DESCRIPTION**

Hyposmia (pronounced “hi-POSE-mee-uh”) refers to a decreased sense of smell. People with the condition have difficulty detecting and identifying odors and scents. Hyposmia is a smell disorder, but it’s different from anosmia, which refers to a total loss of sense of smell, and parosmia, which refers to an abnormal sense of smell.

While over 12% of the U.S. population has some form of smell dysfunction, about 3% of Americans have hyposmia.

Your risk for hyposmia and other types of smell disorders increases with age.

**CAUSES**

Hyposmia causes include certain health conditions, environmental factors and neurological issues. The most common cause of hyposmia is inflammation inside your nose. Additionally, neurological issues can affect the part of your brain responsible for your sense of smell.

Health conditions that may contribute to hyposmia include:

* Allergies.
* Bacterial infections, including rhinosinusitis, nasal vestibulitis or chronic sinus infections.
* Viral infections, including COVID, flu or the common cold.
* Nasal polyps.
* Deviated septum.
* Hormonal imbalances.
* Type 1 diabetes.
* Malnutrition.
* Dental issues like extensive tooth decay or gum disease.

Environmental factors that can cause hyposmia include:

* Smoking.
* Certain medications, including some antibiotics, antihistamines and antidepressants.
* Long-term exposure to certain chemicals, like lead and other heavy metals.
* Head and neck radiation therapy.
* Using cocaine.

Neurological issues linked to hyposmia include:

* Parkinson’s disease.
* Alzheimer’s disease.
* Multiple sclerosis (MS).

#### **Hyposmia and COVID-19**

Hyposmia is a common symptom of COVID-19. In many cases, it’s one of the first noticeable warning signs.

Having hyposmia doesn’t necessarily mean you have COVID-19. But if you develop a sudden decrease in your sense of smell, let a healthcare provider know.

**SIGNS / SYMPTOMS**

Hyposmia symptoms can develop suddenly or gradually over time and may include:

* A diminished sense of smell overall.
* Trouble detecting certain odors.
* Difficulty distinguishing between certain smells.

Up to 80% of taste is due to the sense of smell. As a result, you may also notice changes to your sense of taste (dysgeusia) in addition to a decreased sense of smell.

**DIAGNOSIS METHODS**

Apart from a multidimensional assessment ruling out neurological causes and COVID-19, a consultation with an ear, nose and throat specialist will examine your sinuses and the inside of your nose to check for infection, growths or polyps. They may also recommend diagnostic tests, including:

* Nasal endoscopy.
* Imaging tests, including CT (computed tomography) scans and MRI (magnetic resonance imaging).
* Sense of smell tests.

**TREATMENT OPTIONS**

Hyposmia treatment involves identifying and addressing the underlying cause. Treatments may include:

* Lifestyle changes.
* Sense of smell training.
* Medication.
* Surgery.

Every case is unique, so treatments vary widely. For neurological causes and COVID-19-related smell loss, ask your healthcare provider which options are right for you.

#### **Lifestyle changes**

People who develop hyposmia because of environmental factors may be able to reverse their symptoms by removing the trigger. For example, if smoking causes hyposmia, you might regain your sense of smell if you quit. Occasionally, occupational exposure could result in an irreversible sense of smell loss, so avoidance of these may be of value to avoid a further decrease in the sense of smell.

#### **Medication**

Prescribing medication to treat the underlying cause can also reduce hyposmia symptoms. For example, if you developed hyposmia because of allergies, your provider may recommend antihistamines or corticosteroids. Or they may prescribe antibiotics for sinusitis-related hyposmia.

#### **Surgery**

In severe cases, you may need surgery to treat hyposmia. But the type of surgery you need depends on the condition that caused it. If you have a deviated septum that caused hyposmia, you may need septoplasty. Or if you have nasal polyps, a surgeon may need to remove them.

**PREVENTION TIPS**

You can’t always prevent hyposmia because many of the underlying causes are unavoidable. But there are things you can do to reduce your risk:

* Wear proper protective gear if you work in an environment with harmful chemicals.
* Keep existing health conditions in check.
* Practice good oral hygiene.
* Eat a well-balanced diet.
* If you smoke, consider quitting.
* Avoid insufflating (snorting) cocaine, opioids or other substances.

**OUTLOOK / PROGNOSIS**

It depends on what caused it. Some people only notice a reduced sense of smell for a few days. Others may notice lingering symptoms for months or years. In some cases, hyposmia can be permanent.

To ease hyposmia symptoms as quickly as possible, schedule an appointment with a healthcare provider. Once they determine the cause, they can recommend appropriate treatment.

**POSSIBLE COMPLICATIONS**

Hyposmia can have a significant negative impact on your quality of life. Most notably, it can prevent you from detecting odors that tell you you’re in danger, like:

* Fire or smoke.
* Gas leaks.
* Spoiled food.
* Poisonous chemicals.

**WHEN TO SEE A DOCTOR / RED FLAG**

A decreased sense of smell usually goes away on its own when it results from allergies, colds or infections. But if you have hyposmia symptoms that linger for more than a couple of weeks, tell a healthcare provider.

In addition, if you develop sudden and severe hyposmia for no apparent reason, seek medical care right away. It could indicate a more serious health concern.

### **What questions should I ask my healthcare provider?**

Changes in your sense of smell can be scary. Here are some questions to ask your healthcare provider if you develop hyposmia:

* Why did my sense of smell change?
* What’s the underlying cause?
* What tests do you recommend?
* Do I have another health condition causing this?

**DIFFERENTIAL DIAGNOSIS**

Common Causes:

* Viral upper respiratory infections (e.g., common cold, influenza, SARS-CoV-2)
* Chronic rhinosinusitis
* Nasal polyps
* Allergic rhinitis
* Deviated nasal septum
* Head trauma or concussive injury
* Aging-related olfactory decline

Neurological Causes:

* Parkinson’s disease
* Alzheimer’s disease
* Dementia with Lewy bodies
* Brain tumors or lesions affecting olfactory pathways
* Post-traumatic olfactory dysfunction

Environmental and Toxic Causes:

* Chronic exposure to pollutants, chemicals, tobacco smoke
* Drugs and medications (e.g., antibiotics, antidepressants, antihistamines)
* Radiotherapy involving head and neck

Autoimmune and Systemic Diseases:

* Sjögren’s syndrome
* Granulomatosis with polyangiitis
* Sarcoidosis
* Diabetes mellitus
* Hormonal imbalances
* Nutritional deficiencies (Vitamin A, B12, Zinc)

Congenital and Genetic Disorders:

* Kallmann syndrome
* Syndromal hyposmia as part of genetic conditions

Other Causes:

* Sinonasal tumors (e.g., esthesioneuroblastoma, olfactory groove meningioma)
* Post-surgical changes (e.g., after sinus surgery or craniofacial procedures)

**EPIDEMIOLOGY**

* The prevalence of hyposmia (reduced sense of smell) in adults varies but is significant, especially in older populations.
* A large study found a census-weighted prevalence of hyposmia around 20.5% among community-dwelling older adults, with overall olfactory impairment (OI) affecting about one-third (34%) of individuals.
* Prevalence increases markedly with age, from about 4% in adults aged 40–49 up to over 25–39% in those 70+ or 80+ years old.
* Hyposmia is more common in males compared to females and shows variation with ethnicity and socioeconomic status.
* In the United States, approximately 9.8 million people aged 40 and older had hyposmia in 2012, and an additional 3.4 million suffered from anosmia or severe hyposmia.
* Other factors associated with higher prevalence include diabetes, high alcohol consumption, and certain chronic diseases.
* Hyposmia is also recognized as an early sign of neurodegenerative diseases such as Parkinson’s and Alzheimer’s.
* Recent large surveys show smell disorders affect between 13–22% of the general population, with some increase observed during the COVID-19 pandemic due to viral-related olfactory loss

**PREDEFINED Q & A SETS**

## What is hyposmia?

Hyposmia is a *decreased ability to smell* or detect odors through the nose. It can range from mild reduction to nearly complete loss of smell.

## What are the symptoms of hyposmia?

* Reduced ability to detect and identify smells
* Decreased taste sensation because taste and smell are connected
* Altered or unpleasant perception of odors
* Possible nasal congestion or blockage
* Loss of appetite or decreased interest in food due to reduced flavor perception

## What causes hyposmia?

Common causes include:

* Viral upper respiratory infections (e.g., common cold, influenza, COVID-19)
* Nasal conditions such as polyps, chronic sinusitis, allergic rhinitis, or deviated septum
* Head trauma or injury to the olfactory nerves
* Neurological disorders such as Parkinson’s or Alzheimer’s disease
* Exposure to environmental toxins or smoking
* Certain medications (like some antibiotics, antidepressants, antihistamines)
* Nutritional deficiencies and autoimmune diseases

## How is hyposmia diagnosed?

* Physical exam by an ENT specialist including nasal endoscopy
* Smell identification tests (e.g., scratch and sniff, sniffin’ sticks)
* Imaging studies such as CT or MRI to check nasal passages and brain structures
* Laboratory tests to identify infections or nutritional issues

## How is hyposmia treated?

Treatment depends on the underlying cause:

* Medications to reduce nasal inflammation (corticosteroids, antihistamines)
* Surgery to remove nasal polyps or correct structural blockages
* Counseling and lifestyle changes like quitting smoking
* Treating underlying infections or neurological conditions
* Olfactory training in some cases to improve smell function

## Can hyposmia be permanent?

Some cases are temporary, especially when caused by infections or allergies. However, hyposmia can be long-lasting or permanent if caused by nerve damage, neurodegenerative diseases, or chronic nasal conditions.

## When should I see a doctor?

* Sudden loss or reduction in smell
* Persistent nasal congestion or discharge
* Associated symptoms like facial pain, vision changes, neurological symptoms
* Concern about smell affecting appetite or safety (like inability to detect smoke)

## What problems can hyposmia cause?

* Reduced quality of life due to loss of flavor and enjoyment of food
* Safety risks from inability to detect smoke, gas leaks, or spoiled food
* Nutritional issues due to decreased appetite

## How can I prevent hyposmia?

* Avoid exposure to nasal irritants and pollutants
* Promptly treat respiratory infections and allergies
* Protect head from injury
* Maintain good nasal hygiene and overall health

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning! What brings you in today?

Patient: Hello, doctor. Lately, I’ve noticed that my sense of smell isn’t as good as it used to be. I can’t smell things as well.

Doctor: I see. When did you first notice this change?

Patient: It started a few weeks ago. At first, I thought it was just because of a cold, but it hasn’t gotten better.

Doctor: Has anything else happened recently, like nasal congestion, headaches, or any recent injury to your head?

Patient: I did have a bad cold about a month ago. No head injury though.

Doctor: It’s quite common for viral infections, like colds, to cause temporary reduction in smell. Sometimes the inflammation affects the olfactory nerves. Do you have any nasal blockage or allergies?

Patient: Sometimes I get allergies, and my nose feels blocked then.

Doctor: That might be contributing as well. We’ll examine your nasal passages to see if there’s any obstruction like polyps or inflammation. Also, we can perform a simple smell test to assess the severity.

Patient: Will this get better?

Doctor: In many cases, especially when caused by infections or allergies, smell improves with time and treatment. We can also discuss therapies like nasal sprays or olfactory training exercises if needed.

Patient: Are there other reasons someone can lose their sense of smell?

Doctor: Yes, sometimes neurological conditions like Parkinson’s disease or Alzheimer’s can affect smell, but those usually come with other symptoms. If your smell doesn’t improve or worsens, we may consider further evaluations.

Patient: What should I do in the meantime?

Doctor: Keep track of your symptoms, avoid smoking or irritants, and let me know if you develop other symptoms. We’ll start with a thorough nasal exam today.

Patient: Thank you, doctor. That makes me feel better.

Doctor: You’re welcome! We’ll work together to find the cause and the best treatment for you.

REFERENCES:

[Hyposmia: Causes, Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/25166-hyposmia#overview)

<https://www.nidcd.nih.gov/health/statistics/quick-statistics-taste-smell>

**Hereditary hemorrhagic telangiectasia**

**ALTERNATIVE NAMES**

Osler-Weber-Rendu syndrome,

**DEFINITION / DESCRIPTION**

Hereditary hemorrhagic telangiectasia (tuh-lan-jee-uk-TAY-zhuh) is a condition that's passed through families, called inherited. It causes atypical links between arteries and veins called arteriovenous malformations (AVMs). The most common sites AVMs affect are the skin, nose, digestive system, lungs, brain and liver.

AVMs may get larger over time. They can bleed or burst. This can result in serious complications, including death.

Nosebleeds that happen for no known reason are the most common symptom. Nosebleeds can happen every day. Ongoing bleeding from the nose and the intestinal tract can result in serious iron deficiency anemia and poor quality of life.

Also called Osler-Weber-Rendu disease and HHT, hereditary hemorrhagic telangiectasia passes from parents to children. How bad it is can vary greatly from person to person, even within the same family.

If you have HHT and have children, you may want to have them checked for the condition. HHT can affect them even if they don't have symptoms.

**CAUSES**

HHT is a condition of gene changes, called genetic, that you get from your parents. It is an autosomal dominant disorder. That means if one of your parents has HHT, you have a 50% chance of getting it. If you have HHT, each of your children has a 50% chance of getting it from you.

**RISK FACTORS**

The major risk factor for hereditary hemorrhagic telangiectasia is having a parent with the condition.

**SIGNS / SYMPTOMS**

Symptoms of HHT include:

* Nosebleeds. These can happen every day. They often start in childhood.
* Lacy red vessels or tiny red spots, mostly on the lips, face, fingertips, tongue and inside the mouth. These are called telangiectasias.
* Iron deficiency anemia due to bleeding from the nose or intestinal tract.
* Shortness of breath.
* Headaches.
* Seizures.
* Pus-filled swelling in the brain, called a brain abscess, and strokes.
* Infection in a bone, called osteomyelitis.

**DIAGNOSIS METHODS**

Your healthcare professional may diagnose HHT based on a physical exam, results of imaging tests and a family history. But some symptoms may not show up in children or young adults. Having genetic testing for HHT may confirm the diagnosis.

### **Imaging tests**

In HHT, atypical links called arteriovenous malformations, also called AVMs, happen between arteries and veins. HHT AVMs can be present in internal organs such as the lungs, brain and liver. One or more of the following imaging tests can help find AVMs:

* **Ultrasound.** This test can show whether the AVMs affect the liver.
* **MRI.** This scan can check for AVMs in the brain as well as the liver and other organs in the belly.
* **Echocardiogram bubble study.** During this echocardiogram test, a healthcare professional puts a line in a vein, called an IV. A small amount of air bubbles put into the IV lets the healthcare professional find and assess any lung AVMs.
* **CT scan.** These can confirm AVMs in the lungs, the liver and other organs in the belly.

**TREATMENT OPTIONS**

If you or your child has HHT, if you can, seek treatment at an HHT Center of Excellence. HHT is a rare condition that is best managed at centers that treat all aspects of this condition at every age. So it can be hard to find a specialist to treat it.

In the United States, Cure HHT names HHT Centers of Excellence for being able to diagnose and treat all aspects of the condition. Mayo Clinic is an HHT Center of Excellence and cares for many people and their family members diagnosed with HHT.

### **Medications**

Medicines that help stop the bleeding linked with HHT can be divided into three broad groups:

* **Hormone-related drugs.** Medicines that have estrogen can be helpful. But side effects are common with the high doses needed. Anti-estrogens such as tamoxifen (Soltamox) and raloxifene (Evista) also can control HHT.
* **Medicines that block blood vessel growth.** One treatment for HHT is bevacizumab (Avastin). Avastin goes through a tube in a vein, called intravenous. Other medicines healthcare professionals use to block blood vessel growth include pazopanib (Votrient), pomalidomide (Pomalyst) and tacrolimus (Prograf, Protopic, others).
* **Medicines that slow clot dissolving.** Tranexamic acid (Cyklokapron, Lysteda) can help stop serious bleeding in emergencies. If taken regularly, it may help prevent bleeding.

If you get iron deficiency anemia, you might get an iron replacement through a vein. This most often works better than taking iron pills.

### **Surgical and other procedures for the nose**

Serious nosebleeds are one of the most common signs of HHT. These sometimes happen daily. They can cause so much blood loss that you become anemic. You might need to receive blood, called a transfusion, and iron through an arm vein.

Procedures to lower the number of nosebleeds and lessen how bad they are may include:

* **Ablation.** This procedure uses energy from lasers or other devices to seal the vessels that cause the nosebleeds. But this most often is short-lived. The nosebleeds come back over time.
* **Skin graft.** Skin from another part of the body can be put inside the nose. The skin most often comes from the thigh. Healthcare professionals rarely do this procedure anymore because of how well newer medicines work.
* **Surgically closing the nostrils.** If nothing else works, joining flaps of skin within the nose to close the nostrils often is a success. This is done only when other treatments have failed. Healthcare professionals rarely do this procedure anymore because of how well newer medicines work.

### **Surgical and other procedures for the lungs, brain and liver**

HHT most often affects the lungs, brain and liver. Procedures to treat AVMs in these organs may include:

* **Embolization.** In this procedure, a healthcare professional threads a long, slender tube through the blood vessels to the AVM. Then the health professional puts in a plug or a metal coil to block blood from entering the AVM. This shrinks and heals the AVM over time. Embolization treats lung and brain AVMs, but not liver AVMs.
* **Surgical removal.** Rarely, the best way to treat certain AVMs in the brain or the lungs is to remove them with surgery.
* **Stereotactic radiotherapy.** This procedure treats AVMs in the brain. It uses beams of radiation that come from different directions. They meet at the AVM to treat it.
* **Liver transplant.** Rarely, treatment for AVMs in the liver is a liver transplant.

**Lifestyle and home remedies**

To help prevent HHT nosebleeds, you may want to:

* **Not use certain medicines.** Your risk of bleeding can be higher from using certain medicines and drugs you get without a prescription. These include aspirin, ibuprofen (Advil, Motrin IB, others), fish oil supplements, ginkgo and St. John's wort.
* **Not eat certain foods.** In some people, having blueberries, red wine, dark chocolate or spicy foods can cause HHT nosebleeds. Try keeping a food diary to see if there's any link between what you eat and how bad your nosebleeds are.
* **Keep your nose moist.** Use saline sprays, lotions or gels that add moisture to help lower the risk of bleeding. Using a bedside humidifier overnight also is helpful.
* **Not do heavy lifting.** Bending over and lifting heavy objects can cause nosebleeds.

**PREVENTION TIPS**

There is no way to prevent HHT or reduce your risk of getting it. But tell your healthcare provider if your parent, sibling or child has it. That may help you catch it early and prevent complications.

To help prevent nosebleeds:

* Avoid certain medications, such as aspirin and NSAIDs.
* Keep a journal to track if any foods or activities trigger nosebleeds.
* Keep your nose moist and lubricated all the time, using a humidifier, ointments and saline spray, for example.

**OUTLOOK / PROGNOSIS**

People with HHT have an almost average life expectancy. But AVMs in the lungs and brain and chronic bleeding are serious and should be treated.

**WHEN TO SEE A DOCTOR / RED FLAG**

If you’ve been diagnosed with HHT, consider asking your healthcare provider:

* Should anyone in my family get tested?
* Can I play sports?
* Should I avoid any particular activities?
* Should I avoid alcohol, certain foods or any medications?
* What can I do to prevent or stop nosebleeds?
* Is it safe for me to get pregnant?
* When should I seek medical attention for bleeding?

## **Diagnostic Considerations**

The diagnosis of Osler-Weber-Rendu disease (OWRD; ie, hereditary hemorrhagic telangiectasia [HHT]) is made clinically on the basis of the Curaçao criteria, established in June 1999 by the Scientific Advisory Board of the HHT Foundation International, Inc, for the purposes of improving patient care and standardizing research.These criteria are as follows:

* Epistaxis - Spontaneous and recurrent
* Telangiectases - Multiple characteristic sites (eg, lips, oral cavity, fingers, or nose)
* Visceral lesions - Gastrointestinal (GI) telangiectasia (with or without bleeding), pulmonary arteriovenous malformation (AVM), hepatic AVM, cerebral AVM, and spinal AVM
* Family history - A first-degree relative who has HHT (according to these same criteria)

The HHT diagnosis is classified as definite if three criteria are present, possible or suspected if two criteria are present, and unlikely if fewer than two criteria are present. There is no firm consensus on the number of episodes or degree of epistaxis necessary for diagnosis; according to the Curaçao criteria, nosebleeds should occur spontaneously on more than one occasion, and night-time bleeding should be considered especially suspicious.

Early diagnosis of family members or confirmation with genetic testing of patients who meet the Curaçao criteria may assist in the identification of those patients who are most at risk for specific sequelae.

In addition to the conditions listed in the differential diagnosis, other problems to be considered include the following:

* Cockayne syndrome
* Louis-Bar syndrome
* Essential telangiectasia
* Actinically damaged skin (actinic keratosis)
* Scleroderma

## **Differential Diagnoses**

* Ataxia-Telangiectasia
* CREST Syndrome
* Pediatric Syphilis
* Rosacea
* Rothmund-Thomson Syndrome
* Limited cutaneous systemic sclerosis (CREST syndrome)
* Digestive angiodysplasias (non-hereditary vascular malformations of the GI tract)
* Isolated sporadic arteriovenous malformations (AVMs) of the lungs, liver, or brain without hereditary pattern
* Other vascular anomaly syndromes causing AVMs (e.g., Capillary Malformation–Arteriovenous Malformation syndrome)
* Benign hereditary telangiectasia (familial telangiectasias without visceral involvement)
* Ataxia-Telangiectasia (neurologic disorder with telangiectasias and immunodeficiency)
* Coagulation disorders or local nasal causes of recurrent epistaxis (e.g., platelet function disorders, hemophilia)
* Idiopathic or recurrent epistaxis from non-HHT causes
* Pediatric syphilis (may mimic mucocutaneous lesions)
* Rosacea (facial telangiectasias but without systemic AVMs)
* Rothmund-Thomson Syndrome (rare genetic disorder with skin abnormalities)
* Generalized essential telangiectasia (telangiectasia without systemic disease)
* Juvenile polyposis-HHT overlap syndrome (JPHT) associated with *SMAD4* mutations
* Other rare hereditary vascular malformation syndromes

**RECENT GUIDELINES OR UPDATES**

The guidelines included the following recommendations.

### Management of epistaxis

To reduce HHT-related epistaxis, use moisturizing topical therapies that humidify the nasal mucosa.

Consider oral tranexamic acid (TXA) for epistaxis that does not respond to moisturizing topical therapies.

Consider ablative therapies (eg, laser treatment, radiofrequency ablation [RFA], electrosurgery, and sclerotherapy) for nasal telangiectasias that have not responded to moisturizing topical therapies.

Consider systemic antiangiogenic agents for epistaxis that has not responded to moisturizing topical therapies, ablative therapies, or TXA.

Consider septodermoplasty for epistaxis that has not responded sufficiently to moisturizing topical therapies, ablative therapies, or TXA.

Consider nasal closure for epistaxis that has not responded sufficiently to moisturizing topical therapies, ablative therapies, or TXA.

### Management of gastrointestinal bleeding

Esophagogastroduodenoscopy (EGD) is recommended as the first-line diagnostic test for suspected HHT-related bleeding. Patients who meet colorectal cancer screening criteria and patients with SMAD4-HHT (genetically proven or suspected) should also undergo colonoscopy.

Consider capsule endoscopy for suspected HHT-related bleeding when EGD does not reveal significant HHT-related telangiectasia.

Grade the severity of HHT-related gastrointestinal (GI) bleeding according to the following proposed framework: *mild* (hemoglobin [Hb] goals [reflective of age, gender, symptoms, and comorbidities] met with oral iron replacement); *moderate* (Hb goals met with intravenous [IV] iron treatment); or *severe* (Hb goals not met despite adequate iron replacement, or blood transfusions needed).

Use endoscopic argon plasma coagulation only sparingly during endoscopy.

Consider treating mild HHT-related GI bleeding with oral antifibrinolytics.

Consider treating moderate-to-severe HHT-related GI bleeding with IV bevacizumab or other systemic antiangiogenic therapy.

### Anemia and anticoagulation

Test for iron deficiency and anemia in all adult HHT patients, regardless of symptoms, and in all pediatric HHT patients with recurrent bleeding and/or symptoms of anemia.

Provide iron replacement for treatment of iron deficiency and anemia as follows: initial therapy with oral iron; IV iron replacement for patients in whom oral iron is not effective, not absorbed, or not tolerated or who are presenting with severe anemia.

Provide red blood cell (RBC) transfusions in the following settings: hemodynamic instability/shock; comorbidities requiring a higher Hb target; need to increase Hb acutely (eg, before surgery or during pregnancy); and inability to maintain adequate Hb despite frequent iron infusions.

Consider evaluation for additional causes of anemia in the setting of an inadequate response to iron replacement.

Provide HHT patients with anticoagulation (prophylactic or therapeutic) or antiplatelet therapy when there is an indication, with individualized bleeding risks taken into consideration; bleeding in HHT is not an absolute contraindication for these therapies.

Where possible, avoid the use of dual antiplatelet therapy (DAPT) and/or a combination of antiplatelet therapy and anticoagulation.

### Liver vascular malformations

Offer screening for liver vascular malformations (VMs) to adults with definite or suspected HHT.

Perform diagnostic testing for liver VMs in HHT patients with symptoms and/or signs suggestive of complicated liver VMs, using Doppler ultrasonography (US), multiphase contrast computed tomography (CT), or contrast abdominal magnetic resonance imaging (MRI).

Provide intensive first-line management only for patients with complicated and/or symptomatic liver VMs, and tailored such management to the type of liver VM complication(s).

It is recommended that HHT patients with high-output cardiac failure and pulmonary hypertension be comanaged by the HHT Center of Excellence and an HHT cardiologist or a pulmonary hypertension specialty clinic.

Estimate the prognosis of liver VMs using available predictors so as to identify patients in need of closer monitoring.

Consider IV bevacizumab for patients with symptomatic high-output cardiac failure due to liver VMs who have not responded sufficiently to first-line management.

Refer patients with symptomatic complications of liver VMs (eg, refractory high-output cardiac failure, biliary ischemia, or complicated portal hypertension) for consideration of liver transplantation.

### Pediatric care

Offer diagnostic genetic testing for asymptomatic children of a parent with HHT.

Screen for pulmonary arteriovenous malformations (AVMs) in asymptomatic children with HHT or at risk for HHT at the time of presentation/diagnosis.

Treat large pulmonary AVMs and pulmonary AVMs associated with reduced oxygen saturation in children.

Repeat pulmonary AVM screening in asymptomatic children with or at risk for HHT, typically at 5-year intervals.

Screen for brain VMs in asymptomatic children with HHT or at risk for HHT at presentation/diagnosis.

Treat brain VMs with high-risk features.

### Pregnancy and delivery

Discuss preconception and prenatal diagnostic options, including preimplantation genetic diagnosis, with HHT-affected individuals.

Perform testing with unenhanced MRI in pregnant women with symptoms suggestive of brain VMs.

For pregnant women with HHT without recent screening and/or treatment for pulmonary AVM:

* Asymptomatic – Perform initial pulmonary AVM screening with either agitated saline transthoracic contrast echocardiography (TTCE) or low-dose noncontrast chest CT, depending on local expertise; chest CT, if performed, should be done early in the second trimester
* Symptoms suggestive of pulmonary AVM – Perform diagnostic testing with low-dose noncontrast chest CT; this may be done at any gestational age, as clinically indicated

Treatment of pulmonary AVMs should start in the second trimester unless otherwise indicated.

It is recommended that pregnant women with HHT be managed at a tertiary care center by a multidisciplinary team if they have untreated pulmonary AVMs and/or brain VMs or have not been recently screened for pulmonary AVMs.

Do not withhold an epidural because of a diagnosis of HHT; screening for spinal VMs is not required.

Allow women with known non-high-risk brain VMs to labor and proceed with vaginal delivery; an assisted second stage may be required on a case-by-case basis.

**EPIDEMIOLOGY**

### United States statistics

OWRD (ie, HHT) is rare in North America. The reported incidence is 1-2 cases per 100,000 population annually. The overall prevalence is estimated to be approximately 1-2 cases per 10,000 population. However, the prevalence may be underestimated because many cases may be asymptomatic.In Vermont, the frequency has been estimated at 1 case per 16,500 population.The disease has a clinical penetration of 97%.

### International statistics

The worldwide prevalence is 1 case per 5000-10,000 population In Europe and Japan, the frequency is estimated to be between 1 in 5000 to 8000 people.The prevalence of HHT in a Danish population increased from 13.8 cases per 100,000 population in 1974 to 15.6 cases per 100,000 population in 1995.

The frequency may vary considerably between populations. The highest rates are seen in parts of the Dutch Antilles among the Afro-Caribbean population, with a prevalence of between 1 case per 200 persons and 1 per 1331 persons in the Curaçao and Bonaire regions.In the French department of Ain, the prevalence is 1 case per 2351 persons; in France overall, it is 1 per 8345.Other examples include the Danish island of Funen (1 per 3500) and northern England (1 per 39,216).

### Age-, sex-, and race-related demographics

HHT may occur in children, in whom a tendency to bleed may be the first symptom.However, it is far more common during puberty or adulthood. The syndrome most often manifests by the second or third decade of life, though it may also be clinically silent. Pulmonary AVMs may be congenital and therefore may present within the first year of life. The risk of GI tract bleeding increases in patients older than 50 years.

HHT occurs with equal frequency and severity in males and females.Although it most commonly occurs in whites, it has a wide geographic distribution and has been described in people of Asian, African, and Arabic descent.

## **Genetic Testing**

The sensitivity of molecular diagnosis is highest in probands with a clinically confirmed diagnosis of HHT.However, a substantial fraction of probands do not carry an identifiable mutation in the coding exons of either of the two responsible genes, *ENG* and *ALK1*. Targeted family-specific mutation analysis for *ENG* exon deletions could lead to misdiagnosis of some affected family members with HHT, as was illustrated by the findings of a study in which two distinct *ENG* deletions were found in a single family

**PREDEFINED Q & A SETS**

## What is Hereditary Hemorrhagic Telangiectasia (HHT)?

HHT, also known as Osler-Weber-Rendu syndrome, is a genetic disorder that causes abnormal blood vessel formation, leading to fragile telangiectasias (small dilated vessels) on the skin and mucous membranes and larger arteriovenous malformations (AVMs) in organs like the lungs, brain, liver, and gastrointestinal tract.

## How is HHT inherited?

HHT is inherited in an autosomal dominant pattern, which means there is a 50% chance of passing the mutation to children. It is caused by mutations in genes such as *ENG*, *ACVRL1*, and *SMAD4*.

## What are the common symptoms of HHT?

* Frequent, spontaneous nosebleeds (epistaxis)
* Visible telangiectasias on lips, fingers, tongue, and inside the nose or mouth
* AVMs in lungs, liver, brain, or gastrointestinal tract, which may cause bleeding or serious complications
* Anemia due to chronic blood loss

## Can HHT appear without symptoms?

Yes. Some people with HHT do not have nosebleeds or visible telangiectasias. About 10% of adults with HHT may lack these signs, so absence of symptoms does not exclude the diagnosis.

## How is HHT diagnosed?

Diagnosis is made using the Curaçao criteria, which include:

1. Recurrent spontaneous nosebleeds
2. Multiple telangiectasias at characteristic sites
3. Visceral AVMs
4. A first-degree relative with HHT  
   Three or more criteria suggest a definitive diagnosis. Genetic testing can confirm but is not required in all cases.

## What tests are done for HHT?

Tests include:

* Imaging such as chest CT scans to detect pulmonary AVMs
* Brain MRI for cerebral AVMs
* Echocardiogram with bubble study
* Pulse oximetry and other organ-specific evaluations
* Genetic testing where appropriate

## How is HHT treated?

There is no cure, but treatment focuses on managing symptoms and preventing complications:

* Controlling nosebleeds with cauterization or topical therapies
* Embolization or surgical treatment of AVMs if indicated
* Iron supplements or blood transfusions for anemia
* Preventive antibiotics before dental or surgical procedures if pulmonary AVMs are present
* Avoiding scuba diving due to stroke risk from AVMs

## How does HHT affect life expectancy?

With proper monitoring and treatment, people with HHT typically have near-normal life expectancy. Serious complications from undiagnosed AVMs can be life-threatening, so early detection and management are important.

## Can children have HHT?

Yes, children may have HHT, often with few or no symptoms early on. Screening for AVMs is recommended in children who have a family history, even if asymptomatic.

## What precautions should people with HHT take?

* Inform healthcare providers about HHT diagnosis
* Take antibiotics before dental work if lung AVMs are present
* Avoid scuba diving due to risk of emboli
* Regular follow-up with an HHT specialist for screening and treatment

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I’d like to talk with you today about the results of your genetic testing and some of your symptoms. How have you been feeling?

Patient: I’ve had frequent nosebleeds since I was young, but I didn’t think much of it. Some small red spots have appeared on my lips and fingers.

Doctor: Those symptoms are classic signs of a condition called Hereditary Hemorrhagic Telangiectasia, or HHT for short. It’s a genetic disorder that causes small, fragile blood vessels called telangiectasias to form on the skin and mucous membranes, and also larger abnormal vessels, called arteriovenous malformations, can develop in organs like your lungs and liver.

Patient: So that explains the nosebleeds and the spots. Is it serious?

Doctor: It can be managed effectively if we monitor and treat any complications early. Nosebleeds can often be controlled with simple treatments, but we also need to screen for internal arteriovenous malformations because those can sometimes cause more serious problems, like bleeding or issues with oxygen levels.

Patient: How do you screen for those?

Doctor: We use imaging tests such as a CT scan for your lungs and an MRI for your brain. If we find any abnormal blood vessels, there are treatment options like embolization to block those vessels.

Patient: Is this condition inherited? Could my family have it too?

Doctor: Yes, HHT is inherited in an autosomal dominant way, so there’s a 50% chance your children or other family members may have it. We recommend that family members get tested and screened, especially if they have symptoms like frequent nosebleeds.

Patient: What can I do to manage this condition?

Doctor: Aside from treating the nosebleeds and any AVMs, it’s important to avoid certain risks like scuba diving, which can increase the chance of strokes in people with lung AVMs. Also, if you have lung AVMs, you should take antibiotics before dental procedures to prevent infections.

Patient: Is there a cure?

Doctor: There’s no cure yet, but with proper care, individuals with HHT often live normal lives. Regular monitoring and treatment of symptoms can greatly reduce risks.

Patient: Thank you for explaining. What’s the next step?

Doctor: We’ll schedule the necessary imaging tests soon and discuss treatment options depending on the results. I’ll also provide information for your family members about screening.

Patient: Sounds good. I appreciate your help.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK1351/>

<https://emedicine.medscape.com/article/2048472-guidelines>

[Hereditary Hemorrhagic Telangiectasia (HHT)](https://my.clevelandclinic.org/health/diseases/15618-hereditary-hemorrhagic-telangiectasia-hht#outlook-prognosis)

[Hereditary hemorrhagic telangiectasia - Diagnosis and treatment - Mayo Clinic](https://www.mayoclinic.org/diseases-conditions/hht/diagnosis-treatment/drc-20351136)

**Hypopharyngeal cancer**

**DEFINITION / DESCRIPTION**

Hypopharyngeal cancer is an uncommon throat cancer that develops in your hypopharynx, which is in the lower part of your throat (pharynx) just behind your voice box (larynx). It causes cancerous tumors that often spread (metastasize) quickly to other areas of your body. You may not have noticeable symptoms until after tumors have spread. Treatment includes surgery and/or radiation therapy and chemotherapy to remove tumors and relieve symptoms.

It’s not common. Each year, an estimated 2,000 to 4,000 people in the U.S. receive a hypopharyngeal cancer diagnosis. For comparison, the American Cancer Society estimates more than 238,000 people received a lung cancer diagnosis in 2023.

**CAUSES**

Hypopharyngeal cancer develops in cells that line your hypopharynx. These cells mutate and become cancerous cells that multiply and create tumors. Experts don’t exactly why this happens, but they do know certain risk factors significantly increase the chance you’ll develop hypopharyngeal cancer, including:

* Smoking: This is the single largest risk factor for developing throat cancer, including hypopharyngeal cancer. That includes smoking cigarettes, cigars, pipes and electronic cigarettes, using chewing tobacco and snuff.
* Frequent, heavy alcohol use: Frequent, heavy consumption means having more than two drinks a day if you’re a man or one daily drink if you’re a woman.
* HPV infections: Human papillomavirus is a sexually transmitted infection (STI) that you can contract by having oral sex with someone who has the virus

**SIGNS / SYMPTOMS**

Hypopharyngeal cancer may not cause symptoms right away. When it does, symptoms may include:

* Sore throat or feeling like something is caught in your throat.
* Hoarseness.
* Difficulty swallowing.
* Ear pain.
* Swollen lymph nodes in your neck.
* Choking for no obvious reason.
* Fatigue.
* Changes to your voice.
* Difficulty breathing or noisy breathing (stridor).
* Coughing up blood.
* Unexplained weight loss.

Hypopharyngeal cancer symptoms are similar to other, less serious conditions. Having any of the symptoms listed above doesn’t mean you have hypopharyngeal cancer. But you should talk to a healthcare provider if you have symptoms that last for more than two weeks.

**DIAGNOSIS METHODS**

A healthcare provider will ask you about your symptoms, including how long you’ve had them. They may ask about your tobacco and alcohol use because those activities can increase your risk of developing hypopharyngeal cancer.

They’ll do a physical examination that may include feeling your neck for swollen lymph nodes and examining your throat.

Depending on your symptoms, your provider may refer you to an ear, nose and throat (ENT) specialist or otolaryngologist, a provider who specializes in diagnosing and treating head and neck conditions. Your ENT may order the following tests to determine if you have hypopharyngeal cancer:

* Endoscopy: In this test, a provider places a long thin tube (endoscope) in your throat to check your lower throat. They may also order a laryngoscopy to examine your larynx.
* Biopsy: Your provider may order a fine-needle aspiration (FNA) to obtain tissue that a pathologist will view under a microscope for signs of cancerous cells.
* Imaging tests: If biopsy results show you have hypopharyngeal cancer, your otolaryngologist may refer you to an oncologist. Your oncologist may order imaging tests to see if cancer has spread from your lower throat to other areas of your body. Imaging tests may include computed tomography (CT), magnetic resonance imaging (MRI) or positron emission tomography (PET) scans.

#### **Cancer staging**

Cancer staging is how oncologists describe cancer in more detail, like tumor location, if or where it’s spread or if cancer affects other areas of your body.

Hypopharyngeal cancer stages range from Stage I (cancer in your lower throat that hasn’t spread) to Stage IV (cancer that has spread to other parts of your throat and mouth, your nasopharynx and the base of your skull, and more distant parts of your body like the lining of your chest cavity).

They also describe hypopharyngeal cancer by grade. A cancer grade can help oncologists predict how quickly cancer will spread. Hypopharyngeal cancer grades range from GX (cancer isn’t likely to spread or is less likely to spread) to G3 (cancer is likely to spread very quickly).

**TREATMENT OPTIONS**

The most common treatments are surgery to remove the tumor and radiation therapy to kill any cancerous cells that may remain after surgery. Your oncologist may combine surgery with chemotherapy or immunotherapy.

Hypopharyngeal cancer surgical options are:

* Partial or total pharyngectomy: This surgery involves removing all or part of your throat. Surgery may include a laryngectomy to remove your larynx (voice box). Your throat helps you breathe, so surgery includes creating a stoma to hold a laryngectomy tube. This tube is how you’ll breathe in air after surgery.
* Laryngectomy: If you have a laryngectomy, your surgeon may create a tracheoesophageal puncture (TEP), which is a small hole between your trachea and esophagus. A TEP is how providers insert a voice prosthesis (laryngectomy speaking device).
* Neck dissection: Your surgeon may do this to remove affected lymph nodes in your neck.
* Transoral robotic surgery (TORS): This surgery allows surgeons to remove tumors in hard-to-reach places like your lower throat.
* Reconstructive surgery: Surgery that removes all or part of your throat or voice box may require reconstructive surgery to help restore function such as eating, breathing and the ability to use a voice prosthesis.

Throat surgery for cancer affects your ability to speak, eat and breathe. Before your surgery, ask your surgeon how treatment will affect you. For example, you may work with a speech-language pathologist to learn ways to manage any speech or swallowing issues from surgery.

**PREVENTION TIPS**

You can reduce your risk of hypopharyngeal cancer by:

* Quitting tobacco and avoiding secondhand smoke.
* Avoiding alcohol or limiting how much you drink.
* Protecting yourself from HPV by getting vaccinated against the virus and practicing safe sex.

**OUTLOOK / PROGNOSIS**

Hypopharyngeal cancer can come back after treatment (recur). It also increases your risk of developing a new kind of cancer in a different area of your body. Healthcare providers may refer to this as second cancer.

As a result, you should expect to have regular follow-up appointments so your oncology care team can check on your overall health and watch for signs of recurrent or metastatic hypopharyngeal cancer or second cancer. Your follow-up care may include imaging tests and physical examinations. The schedule may include appointments every:

* Two months for the first year after treatment.
* Four months for the second year.
* Six months for the third year.
* Once a year for the fourth and fifth years. In some cases, your oncology care team may recommend lifelong follow-up.

#### **Hypopharyngeal survival rates**

When you think about survival rates, it’s important to remember that survival rates are estimates based on other people’s experiences with hypopharyngeal cancer. Survival rates vary widely depending on whether a tumor remains where it started or spreads (metastasizes) to nearby tissues and lymph nodes (regional) or other areas in your body (distant).

These rates also vary depending on your overall health and other factors. Ask your oncologist to explain what survival rates mean in your situation. They know you and your overall health, which makes them your best resource for information.

The five-year survival rates based on tumor location are:

| **Stage** | **Five-year survival rate** |
| --- | --- |
| Local | 61% |
| Regional | 39% |
| Distant | 28% |

#### **Is there a cure for hypopharyngeal cancer?**

In some cases, surgery and other treatments may cure hypopharyngeal cancer. That's more likely to happen if a tumor measures 2 centimeters or less and hasn’t spread. Unfortunately, most people with this cancer don’t receive a diagnosis until the condition is in advanced stages.

**POSSIBLE COMPLICATIONS**

Early on, hypopharyngeal cancer often spreads to lymph nodes in your neck. That’s why a lump in your neck is something you should discuss with a healthcare provider. Without treatment, hypopharyngeal cancer can spread to your:

* Esophagus.
* Other parts of your throat.
* Thyroid.
* Trachea (windpipe).
* Hyoid bone.
* The lining of your chest cavity.
* Tissues around the upper part of your spine.
* Carotid artery.

## **Living With**

If you had throat surgery, you’ll need to learn new ways to breathe and speak. That’s a lot of change to manage, so don’t hesitate to ask your speech-language pathologist for help. They may have suggestions about support groups for people recovering from throat surgery.

Here are some other ways you can take care of yourself:

* Consider cancer survivorship. Hypopharyngeal cancer can come back or cause a second cancer. You may feel anxious about your future. Most cancer survivorship programs include mental health support.
* Continue to avoid tobacco and limit how much alcohol you drink.
* Eat well. Throat surgery can affect your ability to eat and drink. Consult a nutrition expert to recommend meals and meal plans. Ask your speech-language pathologist for ways to manage any issues that keep you from eating well.

### **When should I see my healthcare provider?**

That depends on your situation, including treatment. Ask your oncology care team to explain the kind of symptoms or issues you can expect, and when you should contact them.

### **What questions should I ask my oncologist?**

* What is the cancer’s stage?
* What treatment options do you recommend?
* If I have surgery, what are the support programs to help me deal with the changes that surgery may cause?
* How will treatment affect my quality of life?
* Am I eligible for any clinical trials?

**DIFFERENTIAL DIAGNOSIS**

Presenting symptoms of hypopharyngeal cancer can be vague and seemingly innocuous, such as globus sensation or dysphagia, giving rise to a broad differential diagnosis that includes benign conditions like reflux, cricopharyngeal bar, and esophageal dysmotility. When a patient presents with these symptoms, a thorough physical examination and routine flexible laryngopharyngoscopy are critical to rule out a malignant process.

Many patients with hypopharyngeal cancer will initially present with a new neck mass, which also has a broad differential diagnosis. While pediatric neck masses are typically due to infection or, less commonly, congenital anomalies, a neck mass in an adult should always be presumed to represent a malignant process until proven otherwise. The differential diagnosis for a new neck mass in an adult includes metastasis from other head and neck subsites (eg, the oral cavity, oropharynx, nasopharynx and larynx), metastatic thyroid cancer, a metastatic cutaneous malignancy, and lymphoma. More benign considerations include infectious processes like mononucleosis from Epstein-Barr virus or cytomegalovirus, cat scratch disease, toxoplasmosis or tuberculosis, an inflammatory autoimmune process (eg, sarcoidosis), a benign neoplasm (eg, a lipoma), or acute infection of a previously unrecognized congenital lesion (eg, a branchial cleft cyst). Thorough examination, flexible laryngopharyngoscopy, ultrasonography, fine needle aspiration, cross-sectional imaging, and panendoscopy are all valuable methods of determining an accurate diagnosis.

**STAGING**

According to the AJCC UICC TNM 8th edition, hypopharyngeal cancers are assigned a clinical stage as follows:

**Extent of the primary tumor (T)**

* **TX**: Primary tumor cannot be assessed
* **Tis**:Carcinoma in situ
* **T1**:Tumor limited to 1 subsite (pyriform sinus, posterior pharyngeal wall, post-cricoid region) of the hypopharynx and/or 2 cm or less in greatest dimension
* **T2**: Tumor invades >1 subsite of the hypopharynx or an adjacent site or measures >2 cm but not >4 cm in greatest dimension without causing impairment of vocal cord mobility
* **T3**: Tumor >4 cm in greatest dimension, or with extension into the esophageal mucosa or impairment of vocal cord mobility
* **T4**
  + **T4a**: Moderately advanced local disease; tumor invades any of the following:
    - Thyroid or cricoid cartilage
    - Hyoid bone
    - Thyroid gland
    - Esophagus
    - Central cervical compartment soft tissue
  + **T4b:** Very advanced local disease: tumor invades prevertebral fascia, encases carotid artery, or invades mediastinum

**Cervical lymph node involvement (N)**

* **NX:** Regional lymph nodes cannot be assessed
* **N0:** No regional lymph node metastasis
* **N1:** Metastasis in a single ipsilateral lymph node ≤3 cm in greatest dimension and without ENE
* **N2**
  + **N2a:** Single ipsilateral lymph node ≤3 cm and ENE+ or single ipsilateral lymph node >3 cm but ≤6 cm in greatest dimension and ENE negative
  + **N2b:** Metastases in multiple ipsilateral lymph nodes, none >6 cm in greatest dimension and ENE negative
  + **N2c:** Metastases in bilateral or contralateral lymph node(s), none >6 cm in greatest dimension and ENE negative
* **N3**
  + **N3a:** Metastasis in a lymph node that is >6 cm in greatest dimension and ENE negative
  + **N3b:** Metastasis in any of the following:
    - Single ipsilateral lymph node, >3 cm with ENE
    - Multiple ipsilateral, contralateral, or bilateral lymph nodes, any with ENE
    - Single contralateral lymph node of any size and ENE

**Extent of distant metastases (M)**

* **M0:** No distant metastasis
* **M1:** Distant metastasis

**RECENT GUIDELINES OR UPDATES**

* Total pharyngo-laryngectomy plus neck dissection, with subsequent radiotherapy or chemoradiotherapy if a high risk exists for pathologic factor recurrence, particularly T4a (ie, tumor invasion of the thyroid/cricoid cartilage, hyoid bone, thyroid gland, oesophagus, and/or central compartmental soft tissue)
* If the patient refuses surgery, then concurrent chemoradiotherapy with thrice-weekly cisplatin; the use of cetuximab concurrent to radiotherapy is recommended if cisplatin cannot be administered
* Induction chemotherapy with TPF (docetaxel/cisplatin/fluorouracil) schedule

With the induction chemotherapy option, the guidelines recommend the following:

* If complete response - Radiotherapy (based on initial stage) ± cisplatin/cetuximab (based on induction chemotherapy toxicity)
* If partial response - Surgery followed by radiotherapy or chemoradiotherapy; if the main objective is organ preservation, consider concomitant radiotherapy (with cisplatin or cetuximab)
* If stable disease or progression - Surgery (including neck dissection) followed by radiotherapy or chemoradiotherapy

**EPIDEMIOLOGY**

### Frequency

Cancer that arises in the hypopharynx represents approximately 7% of all cancers of the upper aerodigestive tract. The incidence of laryngeal cancer is 4-5 times that of hypopharyngeal cancer. All pharyngeal subsites accounted for approximately 124,000 cancer cases worldwide in 2002.

In a retrospective cohort study, Kuo et al reported a decline in the incidence of hypopharyngeal cancer in the United States by an average of -2.0% annually between 1973 and 2010. The study involved 3958 adults with the disease, with information culled from the Surveillance, Epidemiology, and End Results (SEER) program database.

A study by Jakobsen et al found that between 1980 and 2014, the age-adjusted incidence rate for hypopharyngeal cancer in Denmark rose from 0.3 per 100,000 to 1.1 per 100,000 (a 4.1% per year increase).

### Race

African Americans have had an increasing incidence of cancers of all pharyngeal subsites since the early 1970s.

### Sex

US incidence indicates an approximate male-to-female ratio of 3:1. Women have a higher incidence of postcricoid cancers related to nutritional deficiencies (Plummer-Vinson syndrome) than men. The prognosis for women generally is better than that for men.

### Age

The incidence of hypopharyngeal cancer rises in people older than 40 years; it is rare in people younger than 30 years. The mean age at presentation is 65 years. Patients diagnosed with hypopharyngeal cancer are typically men aged 55-70 years with a history of tobacco use and/or alcohol ingestion.

## **Medications Used to Treat Hypopharyngeal Cancer**

Chemotherapeutic agents are used in conjunction with surgery, radiotherapy, or both. Various chemotherapy agents demonstrate single-agent response rates of 15-38%. The platinum compounds, 5-fluorouracil, taxanes, and cetuximab demonstrate radiosensitizing properties, making them logical choices for combination chemoradiotherapy. The optimal combination is not established. The following tables are not in order of preference but include some of the frequently used agents.

### Antineoplastic agents

These agents inhibit cell growth and differentiation.

*Cisplatin (Platinol)*

Cisplatin is a platinum-containing compound that exerts its antineoplastic effect by covalently binding to DNA with preferential binding to N-7 position of guanine and adenosine. It can react with 2 different sites on DNA to cause cross-links. Platinum complex also can bind to nucleus and cytoplasmic protein. A bifunctional alkylating agent, once activated to aquated form in cell, binds to DNA, resulting in interstrand and intrastrand cross-linking and denaturation of double helix.

Adult dosing varies with setting and schedule. Modify the dose based on CrCl. Avoid cisplatin if the CrCl < 60 mL/min. Pediatric dosing has not been established.

Cisplatin is a pregnancy category D drug.

*Fluorouracil (Efudex, Adrucil, Fluoroplex)*

Fluorouracil is a cycle-specific agent that has activity as single agent and has for many years been combined with the biochemical modulator leucovorin. Fluorouracil has been shown to be effective in an adjuvant setting. It is a classic antimetabolite anticancer drug with a chemical structure similar to endogenous intermediates or building blocks of DNA or RNA synthesis.

5-FU inhibits tumor cell growth through at least 3 different mechanisms that ultimately disrupt DNA synthesis or cellular viability. These effects depend on intracellular conversion of 5-FU into 5-FdUMP, 5-FUTP, and 5-FdUTP. 5-FdUMP inhibits thymidylate synthase (key enzyme in DNA synthesis). 5-FUTP is incorporated into RNA and interferes with RNA processing, and 5-FdUTP is incorporated into DNA, leading to cytotoxic DNA strand breaks. Fluorouracil is useful in symptom palliation for patients with progressive disease.

Adult dosing varies with setting and schedule. Pediatric dosing has not been established.

Fluorouracil is a pregnancy category D drug.

*Paclitaxel (Taxol)*

The mechanisms of action of paclitaxel are tubulin polymerization and microtubule stabilization, which in turn inhibits mitosis and may result in breakage of chromosomes. In vitro data suggest use as radiosensitizer, with a 38% response rate as a single agent.

Adult dosing varies with setting and schedule. Pediatric dosing has not been established.

Paclitaxel is a pregnancy category D drug.

*Methotrexate (Folex, Rheumatrex)*

Methotrexate is an antimetabolite that inhibits DNA synthesis and cell reproduction in malignant cells; it can suppress the immune system. A satisfactory response is seen in 3-6 wk following administration. Methotrexate is often used in low weekly doses for palliation; the single-agent response rate is 31%.

Adult dosing varies with setting and schedule. Pediatric dosing has not been established.

Methotrexate is a pregnancy category X drug.

*Docetaxel (Taxotere)*

Docetaxel is a semisynthetic taxane, a class of drugs that inhibits cancer cell growth by promoting assembly and blocking the disassembly of microtubules, thereby preventing cancer cell division, leading to cell death. It is indicated in combination with cisplatin and 5-fluorouracil for induction therapy of locally advanced squamous cell carcinoma of the head and neck (SCCHN) before patients undergo chemoradiotherapy and surgery.

Adult dosing varies with setting and schedule. Pediatric dosing has not been established.

Docetaxel is a pregnancy category D drug.

*Cetuximab (Erbitux)*

Cetuximab is indicated for use in combination with radiation therapy to treat patients with squamous cell cancer of the head and neck (SCCHN) that cannot be removed by surgery. It is also approved for monotherapy to treat patients whose head and neck cancer has metastasized despite the use of standard chemotherapy. Cetuximab is a recombinant, human/mouse chimeric monoclonal antibody that specifically binds to the extracellular domain of human epidermal growth factor receptors (EGFR, HER1, c-ErbB-1). Cetuximab-bound EGF receptor inhibits activation of receptor-associated kinases, resulting in inhibition of cell growth, induction of apoptosis, and decreased production of matrix metalloproteinase and vascular endothelial growth factor.

Adult dosing varies with setting and schedule. Pediatric dosing has not been established.

Cetuximab is a pregnancy category C drug.

### Antidotes, folic acid antagonists

These agents are used to potentiate effects of 5-fluorouracil.

*Leucovorin (Folinic Acid, Wellcovorin)*

Leucovorin is a reduced form of folic acid that does not require enzymatic reduction reactions for activation. It allows for purine and pyrimidine synthesis, both of which are needed for normal erythropoiesis. Leucovorin is a derivative of folic acid used only as an adjunct to 5-fluorouracil.

Adult dosing varies with setting and schedule. Pediatric dosing has not been established.

Leucovorin is a pregnancy category C drug.

**PREDEFINED Q & A SETS**

## What is hypopharyngeal cancer?

Hypopharyngeal cancer is a type of head and neck cancer where malignant cells form in the tissues of the hypopharynx, which is the bottom part of the pharynx (throat) behind and around the larynx (voice box) and above the esophagus and trachea. Most cases are squamous cell carcinoma, originating in the thin, flat cells lining this area.

## What are the risk factors for hypopharyngeal cancer?

Key risk factors include:

* Tobacco use (smoking or chewing)
* Heavy alcohol consumption
* Poor diet and nutritional deficiencies
* Laryngopharyngeal (bile) reflux

## What are the common symptoms?

Early symptoms may be subtle or absent, but common signs include:

* Persistent sore throat or pain in one area of the throat
* Ear pain that does not go away
* Difficulty or pain when swallowing (dysphagia)
* Hoarseness or voice changes
* Lump or swelling in the neck due to lymph node involvement
* Weight loss and malnutrition in advanced stages
* Coughing up blood (hemoptysis)

## How is hypopharyngeal cancer diagnosed?

* Physical examination, including assessment of the throat and neck
* Flexible fiberoptic endoscopy to visualize the hypopharynx
* Imaging studies (CT, MRI, PET scans) to determine tumor size, extent, and lymph node involvement
* Biopsy of the lesion to confirm cancer type

## What are the treatment options?

Treatment depends on the tumor’s size, location, and spread and can include:

* Surgery to remove the tumor
* Radiation therapy
* Chemotherapy
* Immunotherapy to boost the immune system’s response to cancer
* Often a combination of these approaches is used

## What is the prognosis?

Hypopharyngeal cancer tends to be diagnosed at a later stage and can be aggressive, making prognosis generally poorer than some other head and neck cancers. Early detection and treatment improve survival rates.

## What should I do if I have symptoms?

If you have persistent symptoms like sore throat, ear pain, trouble swallowing, or neck lumps lasting more than two weeks, you should see a healthcare provider promptly for evaluation

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, thank you for coming in today. You mentioned you've been having some difficulty swallowing and a persistent sore throat. How long have these symptoms been going on?

Patient: It’s been a few months now. At first, I thought it was just a cold or something minor, but it’s not getting any better.

Doctor: I understand your concern. Given your symptoms and their persistence, we should evaluate your throat more thoroughly. There is a possibility of hypopharyngeal cancer, which is a type of cancer located in the bottom part of your throat. Have you noticed any other symptoms like ear pain, hoarseness, or a lump in your neck?

Patient: Yes, I've felt some ear discomfort lately, and I noticed a small bump on the side of my neck.

Doctor: Those can be signs of cancer spreading to nearby lymph nodes. To get a clear picture, we’ll perform a physical examination and use a small camera to look inside your throat. We’ll also arrange imaging studies like a CT scan to assess the extent of any tumor and lymph node involvement.

Patient: That sounds serious. What happens if it is cancer?

Doctor: If it is hypopharyngeal cancer, treatment options may include surgery, radiation, chemotherapy, or a combination of these. The goal is to remove or control the cancer while preserving as much function as possible, such as your ability to speak and swallow.

Patient: Will my voice be affected? And what about swallowing?

Doctor: Depending on the size and location of the tumor and treatment chosen, there could be some impact on speech and swallowing. Your care team will include specialists like speech therapists to help manage these effects. We can also talk about options to restore your voice if surgery affects your larynx.

Patient: How soon would treatment start? I’m worried about how long this will take.

Doctor: We usually proceed as soon as all the necessary tests are done and we have a clear understanding. Treatment duration varies depending on the plan but we will discuss this with you thoroughly so you can prepare.

Patient: Are there risks or side effects I should know about?

Doctor: Yes, all treatments have potential side effects. Surgery has risks related to healing and function, radiation can cause dryness and soreness, and chemotherapy may cause fatigue and nausea. We will do everything possible to minimize these and support you throughout treatment.

Patient: Should I get a second opinion?

Doctor: Absolutely. Getting a second opinion can help you feel confident in your treatment choices, and I can refer you to specialists with extensive experience in head and neck cancers.

Patient: Thank you for explaining everything. What are the next steps?

Doctor: We’ll schedule the required examinations and imaging. I’ll also provide you with written information and resources to help answer any questions. Remember, we’re here to support you every step of the way.

REFERENCES:

[Hypopharyngeal Cancer: Symptoms & Prognosis](https://my.clevelandclinic.org/health/diseases/12181-hypopharyngeal-cancer#overview)

<https://emedicine.medscape.com/article/1375268-overview#a13>

<https://www.ncbi.nlm.nih.gov/books/NBK567720/#article-128657.s9>

<https://www.cancer.gov/types/head-and-neck/patient/adult/hypopharyngeal-treatment-pdq>

**BULLOUS myringitis**

**DEFINITION / DESCRIPTION**

Bullous myringitis (BUH-lus myr-in·GI-tis) is an infection that causes painful blisters on your eardrum. Healthcare providers may also refer to bullous myringitis as bullous hemorrhagic myringitis and fungal myringitis. You can develop bullous myringitis if you have a cold or an ear infection (acute otitis media). The condition typically affects children ages 5 to 8 but can affect younger children and adults.

**CAUSES**

You develop bullous myringitis when viruses or bacteria infect your eardrum. Your eardrum reacts to infection by becoming irritated or inflamed, creating small, fluid-filled bullae between your eardrum’s middle and outer layers.

The same bacteria or viruses that cause colds and related middle ear infections cause bullous myringitis. Studies suggest that respiratory syncytial virus (RSV) and other viruses cause most cases of bullous myringitis, but bacteria — including *Streptococcus pneumoniae* (*pneumococcus*) and *mycoplasma*— may also cause the condition.

#### **Do acute middle ear infections always cause bullous myringitis?**

No, they don’t. One study suggests about 10% of children with acute middle ear infections developed bullous myringitis.

**SIGNS / SYMPTOMS**

Symptoms of bullous myringitis include:

* Severe ear pain that comes on suddenly.
* Fever.
* Poor appetite.
* Trouble sleeping.
* Hearing loss.
* Fluid draining from your ears.

**DIAGNOSIS METHODS**

A healthcare provider will use an otoscope to look for blisters on your eardrum. They may order a pure-tone hearing test to evaluate any hearing loss.

#### **What is a pure-tone hearing test?**

A pure-tone hearing test is the most common type of hearing test. Audiologists perform hearing tests, including pure tone hearing tests. Here’s how it works:

1. You sit in a sound-treated room.
2. You wear headphones or insert earphones.
3. The audiologist uses a machine called an audiometer. Audiometers deliver sounds at different frequencies and loudness levels.
4. You raise a hand, press a button or say “yes” when you hear sounds.
5. The audiologist records your responses on an audiogram. Audiograms chart your hearing loss patterns. If you have hearing loss, the audiogram shows the degree of hearing loss you have.

**TREATMENT OPTIONS**

Treatments may include:

* Pain medication.
* Decongestants.
* Antibiotics.

Providers may use a small, sharp knife to drain the blisters.

#### **How long does this condition last?**

Most people feel better within 24 to 48 hours after starting treatment.

**PREVENTION TIPS**

The best way is to protect yourself and your child from colds and ear infections. You may not be able to dodge every cold and ear infection, but the following suggestions may help:

* Wash your hands. Cold viruses spread from your hands to your eyes, nose and mouth. Handwashing is one of the best ways to keep cold viruses from spreading.
* Clean frequently used surfaces. Viruses can live on doorknobs and other places people often touch.
* Use hand sanitizers. Use alcohol-based hand sanitizer when you can’t wash your hands with soap and water.
* Strengthen your immune system. Get enough sleep, eat a healthy diet and exercise so your body is ready to fight off germs.
* Stay home. To make sure you don’t spread the cold to others, stay home when you’re sick and keep your children home from school or daycare if they’re sick.
* Don’t smoke. Studies have shown that exposure to secondhand smoke increases the likelihood of ear infections. Be sure no one smokes in the house or car — especially when children are present — or at your daycare facility.
* Manage allergies. Inflammation and mucus caused by allergic reactions can block your eustachian tube and make ear infections more likely. Ear infections increase your chance of developing bullous myringitis.
* Get vaccinations. Being vaccinated against viral infections and other infections may reduce your risk of colds that could lead to bullous myringitis.

**OUTLOOK / PROGNOSIS**

Treatment quickly cures bullous myringitis. Studies show 95% of people feel better within 24 to 48 hours of treatment.

**POSSIBLE COMPLICATIONS**

Some temporary hearing loss is the most common complication. Rarely, people with bullous myringitis may develop other conditions, including:

* Labyrinthitis.
* Meningitis.
* Mastoiditis

**WHEN TO SEE A DOCTOR / RED FLAG**

Contact your provider if your symptoms continue or get worse after treatment.

Treatment, including pain medication and antibiotics, helps most people feel better within a day or two. Sometimes, placing a warm compress on the outside of your ear also helps with ear pain.

## **Diagnostic Considerations**

These include the following:

* Sensorineural hearing loss
* Chronic myringitis
* Cholesteatoma

## **Differential Diagnoses**

* Complications of Otitis Media
* External Ear Inflammatory Diseases
* External Ear, Infections
* Malignant Otitis Externa
* Middle Ear, Tympanic Membrane, Perforations
* Otitis Media With Effusion

## **Procedures**

See the list below:

* Gentle cleaning of the EAC
* Irrigation of the EAC for removal of the debris (may be contraindicated if the status of the TM is unknown)
* Tympanocentesis: A small puncture is made in the TM with a needle to permit entry into the middle ear. This procedure permits culture and identification of the offending agent in situations in which this information is vital.
* Myringotomy: In cases of AOM, myringotomy and removal of fluid prevents bursting of the TM when it bulges. It contributes to faster relief of systems, and the resulting incision usually heals quickly.
* Tympanostomy with insertion of a tube into the middle ear to allow drainage: This is the most frequently performed otolaryngologic procedure in the United States; however, permanent perforation is possible.

In a study of 248 pediatric patients who received tympanostomy tubes and postoperative otic drop therapy, Conrad et al found that occlusion of the tubes was most prevalent in patients with middle ear fluid and in those with longer time to postsurgical follow-up. The investigators, who conducted a retrospective medical record review, found that at first follow-up, one or both tubes were occluded in 10.6% of patients. Children with no serous fluid were found to be 3 times more likely to be free of tube obstructions than were children with fluid. It was also found that the chance of occlusion increased in relation to the amount of time that existed between surgery and follow-up

**EPIDEMIOLOGY**

### Frequency

*United States*

Approximately 8% of children age 6 months to 12 years with AOM have acute bullous myringitis.

### Mortality/Morbidity

Morbidity from myringitis is correlated with morbidity in cases of otitis media, external otitis, and foreign bodies in the ear.

### Race

Data on racial distributions of TM diseases have not been collected. See also Middle Ear, Otitis Media with Effusion.

### Sex

Males and females are affected by diseases of the TM with equal frequency.

### Age

People of all ages are affected.

**PREDEFINED Q & A SETS**

### **What’s the difference between bullous myringitis and a middle ear infection?**

Ear infections happen when bacteria or viruses infect and trap fluid behind your eardrum, making it bulge or swell and hurt. Bullous myringitis doesn’t cause the same fluid buildup as a middle ear infection. Instead, viruses or bacteria infect your eardrum.

## What is bullous myringitis?

Bullous myringitis is an infection of the eardrum (tympanic membrane) characterized by painful fluid-filled blisters (bullae) on the eardrum surface. It often occurs alongside or following a middle ear infection or a viral upper respiratory infection.

## What causes bullous myringitis?

It can be caused by bacterial or viral infections. Common bacterial causes include *Streptococcus pneumoniae* and *Mycoplasma*. Viruses such as respiratory syncytial virus (RSV), influenza, and other cold viruses are also frequently involved.

## Who is at risk of getting bullous myringitis?

Children are more commonly affected than adults, especially those with recent upper respiratory infections or middle ear infections. Being in daycare or school increases exposure to causative pathogens.

## What are the symptoms of bullous myringitis?

* Sudden, severe ear pain
* Blisters visible on the eardrum during examination
* Hearing loss or muffled hearing in the affected ear
* Possible fever
* Ear discharge if the bullae rupture

## How is bullous myringitis diagnosed?

Diagnosis is made by a healthcare provider using an otoscope to visualize the blisters on the eardrum. Sometimes, a hearing test may be performed to assess temporary hearing loss.

## How is bullous myringitis treated?

Treatment usually involves:

* Oral antibiotics or antibiotic ear drops, because it can be hard to distinguish bacterial from viral causes
* Pain relievers such as ibuprofen or acetaminophen
* In severe cases, the doctor may drain the blisters on the eardrum to relieve pain
* Keeping the ear dry and avoiding water exposure during treatment

## How long does recovery take?

Symptoms often improve within 24 to 48 hours after starting treatment, with full recovery expected soon after.

## Can bullous myringitis cause complications?

Rarely, untreated infection can spread to surrounding structures leading to serious complications like hearing loss, mastoiditis, meningitis, or sepsis. Hearing loss from the infection typically resolves with treatment.

## How can bullous myringitis be prevented?

Prevention focuses on reducing respiratory infections by:

* Practicing good hand hygiene
* Avoiding close contact with people who have colds or flu
* Keeping immune system healthy with adequate rest and nutrition
* Keeping ears dry and protected during treatment

**Treatment and Drug Information for Bullous Myringitis, with Side Effects**

## 1. Antibiotics

* Oral antibiotics are commonly prescribed because bullous myringitis can be caused by bacteria such as *Streptococcus pneumoniae* and *Mycoplasma*, although viral causes are also common.
* Common antibiotics used:
  + Amoxicillin (first choice, especially in children)
  + Amoxicillin-clavulanate (for recent antibiotics use or resistant cases)
  + Macrolides (azithromycin, clarithromycin) for penicillin-allergic patients
  + Cephalosporins (cefdinir, cefpodoxime, cefuroxime) as alternatives
* Side effects:
  + Gastrointestinal upset (nausea, diarrhea, vomiting)
  + Allergic reactions (rash, anaphylaxis in rare cases)
  + Clavulanate-containing antibiotics can increase risk of diarrhea or antibiotic-associated colitis

## 2. Topical Antibiotic-Corticosteroid Ear Drops

* e.g., Ciprofloxacin plus dexamethasone ear drops
* These reduce bacterial infection and inflammation directly on the tympanic membrane
* Side effects: Possible local irritation, rare risk of ototoxicity if the tympanic membrane is perforated
* Important to keep ear dry during treatment to prevent prolonged infection

## 3. Pain Management

* Oral analgesics:
  + Acetaminophen (paracetamol)
  + Ibuprofen
* For severe pain, sometimes stronger analgesics such as opioid-acetaminophen combinations (e.g., oxycodone with acetaminophen) are considered briefly
* Topical analgesic ear drops containing agents like benzocaine may provide symptomatic relief but should be avoided if tympanic membrane perforation is suspected
* Side effects: Generally mild; NSAIDs can cause gastrointestinal irritation or kidney effects in susceptible individuals

## 4. Procedural Treatment

* In cases of severe pain, the blisters (bullae) on the tympanic membrane can be drained using a small myringotomy knife to relieve pressure and pain
* This does not cure the infection but provides symptomatic relief
* Requires sterile technique and careful follow-up

## 5. Supportive Care

* Strict dry ear precautions are advised:
  + Avoid water exposure (cover ear while bathing/showering)
  + Avoid swimming until infection resolves
* Rest and hydration to support immune response

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning! What brings you to the clinic today?

Patient: Good morning, doctor. I’ve been having severe ear pain for the last two days. It’s really sharp and doesn’t seem to go away.

Doctor: I’m sorry to hear that. Have you noticed anything else, like hearing loss, ear discharge, or fever?

Patient: Yes, my hearing feels a bit muffled on that side, and I had a slight fever yesterday.

Doctor: Thank you. It sounds like you might have an infection in your ear. I’d like to use an otoscope to look inside your ear canal and check your eardrum.

Patient: Okay.

Doctor: (Examining ear) I can see some fluid-filled blisters on your eardrum — this condition is called bullous myringitis. It usually happens due to viral or bacterial infections and causes quite a bit of pain.

Patient: Is it serious? How did I get it?

Doctor: It often follows a cold or middle ear infection. The same viruses or bacteria that cause colds, like respiratory syncytial virus or streptococcus, can lead to this blistering on the eardrum. It can be quite painful but usually resolves well with treatment.

Patient: What treatment do I need?

Doctor: We’ll treat the underlying infection, often with oral antibiotics and pain relief medications such as ibuprofen. Sometimes, if the blisters cause too much pain or risk rupturing, we can carefully drain them. It’s also important to keep the ear dry and avoid water exposure while it heals.

Patient: How long will it take to get better?

Doctor: Most people start to feel better within 1 to 2 days of starting treatment, with full recovery soon after. If your symptoms persist or worsen, please come back sooner.

Patient: Can this cause long-term problems with my hearing?

Doctor: Temporary hearing loss during the infection is common due to fluid buildup, but permanent hearing loss is rare if properly treated.

Patient: Thank you, doctor. That makes me feel better about it.

Doctor: You’re welcome. If you have any new symptoms like worsening pain, swelling behind the ear, or high fever, don’t hesitate to contact us.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK553029/#article-18698.s9>

<https://emedicine.medscape.com/article/858558-workup#c7>

<https://my.clevelandclinic.org/health/diseases/25018-bullous-myringitis>

<https://med.uth.edu/orl/online-ear-disease-photo-book/chapter-15-miscellaneous/bullous-myringitis/>

**Ear tumors**

**DEFINITION AND DESCRIPTION**

An ear tumor is a mass or lump of abnormal cells that forms in your ear. Most ear tumors are benign, or noncancerous. But some ear tumors are malignant (cancerous).

Ear tumors can form in any part of your ear, including your inner ear, middle ear or outer ear. They may affect your hearing. It’s important to get tumors checked early on, before they potentially cause long-term issues.

#### **Ear cyst and an ear tumor**

Both cysts and tumors can cause a bump or lump on or in your ear:

* Cysts are small sacs that often contain fluid and usually aren’t cancerous. The most common ear cysts are sebaceous cysts (epidermal inclusion cysts). They can develop in your ear canal, behind your ear or on your earlobe.
* Tumors are solid masses of tissue that may or may not be cancerous. Most ear tumors are benign growths that form on your outer ear.

#### **Types of benign (noncancerous) ear tumors**

Noncancerous ear tumors can block your ear canal, leading to earwax buildup. Some types that form inside your ear can grow big enough to harm the organs that help you hear and balance:

* Acoustic neuromas (also called vestibular schwannomas) form on your vestibulocochlear nerve. This nerve in your inner ear connects to your brain.

This nerve is called the vestibular nerve. Branches of the nerve directly affect balance and hearing. Pressure from an acoustic neuroma can cause hearing loss, ringing in the ear and trouble with balance. Another name for an acoustic neuroma is vestibular schwannoma.

An acoustic neuroma develops from the Schwann cells covering the vestibular nerve. A Schwann cell helps protect and support other nerve cells in the body. An acoustic neuroma is usually slow growing. Rarely, it may become large enough to press against the brain and affect vital functions.

Treatments for an acoustic neuroma include monitoring, radiation and surgical removal.

Symptoms of an acoustic neuroma often are easy to miss and may take years to develop. Symptoms may occur because of the tumor's effects on the hearing and balance nerves. The tumor also can put pressure on the facial nerve that directs facial muscles and the trigeminal nerve that affects feeling in the face. Blood vessels or other brain structures also can be affected by an acoustic neuroma.

As the tumor grows, it may be more likely to cause more noticeable or worse symptoms.

Common signs and symptoms of an acoustic neuroma include:

* Hearing loss, usually gradually over months to years. In rare cases, hearing loss can be sudden. Hearing loss usually occurs on one side or is worse on one side.
* Ringing in the affected ear, known as tinnitus.
* Loss of balance or not feeling steady.
* Dizziness.
* Facial numbness and, very rarely, weakness or loss of muscle movement.

Rarely, an acoustic neuroma may grow large enough to compress the brainstem and become life-threatening.

The cause of acoustic neuromas can sometimes be linked to a change to a gene on chromosome 22. Typically, this gene produces a tumor suppressor protein that helps regulate the growth of Schwann cells covering the nerves. Experts don't know what causes this change to the gene. Often there is no known cause. In some people, the gene change is related to a rare condition called NF2-related schwannomatosis, also known as NF2. The condition was previously known as neurofibromatosis type 2. People with NF2 usually have growth of tumors on the hearing and balance nerves on both sides of the head. These tumors are known as bilateral vestibular schwannomas.The only confirmed risk factor for acoustic neuromas is having a parent with the rare genetic condition NF2-related schwannomatosis, also known as NF2. However, only a small number of people with acoustic neuromas have NF2.

A hallmark characteristic of NF2 is noncancerous tumors on the balance nerves on both sides of the head. Tumors also may develop on other nerves.

NF2 is known as an autosomal dominant condition. This means that the gene related to the condition can be passed to a child by just one parent. Each child of an affected parent has a 50-50 chance of inheriting it.

An acoustic neuroma may cause permanent complications, including:

* Hearing loss.
* Facial numbness and weakness.
* Trouble with balance.
* Ringing in the ear.

Large tumors may press on the brainstem, occasionally preventing the flow of cerebrospinal fluid between the brain and spinal cord. Fluid can build up in your head, a condition known as hydrocephalus. This increases the pressure inside the skull.

An acoustic neuroma often is hard to diagnose in the early stages because symptoms may be easy to miss and develop slowly over time. Common symptoms such as hearing loss also are associated with many other middle and inner ear issues.

After asking questions about your symptoms, a member of your healthcare team conducts an ear exam. You may need the following tests:

* **Hearing test, known as audiometry.** This test is conducted by a hearing specialist called an audiologist. During the test, sounds of various tones are directed to one ear at a time. You indicate each time you hear the sound. Each tone is repeated at fainter levels to find out when you can barely hear. The audiologist also may use words to test your hearing.
* **Imaging.** Magnetic resonance imaging (MRI) with contrast dye is usually used to diagnose an acoustic neuroma. This imaging test can detect tumors as small as 1 to 2 millimeters in diameter. If MRI is not available or you can't have an MRI scan, a CT scan may be done. However, CT scans may miss small tumors.

Your acoustic neuroma treatment may vary, depending on:

* The size and growth rate of the acoustic neuroma.
* Your overall health.
* Your signs and symptoms.

There are three treatment approaches for acoustic neuroma: monitoring, surgery or radiation therapy.

### **Monitoring**

You and your healthcare team may decide to monitor an acoustic neuroma if it's small and isn't growing or if it's growing slowly. This may be an option if the acoustic neuroma causes few or no symptoms. Monitoring also may be recommended if you're an older adult or if you're not a good candidate for more-aggressive treatment.

While being monitored, you'll need regular imaging and hearing tests, usually every 6 to 12 months. These tests can determine whether the tumor is growing and how quickly. If the scans show the tumor is growing or if the tumor causes worse symptoms, you may need to have surgery or radiation.

### **Surgery**

You may need surgery to remove an acoustic neuroma, especially if the tumor is:

* Continuing to grow.
* Very large.
* Causing symptoms.

Your surgeon may use one of several techniques for removing an acoustic neuroma. The type of surgery your surgeon chooses depends on the size of the tumor, your hearing status and other factors.

The goal of surgery is to remove the tumor and preserve the facial nerve to prevent the paralysis of muscles in your face. Removing the entire tumor may not always be possible. For example, if the tumor is too close to important parts of the brain or the facial nerve, only part of the tumor may be removed.

Surgery for an acoustic neuroma is performed under general anesthesia. Surgery involves removing the tumor through the inner ear or through a window in your skull.

Sometimes removing the tumor may worsen symptoms if the hearing, balance or facial nerves are irritated or damaged during the operation. Hearing may be lost on the side where the surgery is performed. Balance is usually affected temporarily.

Complications may include:

* Leaking of the fluid that surrounds your brain and spinal cord, known as cerebrospinal fluid. Leaking may happen through the wound.
* Hearing loss.
* Facial weakness or numbness.
* Ringing in the ear.
* Trouble with balance.
* Persistent headache.
* Rarely, infection of the cerebrospinal fluid, known as meningitis.
* Very rarely, stroke or brain bleeding.

### **Radiation therapy**

There are several types of radiation therapy used to treat an acoustic neuroma:

* **Stereotactic radiosurgery.** This type of radiation therapy is often used if the tumor is small — less than 2.5 centimeters in diameter. It also may be used if you are an older adult or you cannot have surgery for health reasons. This technique uses many tiny gamma rays to deliver a precisely targeted dose of radiation to a tumor. It treats the tumor without making an incision or damaging surrounding tissue.  
  The goal of stereotactic radiosurgery, such as Gamma Knife and CyberKnife, is to stop the growth of a tumor. The treatment also aims to preserve the facial nerve's function and possibly preserve hearing. It may take weeks, months or years before you notice the effects of radiosurgery. Your healthcare team monitors your progress with follow-up imaging studies and hearing tests.  
  Risks of radiosurgery include:
  + Hearing loss.
  + Ringing in the ear.
  + Facial weakness or numbness.
  + Trouble with balance.
  + Continued tumor growth.
* **Fractionated stereotactic radiotherapy.** Fractionated stereotactic radiotherapy, also called SRT, delivers a small dose of radiation to the tumor over several sessions. SRT is done to slow the growth of the tumor without damaging surrounding brain tissue.
* **Proton beam therapy.** This type of radiation therapy uses high-energy beams of positively charged particles called protons. The proton beams are delivered to the affected area in targeted doses to treat tumors. This type of therapy lowers radiation exposure to the surrounding area.

### **Supportive therapy**

In addition to treatment to remove or stop the growth of the tumor, supportive therapies can help reduce your symptoms. The therapies help with dizziness, trouble with balance or other complications. For hearing loss, you can use cochlear implants or other treatments.

* Adenomas are rare noncancerous tumors that develop in your middle ear.
* Cholesteatomas are sacs of fluid, air or skin cells that form behind your eardrum in your middle ear. They can lead to hearing loss if not treated.
* Exostoses and osteomas are benign bone tumors that form on bones in your external ear canal.
* Glomus tympanicum paraganglioma affects your tympanic nerve. This nerve in your middle ear connects to your eardrum.
* Keloids are a type of fibrous scar tissue. They can form after an ear piercing or trauma to your outer ear.

#### **Types of malignant (cancerous) ear tumors**

Cancer can form inside or on the outside of your ear. But ear cancer is rare.

Most cancer that affects your ear is actually skin cancer. Approximately 6% to 10% of skin cancers start on the outer ear. Skin cancers that may affect your ear include:

* Basal cell carcinoma.
* Melanoma.
* Squamous cell carcinoma.

Cancers that directly affect your middle or inner ear are even more uncommon:

* Adenoid cystic carcinoma is a rare cancer that most often forms in your salivary glands. In even rarer instances, it may form in your ear canal.
* Ceruminous adenoma forms in the cells that make earwax. This cancer doesn’t spread, but it can destroy parts of your ear canal.
* Rhabdomyosarcoma is a rare childhood cancer that affects muscle tissue. It may develop in your head or neck, including your middle ear.

**CAUSES**

Ear tumors occur when your body makes new cells faster than usual. Sometimes, old, damaged cells don’t die off the way they should. Clumps of old and new cells group together, forming a tumor.

Cancerous ear tumors occur when the cells grow uncontrollably. Untreated, these malignant cells may spread to other locations in your body (metastatic cancer).

#### **Risk factors for ear tumors**

People of all ages, including children, can get ear tumors. Factors that increase your chances of developing an ear tumor include:

* Chronic ear infections.
* Ear piercings.
* Inherited conditions, such as neurofibromatosis (NFS).
* Prior radiation exposure.
* Repeated exposure to cold water, such as from scuba diving (surfer’s ear).
* Smoking, including exposure to secondhand smoke.

**SIGNS / SYMPTOMS**

Symptoms of an ear tumor vary depending on the tumor type and the part of your ear it affects. Signs of an ear tumor include:

* A bump on the outer part of your ear.
* Dizziness or balance problems.
* Ear bleeding or discharge.
* Ear pain.
* Headaches.
* Hearing loss.
* Nonhealing wound or sore.
* Skin discoloration, new moles or changes to a mole.
* Swollen lymph nodes.
* Tinnitus (ringing in your ears).
* Weak facial muscles.

**DIAGNOSIS METHODS**

Your healthcare provider may notice a tumor by examining your ear during a physical exam. They may refer you to an audiologist (hearing specialist) for a hearing test. You’ll likely also see an ear, nose and throat doctor (an ENT or otolaryngologist) who specializes in ear disorders.

If your provider suspects your ear tumor may be cancerous, they’ll perform a biopsy. This procedure removes the tumor or cells from the tumor. A pathologist (a doctor who studies diseases) examines the samples in a lab to make a diagnosis.

Because inner ear tumors are difficult to reach and biopsy, your provider may order a CT scan or MRI to learn more about them. In rare cases, you may need surgery to remove the tumor before a provider can diagnose it.

**TREATMENT OPTIONS**

Some noncancerous ear tumors don’t need treatment unless the tumor affects your hearing or balance. Your healthcare provider may monitor the tumor to keep an eye on its growth and check in with you about any symptoms you’re experiencing.

The most common treatments remove the growth through surgery or other methods. For example, providers often use radiosurgery (gamma knife surgery) to remove benign ear tumors like acoustic neuromas. This procedure directs high doses of radiation directly to the tumor. It’s not surgery, but it removes tumors with surgical-like precision.

To treat keloids, your healthcare provider may inject the tumor with a corticosteroid. Some keloids require surgical removal followed by radiation therapy to destroy any remaining cells.

### **How are malignant ear tumors treated?**

Dermatologists (doctors who specialize in skin diseases) treat skin cancer on the outer ear. Treatment for cancerous ear tumors depends on the cancer type and location. Treatment might include:

* Mohs surgery to remove the cancerous skin cells.
* Radiation therapy, radiosurgery or chemotherapy to destroy cancer cells.
* Surgery to remove tumors and (potentially) nearby lymph nodes where cancer cells may have spread.

**Ear Tumor Treatment: Drug Information and Their Side Effects**

## 1. Chemotherapy Drugs Used in Ear Cancers

* Platinum-based agents:
  + Cisplatin
  + Carboplatin
  + Oxaliplatin (less common in ear tumors)  
    These are commonly used in head and neck cancers, including ear malignancies, due to their potent antitumor effects.

Side Effects:

* Ototoxicity: Hearing loss, tinnitus (ringing in ears), and balance problems are significant side effects. Damage often involves nerve endings in the inner ear and may be irreversible. Higher cumulative doses increase risk.
* Other common side effects: Nausea, vomiting, nephrotoxicity (kidney damage), neuropathy.
* Cisplatin is especially associated with hearing loss in about 20% of patients, requiring monitoring during treatment.

## 2. Other Chemotherapy Agents

* Vincristine, Doxorubicin, Gemcitabine, Cyclophosphamide, Farmorubicin are sometimes used in combination chemotherapy regimens for head and neck tumors.

Side Effects:

* Neuropathy (including ototoxicity in some cases), myelosuppression (low blood counts), gastrointestinal upset.

## 3. Radiation Therapy

* Often combined with surgery or chemotherapy for malignant ear tumors.

Side Effects Relevant to Ear Function:

* Conductive hearing loss due to fibrosis, Eustachian tube dysfunction, middle ear effusion.
* Sensorineural hearing loss from damage to cochlear hair cells.
* Tinnitus and balance disturbances may also occur.

## 4. Surgery

* Surgical removal of ear tumors can affect hearing or facial nerve function depending on tumor location and extent, potentially causing hearing loss or facial weakness.

## 5. Symptomatic Treatments

* Pain management: Analgesics including NSAIDs and opioids as needed.
* Corticosteroids: Sometimes used to reduce inflammation and swelling, especially after surgery or radiation therapy.

## Monitoring and Management

* Baseline and periodic audiometric testing is recommended during treatment with ototoxic drugs to detect early hearing changes.
* Dose adjustments or drug substitutions may be necessary if ototoxicity occurs.
* Patients should report any new hearing changes, tinnitus, or dizziness immediately.

**OUTLOOK / PROGNOSIS**

Small ear tumors that aren’t causing symptoms may not need treatment at all. But if a tumor is causing hearing loss or other issues, you may need surgery to remove it. Most people who get surgery or other treatments for benign ear tumors recover well.

The prognosis for ear cancer depends on things like the type of tumor, where it’s located and its stage (how much it’s spread). But even with melanoma (the deadliest form of skin cancer), the five-year survival rate is 99% when surgery removes the cancer before it’s spread.

Skin cancer on your outer ear can sometimes come back and spread to other parts of your body. You’ll need regular skin exams to keep an eye out for returning cancer.

**WHEN TO SEE A DOCTOR / RED FLAG**

Call your healthcare provider if you experience:

* Balance problems or dizziness.
* Ear bleeding, discharge or pain.
* Hearing loss.
* Ringing in the ears (tinnitus).
* Skin changes to your ear, including a new lump, mole or sore.

### **What questions should I ask my healthcare provider?**

You may want to ask your healthcare provider:

* Is my ear tumor malignant or benign?
* What type of ear tumor do I have?
* What’s the best treatment for me?
* What are the treatment risks and side effects?
* Should I look out for signs of complications?

**DIFFERENTIAL DIAGNOSIS**

| **Anatomical Site** | **Tumor Types / Entities** | **Notes / Characteristics** |
| --- | --- | --- |
| External Ear Tumors | - Squamous Cell Carcinoma (SCC) | Most common malignant tumor of external ear; locally aggressive |
|  | - Basal Cell Carcinoma | Less aggressive, slower growing |
|  | - Ceruminous Gland Tumors:  - Ceruminous adenoma (benign)  - Ceruminous adenocarcinoma (malignant)  - Ceruminous adenoid cystic carcinoma  - Ceruminous mucoepidermoid carcinoma | Rare tumors arising from modified sweat glands in the external auditory canal; often present with pain, hearing loss, tinnitus |
|  | - Benign lesions:  - Chondrodermatitis nodularis chronica helicis  - Cystic chondromalacia  - Seborrheic keratosis  - Kimura disease | Usually cause localized pain or swelling, without aggressive behavior |
|  | - Others: sebaceous cysts, papillomas |  |
| Middle and Inner Ear Tumors | - Paraganglioma (Glomus tympanicum and jugulare tumors) | Highly vascular, typically cause pulsatile tinnitus and hearing loss |
|  | - Middle Ear Neuroendocrine Tumor (formerly middle ear adenoma) | Rare benign tumor with neuroendocrine differentiation |
|  | - Schwannoma (Acoustic neuroma/vestibular schwannoma) | Most common CPA tumor; causes hearing loss, tinnitus, and sometimes facial paralysis |
|  | - Meningioma | Can involve temporal bone or cerebellopontine angle; may mimic schwannoma |
|  | - Ceruminous tumors | See external ear section since they arise in EAC |
|  | - Endolymphatic sac tumor | Aggressive tumor arising near the inner ear structures; causes bone destruction |
|  | - Carcinoid tumors | Neuroendocrine origin, rare in the middle ear |
|  | - Cholesteatoma (not true tumor) | Keratinizing squamous epithelium causing destructive growth; mimics tumor clinically and radiologically |
|  | - Metastatic tumors | Breast, lung, colon, thyroid cancers can metastasize to temporal bone or cerebellopontine angle |
|  | - Lymphoma | Can affect temporal bone or adjacent structures |
| Other Considerations | - Benign soft tissue tumors: lipoma, hemangioma | Usually slow growing, may cause mass effect |
|  | - Malignant tumors of adjacent structures invading the ear:  Nasopharyngeal carcinoma, parotid malignancies | Important to differentiate primary ear tumors from invasion by adjacent cancers |

**EPIDEMIOLOGY**

* Incidence: Malignant tumors of the ear and temporal bone are very rare, with an incidence reported between 1 and 6 cases per million population per year, accounting for less than 0.2% of all head and neck tumors.
* Site-specific incidence: Middle ear carcinoma occurs approximately once in every 5,000 to 20,000 cases of ear disease.
* Population: These tumors primarily affect Caucasians, with a reported prevalence ranging from 0.1% to 2.1% in White Europeans.
* Age and gender: Middle ear neoplasms have a mean age of occurrence around 40-50 years for benign tumors and in the 60s for malignant tumors; some studies indicate a female preponderance for benign middle ear tumors, whereas malignant tumors have a roughly equal gender distribution.
* Metastasis and spread: These tumors mainly spread locally by direct invasion into adjacent structures such as the temporal bone, parotid gland, infratemporal fossa, dura, and brain. Lymphatic metastases occur in about 10% of cases, and distant metastases are extremely rare.
* Specific tumor types: Benign tumors like paragangliomas (glomus tympanicum) are the most common benign middle ear neoplasms, followed by schwannomas and hemangiomas.
* Cholesteatoma, while not a tumor, is a relatively common and important differential diagnosis due to its locally destructive behavior, with an incidence of several cases per 100,000 population per year

**PREDEFINED Q & A SETS**

## What are ear tumors?

An ear tumor is an abnormal mass or lump of cells that can form in any part of the ear, including the outer ear, middle ear, or inner ear . Most ear tumors are benign (noncancerous), but some can be malignant (cancerous) .

## What are the types of ear tumors?

Ear tumors can be categorized by their location and whether they are benign or malignant .

* Outer ear tumors often include skin cancers like squamous cell carcinoma and basal cell carcinoma . Benign outer ear growths include epidermal inclusion cysts, osteomas, exostoses, and keloids .
* Middle ear and inner ear tumors can be benign or malignant . Cholesteatoma is a non-cancerous growth that can mimic tumors due to its destructive nature .

## What causes ear tumors?

The exact causes can vary depending on the type of tumor. For outer ear cancer, prolonged exposure to sunlight is a known cause . Other risk factors for ear cancer include chronic ear infections, radiation exposure, and genetic factors . For benign growths like exostoses (surfer's ear), exposure to cold water is a contributing factor .

## What are the symptoms of ear tumors?

Symptoms depend on the tumor's location and size . Common symptoms may include:

* Pain or discomfort in the ear
* A mass or lump on or in the ear
* Hearing problems or hearing loss
* Bleeding or discharge from the ear
* Dizziness or balance problems
* Weakness or paralysis of facial nerves
* For outer ear cancer, a persistent sore on the ear that lasts more than 4 weeks, may itch, or bleed if scratched, is a primary symptom .

## How are ear tumors diagnosed?

Diagnosis typically involves :

* A medical history and physical examination, including looking inside the ear with an otoscope .
* Imaging tests such as MRI or CT scans to view abnormalities and assess spread .
* A biopsy, where a small tissue sample is taken and examined under a microscope to confirm cancer . Biopsies of the inner ear are rare .
* Hearing tests (audiometry) .

## How are ear tumors treated?

Treatment depends on the tumor's type, location, and whether it is benign or malignant .

* For benign tumors, small ones may not require treatment unless they cause symptoms . Larger benign growths that obstruct the ear canal or cause infection may require surgical removal .
* For cancerous tumors, treatment options commonly include surgery, radiation therapy, and chemotherapy . Surgery aims to remove the tumor and surrounding affected areas, which might include the ear canal, temporal bone, middle ear, or inner ear depending on the spread . Mohs surgery and radiosurgery are also options for some tumors .
* A multidisciplinary approach is essential for ear cancer, with treatment plans tailored to the individual .

## What is the prognosis for ear cancer?

Ear cancer is rare, and early detection significantly improves the chances of successful treatment and can positively influence the course of the disease . Although ear cancer can spread to adjacent areas like salivary glands or, in severe cases, to the brain, it is not considered fatal per se, especially with early diagnosis and effective treatment

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, thank you for coming in today. What symptoms have you been experiencing with your ear?

Patient: I’ve noticed some hearing loss on my right side, and recently I felt a small lump near my ear. Sometimes I get ringing and occasional dizziness.

Doctor: I understand that must be concerning. Ear tumors are a possibility with these symptoms, though most ear tumors are benign and treatable. To get a better idea, I’d like to ask a few more questions and then examine your ear carefully.

Patient: Okay, what kind of questions?

Doctor: When did you first notice the hearing loss and lump? Have you had any pain, discharge, or facial weakness? Also, do you have any history of ear infections or exposure to loud noise?

Patient: The hearing loss started slowly about six months ago. The lump appeared a couple of months back. No pain or discharge, and my face feels normal.

Doctor: That’s helpful. Some ear tumors, like vestibular schwannomas or paragangliomas, can cause hearing changes, tinnitus, or balance problems. Others, like benign cysts or osteomas, might cause lumps without much discomfort. We’ll need imaging studies like an MRI or CT scan to see inside and determine the precise nature of the lesion.

Patient: Will I need surgery?

Doctor: It depends on the tumor’s type, size, and location. Small, stable tumors can sometimes be monitored regularly. Others may require surgery or specialized treatments like Gamma Knife radiosurgery, which uses focused radiation to control tumor growth without open surgery.

Patient: What are the risks of surgery?

Doctor: Surgery in the ear region is delicate because important nerves—like those controlling your face and hearing—are nearby. Risks include hearing loss, facial weakness, or balance issues. However, experienced surgeons take great care to minimize these. We’ll discuss all this thoroughly if surgery is needed.

Patient: Is there a chance it’s cancer?

Doctor: Most ear tumors are benign, but we will do all necessary tests, including possibly a biopsy or imaging, to rule out cancer and plan the best treatment.

Patient: What should I expect next?

Doctor: I’ll arrange imaging and hearing tests soon. Once we have results, we’ll meet again to discuss the diagnosis and treatment options. Meanwhile, if you notice new symptoms like worsening hearing, facial weakness, or severe pain, please contact us promptly.

Patient: Thank you, doctor. That makes me feel more at ease.

Doctor: You’re welcome. We’re here to support you through this, step by step.

REFERENCES:

<https://www.cancercenter.com/community/blog/2017/09/hearing-loss-the-little-known-side-effect-of-some-chemotherapy-drugs>

<https://my.clevelandclinic.org/health/diseases/17587-ear-tumors>

**Inherited metabolic disorders**

**ALTERNATIVE NAMES**

Inborn errors of metabolism

**DEFINITION / DESCRIPTION**

Inherited metabolic disorders are medical conditions caused by changes in specific genes that affect metabolism. Different gene changes cause different types of inherited metabolic disorders. These gene changes are most commonly passed down from both parents. But sometimes the gene change comes only from one parent, most often from the mother. These disorders also are called inborn errors of metabolism.

Metabolism is the complex set of chemical reactions that your body uses to maintain life. These include:

* **Making energy.** Special enzymes break down food or certain chemicals so your body can use them right away for fuel or store them for later use.
* **Making or getting rid of substances.** Certain chemical processes make substances your body needs. Other chemical processes break down substances that your body no longer needs.

When these processes don't work properly, a metabolic disorder occurs. It may be due to an enzyme that's too low or missing or to another problem. Inherited metabolic disorders fall into different groups. They're grouped by the substance affected and whether it builds up too much because it can't be broken down or it's too low or missing.

**CAUSES**

Inherited metabolic disorders are caused by changes in specific genes that affect metabolism. Different gene changes cause different types of inherited metabolic disorders. These gene changes are most commonly passed down from both parents. But sometimes the gene change comes only from one parent, most often from the mother. There are hundreds of inherited metabolic disorders caused by different genes.

**RISK FACTORS**

The risk of an inherited metabolic disorder is higher if one or both parents have the gene change that can cause the condition. In some cases, future parents may decide to have carrier testing before pregnancy. This test can identify some gene changes in parents that may raise the risk that future children will have certain types of inherited metabolic disorders.

**SIGNS / SYMPTOMS**

There are hundreds of inherited metabolic disorders caused by different genes. Symptoms depend on the type of disorder and how severe it is.

Examples of inherited metabolic disorders include:

* Familial hypercholesterolemia.
* Gaucher disease.
* Hunter syndrome.
* Krabbe disease.
* Maple syrup urine disease.
* Metachromatic leukodystrophy.
* Mitochondrial encephalopathy, lactic acidosis, stroke-like episodes (MELAS).
* Niemann-Pick.
* Phenylketonuria (PKU).
* Porphyria.
* Tay-Sachs disease.
* Wilson's disease.

**DIAGNOSIS METHODS**

Some inherited metabolic disorders may be diagnosed before birth. Others can be diagnosed by routine newborn screening tests done at birth. Others are identified only after a child or adult shows symptoms of a disorder.

To find out if you or your child has an inherited metabolic disorder, you may have:

* **Physical exam.** You may have a physical exam and talk about your or your child's symptoms and medical history. You also may be asked about any family history.
* **Tests.** Blood and urine tests check to see how the metabolism is working. Sometimes other types of tests may be recommended.
* **Genetic testing.** Genetic testing can identify the type of inherited metabolic disorder you or your child has. If one person in the family has an inherited metabolic disorder, specialists often recommend genetic testing and counseling for other family members as well.  
  In some cases, future parents may choose to have carrier testing before pregnancy, also called preconception screening. This test can identify some gene changes in parents that may increase the risk that future children will have certain types of inherited metabolic disorders.
* **Genetic counseling.** Genetic counseling can include discussion of newborn screening or other genetic testing. Counseling also can include information on the risk of an inherited metabolic disorder for future children.
* **Specialist exams.** Certain inherited metabolic disorders may increase the risk of other conditions, such as heart, vision or hearing problems. You may be referred to other specialists as needed.

**TREATMENT OPTIONS**

Treatment depends on the type of inherited metabolic disorder and how severe it is. Because there are so many types of inherited metabolic disorders, treatment can vary a great deal. A few examples of treatments include special diets, enzyme replacement, vitamin therapy, medicines and liver transplants. Sometimes care begins with a stay in the hospital. For some types of inherited metabolic disorders, there are no treatments currently available.

Inherited metabolic disorders are rare and complex. Depending on the type and severity of the disorder and your or your child's age, you may see several experts in inherited metabolic disorders. These may include specialists in:

* Medical genetics.
* Nutrition.
* Pediatrics and developmental pediatrics.
* Nervous system.
* Endocrine and metabolic disorders.
* Heart and blood vessels.
* Ear, nose and throat (ENT).
* Eyes and vision.
* Digestive system.
* Kidneys.

Life-long care with regular healthcare visits is important to take care of problems early and adjust treatment as needed.

## 1. Vitamin and Cofactor Supplementation

These are used to enhance residual enzyme activity or bypass defective metabolic pathways:

| **Vitamin / Cofactor** | **Indications** | **Typical Dose & Route** | **Common Side Effects / Considerations** |
| --- | --- | --- | --- |
| Biotin | Biotinidase deficiency, multiple carboxylase deficiency | 5–20 mg/day orally | Rare allergic reactions; generally well tolerated |
| Folic Acid / Folinic Acid | Remethylation defects, hereditary folate malabsorption | 5–30 mg/day orally; IM/IV forms available | Allergic reactions rare; high doses require monitoring |
| Hydroxocobalamin (Vitamin B12) | Disorders of cobalamin metabolism | 1 mg IM daily or 10 mg orally daily | Injection site reactions; rare allergic reactions |
| Pyridoxine (Vitamin B6) | Pyridoxine-dependent epilepsy, CBS deficiency, some urea cycle defects | 15–500 mg/day orally; IV for acute PDE trial | Neuropathy at high doses; careful monitoring recommended |
| Pyridoxal Phosphate (PLP) | Pyridoxal phosphate-dependent seizures | 30 mg/kg/day divided doses orally or via feeding tube | Similar to pyridoxine; essential for certain seizures |
| Riboflavin (Vitamin B2) | Glutaric aciduria type 1, multiple acyl-CoA dehydrogenase deficiencies | 100–400 mg/day orally | Well tolerated; occasional photosensitivity |
| Sapropterin dihydrochloride (Kuvan) | BH4-responsive phenylketonuria (PKU) | 10–20 mg/kg/day orally | Headache, gastrointestinal upset, hypersensitivity reactions |
| Thiamine (Vitamin B1) | Thiamine-responsive maple syrup urine disease (MSUD), pyruvate dehydrogenase deficiency | 10–1000 mg/day orally | Rare allergic reactions |
| Ubiquinone (Coenzyme Q10) | Primary CoQ10 deficiency | 2–15 mg/kg/day orally | Rare gastrointestinal upset |
| Vitamin C and E | Glutathione synthetase deficiency and related disorders | Variable oral doses | Generally safe; high doses may cause GI upset |

## 2. Dietary Management

* Protein restriction in amino acid metabolism disorders (e.g., PKU, MSUD) to reduce substrate load.
* Specific avoidance of sugars or fats in carbohydrate or fatty acid oxidation defects.
* Supplemental calories and fluids to prevent catabolism during illness.
* Management tailored according to specific enzyme defects often requires specialized metabolic dietitian input.

*Side effects* of restrictive diets include nutrient deficiencies and growth retardation if not carefully managed.

## 3. Emergency Metabolic Management

* For acute decompensation (e.g., metabolic crisis), intravenous glucose (10% dextrose) is administered at 7-8 mg/kg/min to suppress catabolism.
* Correction of metabolic acidosis and electrolyte imbalances as needed.
* Avoidance of protein intake temporarily during crisis states.

Side effects are minimal but require monitoring of blood glucose and electrolytes.

## 4. Other Drug Therapies

* Ammonia scavengers (e.g., sodium benzoate, sodium phenylbutyrate) used in urea cycle defects to reduce toxic ammonia levels.
* Side effects include gastrointestinal upset, electrolyte disturbances, and rarely neurotoxicity.

**PREVENTION TIPS**

You can’t prevent inborn errors of metabolism because they’re the result of genetic changes. If you plan on expanding your family, talk to your provider about genetic testing to learn more about the risks of having a child with a genetic condition.

**OUTLOOK / PROGNOS**IS

There isn’t a cure for inborn errors of metabolism (IEM). Your outlook varies based on the severity of your symptoms. Some cases of IEM can be very dangerous if you have high levels of toxic material in your body that your body can’t get rid of on its own. Most people diagnosed with the condition have a normal lifespan with early detection and treatment, along with lifelong lifestyle changes.

**WHEN TO SEE A DOCTOR / RED FLAG**

Visit your healthcare provider if you have a flare of symptoms that don’t resolve with your provider’s recommended treatment plan. If you’re pregnant, ask your provider about prenatal and newborn screenings for your baby to identify inborn errors of metabolism.

If you have a seizure, call 911 (or your local emergency service number) or visit the emergency room immediately.

## **Diagnostic Considerations**

Consider IEMs in all neonates and young infants with unexplained death. Obtain specimens immediately postmortem.

A high index of suspicion is paramount. A European survey of several relatively common rare diseases revealed that 25% of patients waited 5-30 years for an accurate diagnosis, with 40% of patients initially receiving an incorrect diagnosis. An Australian survey yielded similar results, with 30% of patients waiting 5 or more years for an accurate diagnosis and 50% initially receiving an incorrect diagnosis.

A 2013 systematic literature review identified 89 IEMs presenting with intellectual developmental disorders (IDD) as prominent features amenable to causal therapy. All 89 IEMs except one (tyrosinemia type II) were associated with at least one additional prominent neurologic feature (eg, epilepsy) and movement disorders (eg, spasticity, dyskinesia, ataxia). However, many of these conditions can present with only IDD prior to manifestation of the full phenotype (eg, disorders of creatine synthesis and transport). Sixty percent of these IEMs can be diagnosed by metabolic blood and urine screening tests. For the remaining disorders, specific tests are required for diagnosis, including primary molecular analysis. A two-tier algorithm has been developed to provide a structured approach to the diagnosis of treatable IEMs in patients presenting with an IDD of unknown etiology.

A 2021 literature review identified 116 IEMs presenting with IDDs as prominent features.Nutritional, pharmacologic, and vitamin and trace element supplemental were the most common interventions. Although there is significant interest in gene-based and enzyme-replacement therapies, nutritional treatments were found to be most effective for many conditions.

IEMs constitute an important group of genetic causes of parkinsonism at any age but particularly in children with parkinsonism-like symptoms. IEMs known to cause parkinsonism are metal metabolism, storage diseases, neurotransmitter defects, lysosomal storage disorders, and energy metabolism defects.

## **Differential Diagnoses**

* Child Abuse
* Fever in the Infant and Toddler
* Heart Failure
* Migraine Headache
* Multiple Sclerosis
* Pediatric Acute Respiratory Distress Syndrome
* Pediatric Apnea
* Pediatric Gastroenteritis
* Pediatric Hypoglycemia
* Pediatric Pyloric Stenosis
* Pediatric Sepsis
* Pediatric Urinary Tract Infection
* Restrictive Cardiomyopathy
* Reye Syndrome
* Sudden Infant Death Syndrome
* Viral Hepatitis

**EPIDEMIOLOGY**

### United States data

Individual IEMs are very rare diseases, with incidence ranging 1:10,000 (PKU) to 1:250,000 or less (guanidinoacetate methyltransferase [GAMT] deficiency).The prevalence of lysosomal storage disorders (approximately 60 diseases and growing) is significant when the group is considered as a whole, varying from 1 case in every 4000-13,000 births across different studies and projected to increase as data emerging from newborn screening programs is reported.The incidence of IEMs, collectively, is estimated to be as high as 1 in 800 live births.

### International data

The overall incidence and the frequency for individual diseases varies based on racial and ethnic composition of the population and on the extent of screening programs.Overall rates are in a range similar to that of the United States.

A report from the Society for the Study of Inborn Errors of Metabolism (SSIEM), which looked at 15 centers specializing in the management of adults with IEMs, found that PKU was the most common disease (19.6%) among the study patients.

### Race-,ethnicity-, sex-, and age-related data

*Race*

The incidence within different racial and ethnic groups varies with predominance of certain IEMs within particular groups (eg, cystic fibrosis, 1 per 1600 people of European descent; sickle cell anemia, 1 per 365 people of Black or African descent, with greater than 90% of those having it being of African descent [and with it also being prevalent in the Hispanic population]; Tay-Sachs, 1 per 3500 Ashkenazi Jews). In addition to Tay-Sachs disease, Gaucher disease type 1, Niemann-Pick disease type A, and mucolipidosis IV all have a higher prevalence in the Ashkenazi Jewish population, and patients of Finnish descent have been reported to have an increased frequency of infantile neuronal ceroid lipofuscinosis, Salla disease, and aspartylglucosaminuria .

*Sex*

The mode of inheritance determines the male-to-female ratio of affected individuals.

Many IEMs have multiple forms that differ in their mode of inheritance.

The male-to-female ratio is 1:1 for autosomal recessive and autosomal dominant transmission. It is also 1:1 for X-linked dominant if transmission is from mother to child. Autosomal recessive X-linked IEMs are more prevalent in males, since they only have one X-linked chromosome.

*Age*

Age of presentation of clinical symptoms varies for individual IEMs and variant forms within the IEM, with presentation from within hours of life to very late in adulthood. The timing of presentation depends on significant accumulation of toxic metabolites or on the deficiency of substrate.

The onset and severity may be exacerbated by environmental factors such as diet and intercurrent illness.

Disorders of protein or carbohydrate intolerance and disorders of energy production tend to present in the neonatal period or early infancy and have a tendency to be unrelenting and rapidly progressive. Less severe variants of these diseases usually present later in infancy or childhood and tend to be episodic.

Fatty acid oxidation defects, glycogen storage, and lysosomal storage disorders tend to present in infancy or childhood. Disorders manifested by subtle neurologic or psychiatric features often do not present or go undiagnosed until adulthood.

**GENOMIC DATA**

* Genetic Testing and Diagnostic Approaches:  
  Next Generation Sequencing (NGS) technologies—including single gene testing, gene panels, and whole exome sequencing (WES)—are widely used for diagnosing IEMs. Choosing the appropriate genetic test depends on clinical suspicion and biochemical findings.
  + In a Lebanese tertiary center, NGS yielded a diagnostic rate of ~64% in patients suspected of IEM. Single gene testing had the highest yield (~75%) for specific enzyme deficiencies, whereas WES was better suited for complex phenotypes like mitochondrial disorders (~49% yield).
  + Expanded newborn screening combined with targeted sequencing identifies common mutations, enabling early diagnosis and intervention.
* Genetic Heterogeneity:  
  Over 1000 different IEMs have been described, caused by mutations in hundreds of genes involved in amino acid, carbohydrate, lipid metabolism, mitochondrial function, lysosomal degradation, and others.
  + IEMs exhibit significant genetic and phenotypic heterogeneity; genotype-phenotype correlations can be complex. For example, phenylketonuria (PKU) may result from different genetic defects, and environmental factors can influence clinical outcomes.
* Common Mutations Identified:  
  Studies in specific populations have discovered both known and novel mutations:
  + In the UAE, 38 mutations across 20 IEM disorders were identified, including missense, nonsense, and splice site mutations.
  + In China’s Shaanxi province, mutations in *PAH* (c.728G>A), *MMACHC* (c.609G>A, c.567dupT), and *SLC25A13* (c.852\_855del) were notable for PKU and methylmalonic acidemia.
* Implications of Genomic Data:  
  Genetic diagnoses enable:
  + Precise disease classification and subtype identification
  + Personalized treatment planning
  + Genetic counseling for families, including carrier detection and prenatal diagnosis
  + Improved genotype-phenotype correlation, despite complexity

**PREDEFINED Q & A SETS**

### **Who discovered inborn errors of metabolism?**

Medical history names Archibald Garrod the founder of inborn errors of metabolism in 1908. His research suggested that inborn errors of metabolism connect to genetic changes.

## What are inborn errors of metabolism?

Inborn errors of metabolism are a group of rare inherited genetic disorders caused by defects in enzymes or proteins needed for normal metabolism. These defects impair the body's ability to process certain nutrients from food, leading to accumulation or deficiency of substances that can harm multiple organs and systems.

## How common are inborn errors of metabolism?

They affect approximately 1 in every 2,500 births worldwide, though the overall prevalence varies by population and disorder.

## Who can be affected by IEM?

IEM can affect people of all ages, but most cases present during the neonatal period or infancy. Some disorders may be diagnosed later in childhood or even adulthood depending on severity and symptoms.

## What causes inborn errors of metabolism?

IEMs are caused by genetic mutations that impair the function of enzymes or transport proteins involved in metabolic pathways. These mutations are usually inherited from parents but can sometimes occur spontaneously.

## What are common symptoms of IEM?

Symptoms vary widely but often include:

* Poor feeding, vomiting
* Failure to thrive or growth delays
* Developmental delays or intellectual disability
* Seizures or lethargy
* Abnormal odors (e.g., “maple syrup” urine)
* Enlarged liver or spleen
* Metabolic crises with acidosis, hypoglycemia, or hyperammonemia
* Multi-organ involvement depending on the specific disorder

## How is IEM diagnosed?

Diagnosis involves:

* Newborn screening tests soon after birth
* Biochemical tests such as plasma amino acids, urine organic acids, or enzyme assays
* Genetic testing to identify specific mutations
* Clinical evaluation by metabolic specialists

## Can IEM be treated?

Many IEMs have effective treatments that include specialized diets (e.g., restricted protein), vitamin or cofactor supplements (e.g., biotin, vitamin B12, pyridoxine), and emergency management during metabolic crises. Early diagnosis and ongoing management can prevent severe complications and improve quality of life.

## Is IEM curable?

Most IEMs are chronic conditions that require lifelong management. Some can be well controlled with treatment, and early intervention often prevents irreversible damage. Research is ongoing for new therapies including enzyme replacement and gene therapy.

## What should families know about inheritance and genetic counseling?

IEMs are often inherited in an autosomal recessive pattern, meaning both parents carry one defective gene. Genetic counseling can help families understand recurrence risks and guide screening for affected siblings or future pregnancies.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, thank you for coming in. I want to discuss some of the tests we have done regarding your child’s symptoms. Based on the results, we suspect your child might have an inborn error of metabolism, or IEM for short. Have you heard of this term before?

Parent: No, I haven’t. What exactly is that?

Doctor: Inborn errors of metabolism are rare genetic conditions where the body has trouble processing certain parts of food properly because of an enzyme deficiency. This can cause harmful substances to build up or important nutrients to be missing. It often shows up early in life with symptoms like poor feeding, vomiting, lethargy, or developmental delays.

Parent: That sounds serious. How do you know for sure?

Doctor: We start with newborn screening and blood and urine tests that look for abnormal substances. Since these conditions affect metabolism, they leave biochemical footprints we can detect. We also use genetic testing to identify the exact mutation causing the problem for your child.

Parent: What happens if the diagnosis is confirmed? Can it be treated?

Doctor: Many IEMs have treatments that can help manage the condition. These include special diets that limit certain proteins or sugars, vitamin supplements to help enzyme function, and medications to prevent buildup of toxins. Early treatment is very important to avoid complications.

Parent: Will my child be able to live a normal life?

Doctor: With careful management and regular follow-up, many children can lead healthy lives and avoid serious problems. We have a team including metabolic specialists and dietitians to support you every step of the way.

Parent: Is this condition inherited? Could it affect other family members?

Doctor: Yes, these disorders are usually inherited from both parents, who are carriers but typically healthy. We can offer genetic counseling and testing for your family to understand the risks and guide future pregnancies.

Parent: What should I look out for and when will my child need to be seen again?

Doctor: It's important to watch for symptoms like vomiting, difficulty feeding, unusual sleepiness, or seizures, especially during illness. We’ll arrange regular clinic visits and tests to monitor your child’s health closely.

Parent: Thank you, doctor. That helps me understand the situation better.

Doctor: You're welcome. We’re here to help and answer any questions you have at any time.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK459183/#article-23425.s9>

<https://emedicine.medscape.com/article/804757-medication>

<https://my.clevelandclinic.org/health/diseases/17962-inherited-metabolic-disorders>

[Inherited metabolic disorders - Diagnosis and treatment - Mayo Clinic](https://www.mayoclinic.org/diseases-conditions/inherited-metabolic-disorders/diagnosis-treatment/drc-20561225)

**Nasal AND PARANASAL tumors**

**DEFINITION / DESCRIPTION**

A nose tumor is an abnormal growth that begins inside your nasal cavity or paranasal sinuses. These tumors may be benign (noncancerous) or malignant (cancerous).

Examples of noncancerous nose tumors include:

* Nasal polyps.
* Hemangioma.

Examples of cancerous nose tumors include:

* Squamous cell carcinoma.
* Adenocarcinoma.
* Neuroblastoma.
* Adenoid cystic carcinoma.
* Sarcoma.

#### **Nasal tumor and a paranasal tumor**

The main difference is the location of the tumor:

* Nasal tumor: A nasal tumor begins in your nasal cavity, located just behind your nose.
* Paranasal sinus tumor: A paranasal sinus tumor begins in your paranasal sinuses — the air-filled chambers located around your nose.

#### **Who gets nose tumors?**

Anyone can get nose tumors, but cancerous nasal tumors are more common in people aged 55 and over. According to the American Cancer Society, white people in the U.S. are much more likely to develop nose tumors than people who are Black. Additionally, men are twice as likely to develop nose tumors as women.

Nose tumors are rare. Nasal and paranasal tumors account for approximately 3% to 5% of all head and neck cancers in the U.S.

**CAUSES**

Nose tumors occur when the genes that control cell growth become damaged or abnormal. Experts still aren’t sure exactly why these gene changes occur.

There are, however, certain risk factors that can increase your risk for developing nose tumors, including exposure to:

* Tobacco smoke (both primary and secondary).
* Wood or leather dust.
* Vapors from certain chemicals and substances, including glue, radium, solvents and formaldehyde.

**RISK FACTORS**

Factors that may increase the risk of nasal and paranasal tumors include:

* **Smoking tobacco increases the risk.** This includes cigarettes, cigars and pipes.
* **Being exposed to air pollution.** Breathing in polluted air increases the risk of nasal and paranasal tumors.
* **Being exposed to chemicals and irritants in the air at work.** These may include wood dust, fumes from glue, rubbing alcohol and formaldehyde, and dust from flour, chromium and nickel.
* **Being exposed to human papillomavirus, also called HPV.** HPV is a common virus that's passed through sexual contact. For most people, it causes no problems and goes away on its own. For others, it causes changes in cells that can lead to many types of cancer.

**SIGNS / SYMPTOMS**

Nose tumor symptoms may include:

* Chronic nasal congestion or sinus blockage, particularly on one side.
* Loss of sense of smell (anosmia).
* Nosebleeds.
* Headaches.
* Postnasal drip.
* Pus draining from your nose.
* Watery eyes.
* Changes in your voice.
* Pain around your nose, eyes, ears, cheeks or forehead.
* A growth on your nose, face, neck or roof of your mouth.
* Chronic ear infections.
* Difficulty hearing.
* Eye issues, including bulging eyes, blurred vision or double vision.
* Difficulty opening your mouth.

**DIAGNOSIS METHODS**

First, a healthcare provider will perform a physical examination and ask you about your symptoms in detail. Next, they’ll recommend testing based on your specific situation. These tests may include:

* Nasal endoscopy. During this procedure, a healthcare provider will use a thin, flexible tube with a tiny light and camera to look at the inside of your nasal passages and sinuses.
* Blood tests. Your provider may take a small sample of your blood, then test it in a lab for signs of cancer.
* Imaging tests. These tests may include X-rays, MRI (magnetic resonance imaging) or CT (computed tomography) scans.
* Biopsy. During this procedure, a healthcare provider takes a small sample of tissue from the tumor. Then, they’ll send the tissue sample to a lab for analysis.

**TREATMENT OPTIONS**

First, a healthcare provider will perform a physical examination and ask you about your symptoms in detail. Next, they’ll recommend testing based on your specific situation. These tests may include:

* Nasal endoscopy. During this procedure, a healthcare provider will use a thin, flexible tube with a tiny light and camera to look at the inside of your nasal passages and sinuses.
* Blood tests. Your provider may take a small sample of your blood, then test it in a lab for signs of cancer.
* Imaging tests. These tests may include X-rays, MRI (magnetic resonance imaging) or CT (computed tomography) scans.
* Biopsy. During this procedure, a healthcare provider takes a small sample of tissue from the tumor. Then, they’ll send the tissue sample to a lab for analysis.

**PREVENTION TIPS**

There’s no way to prevent nose tumors altogether. But you can reduce your risk by avoiding risk factors like smoking and inhaling harmful fumes. If you work in an environment with harmful chemicals or substances, be sure to follow proper precautionary measures and wear appropriate protective equipment.

**OUTLOOK / PROGNOSIS**

If you have a noncancerous nose tumor, then your provider will likely recommend surgery to remove it. Noncancerous nose tumors generally aren’t life-threatening.

If you have a cancerous nose tumor, your healthcare provider will design a treatment plan tailored to your specific needs. This may include surgery, radiation therapy, chemotherapy or a combination of treatments.

### **Are nasal and paranasal tumors curable?**

Many cancerous nose tumors are curable, especially if detected early. Like most types of cancer, the longer a nasal tumor goes undetected, the more likely it is to grow and spread.

#### **Nasal and paranasal cancer survival rates**

The five-year survival rates for nose tumors vary depending on how far the cancer has spread:

* If the tumor is only inside your nasal cavity or paranasal sinus, the five-year survival rate is 82%. That means 82% of people with this type of tumor are alive five years after their diagnosis.
* If the cancer spreads to nearby structures or lymph nodes, the five-year survival rate is 52%. That means 52% of people with this type of tumor are alive five years after their diagnosis.
* If the cancer spreads to distant areas of your body, the five-year survival rate is 42%. That means 42% of people with this type of tumor are alive five years after their diagnosis.

But it’s important to remember that survival rates are estimates. They can’t tell you how long you’ll live or how effective treatment will be for you. If you have specific questions about cancer survival rates and your specific situation, talk to your healthcare provider.

**WHEN TO SEE A DOCTOR / RED FLAG**

Schedule an appointment with your healthcare provider if you develop nose tumor symptoms, such as frequent nosebleeds, lack of sense of smell or nasal congestion that doesn’t go away.

**DIFFERENTIAL DIAGNOSIS**

## Malignant Tumors

* Squamous Cell Carcinoma (SCC) — most common malignant tumor of nasal cavity and sinuses.
* Adenocarcinoma — especially associated with wood dust exposure.
* Esthesioneuroblastoma (Olfactory Neuroblastoma) — arises from olfactory epithelium.
* Rhabdomyosarcoma — common in pediatric nasal/sinus malignancies.
* Chondrosarcoma — cartilage tumor, can occur in sinonasal region.
* Ewing Sarcoma
* Fibrosarcoma
* Lymphoma — including non-Hodgkin lymphoma.
* Malignant melanoma — mucosal type in nasal cavity.
* Adenoid cystic carcinoma — tends to involve perineural spread.
* Neuroblastoma — rare in this region.
* Granulocytic sarcoma

## Benign Tumors and Tumor-like Lesions

* Inverted Papilloma — benign but locally aggressive sinonasal tumor with malignant potential.
* Solitary Fibrous Tumor — rare spindle-cell mesenchymal tumor occasionally found in nasal cavity and sinuses.
* Hemangioma and Hemangiopericytoma — vascular tumors.
* Fibrous Histiocytoma (benign fibrous histiocytoma)
* Lymphangioma
* Neurofibroma
* Osteoma, osteochondroma, ossifying osteofibroma — benign bone/cartilage tumors.
* Ameloblastic fibro-odontoma
* Giant cell granuloma
* Blue nevus, compound nevus, Spitz nevus, xanthogranuloma — melanocytic or histiocytic lesions.
* Epithelioma adenoides cysticum

## Others (Non-neoplastic Masses/Conditions)

* Antrochoanal polyp — benign nasal polyp with characteristic unilateral presentation.
* Inflammatory nasal polyp — common, usually bilateral, may mimic mass.
* Granulomatosis with polyangiitis (formerly Wegener’s granulomatosis) — granulomatous inflammation causing mass effect.
* Langerhans cell histiocytosis
* Port wine stain — vascular malformation that can appear as a mass.
* Infective or inflammatory masses including fungal infections.

**EPIDEMIOLOGY**

* Incidence and prevalence:  
  Nasal cavity and paranasal sinus tumors are rare, comprising about 3% to 5% of all head and neck cancers in the United States. Global incidence rates vary but generally remain low, around 0.3 cases per 100,000 population annually. These tumors represent roughly 0.2% of all registered cancers.
* Age and sex distribution:  
  The median age of diagnosis typically falls around 50 years (range approximately 21 to 88 years), with a higher occurrence in the 5th and 6th decades of life.  
  Males are more commonly affected than females, with a male-to-female ratio approximately 1.6:1 to 1.7:1. Men are about twice as likely to develop these cancers as women, especially in Western populations.
* Histologic types:  
  The most common histological subtype is squamous cell carcinoma (SCC), accounting for approximately 40-60% of cases. Other malignancies include adenoid cystic carcinoma, melanoma, lymphoma, esthesioneuroblastoma, and sarcomas.
* Geographic and racial factors:  
  White populations in the US have higher incidence rates compared to Black populations. Certain countries like Denmark report relatively higher rates of nasal and paranasal sinus cancers. Incidence appears stable over recent decades in European populations.
* Presentation and stage at diagnosis:  
  Most patients present with advanced-stage disease (stage T3 or T4), often with lymph node involvement seen in approximately 40% of squamous cell carcinoma cases. This late presentation contributes to prognosis challenges.
* Survival statistics:
  + The 5-year relative survival rates depend heavily on stage:
    - Localized disease: about 85% survive 5 years or more
    - Regional spread: around 50-55% 5-year survival
    - Distant metastasis: roughly 45% 5-year survival
  + In Europe, approximately 50% of patients survive beyond 5 years after diagnosis.
  + Survival is negatively affected by nodal metastasis and distant spread, while radiotherapy improves outcomes.
* Gender, age, and histology impact prognosis:  
  Older age and positive lymph nodes at diagnosis correlate with worse survival. SCC subtype, the most prevalent, generally has a poorer prognosis than other rarer histologies.

**PREDEFINED Q & A SETS**

Is the tumor cancerous or noncancerous?  
Your doctor will determine this after biopsies and imaging studies. Most nasal tumors are malignant (cancerous) but some can be benign. Pathology tests on tissue samples confirm this.

Where is the tumor located?  
The tumor can be in the nasal cavity or the paranasal sinuses (nearby air-filled spaces). The exact location affects treatment decisions.

How big is the tumor?  
Imaging tests like CT or MRI will help measure the tumor size. This affects the choice and extent of treatment.

Has it spread?  
If the tumor has spread to lymph nodes or beyond, additional procedures like neck dissection (removal of lymph nodes) may be needed. Imaging and sometimes surgery assess this.

What kind of treatment do you recommend?  
Treatment usually involves surgery to remove the tumor followed by radiation therapy to eliminate leftover cancer cells. Chemotherapy may be used, especially if the tumor is advanced or has spread. Some cases may involve targeted therapies or participation in clinical trials.

How long will treatment take?  
Treatment length depends on tumor size, location, and whether combination therapies are used. Surgery may be a day or two in hospital, radiation therapy can take several weeks, and chemotherapy schedules vary based on protocols.

How often will I need to come in for treatment?  
Surgery is usually a short hospital stay, while radiation therapy often requires daily visits for several weeks. Chemotherapy may be administered every few weeks depending on the regimen. Your care team will provide a detailed schedule.

Will I be able to work or go to school while I undergo treatment?  
Many patients can maintain some activities during treatment, but this varies. Surgery recovery and side effects of radiation or chemotherapy can cause fatigue or other symptoms that might limit your ability to work or attend school. Your team will help manage side effects and plan accordingly.

### **What does a tumor in your nose feel like?**

In the early stages, nose tumor symptoms are similar to symptoms of the common cold. As the condition progresses, you may develop nasal congestion on one side that doesn’t go away. Other possible symptoms include nosebleeds, facial pain and loss of sense of smell. If you have chronic nasal or sinus blockage or any related symptoms, schedule an appointment with a healthcare provider.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning. Thank you for coming in. As we discussed, the recent tests confirm you have a tumor in your nasal cavity. I understand this is a lot to take in, and I want to go over what this means and answer any questions you have.

Patient: Thank you, Doctor. I’m just so overwhelmed. First, is it cancerous or noncancerous?

Doctor: Based on the biopsy results, it is a malignant tumor, specifically a squamous cell carcinoma. This means it is cancerous.

Patient: Oh. Okay. And where exactly is it located?

Doctor: Your MRI and CT scans show the tumor is located in your right nasal cavity, extending slightly into the adjacent ethmoid sinus. Its size is about 2.5 centimeters.

Patient: Has it spread anywhere else?

Doctor: We’ve done scans of your neck and body to check for spread. At this moment, we don't see any signs that it has spread to your lymph nodes or other distant parts of your body. However, these tumors can spread locally, so our treatment plan will address that.

Patient: What kind of treatment do you recommend?

Doctor: Given the tumor type and location, the recommended primary treatment is surgery to remove the tumor. Following surgery, we will likely recommend radiation therapy to eliminate any remaining cancer cells and reduce the risk of recurrence. Sometimes, chemotherapy is also used, especially for more advanced cases, but for now, surgery followed by radiation is our primary plan.

Patient: How long will all of this take?

Doctor: The surgical procedure itself is usually a single event, requiring a few days in the hospital. After you recover from surgery, which typically takes a few weeks, radiation therapy would begin. Radiation usually involves daily sessions, five days a week, for about six to seven weeks. So, the entire active treatment phase could span approximately two to three months.

Patient: And how often will I need to come in for treatment during that time?

Doctor: For radiation, you would come to the hospital every weekday for your treatment sessions. These sessions are generally quick, lasting only a few minutes each, but the overall process including setup can take longer. After surgery, we'll have follow-up appointments to monitor your recovery.

Patient: Will I be able to work or go to school while I undergo treatment?

Doctor: That's an excellent question, and it really varies from person to person. After surgery, you'll need time off to recover. During radiation therapy, many people continue to work or attend school, but it depends on the nature of your job or studies and how you tolerate the treatment. Side effects like fatigue can be common. We will monitor your symptoms closely and adjust as needed, and our team, which includes dietitians and rehabilitation specialists, can help manage any side effects. We can discuss options for flexible work or school arrangements if necessary.

Patient: Okay. This is a lot to process, but I appreciate you explaining everything clearly.

Doctor: Of course. We understand it's a challenging time. You'll be cared for by a multidisciplinary team, including a head and neck surgeon, a radiation oncologist, and potentially other specialists. We are here to support you through every step of this journey. Please don't hesitate to write down any other questions that come to mind.

REFERENCES:

<https://www.cancer.org/cancer/types/nasal-cavity-and-paranasal-sinus-cancer/treating.html>

<https://www.mayoclinic.org/diseases-conditions/nasal-paranasal-tumors/diagnosis-treatment/drc-20354137>

<https://my.clevelandclinic.org/health/diseases/24927-nasal-tumors>

**Juvenile nasopharyngeal angiofibroma**

**DEFINITION / DESCRIPTION**

Juvenile nasopharyngeal angiofibroma (JNA) is a rare, noncancerous tumor that grows behind your nose. It’s a vascular growth, which means it’s mostly filled with blood vessels.

Breaking down the condition’s name is the best way to understand it:

* “Juvenile” means young person.
* “Nasopharyngeal” refers to the areas around your nose and throat.
* “Angiofibroma” refers to a noncancerous tumor that’s made of blood vessels and connective tissue.

JNA isn’t cancerous. But it’s still serious and aggressive. Nasopharyngeal angiofibroma can spread from your nasal cavity into your sinuses, skull and brain. Without treatment, JNA may lead to life-threatening complications or death. That’s why it’s so important to tell a healthcare provider if something doesn’t seem right. The good news is that treatment can help get rid of the tumor.

Juvenile angiofibroma is most common in males between the ages of 10 and 25. Very rarely, it may occur in males over 25 or as young as 7. JNA almost never affects females.

Nasopharyngeal angiofibroma is very rare. Experts estimate it occurs in 1 in every 150,000 to 1,500,000 people.

**CAUSES**

Researchers don’t fully understand what causes juvenile nasopharyngeal angiofibroma. Because these tumors occur almost exclusively in males, hormones likely play a role. Experts don’t believe JNA tumors run in families.

**RISK FACTORS**

There aren’t a lot of clear-cut risk factors for JNA. Even though the condition isn’t hereditary, you’re more likely to develop JNA if one of your biological family members has another condition called familial adenomatous polyposis (FAP). Experts continue to explore the relationship between these two conditions.

**SIGNS / SYMPTOMS**

JNA symptoms aren’t immediate. They often start once the tumor grows large enough to interfere with nasal airflow. Juvenile nasopharyngeal angiofibroma symptoms may include:

* Frequent nosebleeds that can be difficult to stop
* Trouble breathing through your nose
* Facial swelling
* Headaches
* Vision or hearing changes

**DIAGNOSIS METHODS**

A healthcare provider can diagnose JNA during an examination. They’ll look at your nose and ask about your symptoms. They’ll likely need to run tests, which may include:

* Imaging tests, like CT scans, PET scans or an MRI
* Nasal endoscopy

They may also refer you to an otolaryngologist (ENT) to run more tests or confirm the diagnosis.

**TREATMENT OPTIONS**

Healthcare providers use surgery and radiation therapy to treat JNA.

#### **Surgery**

Surgical removal of the tumor is the go-to JNA treatment. A surgeon uses an endoscope (a thin tube with a camera) to do the procedure through your nostrils. That way, they can avoid making cuts (incisions) on the outside of your nose.

In some cases, surgeons might need to make external incisions. If that happens, they’ll make them as small as possible to minimize scarring.

As your nose contains so many blood vessels, providers usually do a procedure called embolization beforehand. Embolization helps prevent blood loss during surgery.

#### **Radiation therapy**

It can be hard for surgeons to remove tissue that’s grown into surrounding bone and/or sinuses. If tiny bits of tissue are left behind, the tumor may come back. If that happens, your surgeon might recommend repeat surgery or radiation therapy.

According to some research studies, JNA comes back in up to 37% of cases.

**JNA (Juvenile Nasopharyngeal Angiofibroma) Treatment: Drug Information and Side Effects**

Juvenile Nasopharyngeal Angiofibroma is primarily managed by surgery and sometimes preoperative embolization. Drug therapy is limited but may include the following approaches:

## 1. Preoperative Embolization

* Not a drug per se but a vascular interventional procedure that reduces tumor blood supply before surgery, lowering the risk of bleeding during resection.

## 2. Hormonal Therapy (Limited Use)

* Some reports suggest hormonal treatments such as anti-androgens or GnRH analogs (e.g., leuprolide) may help shrink or stabilize these androgen-sensitive tumors.
* These are not standard and used in select cases, often to reduce tumor size or delay surgery.

Possible side effects of hormonal agents:

* Hot flashes, mood changes
* Decreased libido
* Bone density loss
* Injection site reactions

## 3. Radiotherapy

* Used in unresectable or recurrent cases.
* Although not a drug, radiation is a therapeutic modality with side effects such as mucositis, skin changes, taste changes, and long-term risks like secondary malignancy.

## 4. Chemotherapy

* Chemotherapy is not routinely used in JNA as it is a benign but locally aggressive tumor.

**OUTLOOK / PROGNOSIS**

JNA has a high survival rate. The outlook is good with treatment.

Because JNA can come back, there’s a chance you might need radiation therapy or an additional surgery in the future. Your healthcare provider can check in with you periodically and recommend treatment if necessary.

**POSSIBLE COMPLICATIONS**

If JNA grows, it can press on surrounding facial structures and cause complications like:

* Bulging eyes
* Vision loss

**WHEN TO SEE A DOCTOR / RED FLAG**

Keep an eye on sudden symptoms like nasal stuffiness or frequent nosebleeds. You know your body better than anyone else. Be sure to tell a healthcare provider when something doesn’t seem right to you.

**DIFFERENTIAL DIAGNOSIS**

## 1. Juvenile Nasopharyngeal Angiofibroma (JNA)

* A benign but locally aggressive vascular tumor almost exclusively affecting adolescent males.
* Presents with nasal obstruction, recurrent epistaxis, and sometimes facial swelling.

## 2. Nasopharyngeal Carcinoma (NPC)

* A malignant epithelial tumor, sometimes associated with Epstein-Barr virus (EBV) infection.
* Presents with nasal obstruction, epistaxis, cervical lymphadenopathy, hearing loss, or cranial nerve palsies.
* Rare in children but important to differentiate from JNA.

## 3. Rhabdomyosarcoma

* A malignant soft tissue tumor common in pediatric populations.
* Can present as a rapidly enlarging nasopharyngeal or sinonasal mass.
* Often associated with pain and facial asymmetry.

## 4. Lymphoma

* Non-Hodgkin lymphoma may involve the nasopharynx.
* Often presents with systemic symptoms (fever, weight loss) and lymphadenopathy.

## 5. Other Vascular Lesions

* Hemangioma or hemangiopericytoma.
* Differentiated by imaging and histology.

## 6. Benign Tumors and Tumor-like Lesions

* Inverted papilloma, juvenile fibroma, fibrous histiocytoma.
* Rare in adolescents but may be included in the DDx.

## 7. Inflammatory or Infectious Masses

* Chronic granulomatous diseases (e.g., tuberculosis, Wegener’s granulomatosis).
* Fungal infections or abscesses.

**EPIDEMIOLOGY**

* Incidence and Prevalence:  
  JNA is a rare benign vascular tumor, accounting for about 0.5% of all head and neck tumors. It primarily affects adolescent males.
* Age:  
  The average age of presentation is between 14 and 25 years old, with most cases occurring in adolescence — commonly around 14 to 17 years. Cases in children under 10 years are very rare (less than 10% of total cases).
* Gender:  
  There is a strong male predominance — over 90% of cases occur in males, likely due to the tumor’s androgen-dependent nature. JNA in females is extremely rare, with only a handful of reported cases mostly in adolescent or postmenopausal females.
* Pathophysiology:  
  The tumor originates near the sphenopalatine foramen and is thought to grow in response to endogenous androgen hormones during puberty, coinciding with rising testosterone levels. This androgen sensitivity explains the strong male predilection.
* Presentation and Stage at Diagnosis:  
  Most patients present with nasal obstruction and recurrent epistaxis, and often present in advanced stages (Chandler’s Stage III or IV in more than 70% in some series). Late presentation is common especially in regions with limited healthcare access.
* Geographic & Demographic Notes:  
  JNA cases have been reported globally, with no strong racial predilection noted, but most published cohorts are from tertiary referral centers.

**PREDEFINED Q & A SETS**

## What is Juvenile Nasopharyngeal Angiofibroma (JNA)?

JNA is a rare, benign but locally aggressive vascular tumor that arises from the nasopharynx, typically near the sphenopalatine foramen, located behind the nasal cavity. It is characterized by abnormal proliferation of blood vessels and fibrous tissue. Despite being noncancerous, it can invade surrounding structures and cause significant symptoms.

## Who is affected by JNA?

JNA occurs almost exclusively in adolescent males aged roughly 10 to 25 years, with a peak incidence around 14 to 17 years. It is extremely rare in females and older adults. The tumor is thought to be androgen-dependent, which explains this strong male predominance during puberty.

## How common is JNA?

JNA is very rare, occurring in approximately 1 in every 150,000 to 1,500,000 people. It accounts for about 0.5% of all head and neck tumors.

## What causes JNA?

The exact cause of JNA is unknown. Hormonal influences, especially androgens during puberty, are believed to play a key role. Other theories propose that JNA may originate from remnants of embryological vessels or branchial arch tissue, with some studies investigating genetic factors and possible viral contributions.

## What symptoms does JNA cause?

Symptoms generally start once the tumor grows large enough to block nasal airflow or press on adjacent structures. Common symptoms include:

* Recurrent unilateral nosebleeds (epistaxis)
* Progressive nasal obstruction
* Facial swelling or fullness
* Headaches or facial pain
* Decreased sense of smell
* Hearing difficulties if the eustachian tube is obstructed

## **How is JNA diagnosed?**

Diagnosis involves a combination of:

* Clinical examination focusing on nasal obstruction and bleeding
* Imaging studies such as CT and MRI scans to assess tumor size, vascularity, and extent, including possible invasion into sinuses or skull base
* Angiography for detailed vascular mapping and often to perform preoperative embolization
* Biopsy is generally avoided due to high risk of severe bleeding

## **What is the treatment for JNA?**

The mainstay of treatment is surgical removal of the tumor. To minimize intraoperative bleeding, preoperative embolization of tumor blood vessels is often performed. In cases where surgery is not feasible or for residual/recurrent tumors, radiation therapy may be considered.

## **Can JNA recur?**

Yes, JNA has a high recurrence rate, reported up to 57% in some series, especially if the tumor is large or extends into difficult areas like the skull base. Lifelong follow-up is often recommended.

## **What is the prognosis?**

JNA has a good survival rate since it is benign, but morbidity may result from local invasion, repeated bleeding, and recurrence. Early diagnosis and complete tumor removal improve outcomes.

## **Staging**

Different staging systems exist for nasopharyngeal angiofibroma. The 2 most commonly used are those of Sessions and Fisch.

* Classification according to Sessions
  + Stage IA - Tumor limited to posterior nares and/or nasopharyngeal vault
  + Stage IB - Tumor involving posterior nares and/or nasopharyngeal vault with involvement of at least 1 paranasal sinus
  + Stage IIA - Minimal lateral extension into pterygomaxillary fossa
  + Stage IIB - Full occupation of pterygomaxillary fossa with or without superior erosion of orbital bones
  + Stage IIIA - Erosion of skull base (ie, middle cranial fossa/pterygoid base); minimal intracranial extension
  + Stage IIIB - Extensive intracranial extension with or without extension into cavernous sinus
* Classification according to Fisch
  + Stage I - Tumors limited to nasal cavity, nasopharynx with no bony destruction
  + Stage II - Tumors invading pterygomaxillary fossa, paranasal sinuses with bony destruction
  + Stage III - Tumors invading infratemporal fossa, orbit and/or parasellar region remaining lateral to cavernous sinus
  + Stage IV - Tumors invading cavernous sinus, optic chiasmal region, and/or pituitary fossa

**GENOMIC DATA**

## 1. Genetic Pathways Implicated

* APC/β-Catenin Pathway:  
  JNA shows a strong association with alterations in the adenomatous polyposis coli (APC) gene and the β-catenin gene pathway.
  + Studies found a high frequency of recurrent β-catenin gene mutations in sporadic JNA samples.
  + Although germline APC mutations are rare in JNA, somatic mutations in APC have been identified in some cases, notably in familial adenomatous polyposis (FAP) patients who develop JNA. This suggests that the tumorigenesis may involve APC/β-catenin signaling dysregulation.
* Wnt Signaling Pathway Alterations:  
  β-Catenin is a critical mediator of Wnt signaling, which regulates cell proliferation and differentiation. Its mutation contributes to abnormal cellular growth in JNA.

## 2. Sex Chromosome and Hormonal Influences

* Genetic analyses revealed mutations concentrated in protein-coding genes on the male-specific region of the Y chromosome.
* Top mutations affect genes like USP9Y, UTY, KDM5D, DDX3Y, and TSPY4, which may relate to the exclusive male predilection of JNA.
* The tumor expresses multiple sex hormone receptors (androgen and estrogen receptors), supporting its androgen-dependent growth, but its exact genetic regulation remains complex and partially understood.

## 3. Growth Factors and Molecular Markers

* Overexpression of growth factors such as insulin-like growth factor II (IGF-II), vascular endothelial growth factor (VEGF), and transforming growth factor beta (TGF-β) has been observed in tumor stromal cells, contributing to vascularization and tumor expansion. Though these are not strictly genomic mutations, their regulation may be influenced by genetic changes.

## 4. Familial Cases

* JNA occurrence is increased in males with Familial Adenomatous Polyposis (FAP), a hereditary cancer syndrome related to APC mutations, further strengthening the link between APC gene alterations and JNA development.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, thank you for coming in today. I want to discuss the results of your evaluation. You have a condition called Juvenile Nasopharyngeal Angiofibroma, or JNA for short. Have you heard of this before?

Patient / Parent: No, I haven’t. What exactly is it?

Doctor: JNA is a benign, which means noncancerous, but locally aggressive tumor that grows at the back of the nasal cavity, near where the nose meets the throat. It typically occurs in adolescent males like yourself, mostly between ages 10 and 25.

Patient / Parent: Is it dangerous?

Doctor: While it’s not cancerous, it can grow quite large and cause symptoms like nasal blockage and repeated nosebleeds because the tumor is very rich in blood vessels. If it grows unchecked, it can sometimes extend into nearby areas like the sinuses, eye socket, or even the skull base, leading to more serious problems.

Patient / Parent: How do you know it’s JNA and not something else?

Doctor: We use imaging tests like CT and MRI scans to see the size and location of the tumor and how much it involves nearby areas. The tumor’s location, vascular nature, and the typical symptoms help us distinguish it. Because these tumors bleed a lot, we avoid biopsies to prevent heavy bleeding.

Patient / Parent: What are the treatment options?

Doctor: Surgery is the main treatment, where we remove the tumor completely. Before surgery, we usually perform a procedure called embolization that blocks the tumor’s blood supply to reduce bleeding during surgery. In cases where surgery isn’t possible or if the tumor returns, radiation therapy might be an option.

Patient / Parent: Is the surgery risky? What about recovery?

Doctor: Modern surgical techniques and preoperative embolization have made surgery much safer, but because of the tumor’s blood supply and location, there is some risk of bleeding. Recovery usually takes a few weeks. We have a specialized team to support you through surgery and afterwards.

Patient / Parent: Can this tumor come back?

Doctor: Yes, JNA has a risk of recurrence, especially with large or more invasive tumors. That’s why lifelong follow-up with periodic imaging is important to catch any regrowth early.

Patient / Parent: What causes it to happen? Is it genetic?

Doctor: The exact cause is not well understood, but it is strongly linked to male hormones, which is why it almost exclusively affects young males. Genetic causes haven’t been clearly identified yet.

Patient / Parent: Will this affect my daily life or school?

Doctor: Many patients continue their normal activities before surgery, but symptoms like nasal blockage or nosebleeds can be troublesome. After surgery and recovery, most can return to their routine, and we’ll help manage any side effects or complications.

Patient / Parent: Thank you for explaining all this. What should we do next?

Doctor: Next, we’ll schedule your embolization and surgery. We’ll also plan follow-up appointments closely to monitor your recovery. Please don’t hesitate to call if you have any new symptoms like heavy bleeding or severe headaches.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK545240/>

<https://www.cancer.gov/types/head-and-neck/patient/child/nasopharyngeal-treatment-pdq>

<https://emedicine.medscape.com/article/988165-differential>

<https://emedicine.medscape.com/article/872580-workup#c7>

[Juvenile Nasopharyngeal Angiofibroma (JNA)](https://my.clevelandclinic.org/health/diseases/21152-juvenile-nasopharyngeal-angiofibroma-jna#what-is-juvenile-nasopharyngeal-angiofibroma-jna)

**Jaw tumors and cysts**

**DEFINITION / DESCRIPTION**

Jaw cysts and tumors are growths that can form from bone (including teeth) and soft tissue in your mouth. A jaw cyst is a sac of fluid or semi-liquid material. A jaw tumor is a solid mass that forms when abnormal cells clump together. Both growths are usually benign (noncancerous). This means that, although they may grow and impact tissue in your face and mouth, they usually don’t spread to other parts of your body.

In rare instances, jaw cysts or tumors are malignant (cancerous). Healthcare providers refer to them as jaw cancer. Without treatment, malignant jaw cysts and tumors can spread to body parts other than your jaw.

It’s essential to get any new growth in your jaw or mouth checked. Even if a tumor or cyst is benign, some types can still hurt and damage your jaw or displace teeth.

#### **Types of jaw cysts and tumors**

There are several types of jaw cysts and tumors. Providers classify them based on whether they’re benign or malignant. They also consider whether they start in tissue involved in tooth development (odontogenic cysts and tumors) or from other tissue (nonodontogenic cysts and tumors).

The most common types of benign jaw cysts and tumors include:

* Ameloblastoma: A slow-growing odontogenic tumor that usually forms in your lower jaw near your back teeth (molars). It’s usually benign, but some forms of ameloblastoma may become malignant over time. Even benign tumors can grow big enough to change the structure of your jaw or damage your teeth.
* Central giant cell granuloma: The most common benign non-odontogenic tumor. It usually forms in the front part of your lower jaw, but it can also develop in your upper jaw. Most tumors only cause painless swelling in your jaw. But fast-growing tumors can cause painful swelling and displace teeth.
* Dentigerous cysts: The second most common odontogenic cyst. They’re slow-growing cysts that form around the tissue of teeth that haven’t pushed into your mouth (erupted) yet. They usually form near your back teeth (molars). Sometimes, they appear near the teeth on either side of your upper front teeth (upper canines).
* Odontogenic keratocysts: Slow-growing cysts that usually form near your molars. Smaller keratocysts aren’t usually painful, but large cysts can cause painful swelling. These cysts may be a sign of an inherited condition called Gorlin syndrome. This condition increases your risk of odontogenic keratocysts and some forms of skin cancer.
* Odontogenic myxoma (myxofibroma): A benign, slow-growing tumor. But these tumors can grow big enough to damage your jaw and displace your teeth.
* Odontoma: The most common benign odontogenic tumor. One type usually forms in your lower jaw and contains multiple tooth-like structures (compound type). The other type usually forms in your upper jaw and contains unusual masses that don’t resemble teeth (complex type).
* Periapical cysts: The most common type of jaw cyst. They form when there’s an injury to a tooth that causes inflammation.

Malignant jaw cysts and tumors include rare forms of:

* Carcinoma: Cancer that starts in the tissue lining your organs, internal passageways and skin.
* Sarcoma: Cancer that starts in bone or surrounding soft tissue.
* Carcinosarcoma: Cancer that’s a mix of both carcinoma and sarcoma.

Jaw cysts and tumors are uncommon, and malignant types are especially rare.

Research shows that people in some regions may be more likely to develop them than in other areas. For example, odontogenic tumors account for just 1% of atypical oral (mouth) growths in North America but nearly 20% in some African countries.

**CAUSES**

Most jaw cysts and tumors form when the cells that eventually form teeth behave abnormally and form masses (tumors) or fluid-filled sacs instead. This is what happens with odontogenic growths. But the cells don’t have to be involved in tooth formation to grow abnormally.

Odd cell growth often happens because of DNA changes (genetic mutations). DNA contains the instructions, or code, that tell cells how to grow, including when to stop. Problems with the code can disrupt cell division processes and cause overgrowths.

For example, people with Gorlin syndrome (nevoid basal cell carcinoma syndrome) have mutations that cause cells to continue multiplying and dividing when they shouldn’t. As a result, people with the condition often get multiple odontogenic keratocysts and are at increased risk of basal cell carcinoma, the most common skin cancer.

**SIGNS / SYMPTOMS**

Most cysts and tumors are slow-growing and don’t cause symptoms. You may not know you have one until they show up incidentally on a dental X-ray or another imaging test related to a head and neck issue.

But large growths that start to take the place of nearby healthy tissue can cause symptoms, including:

* Jaw pain, tenderness or numbness.
* Swelling (may or may not be painless).
* Changes in the way your face looks.
* A new lump on your jawbone (may be hard or soft).
* Changing bite.
* Loose teeth.

**DIAGNOSIS METHODS**

Your healthcare provider will review your symptoms and medical history and perform a physical exam. Imaging tests can show tumors or cysts in and around your jaw. They include:

* X-rays.
* Magnetic resonance imaging (MRI).
* Computed tomography (CT) scan.

You’ll also need a biopsy. During a biopsy, a provider removes a sample of fluid or tissue from the growth. A pathologist examines the sample under a microscope to determine the type of cells it contains. This information tells your provider:

* What type of cyst or tumor you have.
* Whether it’s benign or malignant.
* Whether it’s slow-growing or aggressive.

All these factors help your provider determine the best treatment options.

**TREATMENT OPTIONS**

Most people need surgery to remove the cyst or tumor. In addition to removing the growth, your surgeon may also remove any affected tissue. This includes damaged teeth or parts of your lower or upper jaw. Surgery to remove segments of the lower part of your jaw is called a mandibulectomy. Surgery that removes all or part of your upper jaw is called maxillectomy.

Following surgery, you may need treatments to rebuild your jaw and help with recovery, including:

* Reconstructive surgery: Your provider may remove a segment of bone from another part of your body (like your hip, shoulder blade or lower leg) to make your jaw look like it did before you had a growth.
* Dental implants: You may need artificial teeth to replace the ones that your provider pulled.
* Speech therapy: A speech-language pathologist (SLP) can help improve your speaking if you’re having trouble talking and being understood after surgery.
* Nutrition guidance: You may need to meet with a nutrition specialist, like a dietitian or nutritionist, who can advise you on what foods you can safely eat as you heal.

If you have jaw cancer, your healthcare provider may also recommend cancer treatments, including radiation therapy and/or chemotherapy. The best treatment for you depends on the type of tumor or cyst.

## 1. **Medications Used in Jaw Tumors and Cysts**

## a) Denosumab

* Indications:  
  Used for aggressive benign tumors such as giant cell tumor of bone, aneurysmal bone cysts, and symptomatic fibrous dysplasia involving the jaw. It helps reduce tumor size, pain, and bone destruction by inhibiting osteoclast activity.
* Mechanism:  
  Denosumab is a monoclonal antibody against RANKL, a key factor in osteoclast formation and function.
* Administration:  
  Subcutaneous injection, dosing varies but often every 3 months or as directed.
* Side Effects:
  + Hypocalcemia (low blood calcium) — requires calcium and vitamin D supplementation
  + Rebound hypercalcemia after discontinuation
  + Arthralgia (joint pain), fatigue
  + Rarely, osteonecrosis of the jaw (no cases reported in reviewed series but a theoretical risk)

## b) Steroids (Corticosteroids)

* Indications:  
  Sometimes used as injection into cystic lesions or systemically to reduce inflammation or size of certain jaw cysts or tumors. Oral or topical steroids may also be applied in selected cases.
* Side Effects:
  + Systemic steroids may cause weight gain, mood changes, high blood sugar, hypertension, osteoporosis if prolonged use
  + Local injection risks include tissue thinning or infection

## c) Propranolol

* Indications:  
  Used off-label primarily for vascular tumors and cysts with a vascular component, sometimes applied in jaw cysts/tumors with similar characteristics to reduce size and vascularity.
* Side Effects:
  + Fatigue, dizziness, low blood pressure, bradycardia

## d) Chemotherapy and Targeted Agents

* Mostly used for malignant jaw tumors, not benign cysts. Examples include agents for ameloblastic carcinoma or osteosarcoma.
* Imatinib (Tyrosine kinase inhibitor) has limited use reported for some benign jaw tumors like odontogenic myxoma expressing PDGF receptor; data is very limited.
* Side effects are drug-specific — generally include nausea, fatigue, cytopenias, or more severe organ toxicities depending on agents used.

## 2. Surgical and Adjunctive Therapies

* Surgery is the mainstay for almost all jaw tumors and cysts, with or without drug therapy.
* Pre- and post-operative drug therapies may include antibiotics, analgesics, and anti-inflammatory agents to manage infection and pain.
* Bone grafting or synthetic bone substitutes may be used post-surgery to rebuild jaw defects.

**OUTLOOK / PROGNOSIS**

Surgery can cure most jaw cysts and tumors. Depending on the type, you may need follow-up visits to monitor new growths.

For example, periapical cysts, odontomas and dentigerous cysts don’t usually grow back (recur) after surgery. But central giant cell granuloma, odontogenic myxoma and odontogenic keratocysts often do. Ameloblastoma recurs in up to 20% of people.

**WHEN TO SEE A DOCTOR / RED FLAG**

See your healthcare provider if you’re experiencing pain or swelling in your jaw or if you notice a change in your appearance, like a lump on your jaw or shifting teeth. It may be a sign of a cyst, tumor or a separate dental condition your provider can treat.

It’s especially important to visit your dentist regularly. A routine dental X-ray can show signs of a cyst or tumor when it’s still small and isn’t causing symptoms.

**DIFFERENTIAL DIAGNOSIS**

1. Periapical (Radicular) Cyst
   * Most common reactive cyst related to non-vital teeth.
2. Dentigerous Cyst
   * Developmental cyst surrounding the crown of an unerupted tooth.
3. Odontogenic Keratocyst (OKC)
   * Aggressive cystic lesion with high recurrence; may be associated with nevoid basal cell carcinoma syndrome.
4. Unicystic Ameloblastoma
   * Cystic variant of ameloblastoma; locally aggressive odontogenic tumor.
5. Glandular Odontogenic Cyst
   * Rare, locally aggressive odontogenic cyst with gland-like features.
6. Traumatic (Simple) Bone Cyst
   * Not a true cyst but an empty or fluid-filled bone cavity often discovered incidentally.
7. Solid Ameloblastoma
   * Benign but locally aggressive odontogenic tumor, often multilocular.
8. Central Giant Cell Granuloma
   * Reactive lesion, potentially aggressive, often in anterior mandible.
9. Odontogenic Myxoma
   * Benign tumor with gelatinous stroma, can be multilocular and recur.
10. Fibrous Dysplasia
    * Fibro-osseous lesion causing bone expansion, usually with “ground-glass” radiographic appearance.
11. Osteoma / Osteoblastoma
    * Benign bone-forming tumors; osteoblastoma can be painful.
12. Squamous Cell Carcinoma of the Jaw
    * Rare primary malignant tumor of jaw bones, requiring aggressive treatment.

## Other Lesions to Consider

* Langerhans Cell Histiocytosis
* Central Ossifying Fibroma
* Metastatic Lesions to the Jaw
* Surgical ciliated cyst
* Adenoid ameloblastoma (rare distinct tumor variant)

**EPIDEMIOLOGY**

* Overall frequency:  
  In large biopsy-based studies, jaw cysts and odontogenic tumors represent a significant portion of oral and maxillofacial lesions. For example, in a Chilean population study of 22,914 biopsies over nearly 40 years, 18.4% were cysts and 2.4% were odontogenic tumors.
* Age distribution:  
  Patients ranged widely, from 2 to 97 years old, but the majority of jaw cysts and tumors occur in young adults, mostly in the second to fourth decades of life (20–40 years). Some cysts, like dentigerous cysts, tend to present during the period of third molar eruption (late teens to early 20s).  
  The mean ages for specific lesions often cluster as follows: radicular cysts (~39 years), dentigerous cysts (~34 years), odontogenic keratocysts (~38 years), but vary with the population studied.
* Gender predominance:  
  There is generally a slight male predominance, around 54% males versus 45% females overall for cysts and odontogenic tumors. However, some studies report higher female proportions, attributing it to social factors affecting healthcare access.
* Common types of cysts:
  + Radicular cysts are the most prevalent, accounting for roughly 56–59% of cystic lesions in many populations.
  + Dentigerous cysts represent about 17–27% of cysts.
  + Odontogenic keratocysts (OKC) account for around 13% but are notable for aggressive behavior and recurrence.
* Common odontogenic tumors:
  + Odontomas are the most common tumors, constituting about 40–51% of odontogenic tumors.
  + Ameloblastomas follow, making up approximately 13–18% of odontogenic tumors.
  + Others include peripheral odontogenic fibromas and cystic ameloblastoma variants.
* Anatomical location:
  + The mandible is more frequently affected than the maxilla, often with ratios around 1.2:1 to 2:1 depending on the lesion type.
  + Lesions commonly involve the mandibular molar region and anterior maxilla.
* Regional differences:  
  Population-based studies show variability by geography and ethnicity but generally confirm similar distributions with minor variations in prevalence and age at diagnosis.
* Classification and Behavior:  
  WHO reclassification impacts the epidemiological tracking, especially for lesions like OKC, which has features of both cyst and tumor. Molecular changes such as PTCH mutation in OKC affect biological behavior but classification as a cyst or tumor is still debated

**PREDEFINED Q & A SETS**

### **When should I be worried about a lump on my jawline?**

Many conditions can cause a lump on your jawline, and most aren’t serious enough to worry about. Causes include cysts and tumors — but the issue may be as simple as an allergic reaction or a swollen lymph node.

It may be helpful to keep in mind that most benign growths feel soft and moveable when you touch them. If a growth is cancerous, it’s more likely to feel hard. The exception is liposarcoma, which is a cancer that may feel like a soft and moveable mass.

If you have a new lump that doesn’t go away, is painful and interferes with your ability to move your jaw — it’s time to see a provider.

## **What are jaw tumors and cysts?**

Jaw tumors and cysts are abnormal growths or lesions that develop in the jawbone or soft tissues of the mouth and face. Tumors are masses of tissue which can be benign (noncancerous) or malignant (cancerous). Cysts are fluid- or semisolid-filled sacs. Both can vary greatly in size and severity and may displace, destroy, or expand the surrounding bone, tissue, and teeth.

## **What causes jaw tumors and cysts?**

The exact causes are often unknown. Odontogenic lesions arise from tissues involved in tooth development. Some tumors and cysts are associated with genetic mutations or syndromes, such as nevoid basal cell carcinoma syndrome (Gorlin-Goltz syndrome), which predisposes to multiple odontogenic keratocysts and basal cell skin cancers.

## **Are jaw tumors and cysts common?**

They are relatively rare. Most jaw cysts and tumors are benign and slow-growing. For example, odontogenic tumors make up a small percentage of oral growths in many populations but may vary regionally. Many jaw cysts and tumors are found incidentally during routine dental X-rays since they are often asymptomatic early on.

## **What are the common types of jaw cysts?**

The most frequently encountered cysts include:

* Radicular (Periapical) cyst: Associated with non-vital teeth; the most common cyst.
* Dentigerous cyst: Surrounds the crown of an unerupted tooth.
* Odontogenic keratocyst (OKC): Known for aggressive behavior and high recurrence risk.

## **What are common jaw tumors?**

Benign jaw tumors include:

* Ameloblastoma (solid or unicystic) – locally aggressive odontogenic tumor.
* Odontoma – the most common odontogenic tumor, usually asymptomatic.
* Central giant cell granuloma – potentially aggressive, usually affects the mandible.  
  Malignant tumors of the jaw are rare but include squamous cell carcinoma and sarcomas.

## **What symptoms might indicate a jaw tumor or cyst?**

Early lesions may cause no symptoms and be discovered incidentally. Larger lesions often cause:

* Swelling or bulging of the jaw or face
* Pain or tenderness
* Loose or displaced teeth
* Numbness or altered sensation
* Drainage or pus if infected.

## **How are jaw tumors and cysts diagnosed?**

Diagnosis involves:

* Clinical evaluation and dental history.
* Imaging studies like dental X-rays, CT scans, or MRI to assess size and location.
* Biopsy or aspiration may be performed to obtain tissue or fluid for pathology, except in highly vascular lesions or when risk of bleeding exists.

## **How are jaw tumors and cysts treated?**

Treatment depends on the type, size, location, and aggressiveness of the lesion:

* Surgical excision or enucleation is the mainstay, sometimes with removal of associated teeth or bone.
* Medical therapies may supplement surgery for specific tumors but are less common.
* Reconstruction may be necessary after removal.
* Long-term follow-up is critical to monitor for recurrence.

## **When should I see a doctor about a jaw mass or cyst?**

Seek evaluation if you notice:

* Persistent or increasing jaw swelling
* Pain, numbness, or changes in tooth position
* Recurrent infections or drainage
* Difficulty chewing, speaking, or swallowing  
  Early diagnosis improves treatment success and minimizes complications

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello! I’d like to discuss the findings from your recent imaging and examinations. You have a growth in your jaw, which could be a tumor or a cyst. Have you had any pain or swelling?

Patient: Yes, I noticed some swelling and discomfort on one side of my jaw. I’m worried about what it could be.

Doctor: That’s understandable. Jaw tumors and cysts are abnormal growths in the bone or soft tissue of the jaw. Most of these lesions are benign, meaning they are not cancerous, but they can cause symptoms like swelling, pain, or changes in tooth position.

Patient: How do you know if it’s a tumor or cyst? And is it dangerous?

Doctor: We use imaging tests like X-rays, CT scans, or MRI to see the size, location, and characteristics of the lesion. Sometimes, we also need a biopsy — that means removing a small tissue sample for laboratory analysis. For some highly vascular or sensitive lesions, we avoid biopsy to prevent complications.

Patient: What kind of treatment will I need?

Doctor: Treatment depends on the type and size of the lesion. Surgery is often the primary treatment, where we remove the cyst or tumor. In some cases, we may use a more conservative approach, especially in children, like marsupialization — opening the cyst to allow it to shrink gradually. If necessary, you might need reconstructive surgery afterward to repair the jaw and restore function.

Patient: Will the tumor or cyst come back? How will I know?

Doctor: Some lesions like odontogenic keratocysts and ameloblastomas have higher chances of recurrence, so we schedule regular follow-up visits and imaging to monitor you. Detecting recurrence early helps us treat it effectively.

Patient: Are there things I can do to prevent this or catch it early next time?

Doctor: Routine dental check-ups and imaging, especially if you have symptoms like unexplained jaw swelling or tooth movements, are important. Early diagnosis often leads to simpler treatment and better outcomes.

Patient: Thank you, doctor. What are the risks of surgery?

Doctor: Surgery risks include pain, swelling, infection, bleeding, and potential nerve injury leading to numbness. We take every precaution to minimize these risks and support your recovery with post-operative care.

Patient: I appreciate the explanation. What’s the next step?

Doctor: We’ll review your imaging thoroughly, possibly perform a biopsy if safe, and then plan the best treatment approach tailored to your specific lesion. We’ll keep you informed throughout every step.

REFERENCES:

<https://emedicine.medscape.com/article/852734-overview>

<https://my.clevelandclinic.org/health/diseases/jaw-cysts-tumors>

<https://www.mayoclinic.org/diseases-conditions/jaw-tumors-cysts/diagnosis-treatment/drc-20446670>

**Labyrinthitis**

**DEFINITION / DESCRIPTION**

Labyrinthitis (*la-br-uhn-THAI-tuhs*) is a type of inner ear infection. It happens when your labyrinth gets inflamed. Your labyrinth is the part of your inner ear responsible for your hearing and sense of balance.

Labyrinthitis is closely related to vestibular neuritis. Labyrinthitis is the swelling of *both* branches of your vestibulocochlear nerve. It affects both balance and hearing. Vestibular neuritis is the swelling of *one* branch of your vestibulocochlear nerve. It affects only balance.

Anyone can get labyrinthitis. But it’s most common in adults ages 30 to 60. And females are twice as likely to develop labyrinthitis.

**CAUSES**

Viral infections cause labyrinthitis in most cases. But bacterial infections can cause it, too. Some of the most common labyrinthitis causes include:

* Epstein-Barr virus.
* Herpes simplex.
* Stomach flu.
* Upper respiratory infections.

Less commonly, a head injury can result in labyrinthitis.

**RISK FACTORS**

Having a cold or flu can trigger labyrinthitis. You also have a higher risk of developing labyrinthitis if you smoke or if you have:

* Alcohol use disorder.
* Allergies.
* Fatigue.
* Stress.

Certain drugs — like antidepressants, anti-inflammatories and some diabetes medications — can also trigger labyrinthitis in some people.

**SIGNS / SYMPTOMS**

People with labyrinthitis may experience a sudden onset of symptoms, including:

* Balance issues.
* Blurred vision.
* Difficulty concentrating.
* Dizziness.
* Hearing loss.
* Nausea and vomiting.
* Nystagmus (involuntary eye movements).
* Ringing in your ears (tinnitus).
* Vertigo.

**DIAGNOSIS METHODS**

Your healthcare provider will perform a physical examination and ask you about your symptoms and medical history. They may also order tests to assess your hearing, balance and other nervous system functions.

#### **TEST**

There are other conditions that have the same symptoms as labyrinthitis (like vestibular neuritis or BPPV), so your healthcare provider will need to rule them out. They may do this by running certain tests, including:

* Electrocardiogram (EKG).
* Magnetic resonance imaging (MRI).
* Vestibular testing.

**TREATMENT OPTIONS**

Labyrinthitis treatment depends on the severity of your condition. Healthcare providers may recommend medications, physical therapy, home remedies or a combination of the three. In very rare cases, labyrinthitis may require surgery.

#### **Medications**

Common labyrinthitis medications include:

* Antivirals (if a virus caused it).
* Antibiotics (if a bacterium caused it).
* Corticosteroids to reduce nerve inflammation.
* Drugs to control dizziness and nausea (like diphenhydramine or fexofenadine).

#### **Physical therapy**

If your symptoms don’t improve in a few weeks, your healthcare provider will likely recommend vestibular rehabilitation therapy for labyrinthitis. This involves doing certain exercises to manage dizziness and imbalance.

#### **Home remedies**

You can also try home remedies to ease labyrinthitis symptoms:

* Apply a warm compress over your ear.
* Gargle with warm salt water to help clear your eustachian tube (a small passage that connects your throat and middle ear).
* Limit alcohol intake.
* Try stress management techniques, like mindfulness or meditation.

During a flare-up, avoid sudden movement. It’s best to lie still and keep motion and bright lights to a minimum.

#### **Surgery**

Very rarely, you might need a labyrinthectomy. During this procedure, a surgeon removes your vestibular end organs (the thin, membrane-like parts of your inner ear).

Providers don’t recommend labyrinthitis surgery very often. It’s a last resort treatment for people with vertigo and significant hearing loss in the affected ear.

**PREVENTION TIPS**

Because labyrinthitis is usually a symptom of other conditions, the best way to avoid it is to wash your hands regularly and take proper precautions during cold and flu season.

**OUTLOOK / PROGNOSIS**

Labyrinthitis symptoms and their response to treatment can vary for everyone. What works well for one person may not work as well for you. Recovering from labyrinthitis can take up to six weeks. But many people feel better after a week or two.

If you’re experiencing vertigo or balance issues, ask your healthcare provider when it’s safe to go back to work or school.

**POSSIBLE COMPLICATIONS**

Labyrinthitis is usually not dangerous unless it goes untreated. Without appropriate care, labyrinthitis can lead to hearing loss, increased risk of falling and permanent damage to your inner ear.

Permanent hearing loss is a common side effect in children who develop labyrinthitis as a complication of meningitis. In cases like this, you may be able to restore hearing with a cochlear implant.

**WHEN TO SEE A DOCTOR / RED FLAG**

If you develop vertigo, nausea or balance issues, you should call your healthcare provider right away. They can help determine the cause of your symptoms and design a personalized treatment plan.

## **Diagnostic Considerations**

## Vestibular neuritis

Viral labyrinthitis is often confused with vestibular neuritis, and the terms are occasionally used interchangeably in the literature. However, most authors agree that vestibular neuritis is a disorder of the vestibular nerve and is not associated with hearing loss.Because the cochlea is affected in pan-labyrinthine inflammation, hearing loss is always present in persons with viral labyrinthitis.

Vestibular neuritis typically manifests as sudden, acute vertigo without hearing loss in an otherwise healthy patient. The condition is more common in the fourth and fifth decades of life and affects men and women equally. An upper respiratory tract infection often precedes the condition, and the disorder is more common in the spring and early summer.

Histopathologic nerve studies of patients with vestibular neuritis demonstrate axonal loss, endoneurial fibrosis, and atrophy.These findings are consistent with a viral inflammatory etiology. The treatment of vestibular neuritis and viral labyrinthitis is similar.

## Other conditions

A 2009 case report suggests that an early anterior inferior cerebellar artery infarction should be considered in patients presenting with acute hearing loss and vertigo.

Noninfectious labyrinthitis is very rare in children; therefore, seek an alternative diagnosis in patients this age. Labyrinthitis resulting from otitis media or meningitis is not uncommon in children.

Conditions to consider in the differential diagnosis of labyrinthitis also include the following:

* Vertebrobasilar insufficiency
* Presyncopal dizziness
* Cerebellar infarct
* Dysequilibrium of aging
* Drug-induced vertigo and/or hearing loss

## **Differential Diagnoses**

* Autoimmune Disease of the Inner Ear
* Benign Paroxysmal Positional Vertigo
* CNS Causes of Vertigo
* Complications of Otitis Media
* Meniere Disease (Idiopathic Endolymphatic Hydrops)
* Migraine-Associated Vertigo
* Ototoxicity
* Perilymphatic Fistula
* Skull Base Tumor and Other CPA Tumors
* Sudden Hearing Loss

**EPIDEMIOLOGY**

### Prevalence

Although definitive epidemiologic data are lacking, viral labyrinthitis is the most common form of labyrinthitis observed in clinical practice. The prevalence of sudden SNHL is estimated at 1 case in 10,000 persons, with up to 40% of these patients complaining of vertigo or dysequilibrium.One study reported that 37 of 240 patients presenting with positional vertigo had viral labyrinthitis.

### Demographics

Viral labyrinthitis is usually observed in adults aged 30–60 years and is rarely observed in children. Meningogenic suppurative labyrinthitis is usually observed in children younger than 2 years, which is the population most at risk for meningitis. Otogenic suppurative labyrinthitis can be observed in persons of any age in the presence of cholesteatoma or as a complication of untreated acute otitis media.Serous labyrinthitis is more common in the pediatric age group, in which the vast majority of acute and chronic otitis media cases are observed.

**PREDEFINED Q & A SETS**

### **What’s the difference between vertigo and labyrinthitis?**

Labyrinthitis is inflammation of your inner ear labyrinth. Vertigo, a common symptom of labyrinthitis, can make you feel like your surroundings are spinning.

### **What’s the difference between labyrinthitis, vestibular neuritis and Ménière’s disease?**

These conditions all affect parts of your inner ear. But there are key differences:

| **Condition** | **What it affects** | **Symptoms** | **Associated conditions** |
| --- | --- | --- | --- |
| Labryinthitis | Entire labyrinth, vestibular nerve, cochlear nerve. | Hearing loss, continuous vertigo, balance issues, nausea and vomiting, ringing in your ears. | Upper respiratory infections. |
| Vestibular neuritis | Vestibular nerve. | Continuous vertigo, dizziness, balance issues, nausea and vomiting. | Upper respiratory infections. |
| Ménière’s disease | Fluid-filled membranes inside your labyrinth. | Hearing loss, periodic vertigo, ringing in your ears. | N/A: There are no known conditions associated with Ménière’s disease. |

## **What is labyrinthitis?**

Labyrinthitis is an inflammation of the inner ear labyrinth, a delicate structure responsible for hearing and balance. This inflammation can cause vertigo (a false sensation of spinning), dizziness, hearing loss, and balance problems.

## **What causes labyrinthitis?**

The most common cause is a viral infection, often following a cold or flu. Less commonly, bacteria, allergies, certain medications, or head injuries can trigger labyrinthitis.

## **What are the main symptoms?**

* Sudden onset vertigo or spinning sensation
* Dizziness and imbalance
* Hearing loss or tinnitus (ringing in ears)
* Nausea and vomiting
* Sometimes ear pain, ear pressure, or discharge  
  Symptoms typically appear suddenly, can be severe initially, and gradually improve over days to weeks.

## **How is labyrinthitis diagnosed?**

Diagnosis is based on medical history and physical exam, including neurological assessment. Tests may include hearing tests, balance assessments, electronystagmography, CT or MRI scans to rule out other causes.

## **How long does labyrinthitis last?**

Symptoms often improve significantly within days to weeks. Full recovery can take several weeks to months. Some people may experience lingering dizziness or balance problems.

## **How is labyrinthitis treated?**

Treatment focuses on relieving symptoms and addressing the underlying cause:

* Rest and hydration
* Medications for vertigo, nausea, and inflammation (e.g. antihistamines, antiemetics, corticosteroids)
* Antibiotics if bacterial infection is confirmed
* Gradual vestibular rehabilitation exercises to improve balance.

## **Can labyrinthitis cause permanent damage?**

Most cases resolve without permanent harm. However, untreated or severe bacterial labyrinthitis can cause lasting hearing loss or balance deficits. Prompt medical care reduces this risk.

## **How is labyrinthitis different from vestibular neuritis?**

Labyrinthitis affects both balance and hearing as it involves the labyrinth, while vestibular neuritis involves only vestibular nerve inflammation, causing vertigo without hearing loss.

## **When should I see a doctor?**

Seek immediate medical attention if you have sudden severe vertigo, hearing loss, ear pain, or neurological symptoms like weakness, double vision, or difficulty speaking, to rule out other serious conditions.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning. What brings you in today?

Patient: Good morning, Doctor. I've been having really bad dizziness and a spinning sensation, especially when I move my head quickly. I also feel a bit nauseous, and my hearing in my right ear seems muffled.

Doctor: I see. How long have these symptoms been going on?

Patient: It started pretty suddenly a couple of days ago, and it's been constant since then. I had a bad cold last week, too.

Doctor: Hmm, that's important to know. Your symptoms sound like they could be related to an inner ear condition called labyrinthitis. It's an inflammation of the labyrinth, which is the part of your inner ear responsible for both hearing and balance . Since you mentioned muffled hearing, that points more towards labyrinthitis rather than a similar condition called vestibular neuritis, which typically only affects balance .

Patient: Oh, okay. So, it's not something more serious, like a stroke? I was worried about that.

Doctor: That's a very good question, and it's why a thorough examination is important. We'll do a physical exam and some tests to help differentiate between peripheral issues like labyrinthitis and central vestibular lesions, such as strokes . I'll check your eye movements for something called nystagmus, which can give us clues about where the problem is coming from .

Patient: What kind of tests will I need?

Doctor: Beyond the physical exam, we may order some additional tests to rule out other conditions. This could include hearing tests, and possibly imaging like a CT or MRI scan of your head, to ensure there's nothing else causing your symptoms .

Patient: And what's the treatment for labyrinthitis?

Doctor: Labyrinthitis is often a self-limiting condition, meaning it usually gets better on its own within a few weeks . Our main goal will be to manage your symptoms and make you more comfortable. I can prescribe medications to help with the vertigo and nausea . Rest is also important. We might also discuss some home remedies, like avoiding sudden movements and keeping motion and bright lights to a minimum during a flare-up .

Patient: How long will it take to feel better?

Doctor: Recovery can vary for everyone. Many people feel better after a week or two, but it can take up to six weeks for full recovery . If your symptoms don't improve within a few weeks, or if you continue to have dizziness and imbalance, we might recommend vestibular rehabilitation therapy. This involves specific exercises to help retrain your balance system .

Patient: Will my hearing go back to normal?

Doctor: In many cases, hearing loss associated with labyrinthitis improves as the inflammation subsides. However, in very rare cases, if it was a severe infection, there can be some lasting hearing issues. We'll monitor your hearing .

Patient: Thank you, Doctor. This helps a lot.

Doctor: You're welcome. Remember to avoid any sudden head movements, and get plenty of rest. If your symptoms worsen, or if you develop any new symptoms like severe headache, weakness, or trouble speaking, please contact us immediately or go to the nearest emergency room . Otherwise, we'll follow up in a week or so to see how you're doing.

REFERENCES:

<https://www.nhs.uk/conditions/labyrinthitis/>

<https://emedicine.medscape.com/article/856215-workup>

<https://www.ncbi.nlm.nih.gov/books/NBK560506/#article-36027.s8>

<https://my.clevelandclinic.org/health/diseases/22032-labyrinthitis>

**Lacrimal gland tumor**

**DEFINITION / DESCRIPTION**

Lacrimal gland tumor is a rare growth that develops in the lacrimal gland, a small organ located above the outer corner of the eye. These tumors can be benign (non-cancerous) or malignant (cancerous). The exact cause of lacrimal gland tumors is not well understood, but some factors may contribute to their development, such as genetic mutations or exposure to certain environmental factors. While these tumors are uncommon, they can impact the eye's function and overall health. If you experience any unusual eye symptoms or notice changes in your vision, it's essential to consult with an eye specialist for proper evaluation and management. Early detection and appropriate treatment are crucial in managing lacrimal gland tumors effectively.

**CAUSES**

Lacrimal gland tumors can develop due to various factors, with the exact cause often remaining unclear. However, certain risk factors are associated with their occurrence. These may include genetic predisposition, exposure to radiation, and underlying conditions such as Sjogren's syndrome. Environmental factors and viral infections have also been suggested as potential contributors to the development of lacrimal gland tumors. While the precise interplay of these factors in tumor formation is complex and not fully understood, a combination of genetic susceptibility and external influences likely plays a role in their pathogenesis.

* Genetic predisposition can increase the risk of developing lacrimal gland tumors.
* Exposure to certain environmental toxins or radiation may contribute to the formation of lacrimal gland tumors.
* Chronic inflammation or infections of the lacrimal gland can potentially lead to the development of tumors.
* Hormonal imbalances, particularly involving the sex hormones, have been linked to the occurrence of lacrimal gland tumors.
* Previous history of head and neck cancers or other malignancies can sometimes be associated with lacrimal gland tumors.

**Types Of Lacrimal Gland Tumor**

Lacrimal gland tumours can be categorised into various types based on their histological characteristics and clinical behaviour. Common types include pleomorphic adenoma, adenoid cystic carcinoma, mucoepidermoid carcinoma, and adenocarcinoma. Pleomorphic adenoma is typically benign but can recur if incompletely excised. Adenoid cystic carcinoma is known for its slow-growing nature but a high tendency for local recurrence and distant metastasis. Mucoepidermoid carcinoma is a malignant tumor with variable aggressiveness. Adenocarcinoma, another malignant type, can be aggressive and may require comprehensive treatment. Proper diagnosis and management are crucial for improving outcomes in patients with lacrimal gland tumors.

* Pleomorphic adenoma: A common benign tumor of the lacrimal gland, usually slow-growing.
* Adenoid cystic carcinoma: A rare but aggressive malignancy that can invade surrounding tissues.
* Lymphoma: Can involve the lacrimal gland and may present with swelling or pain.
* Adenocarcinoma: Another type of malignant tumor that can affect the lacrimal gland.
* Mucoepidermoid carcinoma: A less common malignancy that can arise in the lacrimal gland.

**RISK FACTORS**

However, certain risk factors may contribute to their development. These factors include older age, with most cases occurring in individuals over 40 years old, as well as a history of radiation exposure to the head and neck region. Genetic conditions such as neurofibromatosis type 1 and Li-Fraumeni syndrome have also been linked to an increased risk of lacrimal gland tumors. Additionally, there may be a slightly higher prevalence in females compared to males. Regular eye exams and early detection are crucial in managing these tumors effectively.

* Older age is a risk factor for lacrimal gland tumor development due to increased cell mutation over time.
* Radiation exposure, such as from previous medical treatments or environmental factors, can elevate the risk of lacrimal gland tumors.
* Certain genetic conditions or inherited syndromes may predispose individuals to developing lacrimal gland tumors.
* Chronic inflammation of the lacrimal gland or surrounding tissues can potentially increase the likelihood of tumor formation.
* Individuals with a history of smoking or exposure to tobacco smoke may have a higher risk of lacrimal gland tumor development

**SIGNS / SYMPTOMS**

Lacrimal gland tumors may cause symptoms such as a noticeable mass or swelling around the eye, persistent eye redness, pain or discomfort in the affected eye, blurry vision, excessive tearing or watering of the eye, and sometimes even changes in vision. Additionally, some individuals may experience double vision or a feeling of pressure in the eye area. If you notice any of these symptoms, it is important to consult with an eye specialist for a proper evaluation and management.

* Persistent watery eyes can be a symptom of a lacrimal gland tumor, causing excessive tearing.
* Swelling or a lump near the outer corner of the eye may indicate a lacrimal gland tumor.
* Blurred vision or changes in vision quality can occur due to a lacrimal gland tumor pressing on surrounding structures.
* Eye pain or discomfort, especially when blinking or moving the eye, can be a sign of a lacrimal gland tumor.
* Double vision or seeing halos around lights may be a symptom of a lacrimal gland tumor affecting eye function.

**DIAGNOSIS METHODS**

Initially, a comprehensive eye examination is conducted to assess the symptoms and potential signs of a tumor. This is followed by imaging tests such as MRI or CT scans to visualize the tumor and its location within the lacrimal gland. A biopsy may then be performed to obtain a tissue sample for further analysis. Additionally, blood tests can help rule out other systemic conditions. Through a combination of these methods, healthcare providers can accurately diagnose and plan a treatment strategy for lacrimal gland tumors.

* Physical examination by an ophthalmologist to assess eye symptoms and signs related to lacrimal gland tumors.
* Imaging tests such as CT scan or MRI to visualize the lacrimal gland and surrounding structures for tumor detection.
* Biopsy of the lacrimal gland tissue for definitive diagnosis by examining the cells under a microscope.
* Blood tests to check for specific tumor markers that may indicate the presence of a lacrimal gland tumor.
* Consultation with an oncologist for further evaluation and management planning based on diagnostic findings.

**TREATMENT OPTIONS**

Treatment options for Lacrimal Gland Tumor depend on various factors, including the type and stage of the tumor. Surgery is often the primary approach to remove the tumor and surrounding tissues. In cases where the tumor is malignant or has spread, additional treatments such as radiation therapy or chemotherapy may be recommended to target any remaining cancer cells.

Close monitoring and follow-up care are crucial to assess the effectiveness of treatment and manage any potential side effects. Your healthcare team will work with you to determine the most appropriate treatment plan based on your individual condition and overall health status.

**OUTLOOK / PROGNOSIS**

Since adenoid cystic carcinoma is the most common malignant tumor, it has the most prognostic data of the lacrimal gland carcinomas. Overall, the prognosis is poor, and ACC has often been referred to as the "slow killer" since recurrences and metastasis can occur years after treatment, with most patients dying within ten years of diagnosis. Several prognostic factors have been identified in the literature, including tumor size, histologic subtype, perineural invasion, and the stage at diagnosis.

Tumor size is one of the more important factors, with a better prognosis for tumors that are less than 2.5 cm in greatest diameter. Histologically, these tumors typically have multiple subtypes, but the predominance of the cribriform (Swiss cheese) pattern may be a positive prognostic factor, whereas a predominance of "basaloid" or solid pattern may be a negative factor. The AJCC TNM stage does reasonably well with predicting outcomes of patients, with a worse prognosis for recurrence, metastasis, and death for tumors less than stage T3a than for one wish stage T3a or greater.

For carcinoma ex pleomorphic adenoma, the prognosis depends on the identity and behavior of the malignant component of the tumor that has spread beyond the capsule of the original tumor. If the tumor is non- or minimally invasive, the prognosis is excellent. Otherwise, most patients die within a few years due to intracranial spread and metastases to the lungs, chest, and bone.

Mucoepidermoid carcinoma is organized into low, intermediate, and high-grade tumors. The low and intermediate tumors carry a good prognosis, but high-grade tumors have a poor survival rate.

Ductal carcinoma is an aggressive neoplasm that usually presents as locally advanced disease that is difficult to control, with a mortality rate of over 40%. Metastases develop in more than 50% of cases.

The prognosis for lymphoma overall is good, though it depends on the extent of systemic involvement. For extranodal marginal zone lymphoma localized to just the orbit is very good, as it is usually sensitive to radiation therapy. Diffuse large B cell lymphoma has three subtypes, with the ABC subtype having the poorest prognosis.

**POSSIBLE COMPLICATIONS**

Complications of malignant tumors are mostly related to the treatment involved in eradicating the tumor and preventing recurrences. The tumors may compress orbital structures like the globe or optic nerve if the tumors are large. Malignant lesions may erode through the orbital roof to gain access to the intracranial vault, or in the case of adenoid cystic carcinoma, may spread via the perineural route to access the CNS where severe neurologic changes may manifest.

Surgical biopsy or excision carries risks, and complications are related to the surgery performed and the techniques utilized. For anterior or lateral orbitotomies, the main complications of note include orbital hemorrhage, postoperative orbital cellulitis, damage to the extraocular muscles, globe, or optic nerve, dryness from decreased lacrimal gland function, cerebral spinal fluid (CSF) leak, or recurrence of the tumor.

Radiation therapy can also have adverse effects, including surrounding tissue damage, dermatitis of the skin, atrophy of the bone and soft tissues, and ocular effects, including retinopathy and dry eye disease. Chemotherapy can lead to many side effects, the most concerning being immunosuppression and the risk of infection. Vigilant short- and long-term monitoring after treatment is crucial to managing these complications and monitoring for tumor recurrences.

**DIFFERENTIAL DIAGNOSIS**

In addition to the malignant lesions above, other etiologies can present as lacrimal gland fossa lesions. Two major categories for these other causes are inflammatory lesions and benign tumors. Altogether, inflammatory lesions make up the most common cause of lacrimal gland enlargement.The single most common etiology is dacryoadenitis, which can be unilateral or bilateral and inflammatory or infectious.

**Inflammatory Lesions**

* Idiopathic orbital inflammatory syndrome (IOIS), or orbital pseudotumor
* IgG-4 related disease
* Sarcoidosis
* Granulomatosis with polyangiitis
* Dacryoadenitis
* Sjogren syndrome
* Thyroid eye disease

**Benign Tumors**

* Epithelial
  + Pleomorphic adenoma
  + Dacryops (lacrimal gland cyst)
  + Oncocytoma
  + Myoepithelioma
  + Cystadenoma
  + Warthin tumor
* Lymphoproliferative
  + Reactive lymphoid hyperplasia (benign lymphoepithelial lesion)
* Mesenchymal
  + Capillary or cavernous hemangioma
  + Angiolymphoid hyperplasia with eosinophilia
  + Granular cell tumor
  + Fibrous histiocytoma
  + A solitary fibrous tumor (hemangiopericytoma)
  + Neurofibroma
  + Schwannoma

Some lesions can be found near the superolateral orbit and can be confused for lacrimal gland tumors. They include:

* Epidermoid or dermoid cyst, commonly found at the frontozygomatic suture and may have an intraorbital component
* Prolapsed orbital fat, causing fullness of the lateral upper lid or a mass in the superotemporal fornix
* Dermatolipoma, commonly seen under the superotemporal conjunctiva
* Prolapsed lacrimal gland, giving the appearance that it has been displaced by a mass

Lacrimal gland enlargement can also be seen in amyloidosis. Though rare, amyloid deposition in orbit, including the lacrimal gland, is usually due to a localized disease process rather than associated with systemic amyloidosis

**EPIDEMIOLOGY**

In general, lacrimal gland carcinomas do not show a gender preference, though some exceptions exist. Adenocarcinoma NOS and ductal carcinoma have a slight predilection for males, whereas MEC and lymphoma have a slight female predilection.

All types of malignant lesions can appear at any age, but most are typically found in the older adult age group (6th decade or later).The notable exception to this is adenoid cystic carcinoma, which has an average age of diagnosis of 40 years. There is no racial or geographic preference for tumors, though this may be because they are rare overall.

**PREDEFINED Q & A SETS**

## What are lacrimal gland tumors?

Lacrimal gland tumors are abnormal growths arising from the lacrimal gland’s epithelial or lymphoid tissue. They include both benign and malignant types and account for about 5–8% of all orbital tumors.

## What are the common types of lacrimal gland tumors?

* Benign tumors: The most common is the pleomorphic adenoma (benign mixed tumor), typically slow-growing and painless.
* Malignant tumors: The most common malignant tumor is adenoid cystic carcinoma, known for slow but aggressive growth and nerve invasion. Other malignancies include adenocarcinomas and lymphomas, with MALT lymphoma being the most frequent lymphoid tumor.

## What symptoms do lacrimal gland tumors cause?

* Noticeable proptosis (eye bulging) often with the eyeball displaced downward and inward
* Eyelid swelling or a palpable painless mass above the eye
* Double vision and restricted eye movement due to mass effect
* Pain may indicate malignancy, especially in rapidly growing tumors.

## How are lacrimal gland tumors diagnosed?

Diagnosis involves:

* Detailed history and physical examination focusing on ocular signs
* Imaging (CT or MRI) to define lesion size, extent, and bone involvement
* Biopsy for histopathological confirmation, often via fine-needle aspiration or surgical biopsy.

## How are benign lacrimal gland tumors treated?

Benign tumors like pleomorphic adenomas are managed primarily by complete surgical excision with an intact capsule to prevent recurrence or malignant transformation. Long-term follow-up is necessary.

## How are malignant lacrimal gland tumors treated?

* Surgery is the cornerstone, ranging from local tumor excision to orbital exenteration for extensive disease.
* Radiation therapy is often adjunctive, especially for adenoid cystic carcinoma.
* Chemotherapy may be needed for lymphoma or metastatic disease.
* Treatment plans depend on tumor type, stage, and systemic involvement.

## What is the prognosis of lacrimal gland tumors?

* Benign tumors generally have excellent prognosis after complete removal.
* Malignant tumors, particularly adenoid cystic carcinoma, have poorer prognosis due to recurrence and perineural invasion.
* Lymphomas show variable prognosis depending on systemic spread.

## When should I see a doctor about a lump near my eye?

If you notice persistent swelling, eye bulging, double vision, or pain around your eye, seek medical attention promptly for evaluation as early diagnosis improves outcomes

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, thank you for coming in today. I want to talk to you about the findings from your recent scans and tests. We have identified a growth in your lacrimal gland, which is the gland near your eye that produces tears.

Patient: I see. Is it cancer? What kind of tumor is it?

Doctor: The lacrimal gland can develop different types of tumors—some are benign (noncancerous), and others can be malignant (cancerous). Based on your imaging and biopsy results, your tumor is a [benign pleomorphic adenoma / lymphoma / adenoid cystic carcinoma — insert actual diagnosis]. I’ll explain what this means for you.

Patient: What symptoms should I expect, and what caused this?

Doctor: Common symptoms include swelling in the upper outer part of your eyelid, some bulging of the eye, or discomfort. The exact cause of most lacrimal gland tumors is unknown. Some can arise from chronic inflammation, while others develop spontaneously.

Patient: What are my treatment options?

Doctor: Treatment depends on the tumor type. For benign tumors like pleomorphic adenoma, we usually recommend complete surgical removal to prevent recurrence or malignant transformation. For malignant tumors such as adenoid cystic carcinoma or lymphoma, treatment may involve surgery, radiation therapy, and sometimes chemotherapy.

Patient: Will I lose my eye? What about my vision?

Doctor: Our goal is to preserve your eye and vision whenever possible. With modern surgical techniques combined with radiotherapy, many patients retain their eye and good vision. However, in advanced cases where the tumor invades surrounding tissues extensively, more radical surgery including eye removal (orbital exenteration) may be necessary. We will closely monitor and tailor treatment to minimize such risks.

Patient: What are the risks or side effects of treatment?

Doctor: Surgery can cause swelling, bruising, or temporary changes in eyelid movement. Radiation may cause dry eyes, irritation, or, rarely, damage to other eye structures. Chemotherapy side effects depend on the drugs used but often include fatigue or nausea. We will support you throughout with symptom management.

Patient: What is the outlook or prognosis?

Doctor: Prognosis varies by tumor type and stage. Benign tumors, once completely removed, have an excellent prognosis. Malignant lacrimal gland tumors can be more challenging, but early diagnosis and combined treatment improve survival and quality of life.

Patient: What happens next?

Doctor: We will plan the next steps including scheduling surgery and possibly radiation therapy. We will also arrange regular follow-ups with imaging to monitor your response and detect any recurrence early.

Patient: Thank you, doctor. That helps me understand a lot better.

Doctor: You’re welcome. Please feel free to ask any other questions as they come up. We’re here to support you through the entire process.

REFERENCES:

<https://www.cancerresearchuk.org/about-cancer/eye-cancer/stages-types/types/lacrimal-gland-cancer>

<https://www.ncbi.nlm.nih.gov/books/NBK578187/#article-140265.s4>

**Laryngeal papillomatosis**

**DEFINITION / DESCRIPTION**

Laryngeal papillomatosis is a rare disease caused by the human papillomavirus (HPV). More than 60 HPVs exist. Laryngeal papillomatosis causes the growth of tumors inside the voice box, vocal cords, or the air passage from the nose to the lungs. Most laryngeal papillomas (tumors) occur in children before the age of three. The tumors are usually quick growing and can vary in size, causing breathing and swallowing problems. Other symptoms may include coughing and hoarseness.

Treatment for laryngeal papillomas may include surgery to remove the tumors. Other treatment options may include:

* Antiviral therapy
* Antibiotics

Because the tumors tend to return, repeat surgery may be necessary. Always consult your physician for a diagnosis.

**CAUSES**

### **Infectious/Environmental Causes**

The primary cause of laryngeal papillomatosis is infection with specific strains of the human papillomavirus (HPV), particularly types 6 and 11. These strains are known to cause benign lesions in the larynx. HPV is typically transmitted through direct contact, which can occur during childbirth if the mother has genital warts or through other forms of close contact.

### **Genetic/Autoimmune Causes**

While HPV is the main infectious agent, some studies suggest that genetic predisposition may play a role in the development of laryngeal papillomatosis. Individuals with a family history of HPV-related conditions may be at a higher risk. Additionally, autoimmune factors may influence the body’s ability to control HPV infections, leading to the proliferation of papillomas.

### **Lifestyle and Dietary Factors**

Although lifestyle and dietary factors are not direct causes of laryngeal papillomatosis, certain habits can exacerbate symptoms or increase the risk of complications. For instance, smoking and excessive alcohol consumption can irritate the larynx and may contribute to the severity of symptoms. A diet low in antioxidants and vitamins may also impair the immune system, making it harder for the body to manage HPV infections.

**RISK FACTORS**

* **Age:** Most commonly diagnosed in children and young adults.
* **Gender:** Males are slightly more likely to be affected than females.
* **Geographic Location:** Higher prevalence in certain regions may be linked to varying HPV exposure rates.
* **Underlying Conditions:** Individuals with weakened immune systems, such as those with HIV/AIDS or undergoing immunosuppressive therapy, are at greater risk.

**SIGNS / SYMPTOMS**

### **Common Symptoms of Laryngeal Papillomatosis**

The symptoms of laryngeal papillomatosis can vary depending on the size and location of the papillomas. Common symptoms include:

* **Hoarseness:** A change in voice quality is often the first noticeable symptom.
* **Breathing Difficulties:** Larger papillomas can obstruct the airway, leading to stridor (a high-pitched wheezing sound).
* **Coughing:** A persistent cough may occur, especially if the papillomas irritate the larynx.
* **Throat Pain:** Discomfort or pain in the throat can accompany other symptoms.
* **Difficulty Swallowing:** In some cases, papillomas can interfere with swallowing.

### **Warning Signs for Immediate Medical Attention**

Certain symptoms may indicate a need for immediate medical evaluation, including:

* **Sudden difficulty breathing or stridor.**
* **Severe throat pain that does not improve.**
* **Significant changes in voice quality that worsen rapidly.**
* **Blood in saliva or mucus.**

**DIAGNOSIS METHODS**

The diagnosis of laryngeal papillomatosis begins with a thorough clinical evaluation. This includes taking a detailed patient history and conducting a physical examination. The healthcare provider will inquire about symptoms, duration, and any potential exposure to HPV.

### **Diagnostic Tests**

Several diagnostic tests may be employed to confirm the diagnosis:

* **Laryngoscopy:** A procedure where a thin, flexible tube with a camera is inserted through the nose or mouth to visualize the larynx.
* **Biopsy:** In some cases, a small tissue sample may be taken for laboratory analysis to confirm the presence of HPV.
* **Imaging Studies:** While not routinely used, imaging studies like CT scans may be employed to assess the extent of the papillomas.

**TREATMENT OPTIONS**

The management of laryngeal papillomatosis often involves a combination of medical and surgical approaches:

* **Surgical Removal:** The primary treatment for symptomatic papillomas is surgical excision. This can be performed using various techniques, including laser surgery, which minimizes damage to surrounding tissues.
* **Medications:** Antiviral medications, such as cidofovir, may be used in some cases to help control the growth of papillomas, although their effectiveness can vary.

### **Non-Pharmacological Treatments**

In addition to medical treatments, several non-pharmacological approaches can help manage symptoms:

* **Voice Therapy:** Working with a speech-language pathologist can help improve voice quality and reduce strain on the vocal cords.
* **Lifestyle Modifications:** Avoiding irritants such as smoking and excessive alcohol can help reduce symptoms.
* **Dietary Changes:** A diet rich in fruits, vegetables, and antioxidants may support overall health and immune function.

### **Special Considerations for Different Populations**

* **Pediatric Patients:** Children with laryngeal papillomatosis may require specialized care, as their airways are smaller and more susceptible to obstruction.
* **Geriatric Patients:** Older adults may have additional health considerations that affect treatment options and recovery.

Laryngeal Papillomatosis Treatment Drugs and Their Side Effects

## 1. Cidofovir

* Use:  
  Intralesional antiviral used as an adjuvant after surgical removal to reduce recurrence in severe or recurrent cases of laryngeal papillomatosis (recurrent respiratory papillomatosis, RRP).
* Mechanism:  
  Inhibits viral DNA polymerase, targeting HPV-infected cells.
* Side Effects:
  + Potential nephrotoxicity (kidney damage) — requires renal monitoring
  + Possible malignant transformation reported rarely (1.7% of cases)
  + Vocal cord scarring leading to hoarseness or airway issues
  + Local irritation, cutaneous rash, headache
* Notes:  
  Evidence is mixed; some studies show no clear benefit over surgery alone. No standardized dosing protocols, and concerns about safety limit its routine use.

## 2. Bevacizumab

* Use:  
  A monoclonal antibody targeting VEGF used either intralesionally or systemically as an adjuvant to surgery in severe or refractory RRP cases. It reduces tumor vascularization and growth.
* Mechanism:  
  Blocks vascular endothelial growth factor (VEGF), inhibiting angiogenesis supporting papilloma growth.
* Side Effects:
  + Generally well tolerated in reported cases
  + Minor complications reported include hemoptysis (coughing up blood) and proteinuria (protein in urine)
* Notes:  
  Systemic bevacizumab has shown promising results in severe, recurrent, or lung-involved cases, improving disease control and extending intervals between surgeries.

## 3. Acyclovir

* Use:  
  Oral antivirals are sometimes used postoperatively to reduce viral reactivation and recurrence in adult patients.
* Mechanism:  
  Targets viral DNA polymerase, primarily effective against herpesviruses but used experimentally for HPV-related papillomatosis.
* Side Effects:
  + Typically well tolerated
  + Potential renal effects; renal parameters should be monitored with prolonged or high-dose use
* Notes:  
  Some case reports show improvement with oral acyclovir regimes following surgical excision, but larger studies are lacking.

## 4. Interferon-alpha

* Use:  
  Previously used immunomodulator to decrease papilloma recurrence post-surgery.
* Side Effects:
  + Flu-like symptoms, fatigue, fever
  + Potential for systemic side effects limits use
* Notes:  
  Its role has diminished due to inconsistent efficacy and side effects.

## 5. Other Medications under Investigation or Supportive Therapy

* Vaccines (HPV vaccine): Emerging evidence suggests HPV vaccination may reduce recurrence and tumor growth in RRP, serving as an adjuvant strategy.
* Anti-inflammatory medications, corticosteroids: Sometimes used short-term to reduce inflammation after surgery.
* Other antivirals (ribavirin): Lesser evidence of effectiveness.

**PREVENTION TIPS**

While there is no guaranteed way to prevent laryngeal papillomatosis, several strategies may help reduce the risk:

* **Vaccination:** The HPV vaccine can protect against the strains of HPV that cause laryngeal papillomatosis. Vaccination is recommended for preteens and young adults.
* **Hygiene Practices:** Good hygiene, including regular handwashing and avoiding close contact with individuals who have active HPV infections, can reduce transmission risk.
* **Lifestyle Changes:** Avoiding smoking and excessive alcohol consumption can help maintain throat health.

**OUTLOOK / PROGNOSIS**

The prognosis for individuals with laryngeal papillomatosis varies. Some may experience spontaneous regression of papillomas, while others may require ongoing treatment due to recurrent growths. Early diagnosis and intervention are crucial for improving outcomes.

### **Factors Influencing Prognosis**

Several factors can influence the overall prognosis, including:

* **Age at Diagnosis:** Younger patients may have a more aggressive form of the disease.
* **Response to Treatment:** Adherence to treatment plans and regular follow-up care can improve outcomes.
* **Overall Health:** Individuals with a robust immune system may manage the condition more effectively.

**POSSIBLE COMPLICATIONS**

If left untreated or poorly managed, laryngeal papillomatosis can lead to several complications:

* **Airway Obstruction:** Large papillomas can obstruct the airway, leading to respiratory distress.
* **Chronic Hoarseness:** Persistent papillomas can result in long-term voice changes.
* **Infection:** Recurrent surgeries may increase the risk of infections in the larynx.

### **Short-Term and Long-Term Complications**

Short-term complications may include immediate post-surgical issues, such as bleeding or infection. Long-term complications can involve chronic respiratory issues, ongoing need for surgical interventions, and psychological impacts related to voice changes.

W**HEN TO SEE A DOCTOR / RED FLAG**

It is essential to seek immediate medical attention if you experience any of the following serious symptoms:

* **Sudden difficulty breathing or stridor.**
* **Severe throat pain that does not improve.**
* **Significant changes in voice quality that worsen rapidly.**
* **Blood in saliva or mucus.**

**DIFFERENTIAL DIAGNOSIS**

1. Laryngeal Squamous Cell Carcinoma (SCC)
   * Malignant tumor that may mimic papillomas, especially in adults.
   * Requires biopsy for differentiation.
2. Vocal Cord Nodules and Polyps
   * Benign lesions from vocal strain, generally not papillomatous or viral.
   * Usually unilateral or bilateral symmetrical small growths.
3. Laryngitis (Acute or Chronic)
   * Inflammation without papillomatous growths; presents with hoarseness and dysphonia.
4. Other Benign Laryngeal Lesions
   * Vocal cord granulomas, polypoid corditis, Reinke edema (polypoid degeneration).
   * No HPV infection involved.
5. Benign Lung, Laryngeal, or Tracheal Tumors
   * Rare neoplasms that can present similarly and require histologic diagnosis.
6. Malignant Laryngeal or Tracheal Tumors
   * Includes invasive SCC and other carcinomas presenting with mass and airway symptoms.
7. Laryngeal Infections
   * Bacterial, viral, or fungal infections causing inflammation but lacking papillomas.
8. Asthma and Bronchitis (in children)
   * Can cause chronic cough and wheezing mimicking respiratory symptoms but no papillomas.
9. Gastroesophageal Reflux Disease (GERD) and Allergic Rhinosinusitis
   * Can cause chronic laryngeal irritation and hoarseness.
10. Malignant transformation of papillomas (rare; HPV types 16, 18)
    * Squamous cell carcinoma developing within papillomas.

**EPIDEMIOLOGY**

It is estimated that the incidence of laryngeal papillomatosis is 4.3 per 100,000 children and 1.8 per 100,000 adults. LP is the second most common benign neoplasm of the larynx among children and the second most frequent cause of childhood hoarseness. LP can be divided into two subtypes, which have a strong correlation with how aggressive the disease acts. The juvenile or childhood-onset is the most aggressive form. It has a higher chance to cause airway obstruction, spread to more than one site of the aerodigestive tract, recur faster, and lead to more frequent surgical interventions. The other type is the adult-onset form, which tends to be less aggressive. Yet, some adult-onset LP may have aggressive characteristics mostly based on the HPV subtype.

**PREDEFINED Q & A SETS**

* **What causes laryngeal papillomatosis?** Laryngeal papillomatosis is primarily caused by infection with specific strains of the human papillomavirus (HPV), particularly types 6 and 11.
* **How is laryngeal papillomatosis diagnosed?** Diagnosis typically involves a clinical evaluation, laryngoscopy, and possibly a biopsy to confirm the presence of HPV.
* **What are the common symptoms of laryngeal papillomatosis?** Common symptoms include hoarseness, breathing difficulties, coughing, throat pain, and difficulty swallowing.
* **Can laryngeal papillomatosis be treated?** Yes, treatment options include surgical removal of papillomas and antiviral medications. Voice therapy and lifestyle modifications may also help manage symptoms.
* **Is laryngeal papillomatosis contagious?** While HPV is contagious, laryngeal papillomatosis itself is not directly contagious. However, the virus can be transmitted through close contact.
* **What are the potential complications of untreated laryngeal papillomatosis?** Untreated laryngeal papillomatosis can lead to airway obstruction, chronic hoarseness, and increased risk of infections.
* **How can I prevent laryngeal papillomatosis?** Preventive measures include HPV vaccination, good hygiene practices, and avoiding smoking and excessive alcohol consumption.
* **What is the long-term outlook for individuals with laryngeal papillomatosis?** The long-term outlook varies; some individuals may experience spontaneous regression, while others may require ongoing treatment due to recurrent growths.
* **When should I see a doctor for laryngeal papillomatosis?** You should seek medical attention if you experience sudden difficulty breathing, severe throat pain, or significant changes in voice quality.
* **Are there any alternative therapies for laryngeal papillomatosis?** While there are no established alternative therapies, some individuals may find relief through voice therapy and lifestyle modifications.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, come on in. What brings you in today?

Patient: Hi, Doctor. I've been having some real trouble with my voice lately. It's been hoarse for a while, and it seems to be getting worse. Sometimes I feel like it's harder to breathe, too.

Doctor: I see. Hoarseness is a common symptom for many laryngeal conditions. How long has this been going on?

Patient: A few months now, gradually. It’s been bothering me more and more.

Doctor: Okay. Well, based on your symptoms, I'm thinking about a condition called Laryngeal Papillomatosis. It's the most common benign, or non-cancerous, tumor of the voice box, also known as the larynx . These are wart-like growths, called papillomas, that form on and around your vocal cords .

Patient: Papillomas? What causes them?

Doctor: Laryngeal papillomatosis is caused by the human papillomavirus (HPV), most often types 6 and 11 .

Patient: So, it's like HPV, but in my throat? Is it contagious?

Doctor: While HPV is contagious and transmitted through close contact, the papillomatosis itself is not directly contagious .

Patient: What are the treatment options for this? Will it just go away?

Doctor: Unfortunately, there's no cure for laryngeal papillomatosis, and it often recurs . The primary treatment is surgical removal of the growths . We aim to remove as many of the papillomas as possible while preserving healthy tissue . This usually happens under general anesthesia in an operating room, but sometimes, for adults, office-based laser surgery with local anesthesia is an option .

Patient: So I'd need multiple surgeries?

Doctor: It's common for patients to need repeated surgeries because the papillomas can grow back . The goal of treatment is to keep the growths from coming back for as long as possible and manage your symptoms . In some cases, we might also use medication in combination with surgery to help control the growth .

Patient: What kind of medication?

Doctor: Medications like antiviral drugs, such as cidofovir, or other therapies like bevacizumab, are sometimes used to help control the growth of papillomas, especially in more severe or recurrent cases .

Patient: How do you diagnose this for sure?

Doctor: To confirm the diagnosis, your ENT specialist will likely perform a laryngoscopy. This involves using a thin, flexible tube with a camera to look at your throat and larynx . We may also need to take a small tissue sample, called a biopsy, to test for HPV and confirm the diagnosis . This biopsy is usually done in an operating room under general anesthesia .

Patient: What happens if I don't treat it?

Doctor: If left untreated or poorly managed, larger papillomas can obstruct your airway, leading to breathing difficulties, even a high-pitched wheezing sound called stridor. It can also lead to chronic hoarseness .

Patient: That sounds serious. What's the next step?

Doctor: We'll schedule you for a laryngoscopy, and if needed, a biopsy to confirm the diagnosis. Once we have that, we can discuss the best surgical approach and any potential adjunctive medical treatments for your specific situation. It’s important to address this to improve your breathing and voice.

Patient: Thank you, Doctor. This really helps.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK562327/#article-24046.s10>

<https://emedicine.medscape.com/article/302648-differential>

<https://my.clevelandclinic.org/health/diseases/23101-recurrent-respiratory-papillomatosis>

**Laryngeal cleft**

**DEFINITION / DESCRIPTION**

Babies born with a laryngeal cleft have a gap in the tissues between their larynx (voice box) and esophagus (food tube). The abnormal gap creates an opening between their larynx, which sits atop their trachea (windpipe), and esophagus. This allows food and liquids to enter the opening and travel into your baby’s lungs instead of their stomach.

Laryngeal cleft is a rare birth defect (congenital condition). It’s only present in 1 in 10,000 to 20,000 live births. It’s slightly more common in male babies.

If your child is born with this condition, it’s important that they get diagnosed as soon as possible. Food and liquids traveling down the wrong pipe can cause all sorts of issues. But how serious a laryngeal cleft is depends on the size and location of the gap.

#### **Types of laryngeal cleft**

There are four main types of laryngeal cleft:

* Type I. With the mildest form of laryngeal cleft, the opening is to your child’s vocal cords. This type often doesn’t cause significant symptoms and isn’t diagnosed right away.
* Type II. The opening extends below your child’s vocal cords.
* Type III. The cleft is larger and extends beyond your child’s larynx and into their windpipe.
* Type IV. The most severe form of laryngeal cleft extends further down your child’s windpipe. Sometimes, the opening goes all the way down your child’s windpipe.

**CAUSES**

Researchers don’t know the exact cause of a laryngeal cleft. But it likely develops during the first few months of fetal development. It can happen on its own or as part of an underlying syndrome like:

* Opitz-Frias
* VACTERL
* Pallister-Hall
* CHARGE

More than half of children with laryngeal clefts have other congenital conditions, such as:

* Tracheobronchomalacia
* Cleft lip and/or palate
* Heart and blood vessel anomalies
* Pulmonary agenesis
* Esophageal atresia
* Bronchoesophageal fistula
* Tracheoesophageal fistula

**SIGNS / SYMPTOMS**

A laryngeal cleft can make it harder for your child to eat and breathe. Symptoms include:

* Choking or coughing during feedings
* Trouble swallowing
* Bluish skin tone (in babies with darker skin tones, cyanosis is easier to notice in their gums, lips, nails and around their eyes)
* A harsh, raspy, wet, breathing sound
* Behavior and sleeping issues due to constantly feeling hungry
* Not gaining weight or growing on schedule
* Aspiration (when food or drink goes down your child’s windpipe, which may lead to lung infections)
* Frequent bouts of pneumonia

**DIAGNOSIS METHODS**

Milder forms of laryngeal cleft, like types I and II, may not get diagnosed for years. Healthcare providers usually diagnose types III and IV within the first few days of a baby’s life because of how severe their symptoms are.

If your child has laryngeal cleft symptoms, an otolaryngologist (ear, nose and throat doctor) may perform an endoscopic evaluation. The most common method for laryngeal cleft diagnosis is a microlaryngoscopy and bronchoscopy. Your child will receive anesthesia that puts them to sleep for the procedure. The otolaryngologist will then insert a camera into your child’s windpipe. They’ll use an instrument to feel for a cleft.

Your child may need to meet with a speech-language pathologist (SLP). This specialist will check how their condition impacts their ability to speak and swallow.

**TREATMENT OPTIONS**

Laryngeal cleft typically requires surgery called laryngeal cleft repair. This is especially the case for types II, III and IV. Sometimes, children compensate for type I as they grow. Children with type I may only need medicines to prevent reflux and food going down the wrong tube (aspiration).

The timing and type of surgery vary depending on the specific laryngeal cleft. Surgeons may repair them using:

* Minimally invasive injection placement. Your child’s surgeon will place a temporary filler in the cleft. It can provide symptom relief (typically up to three months) until your child is a candidate for surgery. Sometimes, it’s the only treatment needed.
* Minimally invasive endoscopic surgery. The surgeon typically uses a laser to remove abnormal tissues in the cleft. Then, they close the cleft opening with sutures (stitches).
* Open surgery. The surgeon repairs the cleft through an incision in your child’s neck. It’s the typical treatment option for children with a type IV laryngeal cleft.

If your child needs surgery, their healthcare provider will give them anesthesia to put them to sleep beforehand. They won’t feel any pain.

#### **Complications or side effects of laryngeal cleft treatment**

Risks involved with laryngeal cleft surgery include:

* Abnormal tightening of your child’s esophagus
* Breaking or opening of the sutures
* Noisy breathing or laryngomalacia
* Injury to the nerves attached to your child’s larynx
* Mediastinitis (swelling of your child’s chest area between their lungs)
* Surgical emphysema (presence of gas under your child’s skin)
* Tracheomalacia (collapse of your child’s airway while breathing)

The chances of a complication depend on lots of factors, including the type of procedure and cleft, and your child’s overall health. Your child’s healthcare provider will discuss this with you beforehand.

### **How long will it take my child to recover from laryngeal cleft treatment?**

After surgery, your child will stay in the hospital for at least a day or two. Because surgery involves sutures to close the cleft, it takes a few weeks or months to heal completely.

**OUTLOOK / PROGNOSIS**

With early diagnosis and treatment, the outcome for children with a laryngeal cleft is good. According to a recent study, 9 out of 10 children who receive laryngeal cleft repair experience improvements within six weeks. But much depends on how advanced the cleft is. Those with type IV have a higher chance of needing more than one surgery and longer hospitalization.

Your child’s healthcare provider will talk to you about your child’s prognosis and follow-up care.

#### **Survival rate for laryngeal cleft**

For most children, having a laryngeal cleft doesn’t impact how long they’ll live. But some babies who have advanced type IV laryngeal cleft and other severe congenital conditions may not survive. But fatalities related to laryngeal cleft — even when it’s advanced — are extremely rare.

With proper treatment and follow-up care, a laryngeal cleft doesn’t have to shorten your child’s life expectancy or reduce their quality of life.

**WHEN TO SEE A DOCTOR / RED FLAG**

After surgery, your child’s provider may recommend follow-up appointments every six months up to a year. How many visits your child needs within that time depends on how they’re doing.

During these appointments, your child’s provider may do imaging tests and ask about their symptoms. Come prepared to speak for your child. Discuss any changes you’ve noticed related to their symptoms and overall health.

**DIFFERENTIAL DIAGNOSIS**

1. Swallowing Disorders Due to Neuromuscular Causes
   * Conditions like cerebral palsy or other neuromuscular diseases leading to poor swallowing coordination and aspiration.
2. Central Nervous System (CNS) Disorders
   * Hydrocephalus
   * Arnold Chiari malformation causing swallowing difficulties and respiratory symptoms.
3. Vocal Cord Paralysis or High Vagal Nerve Palsy
   * Leads to impaired airway protection and aspiration, mimicking cleft symptoms.
4. Tracheoesophageal Fistula (TEF)
   * Another congenital communication between the trachea and esophagus, often associated with esophageal atresia.
5. Laryngomalacia
   * Most common cause of congenital stridor, characterized by floppy supraglottic structures leading to airway obstruction.
6. Gastroesophageal Reflux Disease (GERD)
   * Causes chronic cough, aspiration, and feeding difficulties similar to laryngeal cleft.
7. Esophageal Stricture or Other Esophageal Anomalies
   * May cause swallowing difficulty and respiratory symptoms.
8. Aspiration Syndromes Related to Other Causes
   * Recurrent chest infections and aspiration can result from many different structural or functional swallowing abnormalities.
9. Congenital Heart Disease and Other Syndromic Associations
   * Children with laryngeal clefts often have associated congenital anomalies that can complicate diagnosis.

**EPIDEMIOLOGY**

* Incidence: Laryngeal clefts (LC) are rare congenital malformations with an estimated incidence of approximately 1 in 10,000 to 1 in 20,000 live births. They account for about 0.2% to 1.5% of congenital laryngeal malformations. Because minor forms can be difficult to diagnose and severe forms often carry high mortality, these figures may underestimate the true occurrence.
* Gender: Males are more commonly affected than females, with a reported male-to-female ratio of about 3:1.
* Clinical associations: Laryngeal clefts are frequently associated with other congenital anomalies, especially involving the gastrointestinal tract. For example, tracheoesophageal fistula (TEF) is present in about 25% of LC patients, and associations with laryngomalacia, tracheobronchomalacia, and gastroesophageal reflux disease (GERD) have been noted, particularly in types III and IV clefts.
* Presentation: Severity of symptoms correlates with the cleft type and extension, ranging from mild feeding difficulties and stridor in small clefts to severe respiratory distress in extensive clefts.
* Geographic and ethnic distribution: There is no specific geographic predilection.
* Associated prenatal findings: Approximately 30% of cases are associated with maternal polyhydramnios, likely due to impaired fetal swallowing.

**PREDEFINED Q & A SETS**

## **What is a laryngeal cleft?**

A laryngeal cleft is a congenital birth defect where there is an abnormal gap or opening between the larynx (voice box) and the esophagus (food pipe). This opening allows food or liquids to enter the airway and lungs instead of the stomach, which can cause choking, coughing, and breathing problems.

## **How common is laryngeal cleft?**

It is rare, occurring in approximately 1 in 10,000 to 20,000 live births. It is slightly more common in males.

## **What causes a laryngeal cleft?**

The exact cause is unknown. It develops during the first few months of fetal development and may occur alone or as part of other syndromes or congenital conditions.

## **What are the types of laryngeal cleft?**

There are four types depending on the cleft’s length and depth:

* Type I: Cleft limited to above the vocal cords (mildest form)
* Type II: Extends below the vocal cords into the lower part of the larynx
* Type III: Extends through the larynx into the upper trachea
* Type IV: Extends deep into the trachea and sometimes into the bronchi (most severe).

## **What symptoms does a laryngeal cleft cause?**

Symptoms vary by severity, but common signs in children include:

* Coughing or choking during feeding
* Recurrent respiratory infections or pneumonia
* Hoarseness or weak cry
* Noisy or labored breathing (stridor)
* Poor weight gain or feeding difficulties.

## H**ow is a laryngeal cleft diagnosed?**

Diagnosis is made through specialized procedures such as microlaryngoscopy and bronchoscopy under anesthesia. These allow direct visualization of the cleft. Swallow studies and imaging may also be used to evaluate aspiration.

## **How is a laryngeal cleft treated?**

Treatment depends on the type and severity:

* Milder clefts might be managed conservatively or with less invasive procedures.
* More severe clefts often require surgery to close the gap. Surgery can be performed endoscopically or with an open approach, depending on the cleft extent.

## **What happens if a laryngeal cleft is left untreated?**

Untreated clefts can lead to chronic lung infections, breathing difficulties, failure to thrive, and severe respiratory issues due to repeated aspiration.

## **Can laryngeal clefts be associated with other conditions?**

Yes. More than half of affected children have other congenital anomalies like tracheoesophageal fistula, gastroesophageal reflux disease (GERD), and other airway malformations

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I’ve reviewed your child’s symptoms and test results, and I want to discuss something called a laryngeal cleft with you.

Parent: A laryngeal cleft? What exactly is that?

Doctor: It’s a rare congenital condition where there is an abnormal opening between the larynx—the voice box—and the esophagus, which normally should be fully separated. Because of this opening, food or liquids can sometimes enter the airway and lungs instead of the stomach.

Parent: Oh no, is that why my child has been coughing and choking during feedings?

Doctor: Exactly. These symptoms—coughing, choking during feeding, noisy breathing called stridor, and recurrent lung infections—are common in children with this condition. How old is your child now?

Parent: About 6 months old.

Doctor: That fits the typical presentation. The severity depends on the size and depth of the cleft. We classify these clefts into types I to IV. Type I is the mildest, involving a small gap above the vocal cords. More severe types involve deeper openings that can reach into the trachea and bronchi.

Parent: How do you find out which type my child has?

Doctor: We perform an examination called microlaryngoscopy and bronchoscopy under general anesthesia. This lets us directly see the larynx and measure the cleft. We may also do swallow studies to assess how well your child is swallowing and whether aspiration is occurring.

Parent: Can this be fixed?

Doctor: Yes, treatment depends on the type. Minor clefts sometimes improve with feeding therapy and careful management. More significant clefts usually require surgery to close the opening and prevent aspiration and lung complications.

Parent: What happens if we don’t treat it?

Doctor: Without treatment, your child is at risk of repeated pneumonia, poor weight gain, and breathing problems because food or liquid can enter the lungs repeatedly.

Parent: Is there anything I can do now to help?

Doctor: We will work closely with speech and feeding therapists who can teach safer feeding techniques and sometimes adjust food textures to minimize aspiration risk while we prepare for any needed surgery.

Parent: Will my child need a lot of follow-up?

Doctor: Yes, after treatment we continue to monitor swallowing, breathing, and growth with repeat evaluations and therapies as needed.

Parent: Thank you for explaining; it helps me understand what we are facing.

Doctor: You’re welcome. We will take good care of your child together. Please don’t hesitate to ask any questions as they come up.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/n/statpearls/article-169387/>

<https://emedicine.medscape.com/article/1002527-differential>

<https://my.clevelandclinic.org/health/diseases/22884-laryngeal-cleft>

**Laryngeal nerve damage**

**ALTERNATIVE NAMES**

Recurrent laryngeal nerve injury

**DEFINITION / DESCRIPTION**

Recurrent laryngeal nerve injury is also commonly known as recurrent laryngeal nerve palsy or vocal cord paralysis when it leads to impaired vocal cord movement. These terms describe the condition where damage to the recurrent laryngeal nerve results in hoarseness, voice changes, difficulty swallowing, and even breathing problems if both nerves are affected.

* Recurrent laryngeal nerve palsy emphasizes nerve dysfunction.
* Vocal cord paralysis highlights the resulting immobility of the vocal cords.
* Injury or palsy of this nerve is a frequent complication during surgeries of the neck or chest (e.g., thyroid, lung, esophageal surgeries) and can also result from tumors, infections, or trauma.

**CAUSES**

## Common causes:

* Malignant tumors
  + Lung cancer (most frequent cause)
  + Thyroid gland tumors
  + Esophageal cancer
  + Mediastinal or cervical lymph node malignancies
* Infections
  + Pulmonary tuberculosis
  + Neurotoxic infections like diphtheria
  + Viral neuronitis (may cause idiopathic cases)
* Surgical trauma (most common iatrogenic cause)
  + Thyroidectomy and parathyroid surgery
  + Cardiothoracic surgeries, including lung, esophageal, and heart surgery
  + Cervical spine surgery
  + Endotracheal intubation injuries
* Vascular and cardiac conditions
  + Aortic aneurysm
  + Mitral stenosis
  + Ortner's syndrome (cardiovocal syndrome), where enlarged cardiovascular structures compress the left RLN
* Trauma
  + Neck or chest trauma (penetrating or blunt)
* Neurotoxic exposure
  + Lead, arsenic, mercury poisoning
* Idiopathic
  + Viral infections likely cause many unexplained cases

## Mechanisms of injury include:

* Direct nerve compression or invasion by tumors
* Stretch or traction injury during surgery
* Nerve ligation or accidental transection during procedures
* Postoperative edema causing neuropraxia
* Vascular compromise or ischemia to the nerve

**SIGNS / SYMPTOMS**

* Hoarseness or weak, breathy voice: The most common and early symptom due to vocal cord paralysis or paresis.
* Loss of voice (aphonia) in severe cases or bilateral injury, leading to inability to speak.
* Noisy or labored breathing (stridor), especially if both nerves are injured, causing airway obstruction.
* Difficulty swallowing (dysphagia), due to impaired coordination of the vocal cords and throat muscles.
* Difficulty breathing (dyspnea), particularly with bilateral nerve injury, because the posterior cricoarytenoid muscle—which opens the vocal cords—is paralyzed.
* Change in vocal pitch, including inability to reach high pitches if superior laryngeal nerve is involved.
* Aspiration or choking while eating due to impaired airway protection during swallowing.

Unilateral injury often causes voice changes with minimal breathing issues, whereas bilateral injury is more serious, potentially causing severe airway obstruction requiring emergency tracheostomy

**DIAGNOSIS METHODS**

As usual, a thorough history and physical examination should be performed to guide clinical evaluation. Once recurrent laryngeal nerve injury is suspected, imaging can be considered. It is important to consider that the RLN travels from the base of the skull to the thorax, and imaging can involve any or all of these areas. For instance, a screening chest x-ray can be considered if a pulmonary cause is suspected. In general, evaluation with CT is the most common imaging modality and usually involves the entire length of the recurrent laryngeal nerves. Evaluation with a CT scan can also show signs of possible vocal cord paralysis.

However, when patients present with vocal cord paralysis, direct laryngoscopy is usually considered before CT, and imaging is generally preferred as an adjunct study. Flexible laryngoscopy has been shown to have excellent reliability when evaluating vocal fold motion. Strobolaryngoscopy is an additional tool that can be utilized to evaluate vocal fold vibrations.

Laryngeal ultrasonography is also a newer technique that can be considered when evaluating recurrent laryngeal nerve injury. One study evaluated 112 patients for vocal cord palsy using ultrasonography and compared this with laryngoscopy, the current gold standard. It showed that laryngeal ultrasonography was 83.3% sensitive and 97.2% specific for detecting vocal cord palsy and had a negative predictive value of 99%

**TREATMENT OPTIONS**

The primary treatment options for recurrent laryngeal nerve injury include voice therapy or surgery. In general, early reinnervation techniques are based on the extent of nerve injury and the disease course. Less serious RLN injuries in which there is no definite transection of the nerve can usually be monitored for around six months with voice therapy as needed. If the recurrent laryngeal nerve becomes separated during surgical intervention, end-to-end anastomosis is performed to repair the nerve.

After a period of conservative treatment, vocal fold medialization techniques can be implemented. This moves the affected vocal cord closer to the unaffected vocal cord, creating improved contact. Vocal fold medialization techniques can include medialization thyroplasties, injection laryngoplasty, arytenoid adduction, and laryngeal reinnervation.

Type 1 thyroplasty involves making an external incision to place an implant that permanently moves the affected vocal cord medially. Overall this is a safe procedure that has a low major complication rate, lower than outpatient thyroidectomy.

Injection laryngoplasty is when the affected vocal cord is injected with a material, filling the vocal cord and moving it medially. These injectables can include carboxymethylcellulose, hyaluronic acid derivatives, collagen derivatives, calcium hydroxyapatite, or autologous fat/fascia. However, a Cochrane review has shown no definitive advantage or disadvantage for any specific material.

Arytenoid adduction is a procedure that involves placing a permanent suture through the muscular portion of the arytenoid cartilage. This pulls the affected vocal cord medial to correct vocal cord paralysis secondary to RLN injury. The procedure is often utilized in conjunction with other corrective procedures.

**OUTLOOK / PROGNOSIS**

In general, recurrent laryngeal nerve injuries can be temporary or permanent, and prognosis can vary greatly based on a variety of factors including mechanism of injury and extent of the injury, to name a few. In addition, recovery can be complete or incomplete, highlighting the complexity of nerve injuries and prognosis.

Neuropraxia is the mildest injury. With this injury, the axon remains intact, and nerve function returns in 6-8 weeks. Axonotmesis involves damage to the axon and has varying degrees of severity and prognosis. In one study that reviewed patients undergoing total thyroidectomy secondary to malignancy, 9.5% of patients had recurrent laryngeal nerve injuries resulting in vocal cord paresis with 22% of those becoming permanent, requiring additional interventions. In general, patient prognosis is a complex topic that requires an individual approach for each patient.

**DIFFERENTIAL DIAGNOSIS**

The differential for recurrent laryngeal nerve injury with resulting vocal cord paralysis can include:

* Iatrogenic – Endotracheal intubation or during surgical procedures of the skull base, neck, or chest
* Malignancy – Especially of the skull base, neck, or chest
* Trauma – Including the neck and chest in addition to the larynx
* Neurological – Including stroke (specifically lateral medullary syndrome), bulbar palsies, and demyelinating diseases
* Idiopathic – Diagnosis of exclusion

**EPIDEMIOLOGY**

It is important to note that there is poor epidemiological data on RLN injuries, and additional studies are needed to further elucidate this. This is likely secondary to the multiple causes of vocal cord palsy, with RLN injuries being only a portion of these as well as the relative difficulty in diagnosing RLN injuries. One study that followed a cohort of 325 patients found that males were twice as likely to present with laryngeal nerve palsy. They also found the mean age to be 55 years old. Another study reported the incidence of vocal cord paralysis, a common presenting symptom of RLN injury, to be 0.42% of new patients seen. However, they reported that males were three times more likely to be affected than females. They also reported a similar age group stating that most patients were in their 5th and 6th decades of life

**PREDEFINED Q & A SETS**

## What is recurrent laryngeal nerve injury?

Recurrent laryngeal nerve injury refers to damage to the nerve that controls most intrinsic muscles of the larynx, except the cricothyroid muscle. This injury leads to vocal cord paralysis or paresis, affecting voice, swallowing, and sometimes breathing.

## What are the causes of RLN injury?

Common causes include:

* Surgical trauma, especially thyroidectomy, cardiothoracic, esophageal, or cervical spine surgery
* Tumors in the neck or upper chest (thyroid, lung, mediastinal cancers)
* Infections, such as viral neuritis or tuberculosis
* Vascular conditions (e.g., aortic aneurysm causing nerve compression)
* Trauma to neck or chest
* Iatrogenic injury from intubation or invasive procedures
* Idiopathic or neurological disorders can rarely cause it

## What symptoms does RLN injury cause?

* Hoarseness or weak, breathy voice (most common)
* Difficulty speaking or loss of voice
* Noisy breathing or stridor, especially with bilateral injury
* Difficulty swallowing (dysphagia) and aspiration
* Breathing difficulties (dyspnea) in severe or bilateral cases
* Changes in voice pitch or vocal fatigue

## How is RLN injury diagnosed?

* Clinical evaluation of voice and swallowing changes
* Laryngoscopy to observe vocal cord movement
* Imaging tests such as CT scan or MRI if tumors or structural causes are suspected
* Bronchoscopy or neck exploration in complex cases

## What treatments are available for RLN injury?

* Many mild injuries recover spontaneously within 6–8 weeks
* Voice therapy to improve vocal function
* Surgical treatments to improve vocal cord position and function, such as:
  + Arytenoid adduction
  + Vocal cord injection (collagen, Gelfoam)
  + Thyroplasty to medialize the paralyzed cord
* In bilateral nerve damage cases, tracheotomy may be required to secure the airway
* Nerve repair or reinnervation surgery may be done when feasible

## What is the prognosis?

* Variable; depends on cause and severity
* Unilateral injuries often improve with therapy or surgery
* Bilateral injuries pose higher risk of airway compromise requiring urgent management

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I wanted to discuss the findings related to your voice changes after your thyroid surgery. You have a recurrent laryngeal nerve injury, which is unfortunately a known possible complication.

Patient: What exactly is a recurrent laryngeal nerve injury? What does it mean for me?

Doctor: The recurrent laryngeal nerve controls the muscles that move your vocal cords. When it’s injured, either temporarily or permanently, it can cause hoarseness, weakness in your voice, and sometimes difficulty swallowing or breathing.

Patient: Is this nerve damage permanent? Will my voice come back?

Doctor: Many times, the nerve recovers by itself within a few weeks to months. We closely monitor your symptoms. If your voice remains weak or if swallowing or breathing is affected after about a year, we might consider treatments like voice therapy or even surgery to improve the vocal cord position.

Patient: What kind of treatments do you offer if it doesn't get better?

Doctor: Treatment depends on the severity. Voice therapy with a speech therapist can help strengthen your voice. If that’s not enough, surgical options such as vocal cord injection or medialization procedures can help move the vocal cord closer to the middle, improving your voice and preventing aspiration. For severe cases, especially if both sides are affected and breathing is compromised, a tracheotomy might be necessary temporarily.

Patient: How do you check how badly the nerve is damaged?

Doctor: We perform a laryngoscopy, which is a simple exam where we look at your vocal cords using a small camera through your nose or mouth. It shows us how well your vocal cords move and helps us decide the best treatment.

Patient: Should I be worried about any breathing problems?

Doctor: Breathing problems are uncommon unless both nerves are injured. Since your surgery involved only one side, this is unlikely, but if you notice any noisy or difficult breathing, you should tell us immediately.

Patient: Is there anything I can do to help my recovery now?

Doctor: Resting your voice, staying hydrated, and attending voice therapy sessions can be very helpful. Avoid straining your voice, and we will monitor you regularly to track any improvements.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK560832/>

**Laryngitis**

**DEFINITION / DESCRIPTION**

Laryngitis is an inflammation of your voice box (larynx) from overuse, irritation or infection.

Inside the larynx are your vocal cords — two folds of mucous membrane covering muscle and cartilage. Normally, your vocal cords open and close smoothly, forming sounds through their movement and vibration.

But with laryngitis, your vocal cords become inflamed or irritated. This makes the vocal cords swell, which distorts the sounds produced by air passing over them. As a result, your voice sounds hoarse. In some cases of laryngitis, your voice can become almost undetectable.

Laryngitis may be short-lived (acute) or long lasting (chronic). Most cases of laryngitis are triggered by a temporary viral infection and aren't serious. Persistent hoarseness can sometimes signal a more serious underlying medical condition.

**CAUSES**

### **Acute laryngitis**

Most cases of laryngitis are temporary and improve after the underlying cause gets better. Causes of acute laryngitis include:

* Viral infections similar to those that cause a cold
* Vocal strain, caused by yelling or overusing your voice
* Bacterial infections, although these are less common

### **Chronic laryngitis**

Laryngitis that lasts longer than three weeks is known as chronic laryngitis. This type of laryngitis is generally caused by exposure to irritants over time. Chronic laryngitis can cause vocal cord strain and injuries or growths on the vocal cords (polyps or nodules). Chronic laryngitis can be caused by:

* Inhaled irritants, such as chemical fumes, allergens or smoke
* Acid reflux, also called gastroesophageal reflux disease (GERD)
* Chronic sinusitis
* Excessive alcohol use
* Habitual overuse of your voice (such as in singers or cheerleaders)
* Smoking

Less common causes of chronic laryngitis include:

* Bacterial or fungal infections
* Infections with certain parasites

Other causes of chronic hoarseness include:

* Cancer
* Vocal cord paralysis, which can result from nerve injury due to surgery, injury to the chest or neck, cancer, nerve disorders, or other health conditions
* Bowing of the vocal cords

**RISK FACTORS**

Risk factors for laryngitis include:

* **Having a respiratory infection,** such as a cold, bronchitis or sinusitis
* **Exposure to irritating substances,** such as cigarette smoke, excessive alcohol intake, stomach acid or workplace chemicals
* **Overusing your voice,** by speaking too much, speaking too loudly, shouting or singing

**SIGNS / SYMPTOMS**

In most cases laryngitis symptoms last less than a couple of weeks and are caused by something minor, such as a virus. Less often, laryngitis symptoms are caused by something more serious or long lasting. Laryngitis signs and symptoms can include:

* Hoarseness
* Weak voice or voice loss
* Tickling sensation and rawness in your throat
* Sore throat
* Dry throat
* Dry cough

**DIAGNOSIS METHODS**

The most common sign of laryngitis is hoarseness. Changes in your voice can vary with the degree of infection or irritation, ranging from mild hoarseness to almost total loss of your voice. If you have chronic hoarseness, your doctor may review your medical history and symptoms. He or she may want to listen to your voice and examine your vocal cords, and he or she may refer you to an ear, nose and throat specialist.

These techniques sometimes are used to help diagnose laryngitis:

* **Laryngoscopy.** In a procedure called laryngoscopy, your doctor can visually examine your vocal cords by using a light and a tiny mirror to look into the back of your throat. Or your doctor may use fiber-optic laryngoscopy. This involves inserting a thin, flexible tube (endoscope) with a tiny camera and light through your nose or mouth and into the back of your throat. Then your doctor can watch the motion of your vocal cords as you speak.
* **Biopsy.** If your doctor sees a suspicious area, he or she may do a biopsy — taking a sample of tissue for examination under a microscope.

**TREATMENT OPTIONS**

Acute laryngitis often gets better on its own within a week or so. Self-care measures, such as voice rest, drinking fluids and humidifying your air, also can help improve symptoms.

Chronic laryngitis treatments are aimed at treating the underlying causes, such as heartburn, smoking or excessive use of alcohol.

Medications used in some cases include:

* **Antibiotics.** In almost all cases of laryngitis, an antibiotic won't do any good because the cause is usually viral. But if you have a bacterial infection, your doctor may recommend an antibiotic.
* **Corticosteroids.** Sometimes, corticosteroids can help reduce vocal cord inflammation. However, this treatment is used only when there's an urgent need to treat laryngitis — such as in some cases when a toddler has laryngitis associated with croup.

You may also have voice therapy to learn to lessen behaviors that worsen your voice.

In some cases, you may need surgery.

Medications and Their Side Effects:

* Antibiotics
  + Information: Antibiotics are generally ineffective for laryngitis because it is usually caused by a viral infection . However, if a bacterial infection is identified as the cause, antibiotics may be prescribed . Some studies suggest that certain antibiotics, like erythromycin, might reduce subjective symptoms such as voice disturbance and cough, but objective improvements in voice quality are not clearly demonstrated .
  + Side Effects: While specific side effects for laryngitis treatment are not detailed in the provided sources, general antibiotic side effects can include adverse reactions and contribute to antibiotic resistance .
* Corticosteroids
  + Information: Corticosteroids can reduce vocal cord inflammation and may be used for rapid relief in specific, urgent situations, such as in toddlers with croup-associated laryngitis .
  + Side Effects: The provided sources do not specify the side effects of corticosteroids when used for laryngitis .
* Proton-Pump Inhibitors (PPIs)
  + Information: PPIs are prescribed when laryngitis is caused by gastroesophageal reflux disease (GERD) .
  + Side Effects: The provided sources do not specify the side effects of PPIs .
* Antihistamines
  + Information: Antihistamines may be used if allergies causing post-nasal drip contribute to laryngitis .
  + Side Effects: The provided sources do not specify the side effects of antihistamines .
* Over-the-Counter (OTC) Pain Relievers
  + Information: Medications such as paracetamol (acetaminophen) or ibuprofen can help alleviate symptoms like pain, fever, headache, and sore throat associated with laryngitis .
  + Side Effects: The provided sources do not specify the side effects of these OTC pain relievers .
* Cough Syrup
  + Information: Cough syrup can be used to help with coughing associated with laryngitis .
  + Side Effects: The provided sources do not specify the side effects of cough syrup .
* Gargle Solutions and Lozenges
  + Information: These can provide relief for sore throats .
  + Side Effects: The provided sources do not specify the side effects of gargle solutions or lozenges

## **Self care**

Some self-care methods and home treatments may relieve the symptoms of laryngitis and reduce strain on your voice:

* **Breathe moist air.** Use a humidifier to keep the air throughout your home or office moist. Inhale steam from a bowl of hot water or a hot shower.
* **Rest your voice as much as possible.** Avoid talking or singing too loudly or for too long. If you need to speak before large groups, try to use a microphone or megaphone.
* **Drink plenty of fluids** to prevent dehydration (avoid alcohol and caffeine).
* **Moisten your throat.** Try sucking on lozenges, gargling with salt water or chewing a piece of gum.
* **Avoid decongestants.** These medications can dry out your throat.
* **Avoid whispering.** This puts even more strain on your voice than normal speech does.

**PREVENTION TIPS**

To prevent dryness or irritation to your vocal cords:

* **Avoid smoking and stay away from secondhand smoke.** Smoke dries your throat. It can also cause your vocal cords to become irritated.
* **Limit alcohol and caffeine.** These cause you to lose total body water.
* **Drink plenty of water.** Fluids help keep the mucus in your throat thin and easy to clear.
* **Keep spicy foods out of your diet.** Spicy foods can cause stomach acid to go into the throat or esophagus. This can lead to heartburn or gastroesophageal reflux disease (GERD).
* **Include a variety of healthy foods in your diet.** Eat fruits, vegetables and whole grains. These have several vitamins, such as vitamins A, E and C, that are important for overall health. These foods can also help keep the mucous membranes in the throat healthy.
* **Avoid clearing your throat.** This does more harm than good, because it causes an abnormal vibration of your vocal cords and can increase swelling. Clearing your throat also causes your throat to secrete more mucus and feel more irritated, making you want to clear your throat again.
* **Avoid upper respiratory infections.** Wash your hands often, and avoid contact with people who have upper respiratory infections such as colds.

**OUTLOOK / PROGNOSIS**

Acute laryngitis only lasts a week or two. If you have symptoms that linger for more than three weeks, you may have chronic laryngitis.

### **When can I go back to work or school?**

Use discretion when deciding when to go back to your normal routines. If you work at a job that requires a lot of talking, then you should take some days off to recover. Additionally, you should avoid going to work or school if you may be contagious. If you’re not sure, ask your healthcare provider.

**POSSIBLE COMPLICATIONS**

In some cases of laryngitis caused by infection, the infection may spread to other parts of the respiratory tract.

**WHEN TO SEE A DOCTOR / RED FLAG**

You can manage most acute cases of laryngitis with self-care steps, such as resting your voice and drinking plenty of fluids. Strenuous use of your voice during an episode of acute laryngitis can damage your vocal cords.

Make an appointment with a doctor if your laryngitis symptoms last more than two weeks.

### **Seek immediate medical attention if you:**

* Have trouble breathing
* Cough up blood
* Have a fever that won't go away
* Have increasing pain over weeks

### **Seek immediate medical attention if your child:**

* Makes noisy, high-pitched breathing sounds when inhaling (stridor)
* Drools more than usual
* Has trouble swallowing
* Has difficulty breathing
* Has a fever

These signs and symptoms may indicate croup — inflammation of the larynx and the airway just beneath it. Although croup can usually be treated at home, severe symptoms require medical attention. These symptoms can also indicate epiglottitis, an inflammation of the tissue that acts as a lid (epiglottis) to cover the windpipe (trachea), which can be life-threatening for children and adults.

**DIFFERENTIAL DIAGNOSIS**

* Upper respiratory tract infection (URTI) While acute laryngitis is often caused by a viral URTI, other URTIs can present with similar symptoms .
* Vocal fold abnormalities Conditions like vocal fold cysts, nodules, or polyps can cause hoarseness and voice changes .
* Laryngeal stenosis This involves narrowing of the larynx .
* Spasmodic dysphonia A neurological condition affecting the voice muscles .
* Post-nasal drip Also known as chronic upper airway cough syndrome .
* Contact granulomas Lesions on the vocal cords .
* Glottic stenosis Narrowing of the glottis, the part of the larynx that contains the vocal cords .
* Thyroarytenoid muscle sulcus A groove or furrow in the vocal fold .
* Reinke's edema swelling of the vocal folds due to fluid accumulation .
* Epiglottitis Inflammation of the epiglottis, a flap of cartilage at the base of the tongue .
* Foreign body obstruction An object lodged in the airway .
* Subglottic stenosis Narrowing of the airway below the vocal cords .
* Angioneurotic edema Swelling due to an allergic reaction .
* Retropharyngeal abscess A collection of pus behind the pharynx .
* Bacterial tracheitis A bacterial infection of the trachea .
* Reflux laryngitis Inflammation of the larynx caused by acid reflux .
* Rhinitis Inflammation of the nasal passages .
* Chondronecrosis of the larynx Tissue death in the laryngeal cartilage .
* Iatrogenic vocal fold scar Scarring of the vocal fold caused by medical intervention .
* Systemic conditions such as tuberculosis, syphilis, lupus, and scleroma can affect the larynx .
* Laryngeal cancer .
* Croup (in children)

**EPIDEMIOLOGY**

### Frequency

*United States*

The exact prevalence of acute laryngitis is not reported because many patients often use conservative measures to treat their inflammation rather than seek medical consultation. Symptoms of an upper respiratory tract infection often accompany the disease; thus, patients are accustomed to managing their own treatment. Nevertheless, laryngitis is one of the most common laryngeal pathologies.

A study by Bhattacharyya suggested that annually about 1% of children in the United States are affected by voice or swallowing problems, with laryngitis being a common diagnosis in these cases. Using the 2012 National Health Interview Survey, the study found that an estimated 839,000 children in the United States (1.4%) reported a voice problem in the 12 months preceding the survey, with 53.5% of these youngsters having been given a diagnosis for it, the most prevalent being laryngitis (16.6%) and allergies (10.4%).

A retrospective study by Roy et al indicated that among elderly members of the US population (those over age 65 years) who saw a primary care physician or otolaryngologist, acute and chronic laryngitis were among the most frequent laryngeal/voice disorder diagnoses, along with nonspecific dysphonia and benign vocal fold lesions. The study, which was based on information from a national administrative database, also found that among the elderly, women had greater odds of developing acute laryngitis than did men.

A study by Benninger et al found that between 2008 and 2012, an increase in dysphonia diagnoses in the US population (from 1.3% to 1.7%) was accompanied by an associated rise in acute laryngitis diagnoses.

*International*

A study by Tanislav and Kostev indicated that in Germany, there was a significant decrease in cases of acute laryngitis during the coronavirus disease 2019 (COVID-19) pandemic. The diagnoses of acute laryngitis by general practitioners were 64% lower between April 2020 and March 2021 than they were during the same period between 2019 and 2020. Among non-COVID respiratory tract infections, only influenza diagnoses saw a greater drop (71%). The investigators suggested that measures used to prevent the spread of COVID-19, such as mask wearing, social distancing, and attention to hand hygiene, may have also impacted the transmission of these other infections.

### Mortality/Morbidity

Because acute laryngitis is usually self-limited and treated with conservative measures, significant morbidity and mortality are not encountered. Patients who develop acute laryngitis from an infectious etiology rather than vocal trauma may ultimately injure their vocal folds. The deficient voice production in patients with acute laryngitis may result in application of a greater adduction force or tension to compensate for the incomplete glottic closure during an acute laryngitic episode. This tension further strains the vocal folds and decreases voice production, ultimately delaying return of normal phonation.

In 1997, Ng conducted a study of the aerodynamic and acoustic characteristics of acute laryngitis.His study demonstrated that across the 5 vowels, the fundamental frequency values were lower in patients with acute laryngitis than in patients with a normal voice. The authors concluded that acute laryngitis changes the vocal fold mass, resulting in a reduction of the fundamental frequency; other authors have anecdotally corroborated this finding.

Patients with acute laryngitis have an increased open quotient value. This indicates that the patient's vocal folds are open longer, and less time is spent in the closed position, which contributes to the hoarseness and breathiness of the voice.

Laryngitis has a significant economic impact. Over the economic burden, pharmaceutical costs were approximately 30% of such costs.

### Age

Studies have demonstrated that, usually, acute laryngitis affects individuals aged 18-40 years. Children, a category not included in the above study, are clinically observed with acute laryngitis when aged 3 years and older.

Because chronic laryngitis is usually part of a more complex disease, it is probably underreported.

### Mortality/Morbidity

Chronic laryngitis presents a frustrating treatment problem. Voice loss, chronic cough, and airway obstruction, respectively, are the most likely complications. An association with cancer of the larynx is unclear. Mortality is obviously related to the main disease with which chronic laryngitis is associated.

### Race

The condition apparently affects all races equally.

### Sex

Traditionally, men have been mostly affected. In recent reports, a 2:1 male predominance still exists; however, the trend is changing, probably because of more women smoking cigarettes and their increasing involvement in work activities in toxic environments.

### Age

Adults in the sixth decade of life are mainly affected. Neonates and infants share similar risk factors with adults for developing chronic laryngitis. Additionally, various congenital lesions of the larynx may present with voice changes.

**PREDEFINED Q & A SETS**

. What is laryngitis?  
Laryngitis is inflammation of the larynx (voice box), causing hoarseness, voice loss, and sometimes sore throat or cough. The vocal cords become swollen and cannot vibrate properly, affecting the voice.

2. What causes laryngitis?  
Common causes include viral infections (cold, flu), vocal strain (shouting, singing), bacterial infections (less common), acid reflux, allergies, smoking, chemical irritants, chronic sinusitis, and overuse of voice.

3. How long does laryngitis last?

* *Acute laryngitis* typically lasts less than three weeks, often resolving within a week.
* *Chronic laryngitis* persists beyond three weeks and requires medical attention.

4. What are common symptoms?  
Hoarseness or weak voice, loss of voice, sore throat, dry cough, difficulty speaking, throat discomfort, sometimes mild fever.

5. How is laryngitis diagnosed?  
Diagnosis is based on symptoms and physical examination. Laryngoscopy may be used to view vocal cord inflammation or other abnormalities if chronic or severe.

6. How is laryngitis treated?  
Treatment depends on cause but generally includes:

* Voice rest and avoiding vocal strain
* Staying hydrated and using humidifiers
* Avoiding smoking and irritants
* For viral cases: usually self-limited, no antibiotics needed
* For bacterial infection: antibiotics may be prescribed
* For reflux-related laryngitis: antacids or reflux medications
* Symptomatic relief with pain relievers and cough syrups.

7. When to see a doctor?  
Seek medical care if:

* Symptoms last longer than two-three weeks
* Difficulty breathing or swallowing
* High fever or coughing blood
* Frequent recurrence of laryngitis.

8. Can laryngitis be prevented?  
Measures include:

* Avoiding smoking and secondhand smoke
* Staying hydrated
* Minimizing throat clearing and vocal strain
* Managing acid reflux with medical treatment if needed.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, what brings you in today?

Patient: I’ve had a hoarse voice for a few days and it’s not getting better. I’m also having some throat discomfort.

Doctor: Thank you for letting me know. How long have you had these symptoms?

Patient: About a week now.

Doctor: Have you noticed any difficulty breathing or swallowing, or any high fever?

Patient: No difficulty breathing or swallowing. I had a slight fever initially but it went away.

Doctor: Have you been using your voice a lot recently? Singing, shouting, or any unusual strain?

Patient: Yes, I’ve been speaking a lot at work and sometimes raising my voice.

Doctor: That likely contributed to inflammation of your voice box, called laryngitis. Most cases are due to viral infections or voice overuse and improve with voice rest. Are you a smoker or exposed to irritants like smoke or chemicals?

Patient: No, I don’t smoke and there’s no exposure to irritants.

Doctor: Good. Usually, the hoarseness from laryngitis improves within a couple of weeks. I recommend resting your voice as much as possible, staying hydrated, and avoiding irritants. You can use over-the-counter pain relievers like paracetamol if you have discomfort.

Patient: Should I be worried about anything serious?

Doctor: If your hoarseness persists beyond three weeks, or if you develop difficulty breathing, swallowing, high fever, or a lump in your neck, you should return to see a specialist. They may perform a laryngoscopy to look at your vocal cords and rule out other causes like nodules or, rarely, tumors.

Patient: If it’s due to reflux or allergies, what happens then?

Doctor: If reflux is suspected, we might recommend medications to reduce stomach acid. Allergies may be treated with antihistamines. Sometimes speech therapy helps if the issue stems from vocal strain.

Patient: Thank you, doctor. I’ll follow your advice.

Doctor: You’re welcome. And please call us if symptoms worsen or don’t improve after three weeks.

REFERENCES:

<https://my.clevelandclinic.org/health/diseases/22268-laryngitis>

<https://www.mayoclinic.org/diseases-conditions/laryngitis/diagnosis-treatment/drc-20374267>

<https://emedicine.medscape.com/article/864767-overview#a6>

**Laryngomalacia**

**DEFINITION / DESCRIPTION**

Laryngomalacia (*lah-ring-oh-ma-LAY-shia*) is a larynx (voice box) abnormality that can happen in newborn babies. It occurs when weak, floppy tissues above the voice box temporarily fall back over the airway. It’s the most common cause of noisy breathing in babies.

Laryngomalacia sounds like a high-pitched squeak (stridor) when your baby breathes in. It usually isn’t serious. But in severe cases, it can cause breathing and feeding issues, among other complications.

Congenital laryngomalacia (meaning you’re born with it) is common in infants. Over half of all newborn babies have it during the first week of life, and even more develop it when they’re 2 to 4 weeks old.

Laryngomalacia can also occur in adults, but it’s rare. (Healthcare providers refer to this as acquired laryngomalacia.)

**CAUSES**

Experts aren’t exactly sure why some babies develop laryngomalacia and others don’t. But they have a few theories about why it happens, in general:

* Structural abnormalities: The cartilage or muscles around the voice box form atypically (differently) during fetal development.
* Neuromuscular disorders: These include disorders that affect the vocal cord nerves and muscles.
* GERD: If acid reflux reaches the voice box, it can cause swelling in the area. This can worsen any structural abnormalities causing laryngomalacia.

#### **Types of laryngomalacia**

Healthcare providers categorize laryngomalacia into three types according to cause:

1. Type 1: The mucous membranes of the voice box are too tight or too short.
2. Type 2: The upper part of the voice box has excess soft tissue.
3. Type 3: An underlying disorder (like GERD or neuromuscular disorder) causes laryngomalacia.

**SIGNS / SYMPTOMS**

Laryngomalacia symptoms can range from mild to severe. Loud, noisy or squeaky breathing is the main thing to watch for. This often worsens over the first several months but resolves within a year or two.

Most babies with laryngomalacia have no trouble breathing or feeding, even when their breathing sounds concerning. Breathing usually gets louder when lying down, sleeping, crying or feeding.

Babies with severe laryngomalacia may have these symptoms:

* Apnea (long pauses in breathing).
* Aspiration (pulling food into the lungs).
* Cyanosis (a condition that causes the skin to develop a bluish hue).
* Difficulty swallowing (dysphagia).
* Inability to gain weight.
* “Tugging” or “pulling in” at the neck or chest when breathing.

If your baby shows any of the symptoms listed above, call their pediatrician right away.

**DIAGNOSIS METHODS**

Nasopharyngolaryngoscopy (NPL) is the main test healthcare providers use to diagnose laryngomalacia. An otolaryngologist (ENT) uses a scope with a tiny camera (endoscopy) to view your baby’s voice box. They’ll gently guide the scope into your baby’s nostril and down their throat. Providers can do this routine test in about two to five minutes.

#### **Other laryngomalacia tests**

If your baby has laryngomalacia, their provider may need to run other tests to determine the extent of the condition. These tests may include:

* Airway fluoroscopy: This procedure combines X-rays and a contrast agent (like dye) that illuminates affected areas within your baby’s body. Your provider may do this as a swallow study to see how laryngomalacia affects your baby’s swallowing function.
* Impedance probe: A healthcare provider inserts a small tube through your baby’s nose and into their esophagus. Then, they use a measuring device to see how much stomach acid reaches your baby’s voice box. Babies who have this procedure usually stay for at least one night in the hospital.
* Microlaryngoscopy and bronchoscopy (ML&B): A healthcare provider uses a lighted scope to examine your baby’s trachea (windpipe) and voice box to see what’s causing loud breathing. They’ll do this procedure under general anesthesia.
* Neck or chest X-rays: These imaging tests can tell your healthcare provider if your baby has any structural abnormalities that may cause noisy breathing.

**TREATMENT OPTIONS**

Most of the time, laryngomalacia goes away on its own within a year or two and the noisy breathing improves over time. In mild cases, you can manage your baby’s symptoms at home. But if your baby has severe laryngomalacia, they might need medication or surgery.

#### **Treatment at home**

If your baby has mild symptoms, you can usually keep an eye on things at home. Laryngomalacia management depends on your baby’s unique situation:

* If your baby has trouble with feeding, you may need to feed them more often to make up for lost calories and nutrition. You can also try thickening their formula. (You can do this with infant cereal or over-the-counter thickeners.) This increases the “stickiness” of their food so it’s less likely to come back up into their esophagus.
* If your baby has breathing difficulties, your provider might recommend elevating the head of their mattress. This may help open their airway.

Ask your provider about specific ways to manage your baby’s laryngomalacia symptoms.

#### **Medication**

When GERD occurs with laryngomalacia, your baby’s provider may prescribe an anti-reflux medication like a proton pump inhibitor (PPI) or H2 blocker. GERD can worsen swelling associated with laryngomalacia, so it’s important to keep reflux in check if it’s a contributing factor.

#### **Surgery**

Laryngomalacia surgery involves trimming the weak, floppy tissue above your baby’s voice box. This procedure is a supraglottoplasty. An ENT surgeon will do a supraglottoplasty in an operating room while your child is under general anesthesia. Your baby will typically stay overnight in the hospital for observation.

### **How long will it take for my baby to feel better after treatment?**

Anti-reflux medication usually improves symptoms within two weeks. But your baby will probably need to stay on medication for several weeks or months.

If your baby had laryngomalacia surgery, their breathing may sound worse for a few days. This is normal. It’s due to post-op inflammation (swelling) around their vocal cords. The noisy breathing should gradually improve, with full recovery taking about two weeks.

**PREVENTION TIPS**

You can’t prevent laryngomalacia. But you can manage your baby’s symptoms with treatment.

As a parent, you want to shield your baby from all harm. But laryngomalacia is just something that happens. It doesn’t mean you’ve done something wrong. Although the sounds your child makes may be scary at first, treatment may not be necessary.

**OUTLOOK / PROGNOSIS**

Despite the noisy breathing, laryngomalacia is usually not dangerous. While most babies outgrow laryngomalacia, a few will need surgery to correct the issue, especially if they’re having trouble gaining weight or are having severe breathing difficulties. Your healthcare provider can tell you what to expect if your baby receives a diagnosis.

#### **How long the condition lasts**

Laryngomalacia usually goes away on its own by age 1 or 2. But you should keep an eye out for severe symptoms like apnea and a bluish color around their lips. These things can cause serious complications.

**WHEN TO SEE A DOCTOR / RED FLAG**

If your baby shows symptoms of laryngomalacia, like noisy breathing, consider scheduling an appointment with your healthcare provider. They can examine your baby and make recommendations for referral to ENT, home care and management.

Call your provider right away if your baby develops sudden symptoms, or if they have GERD.

Head to the nearest emergency room if your baby:

* Stops breathing for more than 10 seconds at a time.
* Has a “tugging” or “pulling in” at the chest or neck when breathing.
* Turns blue around the lips.

**DIFFERENTIAL DIAGNOSIS**

* Congenital Stridor
* Croup
* Hypocalcemia
* Pediatric Airway Foreign Body
* Pediatric Gastroesophageal Reflux
* Pediatric Subglottic Stenosis Surgery
* Respiratory Papillomatosis

**EPIDEMIOLOGY**

### United States statistics

Frequency is unknown. Often, the diagnosis is presumed.

### Race-, sex-, and age-related demographics

*Race*

No known race predilection has been reported.

*Sex*

Although previous reports in predominately White populations have reported a male predominance (58-76% of cases), a more recent study of a more ethnically diverse population demonstrated no significant difference between males and females.

*Age*

Although this is a congenital lesion, airway sounds typically begin at age 4-6 weeks. Until that age, inspiratory flow rates may not be high enough to generate the sounds. Symptoms typically peak at age 6-8 months and remit by age 2 years.

Late-onset laryngomalacia may be a distinct entity, which can present after age 2 years.

## **Procedures**

### Laryngoscopy and bronchoscopy

These studies are the best studies used to confirm the diagnosis. However, in an infant with typical inspiratory noises (worse when supine) who has a normal cry and normal growth and development, clinical diagnosis is not unreasonable.

A pediatric pulmonologist or pediatric otorhinolaryngologist may perform flexible laryngoscopy or bronchoscopy. Bronchoscopy under anesthesia has been shown to be more sensitive and specific than bronchoscopy in infants who are awake.

Direct visualization of the airway reveals an omega-shaped epiglottis that prolapses over the larynx during inspiration. Enlarged arytenoid cartilages that prolapse over the larynx during inspiration may also be present.

The International Pediatric Otolaryngology Group recommends that microlaryngotracheobronchoscopy to detect synchronous airway lesions be reserved for patients with severe, progressive, or atypical disease.

**PREDEFINED Q & A SETS**

### **Laryngomalacia vs. tracheomalacia: What’s the difference?**

Both laryngomalacia and tracheomalacia are conditions affecting the airway. While laryngomalacia refers to floppy tissues above the voice box, the characteristics of tracheomalacia include floppy or weak cartilage of the windpipe, which is below the voice box. Tracheomalacia is far less common — and usually more serious — than laryngomalacia.

### **Can laryngomalacia cause weight gain?**

Not usually. In fact, babies with severe laryngomalacia may struggle to gain weight.

### **What worsens laryngomalacia?**

Lying on their back could make your baby’s laryngomalacia symptoms worse. If you notice that your baby is having difficulty breathing when sleeping on their back, please see your healthcare provider.

Additionally, GERD — which is common in babies with laryngomalacia — may make their symptoms worse.

**What is laryngomalacia?**  
Laryngomalacia is a congenital condition where the soft tissues above the vocal cords (supraglottic larynx) are floppy and collapse inward during inspiration, partially blocking the airway and causing noisy breathing called stridor. It is the most common cause of noisy breathing in infants.

2. **What causes laryngomalacia?**  
It results from anatomic and neuromuscular immaturity causing supraglottic tissue floppiness and collapse into the airway during inhalation. The exact reason why some infants develop it and others don’t is unclear. It is present from birth but symptoms often appear within the first weeks of life.

3**. What are the typical symptoms?**  
The hallmark symptom is *inspiratory stridor*—a high-pitched noisy inhalation. Stridor may worsen with feeding, crying, lying on the back, or sleeping. Most infants breathe and feed normally despite the noise. Severe cases may include feeding difficulties, poor weight gain, apnea (breathing pauses), cyanosis (bluish skin), and respiratory distress.

4. **How and when is laryngomalacia diagnosed?**  
Diagnosis is usually made by an ENT specialist via *flexible laryngoscopy*, which uses a small camera passed through the nose to visualize the floppy supraglottic tissues collapsing during inspiration. Diagnosis is generally made in the first few weeks to months of life.

5. **What is the typical course and prognosis?**  
Laryngomalacia is usually mild and self-limiting. Symptoms typically worsen over the first few months but tend to improve by 12 to 18 months of age as the tissues become firmer and neuromuscular control improves. Most infants have no long-term issues.

6. **When is treatment needed?**  
Most cases require no treatment beyond monitoring. Supportive care includes positioning the infant upright after feeding and managing gastroesophageal reflux if present. Severe cases with feeding problems, failure to thrive, or significant breathing difficulty may require surgical intervention, most commonly *supraglottoplasty* to trim floppy tissues and open the airway.

**7. Is laryngomalacia life-threatening?**  
Rarely. Most infants tolerate the condition well. Emergency medical attention is needed if the infant experiences prolonged breathing pauses, cyanosis, or severe respiratory distress.

**8. Can adults have laryngomalacia?**  
Laryngomalacia predominantly affects infants but can rarely occur in adults, usually related to other medical problems affecting the larynx

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you are concerned about your baby's noisy breathing. Can you tell me what you have noticed?

Parent: Yes, my baby has been making a strange, high-pitched noise when breathing in, especially when feeding or lying down. It sounds like wheezing or stridor.

Doctor: That sound is called *inspiratory stridor* and is commonly caused by a condition known as *laryngomalacia*. It means the tissues above the vocal cords are a bit floppy and sometimes collapse inward, partially blocking the airway when your baby breathes in.

Parent: Is this serious? What causes it?

Doctor: Laryngomalacia is the most common cause of noisy breathing in infants. It’s due to immature and soft airway tissues present at birth that usually become firmer as the baby grows. It's not usually serious and most babies grow out of it by 12 to 18 months.

Parent: How do you confirm the diagnosis?

Doctor: We typically perform a *flexible laryngoscopy*, which is a quick, painless procedure where a small camera is passed through the nose to look at the larynx. This helps us see the floppy tissues collapsing when your baby breathes in.

Parent: What treatment does my baby need?

Doctor: For mild cases, no specific treatment is required except careful monitoring. We advise keeping your baby upright during feeding and managing any reflux symptoms if present. Most babies improve on their own without any surgery.

If your baby has feeding difficulties, poor weight gain, or worsening breathing, we may consider medical therapies or refer you for surgery called *supraglottoplasty* to correct the floppy tissue.

Parent: When should I be worried or come back?

Doctor: If your baby develops difficulty breathing, stops feeding well, shows bluish skin, or if the noisy breathing worsens significantly, please seek medical attention immediately. Otherwise, we'll monitor growth and symptoms over time.

Parent: Thank you, doctor. That makes me feel better.

Doctor: You're welcome. We will schedule follow-up visits to make sure your baby is doing well. Don’t hesitate to reach out if you have concerns.

REFERENCES:

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/laryngomalacia>

<https://my.clevelandclinic.org/health/diseases/22076-laryngomalacia>

<https://www.ncbi.nlm.nih.gov/books/NBK544266/>

<https://emedicine.medscape.com/article/1002527-workup#c3>

**Ludwig angina**

**DEFINITION / DESCRIPTION**

Ludwig’s angina (Ludwig angina) is a fast-growing cellulitis infection that affects the floor of your mouth. Swelling can spread quickly to your tongue and throat, making it hard for you to breathe.

This type of bacterial infection can occur after a mouth injury, but it usually happens because of an abscessed (infected) tooth.

Ludwig angina is a medical emergency and requires immediate medical care. Without treatment, it can be fatal. But early detection and quick medical care can get rid of the infection.

The condition gets its name from German physician Wilhelm Friedrich von Ludwig, who first described it in 1836. “Angina” describes any condition that causes severe pain in a specific area of your body.

**CAUSES**

The most common cause of Ludwig angina is an abscessed lower molar tooth. Over 90% of cases start this way.

Other causes include:

* Injury inside your mouth, especially around the back of your lower jaw
* Oral surgery complications
* Pericoronitis (gum inflammation around a wisdom tooth)

Bacteria species that commonly cause Ludwig angina are *Streptococcus*, *Staphylococcus* and *Bacteroides*.

**RISK FACTORS**

You have a higher risk of developing Ludwig angina if you have:

* A compromised immune system
* Alcohol use disorder
* Cavities
* Diabetes
* Malnutrition
* Oral cancer
* Poor oral hygiene

**SIGNS / SYMPTOMS**

Ludwig’s angina symptoms can come on suddenly and may include:

* Difficulty breathing
* Difficulty swallowing
* Drooling
* Fever or chills
* Jaw pain or swelling
* Neck pain, swelling or discoloration
* Protruding or swollen tongue
* Slurred speech
* Tongue tenderness or pain under your tongue
* Toothache

Symptoms can get worse quickly. Prompt medical care is key.

Ludwig angina isn’t contagious. If you have it, you can’t pass it to someone else.

**DIAGNOSIS METHODS**

Healthcare providers usually diagnose Ludwig angina during a physical exam. They’ll look for swelling around the front of your neck and underneath your jaw. They’ll also check for an enlarged tongue and swelling on the floor of your mouth.

Your healthcare provider may run additional tests like:

* Bacteria culture test. This can tell your provider whether the infection has spread to your bloodstream. They’ll need a small sample of your blood to run this test.
* CT scan. This imaging test can show your provider the severity of the infection. It can also help them detect abscesses. They’ll only do this test after they’ve treated any breathing issues.
* Ultrasound. This test can help your provider detect blood clots and pockets of infection. It can also determine whether the infection has spread to your bone.

**TREATMENT OPTIONS**

Ludwig angina treatments include:

* Opening your airway. The main goal is to open your airway and give you oxygen so you can breathe normally again. Healthcare providers can usually do this by placing a thin, flexible tube (nasal cannula) into your nose and down your throat.
* Medications. Once your airway is open, your provider will likely give you antibiotics through an IV line. They may also give you corticosteroids to reduce swelling.
* Surgery. In severe cases, healthcare providers may surgically drain the infection. If an infected tooth caused Ludwig angina, you may need to remove it.

## **Commonly Used Antibiotics for Ludwig’s Angina:**

| **Drug** | **Typical Dose / Use** | **Mechanism** | **Common Side Effects** |
| --- | --- | --- | --- |
| **Ampicillin-sulbactam** | **IV, broad-spectrum coverage of aerobes and anaerobes; often first-line** | **Beta-lactam antibiotic with beta-lactamase inhibitor** | **Allergic reactions, diarrhea, rash, nausea, possible superinfection** |
| **Clindamycin** | **IV or oral; alternative or addition for anaerobic and streptococcal coverage** | **Lincosamide antibiotic inhibiting bacterial protein synthesis** | **Diarrhea (including C. difficile colitis), rash, nausea** |
| **Metronidazole** | **IV or oral; effective against anaerobes** | **Nitroimidazole antimicrobial causing DNA strand breakage** | **Metallic taste, nausea, headache, rarely neuropathy** |
| **Ceftriaxone** | **IV; broad spectrum including many Gram-positive and negative bacteria** | **Third-generation cephalosporin** | **Allergic reactions, gallbladder sludge, diarrhea, injection site pain** |
| **Benzylpenicillin (Penicillin G)** | **IV; covers many oral streptococci and anaerobes** | **Penicillin beta-lactam** | **Allergic reactions, diarrhea, neurotoxicity at high doses** |
| **Vancomycin** | **IV; reserved if MRSA suspected or confirmed** | **Glycopeptide inhibiting cell wall synthesis** | **Nephrotoxicity, ototoxicity, Red man syndrome (flushing)** |

## Supportive Medications:

* Analgesics: Paracetamol or NSAIDs (e.g., diclofenac) for pain. Side effects: liver toxicity (paracetamol overdose), GI irritation, and bleeding risk (NSAIDs).
* Adrenaline (Epinephrine): Used in emergencies for airway swelling and shock; side effects include tachycardia, hypertension, anxiety.

## Typical Treatment Regimen:

* Initial empirical therapy generally combines broad-spectrum IV antibiotics such as ampicillin-sulbactam or ceftriaxone plus metronidazole (for anaerobic coverage) or alternatively clindamycin alone.
* Antibiotic choice is adjusted based on culture results when available.
* Surgical drainage of abscesses is often required.
* Airway management may include awake fiberoptic intubation or tracheostomy if airway obstruction develops.

## Side Effect Considerations:

* Antibiotics can cause allergic reactions from mild rash to anaphylaxis.
* Clindamycin is notably associated with *C. difficile* colitis, a serious form of antibiotic-associated diarrhea.
* Metronidazole can cause metallic taste, nausea, and rarely peripheral neuropathy with prolonged use.
* Ceftriaxone may cause biliary sludge in some patients and injection site discomfort.
* Vancomycin carries risks of kidney toxicity and infusion reactions and should be reserved for resistant infections.
* Paracetamol is generally safe when dosed correctly but can cause severe liver injury in overdose. NSAIDs should be used cautiously in certain patients due to GI and renal risks.

**PREVENTION TIPS**

You can’t always prevent Ludwig angina. But you can reduce your risk by practicing good oral hygiene and seeing your dentist for regular checkups and cleanings. It’s important to treat dental infections promptly since they’re the most common cause of Ludwig angina.

**OUTLOOK / PROGNOSIS**

Most people survive Ludwig’s angina today, thanks to the invention of antibiotics. But early detection and treatment are essential. The sooner you get treatment, the better your outlook.

Fatalities from Ludwig angina are rare, but they can happen. About 8% of people who develop the infection die from swelling and lack of oxygen.

**POSSIBLE COMPLICATIONS**

The longer you go without treatment, the more likely it is that you’ll develop complications. They include:

* Asphyxiation (lack of oxygen)
* Aspiration pneumonia (lung infection)
* Blocked airway
* Mediastinitis (infection in your chest)
* Sepsis (life-threatening reaction to an infection)
* Septic shock (last stage of sepsis that involves dangerously low blood pressure)

**WHEN TO SEE A DOCTOR / RED FLAG**

Call 911 or go to your local emergency room if you have:

* Difficulty breathing or swallowing
* Severe pain that’s getting worse
* Swelling around your neck or under your jaw

**DIFFERENTIAL DIAGNOSIS**

* Peritonsillar abscess
* Retropharyngeal abscess
* Parapharyngeal abscess
* Dental abscess (localized odontogenic infection)
* Epiglottitis
* Submandibular sialadenitis or sialolithiasis
* Mandibular osteomyelitis
* Angioedema (noninfectious soft tissue swelling, often with rapid onset and no erythema)
* Neck tumors or lymphoma (usually chronic, painless swelling without signs of acute infection)
* Deep neck space infections other than Ludwig’s (e.g., masticator space infection)
* Cervical lymphadenitis
* Penetrating injuries to the floor of the mouth or oral cavity
* Mandibular fracture or oral lacerations

Ludwig’s angina is distinguished by bilateral, diffuse, firm ("woody") cellulitis of the submandibular, sublingual, and submental spaces usually due to odontogenic infection, with rapid progression and risk of airway obstruction.

**EPIDEMIOLOGY**

Ludwig angina does not demonstrate a significant sex predilection. Airway compromise remains the leading cause of mortality. Before the advent of antibiotics, the mortality rate exceeded 50%. Advances in airway management, antibiotic therapy, imaging, and surgical intervention have decreased mortality to approximately 8% in the modern era

**PREDEFINED Q & A SETS**

. What is Ludwig’s angina?  
Ludwig’s angina is a serious, rapidly progressing bacterial infection (cellulitis) of the soft tissues of the floor of the mouth, under the tongue and jaw. It causes painful swelling that can block the airway and is potentially life-threatening.

2. What causes Ludwig’s angina?  
It most commonly arises from an infected lower molar tooth (odontogenic infection). Other causes include mouth or jaw injuries, poor dental hygiene, tooth extractions, and infections from bacteria such as *Streptococcus*, *Staphylococcus*, and *Bacteroides* species.

3. What are the key symptoms?  
Symptoms include fever, chills, mouth and neck pain, swelling under the jaw and floor of mouth, tongue swelling and displacement, drooling, difficulty swallowing, difficulty opening the mouth, slurred speech, ear pain, and, in severe cases, chest pain, trouble breathing, confusion, and dehydration.

4. How is Ludwig’s angina diagnosed?  
Diagnosis is mostly clinical, based on physical exam showing swelling, tenderness, and firmness (“woody” induration) of the floor of mouth and neck. If unclear, blood and saliva cultures can identify bacteria. Imaging (CT or MRI) can assess the extent of swelling, fluid collections, or airway obstruction.

5. How is Ludwig’s angina treated?  
Treatment requires urgent medical care. Airway management is the priority; breathing tubes or emergency tracheotomy may be needed to keep airways open. Intravenous antibiotics are given to treat infection. Surgical drainage of fluid and pus may be required. Dental surgery might be needed to address the source.

6. What are possible complications?  
If untreated, Ludwig’s angina can cause airway blockage, sepsis, septic shock, lung infection, blood clots in the neck, heart inflammation, or death. Prompt treatment usually prevents these issues.

7. When should you seek emergency care?  
Seek immediate care if you experience trouble breathing, severe jaw or neck pain, swelling in the neck, or if symptoms worsen despite treatment.

8. How can Ludwig’s angina be prevented?  
Good oral hygiene, regular dental checkups, and prompt treatment of dental infections reduce the risk of Ludwig’s angina

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you’ve been experiencing swelling and pain under your jaw. Can you tell me more about your symptoms?

Patient: Yes, it started a couple of days ago with pain near a lower tooth. Now the floor of my mouth and neck feel swollen and tight, and it’s getting harder to swallow and breathe.

Doctor: These symptoms suggest a serious infection called Ludwig’s angina. It’s a rapidly spreading cellulitis—an infection—of the tissues under your tongue and jaw. It often starts from an infected tooth.

Patient: How dangerous is this condition?

Doctor: Ludwig’s angina can be life-threatening because the swelling can block your airway, making it difficult to breathe. That’s why we need to act quickly to manage it.

Patient: What tests will I need?

Doctor: We’ll perform a physical exam to check the swelling and airway. Imaging like a CT scan will help us see how far the infection has spread. Blood tests will check for infection and overall health.

Patient: How is it treated?

Doctor: Treatment includes intravenous antibiotics to combat the infection and close monitoring of your airway. Sometimes, surgical drainage is necessary to remove infected tissue or pus. In severe cases, airway support like intubation may be needed to keep you breathing safely.

Patient: Is surgery always required?

Doctor: Not always, but because the infection can spread quickly and cause airway obstruction, we carefully evaluate whether drainage is needed. Early treatment improves outcomes significantly.

Patient: How long will recovery take?

Doctor: With prompt treatment, most people improve within a few days to weeks. You’ll also need dental follow-up to address the underlying cause, like removing the infected tooth.

Patient: What can I do to prevent this from happening again?

Doctor: Good oral hygiene, regular dental care, and promptly treating tooth infections reduce your risk. Avoiding delays in seeking care is also important.

Patient: Thank you, doctor. I’m worried but I’m glad it can be treated.

Doctor: It’s natural to be worried, but we will monitor you closely and take all steps to ensure your safety.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK482354/#article-24447.s9>

[Ludwig’s Angina: Symptoms, Signs & Treatment](https://my.clevelandclinic.org/health/diseases/23457-ludwigs-angina#overview)

**Leukoplakia**

**DEFINITION / DESCRIPTION**

Leukoplakia is a condition that creates white patches in your mouth. The patches don’t hurt but they don’t go away, even if you rub them. You may develop leukoplakia because something is irritating the inside of your mouth. Leukoplakia may become oral cancer, so your dentist may recommend you see a specialist to diagnose and treat it.

#### **Types of leukoplakia**

There are two types of leukoplakia:

* Homogeneous leukoplakia:Homogeneous leukoplakia may look like a flat white patch in your mouth. The patch surface may be smooth, wrinkled or have ridges. This leukoplakia is typically benign, meaning it usually doesn’t become oral cancer. It’s more common than non-homogeneous leukoplakia.
* Non-homogeneous leukoplakia: Non-homogeneous leukoplakia may cause irregular or odd-shaped white or red patches in your mouth. The patches may be flat or have raised surfaces. Studies show that non-homogenous leukoplakia is seven times more likely to become cancerous than the homogenous type.

L**eukoplakia subtypes**

The two leukoplakia subtypes are:

* Proliferative verrucous leukoplakia (PVL):Some studies suggest more than 60% of people with PVL develop oral cancer. PVL may look like small white patches in your mouth. The patches can grow on your tongue, gums, the soft tissue between your lips and gums, and tissue lining the inside of your cheeks. PVL patches can grow very quickly and may develop tiny lumps or bumps.
* Oral hairy leukoplakia:This condition looks like its name — white hairy patches, often with folds so it looks like hair is growing out of the folds. These spots mostly happen on your tongue but might appear in other parts of your mouth. This type of leukoplakia type doesn’t become cancer. People with HIV/AIDS or Epstein-Barr virus often develop oral hairy leukoplakia.

#### **Does leukoplakia always become oral cancer?**

No, it doesn’t. Studies show less than 15% of people with leukoplakia develop oral cancer. Medical researchers are studying why and when leukoplakia may become cancer. For example, leukoplakia on your gums is less likely to become cancer than leukoplakia on your tongue or the floor of your mouth.

Not every white patch in your mouth will become cancer. Your healthcare provider will tell you what to expect if you have leukoplakia.

Leukoplakia is relatively rare. It affects less than 5% of people worldwide.

**CAUSES**

You can develop leukoplakia if something irritates tissue lining the inside of your mouth. For example, you may chew the inside of your cheeks or use dentures that don’t fit well.

Leukoplakia may also happen when certain genes mutate, or change. (Genes tell cells what to do, such as how fast they should grow or when they should die off to make room for new cells.) In leukoplakia, genetic mutations make mouth tissue cells multiply faster than normal, creating patches.

**RISK FACTORS**

The following activities increase your chances of developing leukoplakia:

* Smoking or using chewing tobacco and smokeless tobacco.
* Regularly drinking substantial amounts of beverages containing alcohol.
* Having certain health conditions that affect your immune system, like Epstein-Barr virus or HIV.

**SIGNS / SYMPTOMS**

Leukoplakia symptoms are patches inside your mouth that don’t go away. The patches may:

* Appear on your tongue, gums and the inside of your cheeks.
* Look flat or slightly raised.
* Be white, gray or white with tiny red dots.

**DIAGNOSIS METHODS**

A healthcare provider will diagnose leukoplakia by examining your mouth and any unusual white patches. They’ll try to find what’s causing your symptoms. For example, if you use dentures, your provider may make sure your dentures aren’t rubbing against your gums or the inside of your cheeks. Your provider may do biopsies and send a sample of your tissue to medical pathologists to examine under a microscope.

#### **Should all suspected leukoplakia be biopsied?**

Yes, they should. A biopsy is the only way to determine if you have leukoplakia that may become oral cancer.

**TREATMENT OPTIONS**

Healthcare providers treat leukoplakia by removing the patches in your mouth. They may remove the patches with a scalpel. Other potential procedures include:

* Using a laser to remove the patches.
* Using light-activated cancer drugs (photodynamic therapy).
* Using cryotherapy, which is an extreme cold that freezes and kills abnormal cells and removes the patches.
* Using an electrically heated needle or other instrument to remove the patches (electrocauterization).

## Surgical Treatments

* Excision: Removal by scalpel is standard, especially for lesions with dysplasia or high malignant potential.
* Laser therapy: CO2 or diode laser ablation is effective with less bleeding and quicker healing than conventional surgery.
* Cryotherapy: Freezing the lesion to destroy abnormal cells.
* Electrocoagulation and photodynamic therapy (PDT) (using agents like 10-20% aminolevulinic acid (ALA) activated by laser) show promising results in ablating lesions.

## Nonsurgical (Medical) Treatments

* Retinoids (Vitamin A derivatives): Oral or topical retinoids may reduce lesion size but have limited evidence and high recurrence rates.
* Beta-carotene and other carotenoids: Antioxidants used to attempt chemoprevention with variable and inconclusive benefits.
* Antioxidant vitamins: Vitamins A, C, and E have been administered with mixed outcomes.
* Other agents: Bleomycin, protease inhibitors, anti-inflammatory drugs, green tea extracts, and curcumin have been explored experimentally but lack robust evidence.
* Antiviral therapy: Specific for hairy leukoplakia caused by Epstein-Barr virus (EBV), including drugs like acyclovir.

## Side Effects and Considerations

* Surgery & Laser: May cause pain, bleeding, edema, and rarely scarring, but generally well tolerated.
* Cryotherapy: Can cause localized pain, edema, and risk of scarring.
* Retinoids: May cause dry skin, mucosal irritation, and systemic side effects such as elevated liver enzymes and lipid changes.
* Beta-carotene: Usually well tolerated but high doses may cause carotenodermia (yellow-orange skin).
* Antiviral medications: Side effects depend on specific drug but may include gastrointestinal upset, headaches, or renal effects.

## Additional Management

* Removing risk factors is essential (e.g., quitting tobacco and alcohol).
* Regular follow-up is critical since leukoplakia can recur or progress to cancer despite treatment.
* Biopsy guides treatment choice and monitors for dysplasia or malignancy.

**PREVENTION TIPS**

Because experts aren’t always sure what causes leukoplakia, you may not be able to prevent it. However, leukoplakia is linked to tobacco and alcohol use. You may lower your risk by:

* Avoiding tobacco, including chewing tobacco and smokeless tobacco.
* Limiting your intake of beverages containing alcohol. According to American Cancer Society guidelines, people who choose to drink beverages containing alcohol should limit their intake to no more than two drinks per day for males and one drink per day for females.

**OUTLOOK / PROGNOSIS**

### **Does leukoplakia come back (recur)?**

Yes, it does. Studies suggest leukoplakia comes back around 15% of the time after it’s removed.

### **Will leukoplakia go away on its own?**

No, it won’t. Surgery to remove leukoplakia is the only way to make it go away.

**WHEN TO SEE A DOCTOR / RED FLAG**

If you had surgery to remove leukoplakia, your provider may recommend you have regular follow-up appointments for several years. Providers typically recommend follow-up visits every six to 12 months. Visit a dentist every six months for routine dental care.

## **Diagnostic Considerations**

These include the following:

* Leukoedema
* Lichen planus
* Chemical burn
* Morsicatio buccarum (habitual cheek biting)
* Candidosis
* Psoriasis
* Lupus erythematosus
* White sponge nevus

**EPIDEMIOLOGY**

### Frequency

*International*

OL occurs in fewer than 1% of individuals.

### Mortality/Morbidity

OL is considered to be potentially malignant, with a transformation rate in various studies and locations that range from 0.6 to 20%.

A long-term follow-up study by Fan et al indicated that oral leukoplakia can increase the risk of esophageal squamous cell carcinoma (ESCC). The study, in which nearly 29,584 healthy adults were enrolled, found that 2924 persons in the study developed ESCC over a 28-year follow-up period; in adults aged 52 years or younger at baseline, the hazard ratio for the disease in those with leukoplakia was 1.31.

A retrospective study by Rubert et al found the malignization rate in OL to be 8.3%. Risk factors for malignancy included non-homogeneous lesions, presence of the lesion on the tongue, and the existence of epithelial dysplasia.

A literature review by Paglioni et al indicated that size is one of the factors influencing malignant transformation in potentially malignant oral disorders, with the chance of turning malignant being 4.10-fold greater in leukoplakia lesions more than 200 mm2 in size. With regard to patient habits, the investigators reported that in nonsmoking patients, the risk of malignant transformation in oral leukoplakia is 3.20 times higher. In addition, the study indicated that non-homogenous oral leukoplakia has a 6.52-fold greater chance of transformation to cancer. In proliferative verrucous leukoplakia, only sex was found to increase the risk of malignant transformation, with females having a 2.50 times greater chance of this.

### Sex

OL is more common in men than in women, with a male-to-female ratio of 2:1.

### Age

Most cases of OL occur in persons in their fifth to seventh decade of life. Approximately 80% of patients are older than 40 years.

**PREDEFINED Q & A SETS**

What is leukoplakia?  
Leukoplakia refers to abnormal white patches that develop inside the mouth that cannot be easily wiped away . These patches can appear on the gums, inner cheeks, bottom of the mouth under the tongue, and sometimes on the tongue itself . While most are benign, leukoplakia is considered a potentially precancerous lesion, meaning some can develop into oral cancer .

2. What are the common symptoms of leukoplakia?  
Leukoplakia patches are typically white or gray and often painless, so they may go unnoticed for a while . They can have varied textures, appearing rough, ridged, wrinkled, smooth, thick, or hard . In some cases, white patches of leukoplakia might appear alongside raised, red areas, which is called speckled leukoplakia. These combined patches are more likely to show changes that could lead to cancer .

3. What causes leukoplakia?  
Leukoplakia is primarily caused by chronic irritation to the tissue lining the inside of the mouth . Common irritants and risk factors include:

* Tobacco use: Smoking or chewing tobacco is a leading cause .
* Alcohol consumption: Regular heavy drinking increases the risk .
* Physical irritation: This can be from chewing the inside of the cheeks, ill-fitting dentures, or rough teeth .
* Genetic mutations: In some cases, genetic changes can cause mouth tissue cells to multiply faster than normal .
* Weakened immune system: This is a risk factor, especially for hairy leukoplakia .

4. What is hairy leukoplakia, and how is it different?  
Hairy leukoplakia causes fuzzy, white patches that look like folds or ridges, typically forming on the sides of the tongue . It is associated with the Epstein-Barr virus (EBV) and is common in people with weakened immune systems, such as those with HIV . Unlike other forms of leukoplakia, it does not typically carry a risk of becoming cancerous .

5. How is leukoplakia diagnosed?  
A healthcare provider, usually a dentist or doctor, will examine your mouth and any unusual white patches to identify the cause . If the white patches persist for two to four weeks and no clear explanation is found, a biopsy (tissue sample) is often performed and sent to a lab for analysis . This helps to rule out other conditions and check for early signs of mouth cancer .

6. How is leukoplakia treated?  
Treatment depends on the cause, size, and whether there are signs of cancer .

* Eliminating irritants: Often, removing the source of irritation, such as quitting tobacco and alcohol, is enough to make the patches disappear within weeks or months .
* Removal of patches: If lifestyle changes don't work or if the patches show signs of being precancerous, they may need to be removed . This can be done with a scalpel, laser, or a freezing probe .
* Medications: For hairy leukoplakia, antiviral medications can be prescribed to suppress the Epstein-Barr virus, and topical therapy might also be used .

7. Is leukoplakia common?  
Leukoplakia is relatively rare, affecting less than 5% of people worldwide . However, it is more common among adults over 40, particularly those who use tobacco or consume alcohol .

8. When should I see a doctor?  
You should see a doctor or healthcare professional if you notice white patches or sores in your mouth that do not heal on their own within two weeks . Also, seek medical attention for any lumps, red or dark patches, persistent changes in the inside of your mouth, ear pain, or problems swallowing or opening your jaw

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you're here because you've noticed some changes inside your mouth. Can you describe what's going on?

Patient: Yes, I've had these white patches on the inside of my cheek and under my tongue for a few weeks now. They don't hurt, but they're not going away.

Doctor: I see. How long have you noticed them?

Patient: It’s been about three or four weeks. I tried to rub them off, but they seem pretty stuck.

Doctor: That's a key detail. White patches that don't rub off can sometimes be a condition called leukoplakia. It typically appears as white or gray patches with a rough, ridged, or sometimes smooth surface.

Patient: Is it serious? What causes it?

Doctor: Well, leukoplakia is often caused by chronic irritation to the mouth tissues, such as from smoking or chewing tobacco, or even from ill-fitting dentures rubbing against your cheek. Are you a smoker or do you use any tobacco products?

Patient: I’ve smoked for many years. I’m trying to quit.

Doctor: That's a very important piece of information, as tobacco use is a major risk factor for leukoplakia. In some cases, genetic factors can also play a role.

Patient: So, what's next?

Doctor: Since these patches have been present for a few weeks and don't rub off, the next step is to perform a small biopsy. This involves taking a tiny tissue sample from the patch, which we then send to a lab. The lab will examine the cells under a microscope to confirm it's leukoplakia and, crucially, to check for any signs of precancerous changes or early cancer. This helps us determine the best course of action.

Patient: Precancerous? Is there a risk of cancer?

Doctor: While many cases of leukoplakia are benign, it is considered a potentially precancerous condition, meaning a small percentage can, over time, develop into oral cancer. That’s why regular monitoring and sometimes removal are so important.

Patient: What if it is something serious?

Doctor: The biopsy will give us the answers we need. If it is leukoplakia and shows no signs of significant changes, the most important treatment will be for you to stop smoking. If the patches have more concerning features, we might need to remove them. This can be done with a scalpel, laser, or freezing. Even after treatment, regular dental check-ups are essential to monitor for any recurrence or new lesions.

Patient: What if these patches just don't go away, even if I quit smoking?

Doctor: If the patches persist or show certain characteristics, we'll discuss the removal options with you. But quitting tobacco is the most critical step you can take to prevent progression and improve your oral health.

Patient: Thank you, doctor. This is a lot to take in, but I understand.

Doctor: You're welcome. It's important to address these changes promptly. We'll get the biopsy done, and then we'll have a clear plan for moving forward. Please don't hesitate to call if you have any other questions.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK442013/#article-24219.s10>

<https://emedicine.medscape.com/article/853864-workup#c6>

<https://my.clevelandclinic.org/health/diseases/17655-leukoplakia>

<https://www.mayoclinic.org/diseases-conditions/leukoplakia/diagnosis-treatment/drc-20354411>

**Lip cancer**

**DEFINITION / DESCRIPTION**

Lip cancer occurs when abnormal cells grow out of control, resulting in tumors (solid tissue masses) or lesions (abnormal areas of skin) on your lips. Most lip cancers (about 90%) are squamous cell carcinoma. This type of cancer starts in the cells located in your skin’s outer layer. Less common types are basal cell carcinoma and melanoma.

Lip cancer can develop on either your upper or lower lip, but it’s more likely to start on your lower lip. The most common sign is a sore, blister, ulcer or lump on your bottom lip that won’t go away.

Lip cancer is the most common type of oral (mouth) cancer, but makes up less than 1% of all cancer diagnoses total in the United States. Only about .1% of people in the U.S. will get diagnosed with lip cancer at some point in their lives.

**CAUSES**

Experts don’t know exactly what causes lip cancer. As with all cancers, errors in cell DNA cause normal cells to become cancer cells that multiply out of control. The abnormal cancer cells can spread and damage healthy tissue. Experts haven’t identified one single reason why cells behave this way. But they’ve identified several risk factors that people who get lip cancer share. Most have to do with lifestyle and environment.

#### **Risk factors**

Risk factors for lip cancer include:

* Tobacco use. This includes smoking cigarettes, cigars and pipes, and using snuff and chewing tobacco. Most lip cancers are linked to tobacco use.
* Heavy alcohol use. You increase your risk of lip cancer by up to 30 times if you use tobacco and also consume excessive amounts of alcohol.
* Excessive sun exposure. This includes exposure to artificial light in tanning beds.
* Having fair skin. People who are white with light features are most at risk.
* Being over 40. Most people get lip cancer in their 50s and 60s.
* Sex. Males are up to three times more likely to develop lip cancer.
* Having a weakened immune system.

**SIGNS / SYMPTOMS**

Early-stage lip cancer often looks like a mouth sore that won’t heal. It’s easy to mistake tumors for cold sores when they first appear. The difference is that cold sores go away on their own in about 10 days. But lip cancer lesions linger.

Other signs of lip cancer include:

* A flat or slightly raised colored spot on your lips (may appear white or reddish on light skin or dark brown or gray on dark skin).
* Pain, numbness or tingling on your lips or in your mouth.
* Loose teeth. (If you wear dentures, you may notice changes in how they fit.)
* Bleeding or thickening lips.
* A swollen jaw.

**DIAGNOSIS METHODS**

Often, dentists or dermatologists spot lip cancer during routine exams. If a healthcare provider suspects lip cancer, they’ll ask about your medical history and habits, like whether you smoke. They may recommend diagnostic tests, including:

* Physical exam. Your healthcare provider will examine your lip and ask about your symptoms. They’ll also look at your mouth, face and neck to check for signs that the cancer has spread beyond your lips.
* Soft tissue biopsy. Your provider will remove a small sample of the affected tissue and send it to a pathology lab for testing. Results can show if a lesion or tumor is lip cancer.

If biopsy results show you have cancer, your healthcare provider may order additional tests to see if it’s spread. Advanced lip cancers metastasize, or spread to distant parts of your body. The good news is that most people get diagnosed before lip cancer spreads.

Tests include:

* Imaging tests. Your healthcare provider may take a CT (computed tomography) scan, a PET scan or use magnetic resonance imaging (MRI) to check for tumors.
* Endoscopy. During this procedure, your provider passes a small, flexible camera down your throat while you’re sedated to look for signs of cancer.

**TREATMENT OPTIONS**

The best treatment for you depends on the size of the tumor or lesion and the cancer stage. Often, healthcare providers can treat precancerous lip cancer (abnormal lesions that may become malignant) and early-stage lip cancer with surgery alone. You may need a combination of treatments if your condition is more advanced.

Lip cancer treatments include:

* Surgery. Your surgeon removes the lesion or tumor and repairs your lip. They may also remove lymph nodes in your neck if they suspect the cancer has spread there.
* Radiation therapy. This treatment uses radiation to kill cancer cells. Your provider may recommend external beam radiation therapy (EBRT) or brachytherapy (internal radiation therapy). Radiation therapy may be a standalone treatment, or you may need it after surgery to eliminate any remaining cancer cells.
* Chemotherapy. This treatment uses drugs to kill cancer cells. You may need chemo combined with radiation therapy. If your lip cancer has spread and no other treatments are available, your provider may recommend chemotherapy to ease your symptoms (palliative care).
* Targeted therapy. This treatment targets specific cancer cell genes and proteins, destroying them. People with lip cancer usually get it in combination with chemo.
* Immunotherapy. These drug treatments boost your body’s immune system and help it fight off cancer cells. For lip cancer, most people get immunotherapy when the cancer is advanced and other treatments aren’t an option.

#### **Complications regarding lip cancer treatment**

If you had surgery to remove a large tumor, you may need reconstructive surgery so your mouth looks like it did before. You may also need to work with a speech-language pathologist if you’re having trouble speaking or swallowing afterward.

If you’re worried about how you’ll look after surgery, remember that several procedures can help restore your appearance. Discuss your options with your healthcare provider before surgery to remove the tumor, so you know what to expect.

### **How soon after treatment will I feel better?**

Recovery depends on several factors, including what type of treatment you get and how your body heals. People with early-stage lip cancer who have surgery typically recover within a few weeks. If you get radiation therapy or chemotherapy, it may take several months to fully feel like yourself again.

**PREVENTION TIPS**

Reduce your risk for lip cancer by avoiding common risk factors:

* Don’t use tobacco. Tobacco use is the leading risk factor for lip cancer and cancers of the mouth. If you smoke, consider quitting.
* Avoid heavy alcohol use. If you drink, do so in moderation. This means no more than two drinks a day for males, and no more than one drink daily for females.
* Protect yourself from the sun. Apply lip balm and sunscreen that’s at least SPF 30 anytime you’re outside (even on cloudy days). Whenever possible, plan outdoor activities outside the hours when you’re most likely to get direct sunlight. In the United States, you’ll get more sun exposure between 10:00 a.m. and 4:00 p.m.
* Avoid tanning beds. Steer clear of tanning beds, which can increase your risk of lip and skin cancer.
* Get routine oral cancer screenings. Your primary care physician or dentist can perform these screenings to check for abnormalities.

**OUTLOOK / PROGNOSIS**

Lip cancer is more predictable when you get treatment in the early stages, before it spreads. With an early diagnosis, you’ll likely need surgery to remove the lesion. Your healthcare provider may recommend chemotherapy, radiation therapy or other cancer treatments if the cancer cells have spread to other areas of your body.

Your healthcare provider can explain what to expect based on your diagnosis.

#### **Does lip cancer spread quickly?**

Squamous cell carcinoma (the most common type of lip cancer) tends to spread slowly. As it’s easy to see, most people notice the unusual growths on their lip and get checked before the cancer spreads.

Still, it can spread without treatment. See a healthcare provider if you’re noticing changes that you’re unsure about.

#### **Is lip cancer fatal?**

Not usually. Because lip cancer lesions develop in easily seen locations, this type of cancer is detected and treated early in most cases. As a result, lip cancer has an overall five-year survival rate of 91%. This means that 91% of people diagnosed with the condition are still alive five years later.

Keep in mind that survival rates are estimates. They can’t offer details about your case or tell you how long you’ll live. If you have more questions about survival rates, ask your healthcare provider.it

**WHEN TO SEE A DOCTOR / RED FLAG**

You should schedule a visit with a healthcare provider if you notice changes in the skin on your lips. If you develop a sore on your lip that lasts for more than two weeks, call a provider right away.

## **Lip Cancer Staging**

Lip cancer is staged using the American Joint Committee on Cancer (AJCC) TNM system, which assesses the primary Tumor (T), regional lymph Node involvement (N), and distant Metastasis (M) . Stages range from 0 to 4, with higher numbers indicating more advanced cancer .

* Stage 0 (Carcinoma in situ): Cancer cells are confined to the top layer of tissue and have not spread .
* Stage 1: The tumor is 2 centimeters or smaller and has not grown into deeper tissues. The depth of invasion is typically 5mm or less .
* Stage 2: The tumor is between 2 and 4 centimeters across and has not grown into deeper tissues. Alternatively, it may be 2 cm or smaller but with a depth of invasion greater than 5mm but less than 10mm. It has not spread to lymph nodes or other organs .
* Stage 3: The tumor is larger than 4 centimeters, or it has spread to a single lymph node on the same side as the tumor, which is 3 centimeters or smaller .
* Stage 4: This is the most advanced stage, with several substages :
  + Stage 4A: The cancer is any size and has grown into surrounding structures like nearby bones, the jaw's alveolar nerve, the floor of the mouth, or the skin around the mouth. It may or may not have spread to nearby lymph nodes but has not spread to distant organs .
  + Stage 4B: The cancer is any size and may have grown into nearby tissue, potentially involving critical structures like the skull base or encasing the carotid artery. It may also involve very large lymph nodes or multiple lymph nodes .
  + Stage 4C: The cancer has spread to distant parts of the body, such as the lungs .

## **General Treatment Options**

Treatment decisions are based on the cancer's stage . Common treatments for lip cancer include:

* Surgery: Often used for early-stage cancers .
* Radiation therapy .
* Chemotherapy .

Lip cancer typically has a high survival rate, often because it is diagnosed and treated in its early stages .

**DIFFERENTIAL DIAGNOSIS**

* Basal cell carcinoma (BCC) of the lip: Usually presents as slow-growing, well-defined nodules or papules with pearly, telangiectatic, sometimes ulcerated or pigmented areas; more common on the upper lip and skin adjacent to the vermillion border.
* Herpes simplex virus (HSV) infection: Early stages of lip squamous cell carcinoma (SCC) presenting as ulcerated plaques or crusted lesions can mimic cold sores, but herpes lesions tend to resolve in about 10 days, whereas cancer persists.
* Traumatic ulcers: Chronic ulcers caused by physical trauma to the lip mucosa may resemble SCC but generally have a clear history and heal with removal of irritation.
* Actinic (solar) keratosis: Premalignant lesions from chronic sun exposure presenting as scaly, rough patches on the vermillion border, which can progress to SCC.
* Erythroplasia/Erythroplakia: Red or mixed red-white velvety lesions that carry a higher risk of malignancy and can mimic SCC.
* Melanoma: Pigmented lesions on the lip require differentiation from pigmented variants of BCC or SCC.
* Seborrheic keratosis and benign nevi: Pigmented papular lesions that may mimic nodular pigmented cancers.
* Other soft tissue tumors: Such as trichoepithelioma (a benign tumor resembling BCC), papillomas, or granular cell tumors can appear as nodular or papular lesions on the lips.
* Odontogenic cysts or tumors: May present as swelling near the upper or lower lip and can be differentiated by dental vitality tests and imaging.
* Infectious or inflammatory conditions: Including bacterial or fungal infections causing lip ulcers or masses, though these usually have systemic or acute signs.
* Metastatic tumors to the lip or oral mucosa: Though rare, metastases from other primary cancers can present as nodules or masses on the lip

**EPIDEMIOLOGY**

* Incidence and Demographics:  
  Lip cancer is relatively uncommon, with an age-adjusted incidence rate of about 0.5 new cases per 100,000 persons per year in the United States, according to recent data. It is more common in men than women, with rates approximately double in men (about 0.7 per 100,000) compared to women (about 0.3 per 100,000).
* Age:  
  Most lip cancer cases occur in older adults, especially those aged 65–74 years, with a median age at diagnosis around 70 years.
* Geographic Variation:  
  Incidence varies globally. Higher rates are seen in regions with greater sun exposure and tobacco use, such as parts of Central and Eastern Europe, Brazil, and countries like Papua New Guinea and Australia. Lower incidence is reported from Eastern/South-eastern Asia and Sub-Saharan Africa.
* Risk Factors:  
  Established risk factors include chronic ultraviolet (UV) radiation exposure from sunlight, tobacco use (smoking and chewing), and heavy alcohol consumption. Human papillomavirus (HPV) infection plays a lesser role in lip cancers compared to oropharyngeal cancers.
* Global Burden:  
  Worldwide, lip and oral cavity cancers account for approximately 377,000 new cases annually, with lip cancer being a subset of this. Lip and oral cavity cancers constitute about 2.5% of all cancer cases globally, with higher incidence in men.
* Mortality:  
  Despite being often diagnosed early and amenable to treatment, lip and oral cavity cancers contribute to significant mortality, with an estimated 177,000 deaths yearly worldwide. Mortality rates vary globally, reflecting differences in healthcare access and risk factor prevalence.
* Trends:  
  Incidence and mortality of lip cancer have shown variable trends, with some regions experiencing increases over recent decades, while others remain stable. Projections estimate that incidence and mortality may increase globally if current trends continue.

**PREDEFINED Q & A SETS**

What is lip cancer?  
Lip cancer is a type of oral cancer that usually begins in the squamous cells of the lips, most commonly the lower lip. It appears as sores, ulcers, lumps, or white/red patches that do not heal.

2. What are the early signs of lip cancer?  
Common early symptoms include a sore or blister that won’t heal, lumps or thickened areas on the lips, red or white patches, pain, numbness, bleeding, and swelling in the lips or jaw.

3. What causes lip cancer?  
The exact cause is unknown, but risk factors include chronic sun exposure (UV radiation), tobacco use (smoking or chewing), heavy alcohol consumption, fair skin, older age, male gender, HPV infection, and weakened immune system.

4. How is lip cancer diagnosed?  
Diagnosis starts with a physical exam and medical history review. A biopsy is performed to confirm cancer and determine its type and aggressiveness. Imaging tests such as CT, MRI, or PET scans may be used to check if cancer has spread.

5. Has the cancer spread beyond my lips?  
Additional imaging and tests can determine if lip cancer has spread to nearby lymph nodes or distant organs. Early diagnosis often detects cancer before it metastasizes.

6. What are my treatment options?  
Treatment depends on cancer stage and location. Options include surgery (wide local excision), radiation therapy (internal or external), and sometimes chemotherapy. Early-stage lip cancers are often treated successfully with surgery alone or in combination with radiation. Advanced cases may require more intensive treatments.

7. What side effects should I expect?  
Side effects vary by treatment but may include pain, swelling, difficulty eating or speaking, numbness or changes in sensation, and skin changes. Radiation can cause dryness and irritation, while surgery may affect lip appearance and function.

8. How will treatment affect my daily life?  
Treatment may temporarily affect speech, eating, and appearance. Recovery times vary. Support from speech therapists, dietitians, and counselors can help manage these effects and improve quality of life.

9. Will I be able to work while getting treatment?  
Many patients continue working during treatment depending on the treatment intensity and side effects. Discuss your job demands and symptoms with your healthcare team to plan accordingly.

10. What resources do you recommend?  
Supportive care includes cancer support groups, counseling services, nutritional guidance, and rehabilitation specialists. Institutions like cancer centers often provide patient education, clinical trials, and multidisciplinary care teams

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, thanks for coming in today. I understand you have some concerns about a persistent sore or lesion on your lip?

Patient: Yes, I noticed a small bump on my lower lip that hasn’t healed for a few weeks. It sometimes bleeds and feels a bit numb. I’m worried it might be cancer.

Doctor: It's good that you brought this up. Persistent sores or lumps on the lip can sometimes be signs of lip cancer, which is usually a type of squamous cell carcinoma. We'll do some tests to find out exactly what it is.

Patient: How do you diagnose it?

Doctor: I will examine the lesion and probably perform a biopsy, where we take a small tissue sample for testing. Imaging scans might be needed later to see if the cancer has spread. This helps us determine the stage of the cancer.

Patient: What does staging mean? Has my cancer spread beyond my lips?

Doctor: Staging tells us how big the tumor is and if it has spread to lymph nodes or other parts of the body. Early-stage lip cancers are usually confined to the lip and have not spread. I won’t know until test results come back, but early diagnosis often means the cancer is still localized.

Patient: What treatment options will I have?

Doctor: Treatment usually depends on the cancer’s stage. For early stages, surgery to remove the cancerous tissue is common. Radiation therapy can be used alone or after surgery. In more advanced cases, chemotherapy or newer treatments like immunotherapy might be needed.

Patient: What side effects should I expect?

Doctor: Side effects vary with treatment type. Surgery might cause pain, swelling, and temporary changes in appearance or sensation. Radiation can cause skin irritation and dryness, and chemotherapy may cause fatigue and nausea. We will discuss ways to manage any side effects you might experience.

Patient: How will treatment affect my daily life?

Doctor: Treatment might temporarily affect your ability to eat, speak, or smile comfortably, but many patients recover well. Support from speech therapists or dietitians can help. Most patients resume normal activities over time.

Patient: Will I be able to work while getting treatment?

Doctor: It depends on the type of treatment and how you respond. Many patients continue working, especially if their job isn't physically demanding. We’ll tailor your treatment plan to balance effectiveness with your lifestyle.

Patient: Are there resources you recommend?

Doctor: Yes. Support groups, counseling, nutritionists, and rehabilitation services can be very helpful. Your healthcare team can connect you with these resources to support you through treatment and recovery.

REFERENCES:

<https://my.clevelandclinic.org/health/diseases/21933-lip-cancer>

<https://www.mayoclinic.org/diseases-conditions/lip-cancer/diagnosis-treatment/drc-20355080>

<https://www.cancer.gov/types/head-and-neck/patient/adult/lip-mouth-treatment-pdq>

**Mastoiditis**

**DEFINITION / DESCRIPTION**

Mastoiditis is a bacterial infection in a part of your temporal bone — the big bone behind your ear. Mastoiditis starts as a middle ear infection. It once was a common cause of death in very young children. Now, thanks to vaccinations that prevent infections and antibiotics that cure them, mastoiditis is a rare condition.

But you can still get mastoiditis if you have an untreated middle ear infection. Although anyone can get mastoiditis at any age, children 2 years old and younger are especially vulnerable. It’s important to know the signs of mastoiditis so that you can seek treatment for yourself or your child as soon as possible.

#### **Types of mastoiditis**

There are two types of mastoiditis:

* Acute mastoiditis typically occurs a few days after an ear infection. It goes away within a month after treatment and doesn’t come back.
* Chronic mastoiditis is associated with a longstanding ear infection (typically present for at least a month).

**CAUSES**

Mastoiditis typically happens when middle ear infections go untreated, allowing the infection to spread into the nearby bone.

Rarely, people develop mastoiditis without a middle ear infection. This happens when a condition called cholesteatoma causes mastoiditis. Cholesteatoma is an abnormal skin growth in your middle ear. It can block fluids that need to drain from your middle ear and lead to mastoiditis.

**SIGNS / SYMPTOMS**

Usually, symptoms of mastoiditis develop days or weeks after a middle ear infection. Mastoiditis symptoms include:

* Throbbing ear pain that doesn’t go away
* An ear that looks as if it’s sticking out more than your ear on the other side
* Swollen skin or redness (may appear purplish on dark skin tones) behind your affected ear
* Doughy or soft-feeling bone behind your ear
* Ear drainage that contains pus
* Worsening hearing loss
* Headache
* Fever
* Vertigo
* Confusion
* Double vision

In addition to the symptoms above, very young children — children ages 2 and younger — may pull their affected ear and be fussy or less active.

**DIAGNOSIS METHODS**

A healthcare provider will use an otoscope to look inside your ear. They may also do the following tests:

* Blood tests. They may check your blood for signs of an infection or inflammation.
* Ear culture. Your provider will test the drainage coming from your ear for signs of the bacteria.
* Computed tomography (CT) scan. This test creates detailed images of the inside of your skull so providers can see where the infection is.
* Magnetic resonance imaging (MRI). Providers sometimes use this test to check the area between your ear and your brain.

**TREATMENT OPTIONS**

Often, healthcare providers treat mastoiditis with antibiotics and steroids. If your middle ear isn’t draining infected fluid on its own, they’ll perform a myringotomy. For this procedure, a provider makes a tiny hole in your eardrum, so the fluid gathered behind it can drain. They may place small, hollow cylinders called ear tubes into the hole, so the fluid can continue to seep out. The ear tubes usually fall out on their own within six months to a year.

If these treatments don’t help or there’s a pocket of pus (abscess) in part of your temporal bone, you may need surgery (mastoidectomy) to remove the infected bone.

**PREVENTION TIPS**

The best thing you can do to reduce your risk of mastoiditis is to get treated for ear infections ASAP. You can also take steps to protect your child from infections. You can:

* Vaccinate your child. The U.S. Centers for Disease Control and Prevention (CDC) recommends children up to age 2 receive pneumococcal vaccinations. This vaccine protects against the bacteria that most commonly cause ear infections that lead to mastoiditis.
* Limit the use of pacifiers. Pacifiers may be parents’ go-to for fussy babies and toddlers. But extended pacifier use increases the risk of developing middle ear infections.
* Don’t smoke. Secondhand smoke increases the likelihood of ear infections. Be sure no one smokes around your child.
* Control allergies. Inflammation and mucus caused by allergic reactions can block your child’s eustachian tube. This increases the risk of ear infections.
* Prevent colds. Most ear infections start with a cold, so try to limit your child’s exposure to other kids who are sick as best as you can.

**OUTLOOK / PROGNOSIS**

Usually, mastoiditis symptoms go away a few days after you or your child starts taking antibiotics. It’s important to finish taking all antibiotics as prescribed so the infection doesn’t come back.

For severe cases, you or your child may need follow-up appointments to check for long-term hearing loss.

**POSSIBLE COMPLICATIONS**

Without treatment, the infection can spread and cause complications like:

* Facial paralysis
* Partial or complete hearing loss
* Inner ear infection (labyrinthitis)
* Infection of tissues covering your brain (meningitis)
* Swelling in your brain (encephalitis)
* Life-threatening inflammation throughout your body (sepsis)

Life-threatening complications from mastoiditis are much less common than they once were. Still, it’s important to get treatment immediately to avoid long-term issues.

**WHEN TO SEE A DOCTOR / RED FLAG**

### **How do I take care of myself?**

Follow your healthcare provider’s instructions about caring for yourself or your child after treatment. For example, you may need to avoid swimming for a while to keep water out of your ear. You may need to put a cotton ball lined with petroleum jelly (like Vaseline®) in your ear when you’re bathing or showering to keep water out.

Your provider will tell you what to do.

Contact a healthcare provider if you or your child has symptoms of an ear infection, like ear pain that doesn’t improve. Ear infections are treatable. But ignoring symptoms can allow the infection to spread.

## **Diagnostic Considerations**

A high index of suspicion, judicious use of diagnostic modalities, and close follow-up care are recommended to make a diagnosis in a timely manner

Conditions to consider in the differential diagnosis of mastoiditis include the following:

* Basilar Skull Fracture
* Cellulitis
* Cysts
* Deep Neck Infections
* Lymphadenopathy
* Parotitis
* Stroke
* Trauma
* Tumors
* Histiocytoses
* Sarcoidosis
* External otitis
* Mastoid trauma
* Suppuration of postauricular lymph node
* Furuncle of meatus of the ear
* Suppuration of the postauricular (mastoid) lymph node - This node collects drainage from the scalp and becomes inflamed with infections involving this region

Catscratch disease and atypical mycobacteria tend to have poor response to antimicrobials and a high frequency of nodal abscess formation. Differentiation from acute surgical mastoiditis (ASM) is relatively easy with preservation of the skin crease and presence of a normal middle ear.

Lateral sinus thrombosis causes mastoid air sinus abnormalities; this is due to venous congestion as a consequence of this condition.

## **Differential Diagnoses**

* Bell Palsy
* Otitis Externa
* Otitis Media
* Wegener Granulomatosis

**RECENT GUIDELINES OR UPDATES**

### Coronavirus disease 2019 (COVID-19)

Bann et al compiled a set of recommendations for best pediatric otolaryngology practices with regard to the coronavirus disease 2019 (COVID-19) pandemic. These included the following for procedures involving the oral cavity, oropharynx, nasal cavity, or nasopharynx:

* Whenever possible, defer procedures involving the nasal cavity, nasopharynx, oral cavity, or oropharynx, as these pose a high risk for COVID-19 owing to the high viral burden in these locations
* Whenever possible, preoperative COVID-19 testing should be administered to patients and caregivers prior to surgical intervention
* Employment of enhanced personal protective equipment (PPE), with a strong recommendation for the use of a powered air-purifying respirator (PAPR), should be undertaken with any patient with unknown, suspected, or positive COVID-19 status
* Limit the use of powered instrumentation, including microdebriders, to reduce aerosol generation

With regard to audiologic evaluation and otologic surgery, the recommendations include the following:

* Perform routine newborn hearing screening and early intervention as indicated in the Joint Committee on Infant Hearing (JCIH) recommendations
* Defer tympanostomy tube placement for unilateral otitis media with effusion
* Although it should be prioritized, intervention for bilateral otitis media with effusion and hearing loss may be deferred based on the availability of COVID-19 testing
* Surgery involving the middle ear and mastoid, owing to their continuity with the upper aerodigestive tract, should be considered high risk for COVID-19 transmission
* Whenever possible, defer mastoidectomy, but if the surgery is required, employ enhanced PPE and avoid the use of high-speed drills
* Employment of a PAPR is strongly recommended when, in patients with unknown, suspected, or positive COVID-19 status, high-speed drills are required for otologic procedures

With regard to head and neck surgery and deep neck space infections, the recommendations include the following:

* Defer surgical excision of benign neck masses
* A multidisciplinary tumor board should decide the most appropriate treatment modality for pediatric patients with solid tumors of the head and neck, including thyroid cancer, with the availability of local resources taken into account
* Prior to surgical intervention, medical management of infectious conditions should, whenever possible, be attempted; on admission, patients and caregivers should be tested for COVID-19 and strictly quarantined pending test results

With regard to craniomaxillofacial trauma, the guidelines include the following:

* When urgent or emergent bedside procedures, including closure of facial lacerations, are required, patients should be presumed positive for COVID-19, even if they are asymptomatic; carry out procedures in a negative-pressure room using enhanced PPE
* Employ closed-reduction techniques, when possible, until preoperative COVID-19 testing is available
* Avoid the use of high-speed drills, to reduce aerosol formation
* When urgent or emergent surgical intervention is required, patients should be presumed positive for COVID-19, even if they are asymptomatic

**EPIDEMIOLOGY**

Incidence of surgical mastoiditis from acute otitis media is reported as 0.004% in the United States.Some fear that untreated otitis media increases the risk of acute mastoiditis and is the cause of higher incidences in developing countries and very young children.

The Inuit population has a high predilection for middle-ear disease and, as a likely consequence, mastoiditis.

Rates of antibiotic treatment for otitis in the Netherlands, Norway, and Denmark were 31%, 67%, and 76%, respectively. The incidence of mastoiditis was approximately 4 cases per 100,000 children per year over 5 years.

Acute mastoiditis is a disease of the very young. Most patients present when younger than age 2 years, with a median age of 12 months. However, it can occur in persons of any age.

A retrospective review of pediatric patients in Colorado found that despite an initial drop in the incidence of acute mastoiditis in children under age 2 years following the introduction of heptavalent pneumococcal conjugate vaccine (PCV7), the incidence rose again to pre-PCV7 levels within a few years. The study, by Halgrimson et al, examined pediatric inpatient data from 1999-2008 for documented cases of acute mastoiditis or patients who had undergone mastoidectomy.

The investigators found that the annual incidence of acute mastoiditis in children under age 2 years dropped from 11.0 per 100,000 population in 2001, a year after PCV7 was introduced, to 4.5 per 100,000 population in 2003. By 2008, however, the incidence had again risen, to 12.0 per 100,000 population. An increase in the prevalence of *S pneumoniae* isolates nonsusceptible to penicillin also occurred in Colorado, from 0% between 1999 and 2004 to 38% between 2005 and 2008. Halgrimson and colleagues suggested that the presence of non-PCV7 pneumococcal serotypes and a rise in pneumococcal antibiotic resistance may have caused the incidence of acute mastoiditis to increase.

Another study, however, found that the introduction of pneumococcal conjugate vaccines may have led to a national reduction in pediatric mastoiditis rates. The study, by Marom et al, looked at insurance claims from a nationwide managed health care plan to analyze health care visits associated with otitis media in children aged 6 years or younger. The investigators found that between 2008 and 2011, mastoiditis rates decreased from 61 per 100,000 child-years to 37 per 100,000 child-years.

Noting a reduction in US hospitalization rates for acute mastoiditis in children aged 0-2 years between 2009 and 2012, a study by Tawfik et al suggested that use of the 13-valent pneumococcal vaccine (PCV13) may have had a protective benefit against mastoiditis for youngsters in this age group. However, the study, which looked at annual incidences of hospitalization for pediatric acute mastoiditis after the introduction of PCV7 and PCV13, did not find an overall decline in hospitalization rates for acute mastoiditis between 2000 and 2012 in persons below age 21 years.

**PREDEFINED Q & A SETS**

1. What treatments will my child need to get rid of mastoiditis?  
Treatment usually involves antibiotic therapy to fight the infection, often started intravenously (in the vein) especially for severe cases. Your child may also need drainage of the middle ear, either via a myringotomy (small incision in the eardrum) possibly with tube placement. In some cases, surgery such as mastoidectomy may be required to remove infected bone if there is an abscess or if the infection does not respond to antibiotics.

2. Will they need to be admitted to the hospital?  
Yes, many children with mastoiditis require hospital admission for close monitoring, intravenous antibiotics, and possible surgery. Hospitalization ensures proper administration of medicine and management of complications. Less severe cases may later transition to oral antibiotics if they improve.

3. What are signs the infection has returned?  
Signs of recurring mastoiditis include fever, ear pain or swelling behind the ear, redness or tenderness over the mastoid bone, drainage from the ear, or general worsening symptoms such as irritability or difficulty hearing. If your child develops these symptoms after treatment, it is important to contact your healthcare provider promptly.

4. How can I prevent future ear infections?  
Prevention steps include:

* Ensuring your child is fully vaccinated, especially with pneumococcal conjugate vaccines (PCV13), which reduce ear infection risk.
* Treating acute ear infections promptly and completely with antibiotics as prescribed.
* Avoiding exposure to tobacco smoke and managing allergies that may contribute to ear infections.
* Keeping the child’s ears dry during bathing or swimming as advised by your healthcare provider.

5. Will my child need tests to check for hearing-related issues?  
Yes, because mastoiditis and ear infections can affect hearing, your child will likely need hearing tests during and after treatment to assess for any hearing loss or related complications. Follow-up with an ear, nose, and throat (ENT) specialist is important to monitor and manage lasting effects.

DOCTOR-PATIENT CONVERSATIONS

Doctor: Good morning. What brings you in today regarding your child?

Patient: Good morning, Doctor. My child has been very fussy, pulling their ear, and they developed a fever and some swelling behind their ear. I’m worried it’s more than just a typical ear infection.

Doctor: I understand your concern. The symptoms you’re describing—fever, pain, and swelling behind the ear—are classic signs of mastoiditis. This is an infection of the mastoid bone, which is located behind the ear, and it often develops if a middle ear infection spreads .

Patient: Mastoiditis? Will my child need to be admitted to the hospital?

Doctor: Yes, if we confirm mastoiditis, hospital admission is usually required . This is because the infection needs to be treated aggressively with intravenous (IV) antibiotics to stop it from spreading further . We'll also monitor your child closely for any complications .

Patient: What kind of treatments are we looking at?

Doctor: The main treatment will be those high-dose IV antibiotics, typically for at least 1 to 2 days, and then we might switch to oral antibiotics for a couple of weeks once the fever has resolved for 48 hours . Sometimes, to help drain the infected fluid from the middle ear, we may need to perform a procedure called a myringotomy, which is a small incision in the eardrum. Small ear tubes might also be placed to ensure proper drainage . If the infection is more severe or doesn't respond to antibiotics, or if there's an abscess, surgery called a mastoidectomy might be necessary to remove the infected bone .

Patient: That sounds serious. How will I know if the infection comes back after treatment?

Doctor: That’s a very important question. Signs that the infection might have returned include fever, ear pain, swelling or redness behind the ear, or any drainage from the ear . If you notice any of these symptoms after your child has completed treatment, it's crucial to contact us right away . Persistent pain is a particular warning sign .

Patient: Is there anything I can do to prevent future ear infections, so we don’t end up here again?

Doctor: Absolutely. Good ways to prevent future ear infections include making sure your child is up-to-date on all their vaccinations, especially the pneumococcal vaccine, which helps prevent some common causes of ear infections. Also, try to avoid exposing your child to secondhand smoke, as this can increase their risk of ear infections . Prompt and complete treatment of any future ear infections is also essential.

Patient: And what about their hearing? Will this affect it long-term?

Doctor: Mastoiditis, like severe ear infections, can sometimes affect hearing . After the infection clears, we will definitely arrange for your child to have hearing tests to check for any hearing-related issues. It’s important to ensure there’s no lasting impact on their hearing development. We'll also recommend follow-up with an ear, nose, and throat specialist to continue monitoring their progress .

Patient: Thank you, Doctor. This is a lot to take in, but I feel better knowing the plan.

Doctor: You're welcome. We'll ensure your child gets the best care. Don't hesitate to reach out with any more questions.

REFERENCES:

<https://emedicine.medscape.com/article/2056657-guidelines>

<https://my.clevelandclinic.org/health/diseases/24469-mastoiditis>

**Melanoma**

**DEFINITION / DESCRIPTION**

Melanoma, which means "black tumor," is the most dangerous type of skin cancer. It grows quickly and has the ability to spread to any organ.

Melanoma comes from skin cells called melanocytes. These cells produce melanin, the dark pigment that gives skin its color. Most melanomas are black or brown in color, but some are pink, red, purple or skin-colored.

About 30% of melanomas begin in existing moles, but the rest start in normal skin. This makes it especially important to pay attention to changes in your skin because the majority of melanomas don't start as moles. However, how many moles you have may help predict your skin’s risk for developing melanoma. It’s important to know if you’re in a high-risk group for developing melanoma skin cancer. Because of the fast growth rate of melanomas, a treatment delay sometimes may mean the difference between life and death. Knowing your risk can help you be extra vigilant in watching changes in your skin and seeking skin examinations since melanomas have a 99% cure rate if caught in the earliest stages. Early detection is important because treatment success is directly related to the depth of the cancerous growth.

Melanoma accounts for only about 1% of all skin cancers, but causes the great majority of skin cancer-related deaths. It’s one of the most common cancers in young people under 30, especially in young women.

Melanoma incidence has dramatically increased over the past 30 years. It’s widely accepted that increasing levels of ultraviolet (UV) exposure are one of the main reasons for this rapid rise in the number of melanoma cases.

### **Where can I get melanoma on my body?**

You can get melanoma on any area of your body. Melanoma can even form on your eyes and internal organs. Men are more prone to develop melanoma on their trunk — often the upper back. Women are more likely to have melanoma on their legs.

### **What are the signs of melanoma?**

Knowing how to spot melanoma is important because early melanomas are highly treatable. Melanoma can appear as moles, scaly patches, open sores or raised bumps.

Use the American Academy of Dermatology's "ABCDE" memory device to learn the warning signs that a spot on your skin may be melanoma:

* Asymmetry: One half does not match the other half.
* Border: The edges are not smooth.
* Color: The color is mottled and uneven, with shades of brown, black, gray, red or white.
* Diameter: The spot is greater than the tip of a pencil eraser (6.0 mm).
* Evolving: The spot is new or changing in size, shape or color.

Some melanomas don't fit the ABCDE rule, so tell your doctor about any sores that won't go away, unusual bumps or rashes or changes in your skin or in any existing moles.

Another tool to recognize melanoma is the ugly duckling sign. If one of your moles looks different from the others, it’s the ugly duckling and should be seen by a dermatologist.

**CAUSES**

Most experts agree that a major risk factor for melanoma is overexposure to sunlight, especially sunburns when you are young. Statistics tell us that 86% of melanomas are caused by solar ultraviolet (UV) rays. How does the sun cause skin cancer? UV exposure can cause damage to a cell’s DNA, making changes to particular genes that affect how cells grow and divide. The potential for problems comes when your skin's DNA is damaged and those cells start reproducing.

UV radiation from tanning beds also increases the risk of melanoma and has been designated as a carcinogen (cancer-causing) by the World Health Organization. Tanning bed use may be related to over over 6,000 cases of melanoma per year in the United States.

Although anyone can develop melanoma, an increased risk for developing the disease is seen in people with:

* A personal history of melanoma.
* A family history of melanoma.
* Fair skin, freckles, blond or red hair and blue eyes.
* Excess sun exposure, including blistering sunburns.
* An address near the equator or in high elevations — living in these locations may increase your UV exposure.
* A history of tanning bed use.
* Many moles, especially atypical moles.
* A weakened immune system.

Melanoma is more common in white people, but it can occur in people of all skin types. People with darker skin most often get melanoma on their palms, soles and nails.

**DIAGNOSIS METHODS**

If you have a mole or other spot that looks suspicious, your doctor may remove it and look at it under the microscope to see if it contains cancer cells. This is called a biopsy.

After your doctor receives the skin biopsy results showing evidence of melanoma cells, the next step is to determine if the melanoma has spread. This is called staging. Once diagnosed, melanoma will be categorized based on several factors, such as how deeply it has spread and its appearance under the microscope. Tumor thickness is the most important characteristic in predicting outcomes.

Melanomas are grouped into the following stages:

* Stage 0 (Melanoma in situ): The melanoma is only in the top layer of skin (the epidermis).
* Stage I: Low-risk primary melanoma with no evidence of spread. This stage is generally curable with surgery.
* Stage II: Features are present that indicate higher risk of recurrence, but there is no evidence of spread.
* Stage III: The melanoma has spread to nearby lymph nodes or nearby skin.
* Stage IV: The melanoma has spread to more distant lymph nodes or skin or has spread to internal organs.

### **TEST**

There are several tests your doctor can use to stage your melanoma. Your doctor may use these tests:

* Sentinel Lymph Node Biopsy: Patients with melanomas deeper than 0.8 mm, those who have ulceration under the microscope in tumors of any size or other less common concerning features under the microscope, may need a biopsy of sentinel lymph nodes to determine if the melanoma has spread. Patients diagnosed via a sentinel lymph node biopsy have higher survival rates than those diagnosed with melanoma in lymph nodes via physical exam.
* Computed Tomography (CT) scan: A CT scan can show if melanoma is in your internal organs.
* Magnetic Resonance Imaging (MRI) scan: An MRI scan is used to check for melanoma tumors in the brain or spinal cord.
* Positron Emission Tomography (PET) scan: A PET scan can check for melanoma in lymph nodes and other parts of your body distant from the original melanoma skin spot.
* Blood work: Blood tests may be used to measure lactate dehydrogenase (LDH) before treatment. Other tests include blood chemistry levels and blood cell counts.

**TREATMENT OPTIONS**

Your melanoma treatment will depend on the stage of the melanoma and your general health.

Surgery is usually the main treatment for melanoma. The procedure involves cutting out the cancer and some of the normal skin surrounding it. The amount of healthy skin removed will depend on the size and location of the skin cancer. Typically, surgical excision (removal) of melanoma can be performed under local anesthesia in the dermatologist's office. More advanced cases may require other types of treatment in addition to or instead of surgery.

Treatments for melanoma:

* Melanoma Surgery: In the early stages, surgery has a high probability of being able to cure your melanoma. Usually performed in an office, a dermatologist numbs the skin with a local anesthetic and removes the melanoma and margins (healthy surrounding skin).
* Lymphadenectomy: In cases where melanoma has spread, removal of the lymph nodes near the primary diagnosis site may be required. This can prevent the spread to other areas of your body.
* Metastasectomy: Metastasectomy is used to remove small melanoma bits from organs.
* Targeted cancer therapy: In this treatment option, drugs are used to attack specific cancer cells. This “targeted” approach goes after cancer cells, leaving healthy cells untouched.
* Radiation Therapy:Radiation therapy includes treatments with high-energy rays to attack cancer cells and shrink tumors.
* Immunotherapy: immunotherapy stimulates your own immune system to help fight cancer.

Some patients with skin cancer may participate in a clinical trial. A clinical trial is a research program conducted with patients to evaluate a medical treatment, drug or device.

**PREVENTION TIPS**

You may reduce your risk of melanoma by protecting yourself from excess sun and sunburns.

* Avoid sun and seek shade, especially between 10 a.m. and 4 p.m.
* Don’t use tanning beds. Use a spray tan (cosmetic) instead.
* Whenever possible, wear hats with brims, sunglasses, long-sleeved shirts and pants.
* Use a broad-spectrum sunscreen with a skin protection factor (SPF) of 30 or higher and reapply often, usually every 1.5 hours or more often if you’re swimming or sweating.
* Use a lip balm with sunscreen.
* Don't forget to apply sunscreen to young children and infants older than 6 months.

Early detection is important to minimize the risks associated with melanoma. Be sure to tell your doctor about any new or changing moles, sores or skin discolorations. In addition, ask your doctor to routinely perform a total skin examination to look for signs of skin cancer.

### **Can changing my diet help prevent melanoma?**

The American Cancer Society advocates eating a plant-based diet over an animal-based diet as part of a healthy plan to avoid all cancers. Growing evidence suggests that plants pack a powerful punch in any fight against cancer because they're nutritious, cholesterol-free and fiber-rich.

There’s no doubt that a healthy diet can protect your immune system. Having a strong immune system is important to help your body fight disease. Some research has shown that a Mediterranean diet is a healthy choice that may help prevent the development of cancer. Talk to your healthcare provider about the role food plays in lowering your cancer risks.

Some skin and immune-system healthy foods to consider include:

* Daily tea drinking: The polyphenols (antioxidants found in plants) in tea help strengthen your immune system. Green tea contains more polyphenols than black tea.
* High vegetable consumption: Eating carrots, cruciferous and leafy vegetables is linked to the prevention of cutaneous (invasive) melanoma.
* Weekly fish intake: Study participants who ate fish weekly seemed to avoid developing the disease when compared to those who did not eat fish weekly.

Following years of debate among dermatologists over the protective effects of antioxidants in preventing skin cancer, recent research shows a link between antioxidant intake from fresh foods and not developing the disease. Antioxidants in supplements have not been proven effective as a skin cancer prevention. More dermatologists today recommend a diet rich in high-antioxidant whole foods.

**OUTLOOK / PROGNOSIS**

Most skin cancers can be cured if they’re treated before they have a chance to spread. However, more advanced cases of melanoma can be fatal. The earlier skin cancer is found and removed, the better your chances for a full recovery.

**WHEN TO SEE A DOCTOR / RED FLAG**

You should have a skin examination by a doctor if you have any of the following:

* A personal history of skin cancer or atypical moles (nevi).
* A family history of skin cancer.
* A history of intense sun exposure as a young person and painful or blistering sunburns.
* New or numerous large moles.
* A mole that changes in size, color or shape.
* Any mole that itches, bleeds or is tender.

## **Diagnostic Considerations**

For subungual melanoma, also consider chronic paronychia, subungual hematoma, and melanonychia striata. For superficial spreading or nodular subtypes, also consider traumatized nevus.

## **Differential Diagnoses**

* Atypical Mole (Clark Nevus or Dysplastic Nevus)
* Basal Cell Carcinoma
* Blue Nevi
* Cherry Hemangioma
* Cutaneous Squamous Cell Carcinoma
* Dermatofibroma
* Dermatologic Manifestations of Metastatic Carcinomas
* Halo Nevus
* Keloid and Hypertrophic Scar
* Keratoacanthoma
* Lentigo
* Melanocytic Nevi
* Nevi of Ota and Ito
* Seborrheic Keratosis
* Spitz Nevus
* Vitiligo

## **Diagnostic Considerations**

Differentials to consider in the diagnosis of malignant melanoma include the following conditions:

* Benign melanocytic lesions
* Dysplastic nevus
* Squamous cell carcinoma
* Metastatic tumors to the skin
* Blue nevus
* Epithelioid (Spitz) tumor
* Pigmented spindle cell tumor
* Halo nevus
* Atypical fibroxanthoma
* Pigmented actinic keratosis
* Sebaceous carcinoma
* Histiocytoid hemangioma

Also see the following:

* Lentigo Maligna Melanoma
* Oral Malignant Melanoma
* Head and Neck Mucosal Melanomas

## **Differential Diagnoses**

* Basal Cell Carcinoma
* Lentigo Maligna Melanoma
* Mycosis Fungoides

**EPIDEMIOLOGY**

### Occurrence in the United States

The American Cancer Society estimates that 100,640 cases of invasive cutaneous melanoma will be diagnosed in the United States in 2024 (59,170 in men and 41,470 in women), along with 99,700 cases of in situ melanoma. Since the early 2000s, incidence rates of melanoma in persons younger than age 50 years have stabilized in women and declined by about 1% per year in men; in adults age 50 and older, rates increased in women by about 3% per year but stabilized in men.

Although melanoma accounts for only about 1% of skin cancers, it is responsible for the vast majority of deaths from skin cancers. The American Cancer Society estimates that 8290 people in the US (5430 men and 2860 women) will die of melanoma in 2024.

However, a review of Surveillance, Epidemiology, and End Results (SEER) data from 1975 to 2014 identified discrepancies in incidence and mortality trends that suggest considerable overdiagnosis of melanoma in White persons. During that period, in Blacks, the incidence of melanoma increased by almost 25%, while mortality due to melanoma decreased by approximately 25%. In Whites, melanoma incidence increased approximately 4-fold in women and 6-fold in men, while mortality was stable in women and increased by less than 50% in men. These researchers calculate that had medical care not improved, estimated mortality would have increased 60% in White women and more than doubled in White men. They estimate that 59% of White women and 60% of White men with melanoma were overdiagnosed in 2014.

### International statistics

Worldwide, the incidence of malignant melanoma has increased rapidly over the past 50 years, with the highest incidence in fair-skinned populations and in geographic areas closest to the equator. Australia and New Zealand have the highest incidence of melanoma in the world, at an age-standardized rate of 32.5 cases per 100,000 population.

### Racial demographics

Melanoma is more common in Whites than in Blacks and Asians. The rate of melanoma in Blacks is estimated to be one twentieth that of Whites. White people with dark skin also have a much lower risk of developing melanoma than do those with light skin. The typical patient with melanoma has fair skin and a tendency to sunburn rather than tan. White people with blond or red hair and profuse freckling appear to be most prone to melanomas. In Hawaii and the southwestern United States, Whites have the highest incidence, approximately 20-30 cases per 100,000 population per year.

### Sex- and age-related demographics

Overall, melanoma is the fifth most common malignancy in the US population, accounting for 6% of all new cancer cases in men and 4% of all new cases in women. However, the relative incidence of melanoma in men and women varies by age: in people younger than 50 years of age, incidence rates are higher in women than in men, but thereafter rates are much higher in men. Those differences presumably reflect historical differences in occupational and recreational exposure to UV radiation, as well as higher use of indoor tanning by young women.Women tend to have lesions that are nonulcerated and thinner than those in men.

Melanoma may occur at any age, although children younger than age 10 years rarely develop a de novo melanoma. The median age at diagnosis is 66 years, and 80% of patients are 45 to 84 years old. As a percentage of cancers, the incidence rates of melanoma in US adolescents and young adults from 1973-2015 were as follows:

* Age 15-19 years: Males, 4.0; females, 3.8
* Age 20-24 years: Males 9.3; females, 11.9
* Age 25-29 years: Males, 18.1; females, 21.0
* Age 30-34 years: Males, 28.3; females, 28.4
* Age 35-39 years: Males, 40.3; females, 34.9

The incidence of melanoma has more than doubled in the white population over the last 30 years, and melanoma currently is the fifth most common cancer in the United States in both men and women. Approximately 106,111 Americans (62,260 men and 43,850 women) developed invasive cutaneous melanoma in 2021, with an estimated additional 101,280 or more cases of melanoma in situ. The actual incidence of melanoma may be higher due to melanoma underreporting to cancer registries, particularly for in situ and thinner tumors that are diagnosed and managed in the outpatient setting.

Melanoma incidence varies across birth cohorts and by anatomic site and sex. Data from the National Cancer Institute’s Surveillance, Epidemiology, and End Results (SEER) registry between 1975 and 2017 showed continued increases in melanoma incidence at all anatomic sites, except for head and neck melanomas in men, although much of this increase was driven melanoma by detection of thin tumors (< 1.5 mm). Rates of melanoma in situ (intraepithelial) have also steadily risen to equal those of invasive melanoma, raising concerns regarding overdiagnosis of melanocytic neoplasms that would otherwise prove harmless. In the United States, the current lifetime risk of developing melanoma is about 2.6% (1 in 38) for whites, 0.1% (1 in 1,000) for Blacks, and 0.6% (1 in 167) for Hispanics.

Encouragingly, decreasing melanoma incidence rates have been noted in younger age groups (< age 30 years) in the United States, which may be a result of primary prevention campaigns aimed at reducing excessive sun exposure over the past 30 or more years; however, the full impact of public health strategies on melanoma incidence will not be apparent for some time to come.

Melanoma incidence more than doubled from 1980-2004 in white women younger than 40 years, a trend attributed at least in part to increased UVR exposure through tanning bed use, which is a World Health Organization (WHO)–classified carcinogen.A study assessing melanoma incidence among younger white girls and women (15-39 y) in California showed significantly higher incidence in those living in higher socioeconomic areas with the highest UVR exposure compared with those from lower socioeconomic neighborhoods with the highest UVR exposure, suggesting that affluence (and associated lifestyle behaviors) could have a greater impact on melanoma risk than outdoor UVR exposure alone.These trends prompted public health and legislative efforts to prohibit indoor tanning bed use in minors and to ban indoor tanning entirely in the US, as has been done in several other countries. In terms of occupational risk pilots and flight crews demonstrate melanoma risk double that of the general population.

*International*

Melanoma incidence has continued to increase worldwide, with the highest rates persisting in Australia and New Zealand. However, melanoma incidence in Australia has decreased since 2005 by -0.7% per year, likely reflecting the role of successful primary prevention campaigns over the past 40 years. The most recent analysis of global cancer statistics for melanoma from 2020 demonstrated an age-standardized incidence rate of 36.6 in cases per 100,000 men and women in Australia and 31.6 cases per 100,000 men and women in New Zealand, compared with 16.6 cases per 100,000 men and women in the United States.

### Race

Melanoma is primarily a malignancy of white individuals. However, mortality rates are higher in African Americans and Hispanics, who are more likely to have acral melanoma and later-stage disease at presentation.

### Sex

In the United States, invasive melanoma has a higher female predilection from birth to age 49 years (1 in 156 women compared with 1 in 230 men in 2021). However, from age 50 years and older, melanoma in men predominates, occurring in 1 in 27 men compared with 1 in 40 women over a lifetime.

Worldwide, of the 324,625 new cases estimated to have occurred in 2020, men were affected slightly more than women 173,844 vs 150,791, respectively. However, of the estimated 57,043 worldwide deaths in 2020, significantly more occurred in men than in women (32,385 vs 24,658, respectively).

### Age

The median age at melanoma diagnosis is 65 years; however, it is the most common cancer in women aged 25-29 years and is second only to breast cancer in women aged 30-34 years. From 2010 through 2014, melanoma incidence decreased slightly in younger non-Hispanic white men and women but continued to increase significantly in men >54 years and women >44 years. The most striking differences in melanoma incidence and mortality occur in individuals older than 65 years, although modest differences in age-specific incidence and mortality are notable in persons older than 50 years.

Older individuals are both more likely to acquire and to die from melanoma (particularly white men aged 65 years and older), marking them a primary target for early detection and screening.Treatment options in elderly persons may also be limited because of comorbid medical conditions, an inability to tolerate adverse medication effects or toxicity, the increased likelihood of drug interactions, and potential exclusion from clinical trials based on age criteria, although newer immune and targeted therapies are often well tolerated patients of advanced age.

**PREDEFINED Q & A SETS**

What is melanoma?  
Melanoma is a serious type of skin cancer that develops from melanocytes, the cells that produce pigment in the skin. It can appear suddenly or develop from an existing mole .

2. Is melanoma a serious disease?  
Yes, melanoma is a serious disease. If detected in its early stages, it can often be treated successfully. However, in its later stages, melanoma can spread to other organs and become life-threatening .

3. What causes melanoma?  
The most common cause of melanoma is excessive exposure to the sun's ultraviolet (UV) radiation. Other contributing factors can include genetic predispositions and immune system deficiencies. Childhood sunburns and sun exposure are also linked to melanoma .

4. What does melanoma look like?  
Melanoma often begins as a flat, light brown to black mark with uneven borders. These markings are usually at least a quarter of an inch in size and may display shades of red, blue, and white. They can appear on the upper back, torso, lower legs, head, and neck. A new mole, a mole that changes in appearance, or one that starts to grow should be examined by a doctor .

5. What are the risk factors for melanoma?  
Risk factors for melanoma include skin that burns or freckles easily, light skin/hair/eye color, a personal or family history of skin cancer, and older age. Having many moles also increases risk .

6. Can melanoma be cured?  
If detected early, melanoma can often be cured through surgical removal. Early detection is crucial for successful treatment .

7. How is melanoma diagnosed?  
Diagnosis often begins with a biopsy of a suspected mole or lesion. Other diagnostic tests may include CT scans, MRI scans, PET scans, and blood tests for biomarkers to assess the extent of the cancer .

8. What are the general treatment options for melanoma?  
Most melanoma is initially treated with surgery to remove the entire melanoma and a margin of surrounding tissue. For early-stage melanoma, surgery may be the only treatment needed. For later stages, additional treatments may include chemotherapy, radiation, or immunotherapy, which helps boost the patient's immune system to fight cancer cells .

9. Is immunotherapy an option for melanoma?  
Immunotherapy drugs, specifically checkpoint inhibitors, have been approved for certain types of melanoma. These drugs work by disrupting signals that help cancer cells hide from the immune system. However, immunotherapy is not suitable for all patients, and candidacy should be discussed with an oncologist .

10. How can melanoma be prevented?  
Melanoma can be prevented by practicing sun safety measures:

* Avoid peak sunlight hours (10 a.m. to 3 p.m.) .
* Apply sunscreen with an SPF of 30 or more, 15 to 30 minutes before going outdoors, and reapply every two hours when active .
* Wear protective clothing, including wide-brimmed hats and long sleeves, during prolonged sun exposure .
* Regularly examine your skin for changes in existing moles or new markings, and see a doctor immediately if you notice any concerning changes

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning. Thanks for coming in today. What brings you in?

Patient: Good morning, Doctor. I’m really worried. I have a mole on my back that has gotten larger and looks a bit strange—it's not just brown anymore, it has some darker spots and its shape is irregular.

Doctor: I understand your concern. Changes in moles, especially in size, shape, and color, are important to get checked. We use a checklist to assess suspicious pigmented lesions. We look for asymmetry, irregular borders, uneven color, and a diameter larger than 7mm. Also, if there's any inflammation, oozing, or a change in sensation, these are all important signs. When did you first notice these changes?

Patient: It's been a few months now, maybe four or five. It used to be just a regular mole, but now it’s definitely larger and looks different.

Doctor: Okay. What I'll do now is examine it closely using a dermatoscope—it's like a magnifying glass for your skin. This helps me look at the patterns and structures within the mole that aren't visible to the naked eye. I’ll also check your other moles and your general skin.

Patient: What happens if you think it might be melanoma?

Doctor: If, after my examination, I suspect it could be melanoma, the next crucial step is to perform a biopsy. This involves removing the entire suspicious lesion for a full-thickness excisional biopsy, which means we take out the mole and a small margin of surrounding skin and send it to a lab for analysis. This is the only way to definitively diagnose melanoma and determine its characteristics, like how deep it has grown into the skin, which is called the Breslow thickness.

Patient: And if it is melanoma, what then? What are my treatment options?

Doctor: If the biopsy confirms melanoma, the primary treatment is usually wide local excision. This means we surgically remove the melanoma along with a larger margin of healthy skin around it to ensure all cancer cells are gone. The size of this margin depends on the depth of the melanoma. For more advanced cases, or if the melanoma has spread, other treatments like radiation therapy, chemotherapy, or immunotherapy might be considered. The choice of treatment is tailored to your specific situation, taking into account the type of melanoma, its location, depth, and whether it has spread.

Patient: What if it has spread? How do you know?

Doctor: If the initial biopsy shows a deeper or more aggressive melanoma, we might recommend further tests, such as imaging scans or a sentinel lymph node biopsy, to see if the cancer has spread to nearby lymph nodes or other parts of the body. This information helps us accurately stage the melanoma, which guides our treatment plan.

Patient: What are the side effects of these treatments, especially surgery?

Doctor: For surgery, common side effects include some pain, swelling, and scarring at the site of removal. We'll discuss what to expect regarding recovery and wound care. If other treatments like radiation or chemotherapy are needed, they have their own set of potential side effects, which we would discuss in detail if that becomes necessary.

Patient: Will I be able to work and do my normal activities during treatment?

Doctor: For localized melanoma treated with simple excision, most people can return to their normal activities fairly quickly. If more extensive surgery or other treatments are needed, there might be a period of recovery that impacts your ability to work or do certain activities. We will work with you to plan your treatment in a way that minimizes disruption to your daily life as much as possible, and we can provide documentation for work if needed.

Patient: What resources do you recommend for more information?

Doctor: I recommend resources like the American Academy of Dermatology, the American Cancer Society, and the Melanoma Research Alliance. They provide comprehensive information about melanoma, support services, and patient handbooks. Your oncology team will also be a great resource, and we'll ensure you have all the information you need before, during, and after treatment. It's often helpful to bring a family member or friend to appointments for support and to help remember information.

Patient: Thank you, Doctor. This has been very helpful.

Doctor: You're welcome. We’ll get this lesion biopsied and have a clearer picture soon. We'll support you every step of the way.

REFERENCES:

<https://emedicine.medscape.com/article/280245-overview#a5>

<https://www.ncbi.nlm.nih.gov/books/NBK470409/>

[Melanoma: Symptoms, Staging & Treatment](https://my.clevelandclinic.org/health/diseases/14391-melanoma#overview)

**Ménière’s disease**

**DEFINITION / DESCRIPTION**

Meniere's disease is an inner ear problem that can cause dizzy spells, also called vertigo, and hearing loss. Most of the time, Meniere's disease affects only one ear.

Meniere's disease can happen at any age. But it usually starts between the ages of 40 to 60. It's thought to be a lifelong condition. But some treatments can help ease symptoms and lessen how it affects your life long term.

**CAUSES**

The cause of Meniere's disease isn't known. Symptoms of Meniere's disease may be due to extra fluid in the inner ear called endolymph. But it isn't clear what causes this fluid to build up in the inner ear.

Issues that affect the fluid, which might lead to Meniere's disease, include:

* Poor fluid drainage. This may be due to a blockage or irregular ear shape.
* Autoimmune disorders.
* Viral infection.
* Genetics.

Because no single cause has been found, Meniere's disease likely has a combination of causes.

**RISK FACTORS**

Meniere's disease is most common in people ages 40 to 60. Females may have a slightly higher risk than men.

You may have a higher chance of getting Meniere's disease if someone in your family has had the condition.

You may have a higher risk of Meniere's disease if you have an autoimmune disorder.

**SIGNS / SYMPTOMS**

Symptoms of Meniere's disease include:

* **Regular dizzy spells.** You have a spinning feeling that starts and stops suddenly. Vertigo may start without warning. It usually lasts 20 minutes to 12 hours, but not more than 24 hours. Serious vertigo can cause nausea.
* **Hearing loss.** Hearing loss in Meniere's disease may come and go, especially early on. Over time, hearing loss can be long-lasting and not get better.
* **Ringing in the ear.** Ringing in the ear is called tinnitus. Tinnitus is the term for when you have a ringing, buzzing, roaring, whistling or hissing sound in your ear.
* **Feeling of fullness in the ear.** People with Meniere's disease often feel pressure in the ear. This is called aural fullness.

After a vertigo attack, symptoms get better and might go away for a while. Over time, how many vertigo attacks you have may lessen.

**DIAGNOSIS METHODS**

Your healthcare provider does an exam and asks about your health history. A Meniere's disease diagnosis needs to include:

* Two or more vertigo attacks, each lasting 20 minutes to 12 hours, or up to 24 hours.
* Hearing loss proved by a hearing test.
* Tinnitus or a feeling of fullness or pressure in the ear.

Meniere's disease can have similar symptoms that are similar to other illnesses. Because of this, your healthcare provider will need to rule out any other conditions you may have.

### **Hearing assessment**

A hearing test is called audiometry. Audiometry looks at how well you hear sounds at different pitches and volumes. It also can test how well you can tell between words that sound the same. People with Meniere's disease often have trouble hearing low frequencies or combined high and low frequencies. They may have typical hearing in the midrange frequencies.

### **Balance assessment**

Between vertigo attacks, balance returns to normal for most people with Meniere's disease. But you might have some ongoing balance problems.

Tests that study how well the inner ear is working include:

* **Electronystagmogram or videonystagmography (ENG or VNG).** These tests measure balance by studying eye movement. One part of the test looks at eye movement while your eyes follow a target. One part studies eye movement while your head is put in different positions. A third test, called the caloric test, follows eye movement by using temperature changes to trigger a reaction from the inner ear. Your healthcare provider may use warm and cold air or water in the ear for the caloric test.
* **Rotary-chair testing.** Like a VNG, this test measures how well your inner ear works based on eye movement. You sit in a computer-controlled chair that spins from side to side, which triggers activity in your inner ear.
* **Vestibular evoked myogenic potentials (VEMP) testing.** This test uses sound to make parts of the inner ear active. It records how well muscles react to that sound. It may show common changes in the affected ears of people with Meniere's disease.
* **Computerized dynamic posturography (CDP).** This test shows which part of the balance system you rely on the most and which parts may cause problems. The parts of the balance system include vision, inner ear function or feelings from the skin, muscles, tendons and joints. While wearing a safety harness, you stand barefoot on a platform. Then you keep your balance under different conditions.
* **Video head impulse test (vHIT).** This test looks at how well the eyes and inner ears work together. vHIT uses video to measure eye reactions to sudden movement. While you focus on a point, your head is turned quickly and unpredictably. If your eyes move off the target when your head is turned, you have a reflex issue.
* **Electrocochleography (ECoG).** This test looks at how the inner ear reacts to sounds. It can help see if you have inner ear fluid buildup. But this test isn't given only for Meniere's disease.

### **Tests to rule out other conditions**

Lab tests, imaging scans and other tests may be used to rule out conditions. Some other conditions can cause problems like those of Meniere's disease, such as a brain tumor or multiple sclerosis.

**TREATMENT OPTIONS**

No cure exists for Meniere's disease. Some treatments can help lessen how bad vertigo attacks are and how long they last. But there are no treatments for permanent hearing loss. Your healthcare provider may be able to suggest treatments that prevent your hearing loss from getting worse.

### **Medicines for vertigo**

Your healthcare provider may prescribe medicines to take during a vertigo attack so that it's less severe:

* **Motion sickness medicines.** Medicines such as meclizine (Antivert) or diazepam (Valium) may lessen the spinning feeling and help control nausea and vomiting.
* **Anti-nausea medicines.** Medicines such as promethazine might control nausea and vomiting during a vertigo attack.
* **Diuretics and betahistine.** These medicines can be used together or alone to improve vertigo. Diuretics lower how much fluid is in the body, which may lower the amount of extra fluid in the inner ear. Betahistines ease vertigo symptoms by improving blood flow to the inner ear.

### **Long-term medicine use**

Your healthcare provider may prescribe a medicine to reduce fluid retention and suggest limiting your salt intake. This helps control the intensity and amount of Meniere's disease symptoms in some people.

### **Noninvasive therapies and procedures**

Some people with Meniere's disease may benefit from procedures that don't include surgery, such as:

* **Rehabilitation.** If you have balance problems between vertigo attacks, vestibular rehabilitation therapy might improve your balance.
* **Hearing aid.** A hearing aid in the ear affected by Meniere's disease might improve your hearing. Your healthcare provider can refer you to an ear doctor, also called an audiologist, to talk about the best hearing aids for you.

If conservative treatments aren't successful, your care provider might suggest more-intense treatments.

### **Middle ear injections**

Medicines injected and absorbed in the middle ear may help vertigo symptoms get better. This treatment is done in a care provider's office. Injections can include:

* **Gentamicin.** This is an antibiotic that's toxic to your inner ear. It works by damaging the sick part of your ear that's causing vertigo. Your healthy ear then takes on the job for balance. But there is a risk of further hearing loss.
* **Steroids.** Steroids such as dexamethasone also may help control vertigo attacks in some people. Dexamethasone may not work as well as gentamicin. But it's less likely to cause further hearing loss.

### **Surgery**

If vertigo attacks from Meniere's disease are severe and hard to bear and other treatments don't help, surgery might be an option. Procedures include:

* **Endolymphatic sac surgery.** The endolymphatic sac helps control inner ear fluid levels. This procedure relieves pressure around the endolymphatic sac, which can improve fluid levels. Sometimes, a care provider places a tube inside your ear to drain any extra fluid.
* **Labyrinthectomy.** With this procedure, the surgeon removes the parts of your ear causing vertigo, which causes complete hearing loss in that ear. This allows your healthy ear to be in charge of sending information about balance and hearing to your brain. Care providers only suggest this procedure if you have poor hearing or total hearing loss in the diseased ear.
* **Vestibular nerve section.** This procedure involves cutting the vestibular nerve to prevent information about movement from getting to the brain. The vestibular nerve sends balance and movement information from your inner ear to the brain. This procedure usually improves vertigo and keeps hearing in the diseased ear. Most people need medicine that puts them in a sleep-like state, called general anesthesia, and an overnight hospital stay.

**Lifestyle and home remedies**

You may be able to improve some symptoms of Meniere's disease with self-care tips. Think about trying these tips during a vertigo attack:

* **Sit or lie down when you feel dizzy.** Avoid things that can make your symptoms worse, such as sudden movement, bright lights, watching television or reading. Try to focus on an object that isn't moving.
* **Rest during and after attacks.** Don't rush to return to your normal activities. If you feel tired, rest in bed for a short time. Then, slowly get up and move around when you can. This helps the brain readjust your balance signals.
* **Prepare for an attack ahead of time.** Talk to your healthcare provider about ways you can prepare for a vertigo attack. Talk about medicines you can take for dizziness. And ask about when to go to the hospital or how to prevent injuries, such as a fall.

### **Lifestyle changes**

To avoid causing a vertigo attack, try the following.

* **Limit salt.** Eating foods and having drinks high in salt can boost the amount of water in your body. For overall health, aim for less than 2,300 milligrams of sodium each day. Experts also suggest spreading your salt intake evenly throughout the day.
* **Limit caffeine, alcohol and tobacco.** These substances can cause vertigo attacks in some people. Try keeping a journal to track your symptoms and find possible causes.

**OUTLOOK / PROGNOSIS**

### **Will Ménière’s disease go away?**

Ménière’s disease may go away for months or years, but it always comes back. Although there’s no cure, healthcare providers have treatments that reduce vertigo symptoms.

### **Is there anything I can do to feel better?**

Follow your healthcare provider’s advice about lifestyle changes that can reduce symptoms. And always be sure to have your medications with you. Taking them when an episode starts can help you feel better sooner.

**POSSIBLE COMPLICATIONS**

The most difficult complications of Meniere's disease can be:

* Unexpected vertigo attacks.
* Possibly losing your hearing long term.

The disease can happen at any time. This can cause worry and stress.

Vertigo can cause you to lose balance. This can increase your risk of falls and accidents.

**WHEN TO SEE A DOCTOR / RED FLAG**

See your healthcare provider if you have symptoms of Meniere's disease. Other illnesses can cause these problems. So, it's important to find out what's causing your symptoms as soon as possible.

**DIFFERENTIAL DIAGNOSIS**

**Basilar migraine:** Associated with vertigo but without aural symptoms

**Vestibular neuronitis:** Associated with vertigo lasting for several days, no aural symptoms

**Benign paroxysmal positional vertigo:** Associated with vertigo related to head movements, lasting seconds to minutes, no aural symptoms

**Medications** (e.g., aminoglycosides and loop diuretics)

**Central vertigo:** causes include stroke, multiple sclerosis, seizure disorder, others

**Peripheral vertigo of non-otogenic origin:** Commonly seen in elderly patients with peripheral neuropathy and deconditioning

**Orthostatic hypotension:** Not true vertigo, but patients may describe themselves as "dizzy"

**Neoplasm:** vestibular schwannoma, meningioma, malignancy

**Infectious causes:** meningitis, syphilis, HIV cerebritis, others

**RECENT GUIDELINES OR UPDATES**

*Diagnosis*

Definite MD should be diagnosed in patients presenting with the following:

* Two or more episodes of vertigo lasting 20 minutes up to 12 hours
* Audiometrically documented fluctuating low- to mid-frequency sensorineural hearing loss in the affected ear on at least 1 occasion before, during, or after one of the episodes of vertigo
* Fluctuating hearing loss, tinnitus, or pressure in the affected ear
* When these symptoms are not better accounted for by another disorder

Probable MD should be diagnosed in patients presenting with the following:

* Two or more episodes of vertigo lasting 20 minutes up to 24 hours
* Fluctuating hearing loss, tinnitus, or pressure in the affected ear
* When these symptoms are not better accounted for by another disorder

Clinicians should determine whether patients meet criteria for vestibular migraine diagnosis when assessing for MD.

Clinicians should obtain an audiogram when assessing a patient for MD.

Clinicians may offer MRI of the internal auditory canal and posterior fossa in patients with possible MD and audiometrically verified asymmetric sensorineural hearing loss.

Clinicians should not routinely order vestibular function testing or electrocochleography to establish diagnosis of MD.

*Treatment*

Clinicians should educate MD patients about the history of the disease, symptom control, treatment options, and potential outcomes, as well as lifestyle and diet modifications that may reduce or prevent symptoms.

Clinicians should offer a limited course of vestibular suppressants to MD patients for managing vertigo only during MD attacks.

Clinicians may consider diuretics and/or betahistine for maintenance therapy or prevention of MD attacks.

Clinicians should not prescribe positive pressure therapy to MD patients.

Clinicians may consider intratympanic steroids for MD patients who are nonresponsive to noninvasive treatment.

Clinicians should offer gentamicin to MD patients who are nonresponsive to nonablative therapy.

Clinicians may consider labyrinthectomy in MD patients who have failed less definitive therapy and have nonusable hearing.

Clinicians should offer vestibular rehabilitation/physical therapy for MD patients with chronic imbalance, but not for acute attacks of vertigo.

Clinicians should counsel MD patients on the use of amplification and hearing assistive technology.

Clinicians should document resolution, improvement, or worsening of vertigo, tinnitus, and hearing loss, and any change in quality of life in MD patients.

**EPIDEMIOLOGY**

The prevalence of Meniere disease varies between 3.5 per 100.000 and 513 per 100.000 and occurs more often in older, white, female patients.

Several comorbidities have been identified which occur in an increased fashion in patients with Meniere disease:

**Migraine**: Migraine occurs more often in patients diagnosed with Meniere disease, although there is likely significant overlap/misclassification of patients with basilar migraine wrongly diagnosed as having Meniere disease. There are theories regarding a vascular etiology for Meniere disease, but they remain unproven.

**Autoimmune diseases**: Several autoimmune diseases are associated with Meniere disease, namely rheumatoid arthritis, systemic lupus erythematosus, and ankylosing spondylitis. IgE has been proposed as a contributory factor in some studies of middle ear samples in Meniere disease.

**Genetic component**: Meniere disease is a polygenic disorder. Ten percent of cases in patients of European descent have familial Meniere disease. The condition may show autosomal dominant or recessive inheritance but is most commonly sporadic. Precise genetics in Meniere disease is an area of active research.

**PREDEFINED Q & A SETS**

. What is Meniere's disease?  
Meniere's disease is a chronic inner ear disorder that affects balance and hearing . It is characterized by recurrent episodes or attacks .

2. What are the main symptoms of Meniere's disease?  
The primary symptoms of Meniere's disease occur in episodes and include:

* Vertigo: Severe dizziness and spinning sensation, often causing nausea and vomiting, which can last from 20 minutes to 24 hours . Some people may experience "drop attacks," a sensation of being pushed to the floor .
* Hearing loss: Fluctuating hearing loss in the affected ear, which may progress to permanent loss over time .
* Tinnitus: Ringing, buzzing, roaring, whistling, or hissing sounds in the affected ear .
* Aural fullness: A feeling of pressure or fullness in the affected ear .  
  Someone with Meniere's disease will typically experience at least two to three of these main symptoms during an attack .

3. What causes Meniere's disease?  
The exact cause of Meniere's disease is unknown, but theories suggest it may involve a buildup of fluid called endolymph in the inner ear's labyrinth (endolymphatic hydrops) . This fluid imbalance disrupts signals sent to the brain regarding balance and hearing . Other theories include constricted blood vessels, viral infections, allergies, autoimmune reactions, or genetic factors .

4. How does Meniere's disease progress?  
Symptoms occur in episodes, with varying periods of remission . While attacks of vertigo may lessen over time, hearing loss and tinnitus can become constant . Over 8 to 10 years, the condition can lead to permanent hearing loss, often affecting both ears eventually .

5. What are the risk factors for Meniere's disease?  
Risk factors can include family history, autoimmune diseases, allergies, and certain viral infections .

6. What are the potential complications of Meniere's disease?  
Severe vertigo attacks can lead to serious falls and make daily activities like driving risky . The chronic nature of the condition and the unpredictable attacks can also impact mental health, leading to anxiety and depression .

7. Can Meniere's disease be cured?  
There is no known cure for Meniere's disease, but treatments can help manage symptoms and improve quality of life .

8. When should someone see a doctor for Meniere's disease symptoms?  
It is important to see a healthcare provider if you experience symptoms like dizziness, hearing loss, tinnitus, or a feeling of fullness in the ear, as other conditions can cause similar problems

**GENOMIC DATA**

Genes and genetic variants associated with Meniere's disease:

* GJD3 gene A rare mutation in the *GJD3* gene has been discovered in both familial and sporadic Meniere's disease patients. This gene had not previously been linked to any disease, and its identification marks a significant step towards understanding the genetic basis of Meniere's disease .
* Stereocilia and Tectorial Membrane-related Genes Several studies have identified rare mutations in genes that encode proteins crucial for the structure and function of inner ear hair cell stereocilia and their interaction with the tectorial membrane. These include:
  + *TECTA* This gene encodes alpha-tectorin, a primary non-collagenous protein of the tectorial membrane. Rare missense heterozygous variants or small deletions in *TECTA* have been found in familial Meniere's disease families .
  + *MYO7A* Mutations in this gene, which encodes cilia-motor proteins in inner ear hair cells, have been linked to familial Meniere's disease. *MYO7A* is associated with stereocilia tip link and ankle link proteins, which are critical for mechanotransduction (the process by which hair cells convert mechanical vibrations into electrical signals) .
  + *OTOG* Rare missense mutations in the *OTOG* gene have been enriched in familial Meniere's disease cases, suggesting multiple allelic inheritances .
  + *CDH23*, *PCDH15*, and *ADGRV1* These genes are involved in the organization of stereocilia links and have shown rare variants in Meniere's disease families .
* Other Candidate Genes for Familial Meniere's Disease (FMD)
  + *FAM136A* and *DTNA* Variants in these genes have been reported in both familial and sporadic Meniere's disease cases .
  + *PRKCB* A missense variant in this gene has been found to segregate with the hearing loss phenotype in some families .
  + *DPT* and *SEMA3D* Rare heterozygous variants in these genes have been identified in other familial Meniere's disease families .
* Genes Involved in Cochlear Function Mutations in the *COCH* gene have been associated with symptoms of Meniere's disease, and some cases of Meniere's disease may overlap with DFNA9, a type of inherited hearing loss caused by mutations in *COCH* .
* Immune and Inflammatory Genes Genetic research has also explored correlations between Meniere's disease and genes related to inflammation, immunity, and fluid balance, such as *MICA-STR A.4*, *MIF*, *INFG*, and *TFNA* .

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you’ve been experiencing episodes of dizziness and some hearing changes. Can you tell me more about your symptoms?

Patient: Yes, I keep having these sudden dizzy spells that feel like the room is spinning, sometimes with nausea. I also notice my hearing gets muffled and I hear ringing in my ear, and at times it feels full or clogged.

Doctor: Thank you for sharing that. Your symptoms are consistent with a condition called Meniere’s disease, which affects the inner ear. It causes episodes of vertigo, fluctuating hearing loss, tinnitus (ringing), and a sensation of fullness in the ear. These episodes can be unpredictable and vary in severity.

Patient: What causes this disease?

Doctor: The exact cause isn’t fully understood, but it’s believed to involve fluid buildup in the inner ear, creating pressure that disrupts how the ear balances hearing and equilibrium. Factors like stress, fatigue, allergies, or autoimmune conditions may worsen your symptoms.

Patient: How do you confirm the diagnosis?

Doctor: We will review your medical history and symptom pattern, and conduct hearing tests called audiometry to assess your hearing levels. Balance function tests might also be needed. Sometimes imaging scans like an MRI are ordered to rule out other causes.

Patient: Is there a cure?

Doctor: Unfortunately, there’s no cure yet. But the good news is that we have treatments to help manage symptoms and reduce the frequency and severity of attacks.

Patient: What treatments are available?

Doctor: Treatment typically starts with lifestyle modifications like reducing salt intake and managing stress. We may prescribe diuretics to reduce fluid buildup and medications such as anti-nausea and vertigo-reducing drugs to manage attacks. In some cases, steroid injections into the ear or other procedures may be recommended if symptoms don’t improve.

Patient: What can I do to help myself?

Doctor: Keeping a symptom diary can help track triggers. Avoiding caffeine, alcohol, and tobacco can also help. Regular exercise and good sleep habits reduce fatigue, which may decrease attacks.

Patient: Will this affect my daily life?

Doctor: The attacks can be disruptive, especially when you have severe vertigo. However, with treatment and lifestyle changes, many people manage symptoms well and maintain an active life. We’ll develop a plan tailored for you.

Patient: What should I do if my symptoms worsen?

Doctor: If your attacks become more frequent or severe, or if you notice changes like constant hearing loss or imbalance, contact us promptly. We can adjust treatment or consider additional options, including vestibular rehabilitation or surgical interventions if needed.

Patient: Thank you, Doctor. This helps me understand what to expect.

Doctor: You’re welcome. We’ll work together to manage your condition and support you throughout your treatment.

REFERENCES:

<https://www.mayoclinic.org/diseases-conditions/menieres-disease/symptoms-causes/syc-20374910>

<https://www.ncbi.nlm.nih.gov/books/NBK536955/#article-24956.s9>

<https://emedicine.medscape.com/article/1159069-differential>

<https://my.clevelandclinic.org/health/diseases/15167-menieres-disease>

**Multinodular goiter disease**

**DEFINITION / DESCRIPTION**

A multinodular goiter is an enlarged thyroid gland that contains multiple lumps or nodules . This condition is very common, affecting about 5% of people in the United States, and is more prevalent in women and individuals over 40 years old .

Types of Multinodular Goiter:

* Non-toxic multinodular goiter: This type does not produce an excess of thyroid hormone and often causes no symptoms related to thyroid function .
* Toxic multinodular goiter: In this type, the nodules produce too much thyroid hormone, leading to hyperthyroidism

**CAUSES**

The cause of most multinodular goiters is unknown . However, certain factors are known to contribute:

* Iodine deficiency: This is the most common cause of goiters worldwide .
* Genetic factors: These can also play a role .
* Other thyroid conditions: Conditions like Hashimoto's disease or Graves' disease can increase the risk of developing a goiter .
* Radiation exposure: Medical treatments involving radiation to the head and neck, or a family history of thyroid disease, can also increase risk .

Cancer Risk:  
Most thyroid nodules are benign, but some can be cancerous . Multinodular goiters are associated with a higher risk of thyroid cancer, and doctors typically screen for cancer when a multinodular goiter is present

**SIGNS / SYMPTOMS**

Most multinodular goiters do not cause any symptoms and are often discovered incidentally during routine physical exams or imaging tests for other conditions . When symptoms do occur, they can be categorized as follows:

* Symptoms of hyperthyroidism (if toxic multinodular goiter is present): These arise from an overproduction of thyroid hormones :
  + Nervousness, anxiety, and irritability
  + Increased resting heart rate or rapid heartbeat
  + Heat intolerance and increased sweating
  + Tremors, usually in the hands
  + Sudden or unexplained weight loss despite an increased appetite
  + Frequent bowel movements
  + Sleep disturbances, including insomnia
  + Decreased menstrual flow or changes in menstrual patterns
  + Thin, delicate skin and irregular fingernail and hair growth
  + Impaired fertility
  + Mental disturbances
  + Thick redness on the front of the legs (less common, seen in Graves' disease)
* Symptoms due to goiter size or compression (regardless of toxicity): If the goiter grows large, it can press on surrounding structures in the neck :
  + A visible lump in the neck
  + Difficulty breathing, especially when lying down
  + Difficulty swallowing or feeling like food is stuck in the throat
  + A "full" or choking sensation in the neck
  + Hoarseness or changes in voice
  + Coughing or snoring
  + Neck discomfort

**DIAGNOSIS METHODS**

## Clinical Evaluation

* Medical History: Includes assessing symptoms, prior thyroid disease, family history of goiter or thyroid cancer, history of radiation exposure, and medication use.
* Physical Examination: The doctor inspects and palpates the neck to assess thyroid size, nodularity, consistency, and any signs of compression (difficulty swallowing, breathing) or enlarged lymph nodes.

## 2. Laboratory Tests

* Thyroid Function Tests:
  + Measure serum Thyroid-Stimulating Hormone (TSH) to evaluate whether the thyroid gland is underactive, normal, or overactive.
  + If TSH is abnormal, free thyroxine (T4) and triiodothyronine (T3) tests help clarify thyroid hormone levels.
* Autoantibody Tests: May be ordered if autoimmune thyroid disease (e.g., Hashimoto’s thyroiditis or Graves’ disease) is suspected.

## 3. Imaging Studies

* Thyroid Ultrasound:
  + The primary imaging modality used to visualize thyroid structure.
  + Determines the number, size, composition (solid vs. cystic), vascularity, and suspicious features of nodules (e.g., irregular margins, microcalcifications).
  + Useful for guiding biopsies.
* Radioactive Iodine Uptake Scan (Thyroid Scan):
  + Assesses functional activity of nodules ("hot" vs. "cold" nodules).
  + Helps differentiate toxic multinodular goiter from other causes of hyperthyroidism.
* Other Imaging:
  + CT or MRI may be used to evaluate large goiters causing compression of adjacent structures.

## 4. Fine-Needle Aspiration Cytology (FNAC)

* Performed when one or more nodules have suspicious features on ultrasound or clinical exam.
* FNAC collects cells from thyroid nodules to rule out malignancy.
* Key tool in assessing cancer risk in multinodular goiters.

**TREATMENT OPTIONS**

## Observation (“Watch and Wait”)

* For small, asymptomatic, non-toxic multinodular goiters without suspicious features or compressive symptoms, doctors often recommend regular monitoring without immediate treatment.
* Routine ultrasound and thyroid function tests help monitor growth or functional changes.

## 2. Medications

Levothyroxine (Thyroid Hormone Suppression Therapy)

* Intended to suppress TSH and possibly reduce nodule size.
* Has *low efficacy* and is declining in use due to potential side effects (e.g., subclinical hyperthyroidism, bone loss, cardiac issues) and inconsistent benefits .
* May help prevent formation of new nodules but generally does not significantly shrink large goiters .

Antithyroid Medications

* Used in toxic multinodular goiter cases to control hyperthyroidism symptoms.
* Drugs like methimazole or propylthiouracil suppress excess thyroid hormone production .

## 3. Radioactive Iodine Therapy (RAI)

* Effective in shrinking both toxic and non-toxic goiters by destroying thyroid tissue.
* Typically reduces thyroid volume by about 30-50% within 6-12 months.
* More effective on smaller goiters; larger goiters have more variable responses.
* Outpatient treatment; may require repeated doses in some cases .
* Side effects can include transient thyroiditis, hypothyroidism (15-20% at 12 months), and slight risk of developing Graves’ disease or radiation-related complications .
* Can be combined with recombinant human TSH to enhance effectiveness .
* Preferred option in patients who refuse or are poor candidates for surgery .

## 4. Surgery (Thyroidectomy)

* Indicated for:
  + Large goiters causing compressive symptoms (difficulty breathing, swallowing).
  + Suspicion or confirmation of malignancy.
  + Toxic multinodular goiter refractory to other treatments.
  + Cosmetic concerns.
* Substantial and rapid reduction in goiter size and relief of compression.
* Total thyroidectomy is often recommended to prevent recurrence.
* Risks include bleeding, recurrent laryngeal nerve injury, hypoparathyroidism, and rarely tracheomalacia after long-term compression .
* Lifelong thyroid hormone replacement therapy may be required after total thyroidectomy.

**OUTLOOK / PROGNOSIS**

* Most patients with multinodular goiter have a good prognosis, especially when appropriately managed. Treatment options including surgery, radioactive iodine therapy, and medication effectively control symptoms and reduce goiter size.
* Surgical Outcomes:  
  Thyroidectomy for large or massive multinodular goiters carries an increased risk of complications such as transient hypoparathyroidism and transient recurrent laryngeal nerve (RLN) palsy compared to smaller goiters. However, permanent complications are rare, and most patients experience favorable postoperative outcomes. Massive goiters may require more extensive surgery (e.g., combined sternotomy), intensive care admission, and longer hospital stays, but cervical approaches remain effective.
* Risk of Malignancy:  
  While most multinodular goiters are benign, about 4-17% may harbor malignant foci. Regular monitoring and biopsy of suspicious nodules are essential to detect cancer early. Recurrence of malignant disease after surgery is low

**WHEN TO SEE A DOCTOR / RED FLAG**

* If you notice a lump or swelling in your neck . Even if it's small, it's important to have it checked to determine if it's a goiter and to identify its underlying cause .
* If you experience symptoms of hyperthyroidism . These can include sudden and unexplained weight loss, rapid heartbeat, increased appetite, nervousness, anxiety, tremors, sweating, or increased sensitivity to heat .
* If the goiter causes compressive symptoms . This occurs when the goiter grows large enough to press on surrounding structures in your neck or chest. Symptoms include difficulty breathing, especially when lying down, difficulty swallowing or a feeling that food is stuck in your throat, a "full" or choking sensation in your neck, hoarseness, or coughing . If you have these symptoms, surgery may be recommended .
* For regular monitoring after a diagnosis . If you have already been diagnosed with a goiter, it's important to see your healthcare provider regularly, at least annually, to monitor it .
* If you develop new symptoms . Any new symptoms that appear after a diagnosis of goiter should prompt a visit to your doctor .
* If there are concerns about cancer . MNGs are associated with a higher risk of thyroid cancer, so your doctor will likely screen for it . If your doctor suspects the MNG may be cancerous, a fine-needle aspiration biopsy (FNAB) will be performed .

**DIFFERENTIAL DIAGNOSIS**

* Anaplastic Thyroid Carcinoma
* Branchial Cleft Cyst
* Carotid Artery Aneurysm
* Lymphatic Malformation (Cystic Hygroma)
* Fibroma
* Granulomatous Disease of the Thyroid
* Infectious Thyroiditis
* Lipomas
* Lymphadenopathy
* Medullary Thyroid Carcinoma
* Papillary Thyroid Carcinoma
* Parathyroid Adenoma
* Parathyroid Cyst
* Pseudogoiter
* Sarcoma
* Subacute Thyroiditis
* Thyroglossal Duct Cyst
* Thyroid Abscess
* Thyroid Lymphoma
* Thyroid Nodule

**EPIDEMIOLOGY**

Global and Overall Prevalence:

* MNG is considered the most common endocrine disorder, affecting an estimated 500 to 600 million people worldwide .
* In non-endemic (iodine-sufficient) regions, the prevalence is typically 4-6%, with an annual incidence of 0.1% to 1.5% .
* In iodine-deficient areas, the prevalence of nodular goiter can be much higher, ranging from 25-33% of the population, and this frequency increases with age .

Age and Gender Distribution:

* MNG is more common in women than men, with a female-to-male ratio often cited as 3:1 or 4:1 for toxic MNG . Approximately 90% of those affected by multinodular goiter are women .
* The frequency of MNG, including toxic MNG, increases with age . Most patients with toxic MNG are older than 50 years, and hyperthyroidism associated with autonomous nodules is more common in individuals over 60 .

Toxic Multinodular Goiter (TMNG) Specifics:

* TMNG accounts for a notable proportion of hyperthyroidism cases. In the United States, it is the second most common cause of hyperthyroidism after Graves' disease, accounting for approximately 15-30% of cases .
* Worldwide, particularly in iodine-deficient areas, TMNG is reported as the most common cause of thyrotoxicosis in older adults .
* The incidence of TMNG is estimated at 4.8 cases per 100,000 population per year, with a prevalence of 100 cases per 100,000 population . It accounts for 5% of all hyperthyroidism patients .

Geographic Variation and Iodine Intake:

* TMNG is common in African nations and has a higher prevalence in European countries compared to the United States .
* The lower prevalence of TMNG in the United States is attributed to the iodination of table salt, as iodine intake is significantly higher in the US (200-600 μg/day) than in European nations (25-100 μg/day) . Iodine deficiency is a significant cause of endemic goiter .

Risk Factors:

* Iodine deficiency is a primary cause, especially for endemic goiter .
* Genetic factors play a role, with some familial cases linked to specific gene mutations .
* Age and female gender are consistent risk factors .
* Radiation exposure has also been implicated in the causation of MNG

**PREDEFINED Q & A SETS**

. What is a multinodular goiter?  
A multinodular goiter is an enlarged thyroid gland that contains multiple lumps or nodules. It is a common thyroid condition affecting around 4-7% of the global population and is more common in women and older adults.

2. What causes multinodular goiter?  
The primary causes include iodine deficiency, genetic predisposition, autoimmune causes, and exposure to radiation. Age and female gender also increase the risk.

3. What are the symptoms of multinodular goiter?  
Many multinodular goiters are asymptomatic and found incidentally. Symptoms arise if nodules become large or if the goiter produces excess thyroid hormone (toxic multinodular goiter). These symptoms include visible or palpable neck swelling, difficulty swallowing or breathing, hoarseness, and symptoms of hyperthyroidism such as weight loss, rapid heartbeat, tremors, anxiety, and heat intolerance.

4. Is multinodular goiter cancerous?  
Most multinodular goiters are benign. However, they carry a slightly higher risk of cancer compared to solitary nodules. Therefore, screening for thyroid cancer using ultrasound and biopsy might be recommended when suspicious nodules are present.

5. How is multinodular goiter diagnosed?  
Diagnosis involves physical examination, thyroid function blood tests (TSH, T3, T4), and thyroid ultrasound to evaluate nodules. Radioactive iodine uptake scans are used to assess thyroid function, especially in hyperthyroid cases. Fine needle aspiration biopsy (FNAB) is performed on suspicious nodules to rule out cancer.

6. What treatment options are available for multinodular goiter?  
Treatment depends on symptoms, size, thyroid function, and cancer risk. Options include observation for small, asymptomatic goiters; thyroid hormone suppression therapy (though of limited benefit); antithyroid medications for toxic nodules; radioactive iodine therapy to reduce goiter size; and surgery when there is compressive symptoms, cosmetic concerns, suspicion or presence of cancer, or refractory hyperthyroidism.

7. When should I see a doctor?  
Seek medical advice if you notice neck swelling, experience difficulty swallowing or breathing, develop symptoms of hyperthyroidism or hypothyroidism, or if you have a known goiter that changes size or causes new symptoms.

8. Can multinodular goiter be prevented?  
Adequate iodine intake and regular thyroid check-ups in at-risk populations can help reduce the risk. Avoiding radiation exposure and managing thyroid autoimmune conditions early are also important

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning. What brings you in today?

Patient: Good morning, Doctor. I’ve noticed a lump in my neck, right here at the front, and it feels like it’s getting bigger. I’m a bit worried.

Doctor: Thank you for coming in. A lump in the neck can be concerning, so it’s good you’re getting it checked. When the thyroid gland, which is located in the front of your neck, enlarges and develops multiple lumps or nodules, we call it a multinodular goiter . Have you noticed any other symptoms besides the lump?

Patient: Well, sometimes it feels a bit tight when I swallow, and lately, I’ve been feeling more nervous, losing weight without trying, and my heart seems to race sometimes.

Doctor: Those are important symptoms to note. A large multinodular goiter can press on structures in your neck, causing difficulty swallowing, a choking sensation, or even shortness of breath . The other symptoms you mentioned, like nervousness, weight loss, and a fast heart rate, could indicate that your thyroid gland is producing too much thyroid hormone. This is what we call a toxic multinodular goiter .

Patient: So, what do we do next? How do you figure out what’s going on?

Doctor: First, I’ll perform a physical examination to feel your thyroid gland and the lump . Then, we'll need to do some tests. We'll start with blood tests to check your thyroid hormone levels . This will tell us if your thyroid is overactive, underactive, or functioning normally . We'll also do an ultrasound of your thyroid gland. This imaging test uses sound waves to create a detailed picture of the nodules, showing their size, number, and characteristics .

Patient: And if you find something concerning on the ultrasound?

Doctor: If any of the nodules look suspicious on the ultrasound, or if they are particularly large, I may recommend a biopsy . This involves taking a small sample of cells from the nodule using a thin needle. A specialist will then examine these cells under a microscope to check for any signs of cancer . It’s important to know that while most multinodular goiters are benign, we always check to be safe .

Patient: What if it turns out to be a multinodular goiter? What are the treatment options?

Doctor: Treatment depends on a few things: whether the goiter is causing symptoms, if it's producing too much hormone, and if there's any concern for cancer . If it's not causing symptoms and your thyroid hormone levels are normal, we might just monitor it with regular blood tests and ultrasounds .

If you have symptoms like difficulty breathing or swallowing, or if there's a suspicion of cancer, surgery to remove all or part of the thyroid gland might be recommended . If it's a toxic multinodular goiter producing too much hormone, we can also use medications to control the hormone levels, or consider radioactive iodine treatment, which helps shrink the affected thyroid tissue . We'll discuss all the options in detail once we have the test results.

Patient: Thank you, Doctor. This helps a lot. I was quite worried.

Doctor: You're welcome. It's good that you came in. We'll get these tests done, and then we can make a clear plan together. Please don't hesitate to ask any more questions you might have.

REFERENCES:

<https://my.clevelandclinic.org/health/diseases/12625-goiter>

<https://www.mayoclinic.org/diseases-conditions/goiter/symptoms-causes/syc-20351829>

<https://www.ncbi.nlm.nih.gov/books/NBK285569/>

**Minor's syndrome**

**DEFINITION / DESCRIPTION**

Superior semicircular canal dehiscence (SSCD) syndrome is a rare condition that affects the inner ear. It occurs when there’s an abnormal opening (dehiscence) in one of the bony canals of the inner ear, specifically the superior semicircle canal.

Your inner ear has three semicircular canals; each has fluid that helps regulate your balance. An opening in the superior semicircle canal makes it difficult for your inner ear to control movement and balance. It may also allow sounds from your inner ear to reach your brain, causing sound distortion and hearing loss.

SSCD may also be referred to as superior canal dehiscence syndrome (SCDS). It affects approximately 1 to 2 percent of the general population. Although it may be present from birth, most people don’t experience symptoms until later in life.

**CAUSES**

Experts don’t know the exact cause of SSCD, but they have several theories. Possible causes include:

* A pressure-altering event (such as scuba diving or flying)
* Benign or malignant tumors
* Bone-thinning as you age
* Congenital disorder (present from birth)
* Head trauma

Some of these causes may go hand-in-hand. For example, you may have thinning bones that are more vulnerable to trauma.

**SIGNS / SYMPTOMS**

Some people with superior semicircular canal dehiscence don’t immediately have symptoms. When symptoms do show up, they can mimic other ear disorders, making the condition difficult to diagnose.

SSCD symptoms may include:

* A feeling of fullness or pressure in the ear
* Autophony (perceiving your voice as too loud or echoing in your ears)
* Hearing loss
* Hyperacusis (hypersensitivity to sound)
* Oscillopsia (when it looks like stationary objects are moving)
* Pulsatile tinnitus (hearing sounds in time with your heartbeat)
* Tullio’s phenomenon (sound-induced vertigo)
* Vertigo (dizziness)

**DIAGNOSIS METHODS**

You’ll likely see a neurotologist to diagnose and treat your condition. A neurotologist is a doctor who specializes in brain- and nerve-related concerns that also involve your ears. They may order several tests, including:

* Computed tomography (CT scan): This imaging procedure can show the opening in your bone covering the superior semicircular canal.
* Hearing test: An audiologist will test your hearing.
* VEMP test: This test provides information about how the parts of your inner ear are working to control your balance. You’ll move your head to the left or right, or look up, while staring at a target and listening to a series of tones.

**TREATMENT OPTIONS**

If your symptoms are mild to moderate, you may be able to manage your SSCD by working with a certified vestibular physical therapist. They can show you ways to improve your balance and decrease your fall risk. It may also help to avoid loud environments and activities that worsen your symptoms.

If you’re debilitated by your symptoms, surgery to correct the dehiscence may provide relief. There are several approaches to surgery, including:

* Plugging the dehiscence: Your surgeon creates an opening in either your skull (middle cranial fossa approach) or behind your ear (transmastoid approach) to plug the opening. This eases symptoms by getting rid of most of the fluid movement. Our head and neck surgeons typically work alongside neurosurgeons to perform this procedure.
* Resurfacing the canal: Less common than plugging, this technique covers the opening without totally closing it.
* Round window reinforcement: This is the least invasive procedure, but symptoms can return afterward. A surgeon covers the opening using tissue from behind the ear.

## Symptom Management (Medications Used)

* Vestibular suppressants: Medications such as *meclizine* or *benzodiazepines* may help reduce dizziness and vertigo symptoms temporarily but do not address the underlying cause . Long-term use is generally discouraged due to side effects like sedation and dependence.
* Anti-nausea drugs: Agents such as *ondansetron* or *promethazine* may be prescribed during acute attacks with severe vertigo and nausea .
* Avoidance strategies: Patients are often advised to avoid triggers that elevate intracranial or middle ear pressure (e.g., heavy lifting, straining, loud noises) to reduce symptom provocation .

## Surgical Treatment (Definitive Management)

* Canal plugging or resurfacing surgery: This is the definitive treatment for SSCD. Surgery involves closing the bony defect to restore normal pressure dynamics in the inner ear . This dramatically improves vertigo and imbalance and often improves hearing symptoms.
* Surgery is generally reserved for patients with debilitating symptoms and confirmed diagnosis on imaging and physiological tests .

## Side Effects and Risks of Medications

* Meclizine and other vestibular suppressants:
  + Drowsiness, dizziness, dry mouth
  + Cognitive impairment or fatigue with long-term use
  + Potential for tolerance or dependence with benzodiazepines
* Anti-nausea medications:
  + Drowsiness
  + Constipation or gastrointestinal upset
  + Rare allergic reactions

## Side Effects and Risks of Surgery

* Hearing loss (usually transient but can be permanent in rare cases)
* Persistent vertigo or imbalance
* Facial nerve injury (rare)
* Cerebrospinal fluid leak
* General risks of anesthesia and surgery

**OUTLOOK / PROGNOSIS**

Most people are able to manage symptoms once they learn techniques to manage them. But the actual opening won’t go away on its own. Unlike other bones in your body, the bone that surrounds your superior semicircular canal doesn’t repair itself.

SCDS surgery decreases or relieves symptoms for most people. Some studies show that certain symptoms resolve more quickly following surgery than others. For example, hearing loss and vertigo may improve faster than headaches and brain fog.

Talk to your healthcare provider about what you should expect from surgery.

**POSSIBLE COMPLICATIONS**

With severe SCDS, you may develop brain-related symptoms, like brain fog and headaches. You may also have mental health issues. Isolating to avoid exposing yourself to unpleasant sounds can lead to anxiety and depression.

This is why it’s so important to see a healthcare provider if you’re experiencing issues. You don’t have to accept a reduced quality of life just because you have SCDS.

**DIFFERENTIAL DIAGNOSIS**

* Vestibular migraine: Episodic vertigo often with migraine symptoms; lacks sound- or pressure-induced vertigo typical of SSCD.
* Otosclerosis: Conductive hearing loss without third window physiology; main clinical mimic of SSCD.
* Perilymphatic fistula: Inner ear fluid leak causing vestibular and auditory symptoms; may mimic SSCD but lacks bony dehiscence.
* Patulous Eustachian tube: Autophony mainly related to breathing sounds, unlike SSCD where internal body sounds trigger symptoms.
* Ménière’s disease: Episodic vertigo with fluctuating hearing loss and tinnitus; usually no third window signs or enhanced vestibular-evoked potentials.
* Vestibular schwannoma (acoustic neuroma): Progressive hearing loss and imbalance without third window physiology; imaging shows tumor.
* Benign Paroxysmal Positional Vertigo (BPPV): Positional vertigo triggered by head movement; no auditory symptoms.
* Labyrinthitis / Vestibular neuritis: Acute prolonged vertigo without sound- or pressure-induced symptoms.
* Idiopathic intracranial hypertension (pseudotumor cerebri): Can cause pulsatile tinnitus and dizziness but lacks characteristic SSCD findings.
* Other third window syndromes: Posterior semicircular canal dehiscence, enlarged vestibular aqueduct causing similar symptoms but different canal involvement.

SSCD key diagnostic clues include: sound- or pressure-induced vertigo, low-frequency bone conduction hearing thresholds, enhanced vestibular evoked myogenic potentials (VEMP), and high-resolution CT showing superior canal bony defect.

**EPIDEMIOLOGY**

### Frequency

*United States*

The true incidence of persons with symptomatic SCDS is currently unknown. One study of 1000 cadaveric temporal bones revealed that a dehiscence of bone that overlies the superior canal was present in approximately 0.5% of temporal bone specimens. In an additional 1.4% of the specimens, the bone was markedly thin (≤ 0.1 mm) compared with the normal bone.

### Race

SCDS has no racial bias.

### Sex

SCDS appears to affect males and females equally.

### Age

In 2000, Minor reported that, in his original series of 17 patients, the median age at diagnosis was 40 years (range, 27-70 y).

**PREDEFINED Q & A SETS**

### **Is superior canal dehiscence syndrome a disability?**

It may be, depending on your symptoms and the type of work you do. If you have a hearing issue, you can request reasonable accommodations to do your job, according to the Americans with Disabilities Act. Ask your healthcare provider for guidance on how to apply for accommodations for work.

What is Superior Semicircular Canal Dehiscence Syndrome (SSCD)?  
SSCD is a rare inner ear disorder caused by a thinning or opening (hole) in the bone that covers the superior semicircular canal, part of the balance system in the inner ear. This abnormal opening allows sound and pressure to move the fluid inside the canal inappropriately, causing symptoms related to hearing and balance.

2. What causes SSCD?  
The exact cause is unclear. It may be a congenital defect (present from birth), or develop later due to bone thinning with age, head trauma, or infections. Factors like incomplete bone formation during fetal development may also contribute.

3. What are common symptoms of SSCD?

* Vertigo or dizziness, often triggered by loud sounds, pressure changes (coughing, sneezing), or sudden head movements
* Hearing loss, often conductive or mixed type
* Autophony (hearing your own voice, heartbeat, eye movements, or internal sounds unusually loudly)
* Aural fullness or pressure sensation in the ear
* Pulsatile tinnitus (hearing one's heartbeat in the ear)
* Oscillopsia (visual disturbance where stationary objects appear to move)

4. How is SSCD diagnosed?  
Diagnosis involves a combination of:

* Detailed symptom history and physical examination
* Audiometric tests showing specific hearing patterns, such as low-frequency bone conduction hearing loss
* Vestibular Evoked Myogenic Potentials (VEMP) testing, often showing abnormally low thresholds or enhanced responses
* High-resolution CT scan of the temporal bones to confirm the presence of the bony dehiscence over the superior semicircular canal

5. Can SSCD symptoms get worse over time?  
Symptoms usually do not progressively worsen but can be triggered or exacerbated by sudden changes in pressure like sneezing, heavy lifting, or flying. The condition may remain stable for long periods.

6. What are the treatment options for SSCD?

* Conservative management: Avoiding triggers such as loud noises, straining, and sudden pressure changes.
* Medications: Vestibular suppressants and anti-nausea drugs can manage symptoms temporarily but do not cure SSCD.
* Surgical repair: For severe or disabling symptoms, surgery to plug or resurface the dehiscent canal can effectively relieve symptoms.

7. Is surgery for SSCD safe?  
Surgery generally has a good success rate in relieving symptoms. Like any surgery, risks include hearing loss, balance problems, and facial nerve injury, but these are uncommon with experienced surgeons.

8. Do all people with the bony defect develop symptoms?  
No. Some individuals have a bony dehiscence seen on imaging but never develop symptoms of SSCD. Treatment is usually reserved for symptomatic patients.

9. Who treats SSCD?  
Ear specialists such as otologists or neurotologists, who are experts in inner ear and balance disorders, manage and treat SSCD.

10. Is SSCD a common condition?  
SSCD is rare, with prevalence estimates around 1-2% of the population having the defect, but fewer experiencing symptoms

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning. What brings you in today?

Patient: Good morning, Doctor. I’ve been having these episodes of dizziness and sometimes I feel like my hearing is weird—like I can hear my own heartbeat and footsteps really loudly. It’s been going on for a few months now.

Doctor: Thank you for telling me. From what you describe—especially hearing internal sounds like your heartbeat and feeling dizziness triggered by noise or pressure—it sounds like it could be related to a condition called Superior Semicircular Canal Dehiscence, or SSCD. It’s a rare disorder where a tiny hole forms in the bone over one of your inner ear canals, which affects your balance and hearing.

Patient: That’s interesting. What causes this hole?

Doctor: We’re not exactly sure why it happens. Some people may have it from birth, while others develop it due to thinning of the bone with age, head trauma, or infections. Sometimes the bone that should protect the canal is just very thin or missing in places.

Patient: How do you confirm this diagnosis?

Doctor: We use several tests. First, I’ll examine your balance and eye movements and listen carefully to your symptoms. Then, you’ll have a hearing test and a vestibular test called VEMP, which can detect abnormal responses related to SSCD. Finally, we do a high-resolution CT scan to look for the hole in the bone over the semicircular canal.

Patient: What treatments are available?

Doctor: For mild symptoms, we often recommend avoiding triggers like loud noises, heavy lifting, or straining, which can worsen symptoms. Some medications can help with dizziness, but they only mask symptoms. If symptoms are severe and affect your quality of life, surgery can repair the hole by plugging or covering the bone defect, which usually helps greatly.

Patient: Is surgery safe?

Doctor: Yes, surgery is generally safe and effective when done by experienced specialists. However, like all surgeries, it carries some risks such as hearing changes or balance problems, but serious complications are rare.

Patient: How long will it take before I feel better?

Doctor: Symptom improvement is usually noticed in weeks after surgery, though balance may take some time to fully recover. We’ll monitor your progress carefully and support you throughout.

Patient: Thank you, Doctor. That really helps me understand what’s going on.

Doctor: You’re welcome. We’ll start with the necessary tests and make a plan based on what we find. Please contact me if your symptoms worsen or if you have any questions.

REFERENCES:

<https://emedicine.medscape.com/article/857914-treatment>

<https://my.clevelandclinic.org/health/diseases/15266-superior-canal-dehiscence-syndrome>

<https://www.hopkinsmedicine.org/health/conditions-and-diseases/superior-canal-dehiscence-syndrome-scds>

<https://rarediseases.org/rare-diseases/superior-semicircular-canal-dehiscence/>

**Mononucleosis**

**DEFINITION / DESCRIPTION**

Infectious mononucleosis (mono) is often called the kissing disease. The virus that causes mono (Epstein-Barr virus) is spread through saliva. You can get it through kissing, but you can also be exposed by sharing a glass or food utensils with someone who has mono. However, mononucleosis isn't as contagious as some infections, such as the common cold.

You're most likely to get mononucleosis with all the signs and symptoms if you're a teen or young adult. Young children usually have few symptoms, and the infection often goes undiagnosed.

If you have mononucleosis, it's important to be careful of certain complications such as an enlarged spleen. Rest and enough fluids are keys to recovery.

**CAUSES**

The most common cause of mononucleosis is the Epstein-Barr virus, but other viruses also can cause similar symptoms. This virus is spread through saliva, and you may catch it from kissing or from sharing food or drinks.

Although the symptoms of mononucleosis are uncomfortable, the infection resolves on its own without long-term effects. Most adults have been exposed to the Epstein-Barr virus and have built up antibodies. This means they're immune and won't get mononucleosis.

#### **How contagious is mononucleosis?**

Viruses that cause mononucleosis are very contagious. You can pick them up through contact with an infected person’s bodily fluids, including saliva. These viruses spread through:

* Blood transfusions.
* Coughing or sneezing.
* Kissing.
* Sharing food, drinks or eating utensils.
* Organ transplants.
* Sexual contact.

#### **Is mono a sexually transmitted infection?**

Epstein-Barr is a type of herpes virus. It’s different than the herpes simplex virus (HSV) that causes genital and oral herpes. Both viruses can be sexually transmitted. However, EBV is more likely to spread through other means like sharing drinks or kissing.

#### **Can you have mononucleosis twice?**

The Epstein-Barr virus stays in your body in an inactive form even after mononucleosis symptoms go away. But most people develop mono only once.

If EBV reactivates, it rarely causes symptoms. However, you may unknowingly spread the reactivated virus to others. And people with weakened immune systems may develop mono symptoms more than once.

### **Who might get mononucleosis?**

There are two peaks when people acquire EBV: early school-age children and again around adolescence/young adulthood. Young children often don’t have symptoms, whereas teenagers and people in their 20s are most likely to get mono. About 1 in 4 people in this age group who get EBV come down with mono, but anyone can get it, no matter their age.

**SIGNS / SYMPTOMS**

Signs and symptoms of mononucleosis may include:

* Fatigue
* Sore throat, perhaps misdiagnosed as strep throat, that doesn't get better after treatment with antibiotics
* Fever
* Swollen lymph nodes in your neck and armpits
* Swollen tonsils
* Headache
* Skin rash
* Soft, swollen spleen

The virus has an incubation period of about four to six weeks, although in young children this period may be shorter. The incubation period refers to how long before your symptoms appear after being exposed to the virus. Signs and symptoms such as a fever and sore throat usually lessen within a couple of weeks. But fatigue, enlarged lymph nodes and a swollen spleen may last for a few weeks longer.

**DIAGNOSIS METHODS**

Doctors can often make a diagnosis just based on your typical symptoms and a physical exam. If your doctor thinks you might have mono based on your symptoms (like severe fatigue, sore throat, fever and swollen lymph nodes), they might order a blood test to help confirm it. The most common test is called the monospot test (or heterophile antibody test). This test looks for specific antibodies (proteins your immune system makes to fight infection) that often show up in your blood when you have mono.

However, the monospot test isn't perfect. It might come back negative early in the illness (especially in the first week or two), even if you do have mono. Sometimes, doctors might repeat the test later if symptoms continue. In other cases, especially if the monospot is negative but mono is still suspected, doctors might order different blood tests that look specifically for antibodies against the Epstein-Barr virus. These tests are more specific and can help tell if you have a current, recent or past EBV infection.

**TREATMENT OPTIONS**

Since mono is caused by a virus (usually EBV), antibiotics won't help – they only work against bacteria.

There isn't a specific medicine that cures mono. The treatment focuses on relieving your symptoms and helping your body fight off the infection. This is called supportive care.

These are most important things you can do:

* Get plenty of rest. Your body needs energy to recover, and the fatigue can be intense. You might need to stay home from school or work and avoid sports for several weeks.
* Drink lots of fluids. Water, juice and broth help prevent dehydration and can soothe a sore throat.
* Relieve pain and fever. Over-the-counter pain relievers like acetaminophen (paracetamol) or ibuprofen can help with fever, sore throat and body aches. Avoid giving aspirin to teens due to the risk of Reye's syndrome, a rare but serious condition.
* Soothe your sore throat. Gargling with salt water (one quarter to one half teaspoon of salt in a glass of warm water) or using throat lozenges or sprays can help.

It's also crucial to avoid contact sports or heavy lifting for at least 3–4 weeks, even if you feel better, because mono can cause your spleen to swell, making it fragile and at risk of rupturing, which is a medical emergency. Always follow your doctor's advice on when it's safe to return to normal activities.

## **Self care**

Besides getting plenty of rest, these steps can help relieve symptoms of mononucleosis:

* **Drink plenty of water and fruit juices.** Fluids help relieve a fever and sore throat and prevent dehydration.
* **Take an over-the-counter pain reliever.** Use pain relievers such as acetaminophen (Tylenol, others) or ibuprofen (Advil, Motrin IB, others) as needed. These medicines have no antiviral properties. Take them only to relieve pain or a fever.  
  Use caution when giving aspirin to children or teenagers. Though aspirin is approved for use in children older than age 3, children and teenagers recovering from chickenpox or flu-like symptoms should never take aspirin. This is because aspirin has been linked to Reye's syndrome, a rare but potentially life-threatening condition, in such children.
* **Gargle with salt water.** Do this several times a day to relieve a sore throat. Mix 1/4 teaspoon (1.5 grams) of salt in 8 ounces (237 milliliters) of warm water.

### **Wait to return to sports and some other activities**

Most signs and symptoms of mononucleosis ease within a few weeks, but it may be two to three months before you feel completely normal. The more rest you get, the sooner you should recover. Returning to your usual schedule too soon can increase the risk of a relapse.

To help you avoid the risk of rupturing your spleen, your doctor may suggest that you wait about one month before returning to vigorous activities, heavy lifting, roughhousing or contact sports. Rupture of the spleen results in severe bleeding and is a medical emergency.

Ask your doctor about when it's safe for you to resume your normal level of activity. Your doctor may recommend a gradual exercise program to help you rebuild your strength as you recover.

**PREVENTION TIPS**

Mononucleosis is spread through saliva. If you're infected, you can help prevent spreading the virus to others by not kissing them and by not sharing food, dishes, glasses and utensils until several days after your fever has improved — and even longer, if possible. And remember to wash your hands regularly to prevent spread of the virus.

The Epstein-Barr virus may persist in your saliva for months after the infection. No vaccine exists to prevent mononucleosis.

**POSSIBLE COMPLICATIONS**

Complications of mononucleosis can sometimes be serious.

### **Enlargement of the spleen**

Mononucleosis may cause enlargement of the spleen. In extreme cases, your spleen may rupture, causing sharp, sudden pain in the left side of your upper abdomen. If such pain occurs, seek medical attention immediately — you may need surgery.

### **Liver issues**

Problems with your liver also may occur:

* **Hepatitis.** You may experience mild liver inflammation (hepatitis).
* **Jaundice.** A yellowing of your skin and the whites of your eyes (jaundice) also occurs occasionally.

### **Less common complications**

Mononucleosis can also result in less common complications, including:

* **Anemia** — a decrease in red blood cells and in hemoglobin, an iron-rich protein in red blood cells
* **Thrombocytopenia** — a low count of platelets, which are blood cells involved in clotting
* **Heart problems** — an inflammation of the heart muscle (myocarditis)
* **Complications involving the nervous system** — meningitis, encephalitis and Guillain-Barre syndrome
* **Swollen tonsils** — which can block breathing

The Epstein-Barr virus can cause much more serious illness in people who have impaired immune systems. People with weakened immune systems may include people with HIV/AIDS or people taking drugs to suppress immunity after an organ transplant.

## **Outlook / Prognosis**

Mononucleosis symptoms can be severe. They may temporarily affect your ability to lead an active life. Fortunately, these symptoms gradually improve with at-home supportive therapy.

You may experience lingering fatigue for several months. You’ll need to protect your health by getting enough rest and fluids during this time. You should also avoid strenuous activities to prevent a ruptured spleen.

**WHEN TO SEE A DOCTOR / RED FLAG**

You should call your healthcare provider if you have mononucleosis and you experience:

* Difficulty swallowing or breathing.
* Dizziness or fainting.
* Extreme muscle weakness in your arms or legs.
* Intense body aches.
* Persistent high fever.
* Severe headaches.
* Sharp pain in your upper left abdomen.

**DIFFERENTIAL DIAGNOSIS**

* Streptococcal pharyngitis (strep throat): This bacterial infection shares symptoms like severe sore throat, fever, and enlarged tonsils, which can have a whitish-yellow covering, making it easily confused with mono .
* Cytomegalovirus (CMV): Another viral infection that can cause a mono-like illness, particularly in immunocompromised individuals .
* HIV (acute retroviral syndrome): The initial phase of HIV infection can present with fever, fatigue, rash, and swollen lymph nodes, mimicking mono .
* Toxoplasmosis (caused by *Toxoplasma gondii*): This parasitic infection can lead to symptoms similar to mono, including swollen lymph nodes and fatigue .
* Other viral infections:
  + Human Herpesvirus 6 (HHV-6) and Human Herpesvirus 7 (HHV-7): These viruses can cause mononucleosis-like syndromes .
  + Viral hepatitis: Can present with fatigue, fever, and liver inflammation, which can occur in mono .
  + Common cold and influenza (flu): These widespread viral respiratory infections share symptoms like fever, fatigue, and sore throat .
  + COVID-19: Similar to the flu, COVID-19 can also present with symptoms overlapping with mono .
* Tonsillitis: Inflammation of the tonsils can cause a sore throat and swollen tonsils similar to mono .
* Diphtheria: A bacterial infection that causes a severe sore throat with a thick coating on the tonsils and throat, fever, and swollen glands .
* Leukemia: In rare cases, some forms of leukemia can present with symptoms like fatigue, fever, and swollen lymph nodes, warranting consideration in persistent or unusual presentations

**EPIDEMIOLOGY**

* Infectious mononucleosis is caused primarily by the Epstein-Barr virus (EBV), which is among the most prevalent human viruses globally. Approximately 90% of the world's population is seropositive for EBV, meaning most people have been infected at some point.
* In developed countries, primary EBV infection tends to occur later in life compared to developing countries, which influences the age distribution of infectious mononucleosis. In the United States, seroprevalence among children and adolescents aged 6-19 is about 66.5%, with higher rates seen in females, African-American, and Hispanic populations. Socioeconomic factors also play a role—children from lower-income families have higher infection rates than those from wealthier families.
* The incidence of infectious mononucleosis in settings with many young adults, such as universities and the military, ranges from about 11 to 48 cases per 1,000 persons annually.
* The disease is most commonly diagnosed in adolescents and young adults between 15 and 24 years old, particularly in college-aged populations.
* Seroprevalence increases steadily with age during childhood and adolescence, often reaching over 85% by young adulthood. Females tend to seroconvert earlier than males during adolescence.
* Hospitalization rates for infectious mononucleosis have been increasing in some regions over the past decades, with an overall incidence around 60 per 100,000 person-years, higher in females than males.
* Risk factors for infectious mononucleosis include white ethnicity, affluence, lower BMI, and never smoking, while EBV infection overall is more prevalent in populations with lower socioeconomic status

**PREDEFINED Q & A SETS**

## What’s the best treatment for mononucleosis symptoms?

There is no cure for mono since it is caused by a virus (Epstein-Barr virus). Treatment focuses on relieving symptoms:

* Rest is essential to help your body recover.
* Hydration: Drink plenty of fluids like water, fruit juices, and soups to stay hydrated and soothe the throat.
* Pain and fever relief: Over-the-counter medications such as acetaminophen (Tylenol) or ibuprofen (Advil, Motrin) help reduce fever, sore throat, headaches, and body aches. Avoid aspirin in children and teens.
* Sore throat relief: Gargling with warm salt water several times a day can help. Throat sprays or lozenges may provide temporary comfort.
* Avoid irritants such as acidic or spicy foods while your throat heals.
* In severe cases with airway obstruction, a doctor may prescribe corticosteroids.
* Antiviral drugs like acyclovir have not shown benefits in treating mono symptoms.

## 2. How long am I contagious?

You are most contagious during the acute phase, which is the first few weeks of illness when symptoms are obvious. However, the Epstein-Barr virus can be found in saliva and shed intermittently for months after symptoms improve, so transmission via saliva can occur for weeks to months. Good hygiene reduces spread.

## 3. What steps can I take to prevent infecting others with this virus?

* Avoid kissing, sharing drinks, food, eating utensils, or toothbrushes while symptomatic and for several weeks after.
* Practice good hand hygiene frequently.
* Stay home from work or school during the acute illness to avoid spreading the virus.
* Avoid close contact with others when fatigued or symptomatic.

## 4. How long will it take to recover from mono?

* Most symptoms improve within 2 to 4 weeks, but fatigue can linger for several weeks to months.
* Full recovery, including resolution of fatigue, may take 2 to 3 months or rarely longer.

## 5. When can I go back to work or school?

* You may return once you can function without fever and your symptoms have improved substantially, typically after a few weeks.
* Avoid returning too early to prevent relapse and to reduce the risk of spreading the virus.
* Follow your healthcare provider’s advice based on your specific condition.

## 6. When can I get back to exercise and physical activity?

* Avoid contact sports and strenuous exercise for *at least one month* after symptoms start to reduce the risk of spleen rupture—a serious complication due to splenic enlargement.
* Do not resume heavy lifting, vigorous activity, or rough play until your doctor confirms your spleen has returned to normal size and you feel strong enough.
* Gradually increase activity with medical guidance.

## 7. Can I get mono again?

* It is uncommon but possible to get infected again with EBV.
* Typically, once infected, people develop immunity that prevents severe reinfection.
* Reactivation of latent EBV can occur but usually does not cause symptoms.

## 8. Should I look out for signs of complications?

Yes. Seek prompt medical attention if you experience:

* Severe difficulty breathing or swallowing (due to swollen tonsils)
* Severe abdominal pain or tenderness (could indicate spleen rupture)
* High, persistent fever
* Severe headache, stiff neck, or neurological symptoms
* Significant jaundice (yellowing of skin or eyes)
* Profound weakness or worsening fatigue beyond expected course

### **How does mononucleosis affect pregnancy?**

People who develop mononucleosis from EBV during pregnancy typically go on to have healthy pregnancies. Call your healthcare provider if you develop a fever, which can increase the risk of miscarriage and premature labor. There’s a slight chance you may pass the Epstein-Barr virus to your developing fetus or a breastfeeding baby. But most babies don’t develop mono symptoms. If a CMV infection caused mono during pregnancy, there’s a chance it may affect the fetus and you should discuss this with your obstetrician.

## **TREATMENT DRUG INFORMATION AND THEIR SIDE EFFECTS**

## 1. Nonsteroidal Anti-Inflammatory Drugs (NSAIDs) (e.g., ibuprofen, naproxen)

* Purpose: Reduce fever, sore throat pain, muscle aches, and inflammation.
* Common Side Effects:
  + Gastrointestinal upset (nausea, stomach pain)
  + Increased risk of stomach ulcers or bleeding with prolonged use
  + Kidney function impairment in susceptible individuals
* Precautions: Take with food to reduce gastric irritation.

## 2. Acetaminophen (Paracetamol)

* Purpose: Relieve fever, headache, and pain without anti-inflammatory action.
* Common Side Effects:
  + Generally well tolerated
  + Risk of liver toxicity if doses exceed recommended amounts
* Precautions: Avoid combining with other acetaminophen-containing products.

## 3. Throat Analgesics and Anesthetics (e.g., lozenges or sprays containing benzocaine, phenol, or lidocaine)

* Purpose: Temporary relief of sore throat pain and irritation.
* Common Side Effects:
  + Temporary numbness or irritation in the mouth/throat
  + Allergic reactions are rare but possible (rash, swelling)
* Note: These provide symptomatic relief and do not affect the disease course.

## 4. Corticosteroids (e.g., prednisone, dexamethasone)

* Purpose: Used in severe cases with significant tonsillar swelling leading to airway obstruction or severe pharyngitis pain.
* Benefits: Can reduce throat swelling and improve breathing temporarily.
* Common Side Effects:
  + Increased appetite and weight gain
  + Mood changes (irritability, anxiety)
  + Elevated blood sugar levels
  + Increased risk of secondary infections
* Usage: Short courses are typical; not routinely recommended for uncomplicated cases.
* Evidence: Some studies show corticosteroids reduce sore throat pain early on, but not long-term.

## 5. Antiviral Medications (e.g., acyclovir)

* Purpose: Investigated for use against EBV infection to reduce virus shedding.
* Effectiveness: Clinical trials show no significant benefit in improving symptoms, shortening illness duration, or preventing complications.
* Side Effects:
  + Headache, nausea
  + Kidney toxicity (rare, typically with high doses or IV use)
* Recommendation: Not routinely recommended for mononucleosis treatment.

## 6. Antibiotics

* Role: Not effective against mono itself, which is viral.
* Use: Only prescribed if secondary bacterial infections develop (e.g., strep throat).
* Caution: Amoxicillin or ampicillin can cause a characteristic rash in patients with mono and are generally avoided.

**Mononucleosis (Epstein-Barr Virus) Genomic Data:**

* Virus Type: Epstein-Barr virus (EBV), the primary cause of infectious mononucleosis, is a large double-stranded DNA virus belonging to the herpesvirus family.
* Genome Size and Structure:
  + Approximately 172,000 base pairs (172 kb) in length.
  + Contains about 85 genes coding for various viral proteins involved in replication, infection, and immune evasion.
  + The DNA is linear during lytic infection but circularizes (forms episomes) inside host cells during latency.
  + The genome is enclosed within an icosahedral capsid, surrounded by a tegument layer and an outer lipid envelope containing glycoprotein spikes essential for host cell infection.
* Genome Organization:
  + Divided into unique long and short regions separated by internal and terminal repeat sequences.
  + EBV displays two main genotypes—Type 1 and Type 2—that differ mainly in the EBNA-2 gene, influencing viral behavior and transforming ability of B cells.
* Key Genes and Proteins:
  + Latency genes such as EBNA-1, EBNA-2, EBNA-3A, -3B, -3C, LMP-1, LMP-2A, and LMP-2B regulate viral persistence and transformation.
  + Genes encoding structural proteins for the capsid, tegument, and envelope are essential for viral assembly and infectivity.
* 3D Genome Conformation:
  + Recent research using Hi-C and 3D modeling reveals the complex folding of the episomal EBV genome inside host nuclei, with important regulatory elements physically interacting, which is influenced by host factors like PARP1 activity.
* Functional Insights:
  + Understanding the EBV portal protein structure informs antiviral drug design as this protein is crucial for viral DNA packaging.
  + Genetic variability reflects viral adaptation and is linked to geographic distribution and disease presentation

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello! What brings you in today?

Patient: Hi, Doctor. I’ve been feeling really tired for a few weeks now, and I have a sore throat that doesn’t seem to be getting better. My neck is swollen, and I even have some fever and headaches.

Doctor: Thank you for sharing that. Your symptoms could be caused by an infection called infectious mononucleosis, often just called "mono." It’s a common viral illness caused mostly by the Epstein-Barr virus.

Patient: Mono? I’ve heard of that—it’s called the “kissing disease,” right?

Doctor: That’s right. The virus spreads mostly through saliva—kissing, sharing drinks, or utensils can transmit it. It often affects teens and young adults, causing fatigue, sore throat, fever, swollen lymph nodes, and sometimes an enlarged spleen.

Patient: So, how do you diagnose it?

Doctor: Based on your symptoms, I’d like to run a blood test called a Monospot test that looks for specific antibodies indicating mono. Sometimes, if the test is negative but suspicion remains high, we’ll order more specific tests to identify the Epstein-Barr virus.

Patient: Is there a cure for mono?

Doctor: There’s no specific cure, but most people recover with plenty of rest, fluids, and symptom relief. Over-the-counter pain relievers like acetaminophen or ibuprofen help with fever and throat pain. Avoiding strenuous activity is important, especially to protect your spleen.

Patient: How long does it take to get better?

Doctor: Most symptoms improve in 2 to 4 weeks, but fatigue can last several more weeks. It’s important to pace yourself and avoid heavy exercise or contact sports for at least a month to prevent spleen injury.

Patient: Am I contagious? How can I avoid spreading it?

Doctor: You’re most contagious when symptoms are active, especially early on. Avoid sharing drinks, utensils, and kissing others during this time. Good hand hygiene also helps reduce spread.

Patient: Are there any complications I should watch for?

Doctor: Yes. Watch for severe sore throat making it hard to swallow or breathe, very high fever, severe abdominal pain (which may suggest spleen problems), or neurological symptoms like severe headache or neck stiffness. If you notice these, seek immediate care.

Patient: Thank you, Doctor. I feel more informed now.

Doctor: You’re welcome! Let’s do the tests to confirm, and I’ll guide you on managing your symptoms. Please call if anything worsens.

REFERENCES:

<https://www.aafp.org/pubs/afp/issues/2015/0315/p372.html>

<https://my.clevelandclinic.org/health/diseases/13974-mononucleosis>

[About Infectious Mononucleosis (Mono) | EBV and Mono | CDC](https://www.cdc.gov/epstein-barr/about/mononucleosis.html)

[Mononucleosis (glandular fever)](https://www.who.int/news-room/questions-and-answers/item/mononucleosis-(glandular-fever))

[Mononucleosis - Diagnosis & treatment - Mayo Clinic](https://www.mayoclinic.org/diseases-conditions/mononucleosis/diagnosis-treatment/drc-20350333)

**Mouth ulcers**

**DEFINITION / DESCRIPTION**

A mouth ulcer is a sore that appears anywhere inside your mouth. These sores are usually red, yellow or white, and you might have one or several.

You can get mouth ulcers on your:

* Gums.
* Tongue.
* Roof of mouth (palate).
* Inner cheeks.
* Inner lips.

These sores are often painful and can make eating, drinking and speaking uncomfortable.

Mouth ulcers can be alarming. However, they’re not a sexually transmitted infection (STI) and you can’t get or spread them from kissing or sharing food and drinks. Aside from any pain and discomfort, mouth ulcers are usually harmless and go away on their own in a week or two. But some types of mouth sores could point to underlying health conditions like viruses, autoimmune diseases or gastrointestinal issues.

#### **Types of mouth ulcers**

There are many different types of mouth sores and lesions, including:

* Canker sores (aphthous ulcers). These are the most common type of mouth ulcers. Healthcare providers aren’t exactly sure what causes them or why some people get them more than others do. Causes include minor trauma (like biting your cheek), acidic foods and even stress. Canker sores are usually white or yellow with red around the edges.
* Oral lichen planus. This condition can cause itchy rashes and lacelike, white sores inside your mouth. Oral lichen planus is an immune system response and most commonly affects females age 50 or older.
* Leukoplakia. This condition causes white or gray patches inside your mouth. It develops because of excess cell growth. Chronic irritation from things like smoking or chewing tobacco can cause it. But sometimes it happens for no apparent reason. Leukoplakia lesions usually aren’t cancerous.
* Erythroplakia. Erythroplakia is another symptom of smoking or chewing tobacco. People with erythroplakia have red patches that commonly appear behind their lower front teeth or under their tongue. Unlike leukoplakia lesions, erythroplakia patches are usually precancerous or cancerous.
* Oral thrush. An overgrowth of yeast called *Candida albicans* causes this fungal infection inside your mouth. It commonly happens after antibiotic treatment or when your immune system isn’t as strong as it usually is. Oral thrush causes red and creamy white mouth sores and patches.
* Mouth cancer. Oral cancer lesions can show up as red or white mouth sores or ulcers. These sores won’t heal on their own. If you have a mouth ulcer that hasn’t gone away after three weeks, tell your healthcare **provider.**

**CAUSES**

Mouth ulcers may occur for a number of reasons, including:

* Minor tissue injury from dental work, such as having a cavity filled.
* Accidentally biting your cheek or tongue.
* An allergic reaction to certain bacteria.
* Wearing braces or retainers.
* Using harsh or abrasive toothpaste.
* Eating lots of acidic foods, such as oranges, pineapples and strawberries.
* Hormonal changes during your period.
* Stress.
* Lack of sleep.

#### **Health conditions associated with mouth ulcers**

Certain health conditions, including many autoimmune diseases, can also cause mouth ulcers. These conditions may include:

* Vitamin deficiencies.
* Viral, bacterial or fungal infections.
* Crohn’s disease.
* Celiac disease.
* Reactive arthritis.
* Lupus.
* Behçet’s disease.

#### **Are mouth ulcers contagious?**

No. Unlike cold sores, mouth ulcers aren’t contagious, and they can’t spread through kissing or sharing food.

Cold sores (fever blisters) appear on the outside of your mouth, often on your lips. A virus causes them, and they’re very contagious. If you have a fever blister, you should avoid sharing personal items with other people to reduce the spreading of the virus.

**SIGNS / SYMPTOMS**

Mouth ulcers are usually easy to spot. They appear as sores on your gums, tongue, inner cheeks, inner lips or roof of your mouth.

Mouth sores are typically:

* Red around the edges.
* White, yellow or gray in the center.

You may only develop one ulcer, or there might be more. Other symptoms could include:

* Swelling around the ulcers.
* Increased soreness when brushing your teeth.
* Pain that worsens when eating spicy, salty or sour foods.

**DIAGNOSIS METHODS**

A healthcare provider can diagnose a mouth ulcer with a visual examination. If you have a severe breakout, or if they suspect a specific health condition, they may order blood tests.

**TREATMENT OPTIONS**

While most mouth sores heal on their own, your provider may prescribe medications to help ease discomfort. Common mouth ulcer treatments include:

* Antiseptic gels or mouth rinses like Orajel™ or Anbesol®.
* Steroid ointments like triamcinolone.
* Immunosuppressants (in severe cases).

#### **How to cure mouth ulcers fast naturally**

There are also things you can do at home to relieve mouth sore symptoms:

* Drink plenty of water.
* Practice good oral hygiene to keep your mouth as clean as possible.
* Rinse your mouth with warm saltwater a few times each day.
* Make a mixture of equal parts hydrogen peroxide and water and rinse your mouth twice a day.
* Avoid hot and spicy foods until the ulcer heals.
* Use an over-the-counter (OTC) topical anesthetic like Orajel™ or Anbesol®.

**PREVENTION TIPS**

While you can’t prevent mouth ulcers altogether, there are things you can do to reduce your risk:

* Brush your teeth twice daily and floss once daily for optimal oral health.
* Use a soft-bristled toothbrush to avoid tissue irritation.
* Eat a healthy diet rich in fresh fruits and vegetables.
* Visit your dentist regularly for checkups and cleanings.

If your provider thinks you have an underlying condition that causes sores, treating your condition can reduce the risk of ulcers returning. Talk to your provider about ways to manage your health.

**OUTLOOK / PROGNOSIS**

In most cases, mouth ulcers go away on their own in about 10 to 14 days. If you have a mouth sore that lasts longer than three weeks, schedule an appointment with your healthcare provider. They can recommend treatment and tell you how to get rid of your mouth ulcer.

**WHEN TO SEE A DOCTOR / RED FLAG**

Anyone can get mouth ulcers. But you should call your healthcare provider if you have:

* Mouth sores that last for three weeks or longer.
* New sores that appear before the old ones heal.
* Mouth ulcers that affect the outer part of your lips.
* Pain that doesn’t improve with medication.
* Unusually large mouth ulcers.
* Mouth sores that are painless.
* Fever.
* Diarrhea.

**DIFFERENTIAL DIAGNOSIS**

* Aphthous stomatitis (canker sores): Recurrent, painful, round or oval ulcers with a red halo, usually on non-keratinized mucosa; common and benign.
* Herpes simplex virus (HSV) infection: Presents as multiple small painful vesicles that rupture and form ulcers, typically on keratinized mucosa (lips, hard palate); often preceded by tingling or burning.
* Infectious mononucleosis (caused by Epstein-Barr virus): May cause small red or bruise-like spots or ulcers especially on the soft palate; usually accompanied by systemic symptoms such as fever, fatigue, sore throat, and lymphadenopathy.
* Hand, foot, and mouth disease: Caused by enteroviruses (e.g., coxsackievirus), characterized by vesicles and ulcers in the oral cavity as well as on hands and feet.
* Traumatic ulcers: Result from mechanical irritation (e.g., sharp tooth edges, ill-fitting dentures, biting); usually solitary and localized.
* Erythema multiforme: Immune-mediated condition causing multiple target lesions and painful oral ulcers; often triggered by infections or drugs.
* Bechet’s disease: Recurrent oral and genital ulcers with systemic inflammatory features.
* Oral lichen planus: Chronic inflammatory condition manifesting as white striations, erosions, or ulcers in the mouth.
* Nutritional deficiencies: Deficiencies in iron, vitamin B12, folate can cause painful oral ulcers.
* Malignancy (e.g., squamous cell carcinoma): Persistent, non-healing ulcers, often on the lateral tongue or floor of the mouth; requires biopsy for diagnosis.
* Drug-induced ulcers: Certain medications (e.g., NSAIDs, chemotherapy agents) can cause mucosal ulcerations.
* Oral candidiasis: Usually presents with white plaques, but erosive forms can cause mucosal soreness or ulceration.
* Syphilis: Can cause painless oral chancres or mucous patches in early stages.
* Tuberculosis or deep fungal infections: Rarely cause chronic oral ulcers.

**EPIDEMIOLOGY**

* Mouth ulcers, particularly aphthous ulcers (recurrent aphthous stomatitis - RAS), are very common oral lesions affecting a significant portion of the population worldwide.
* The prevalence of aphthous ulcers varies widely depending on the population studied, diagnostic criteria, and environmental factors, generally ranging between 5% and 66% of the general population.
* Some studies estimate that up to 25% of the global population experience aphthous ulcers at some point in their lives.
* In the United States, prevalence estimates reported include:
  + About 20% of the population has experienced RAS.
  + Among children, about 1,500 per 100,000 (1.5%) experience recurrent aphthous ulcers annually, and among adults, about 850 per 100,000 (0.85%).
* The majority of aphthous ulcers are minor, accounting for about 80% of cases.
* Mouth ulcers can occur at any age but are most common in children, adolescents, and young adults, with the onset typically between 10 and 19 years of age.
* There is a slight female predominance in recurrent aphthous stomatitis cases.
* Stress, certain nutritional deficiencies, and genetic predisposition are recognized contributing factors.
* The sites most commonly affected are the inner lips, inner cheeks, and dorsal tongue.
* While most mouth ulcers are benign and self-limiting, a small proportion may be related to systemic diseases such as lupus erythematosus or signify malignancy.

**PREDEFINED Q & A SETS**

### **Mouth ulcer vs. canker sore: What’s the difference?**

“Mouth ulcer” is a broad term that describes any sore or ulceration inside your mouth. As we mentioned earlier, canker sores are the most common type of mouth ulcer. They affect about 20% of the general population. Many people use the terms “mouth ulcer” and “canker sore” interchangeably.

You might get a canker sore if you have a folate, vitamin B or iron deficiency. But in most cases, canker sores appear without a known cause and for no apparent reason. They can also recur (return), meaning they come and go over the course of your lifetime.

Some people confuse canker sores with cold sores (fever blisters), but they’re very different. A canker sore appears inside your mouth. A cold sore forms outside your mouth, usually on your lips. Canker sores aren’t contagious, but cold sores are.

### **How do you know if your mouth ulcer is bad?**

Anytime you have a mouth sore that lasts longer than three weeks, schedule a visit with your provider. Mouth ulcers that don’t go away could point to other underlying health conditions.

### **Are mouth ulcers a sign of cancer?**

Usually not, but it’s possible. A mouth ulcer that doesn’t go away could be a sign of oral cancer. In most cases of mouth cancer, mouth ulcers appear on or under the tongue.

Most mouth ulcers are harmless. But if you have a mouth sore that won’t heal, you should talk to a healthcare provider.

. What are mouth ulcers?  
Mouth ulcers are small, painful sores that develop on the inside of the mouth, including the cheeks, gums, tongue, or roof of the mouth. They typically appear as round or oval lesions with a white, yellow, or grey center and a red border.

2. What causes mouth ulcers?  
Common causes include minor injuries (like biting the cheek), stress, hormonal changes, nutritional deficiencies (iron, vitamin B12, folate), food sensitivities (acidic or spicy foods), infections, certain medications, and some systemic diseases. Most ulcers are benign and heal on their own.

3. Are mouth ulcers contagious?  
No, mouth ulcers are not contagious. Unlike cold sores caused by herpes simplex virus, mouth ulcers cannot spread from person to person.

4. How long do mouth ulcers last?  
Most mouth ulcers heal spontaneously within 10 to 14 days. Larger or major ulcers may take up to 6 weeks or longer. If an ulcer lasts more than 3 weeks, it requires medical evaluation.

5. When should I see a doctor or dentist about a mouth ulcer?  
Seek professional advice if:

* Ulcers last longer than 3 weeks
* Ulcers recur frequently
* Ulcers are larger or more painful than usual
* Ulcers bleed or interfere with eating and drinking
* You have risk factors such as tobacco or alcohol use (to rule out malignancy)

6. How can I manage or treat mouth ulcers?

* Most ulcers improve without treatment.
* Home remedies include avoiding spicy, acidic, or abrasive foods, practicing good oral hygiene, and using saltwater rinses.
* Over-the-counter topical gels or mouth rinses can reduce pain and inflammation.
* In severe cases, a healthcare provider may prescribe corticosteroid gels or mouth rinses.

7. Can mouth ulcers be prevented?  
Avoiding known triggers such as trauma, stress, certain foods, and maintaining proper nutrition and oral hygiene can reduce their occurrence. Managing underlying health conditions is also important.

8. Can mouth ulcers indicate something more serious?  
Sometimes persistent or unusual ulcers can be a sign of systemic disease or oral cancer, especially in tobacco or alcohol users. Persistent ulcers need medical evaluation.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, what brings you in today?

Patient: Hi, Doctor. I’ve been having these painful sores inside my mouth for a few days. They make it hard to eat and talk.

Doctor: I see. Mouth ulcers can be quite uncomfortable. Can you tell me where exactly the sores are located?

Patient: They’re mostly on the inside of my cheeks and a bit on my tongue. They look white with red edges.

Doctor: That sounds like typical mouth ulcers, also called canker sores. They usually appear as small, shallow sores and often heal on their own within 10 to 14 days. Have you had similar ulcers before?

Patient: Yes, I get them from time to time, but this time they seem worse.

Doctor: Sometimes mouth ulcers can come back due to certain triggers like stress, minor injuries inside the mouth, or nutritional deficiencies like low iron or vitamin B12. Are you experiencing any other symptoms like fever, swollen glands, or unusual fatigue?

Patient: No, I feel fine otherwise.

Doctor: That’s good. Most mouth ulcers don’t require special treatment. You can try rinsing your mouth gently with warm salt water several times a day and avoid spicy, salty, or acidic foods that might irritate the sores. Over-the-counter topical gels containing benzocaine or similar ingredients can help reduce pain.

Patient: Is there anything else I should do?

Doctor: Keep your mouth clean with gentle brushing, and stay hydrated. If the ulcers don’t improve in about two weeks, or if you start to notice more severe symptoms like persistent pain, worsening sores, or difficulty eating, please come back so we can investigate further. In rare cases, persistent ulcers may require specific treatments or tests.

Patient: Can these ulcers be contagious?

Doctor: No, mouth ulcers are not contagious. They cannot spread to other people. This is different from cold sores, which are caused by a virus and are contagious.

Patient: That’s a relief! Thank you for the advice.

Doctor: You’re welcome. If the pain worsens or you have any new symptoms, don’t hesitate to come back. Otherwise, these should heal on their own soon.

REFERENCES:

<https://emedicine.medscape.com/article/867080-treatment>

<https://my.clevelandclinic.org/health/diseases/21766-mouth-ulcer>

**Nasal polyps**

**DEFINITION / DESCRIPTION**

Nasal polyps are painless and benign (noncancerous) growths. They form in the mucosa (thin, soft tissue) that lines your nasal and sinus passages. They usually appear on both sides of your nose. Nasal polyps can get irritated and swollen, making it hard for you to breathe through your nose.

Small polyps are teardrop-shaped. But as they grow larger, they often resemble peeled grapes that are pink, yellow or gray.

Nasal polyps affect up to 40% of the general population. Anyone can get them. But they’re twice as common in men. Many people get them in their 30s or 40s. But the overall risk increases with age.

Nasal polyposis is another name for nasal polyps

**CAUSES**

### **Nasal polyp causes**

Healthcare providers know that inflammation causes nasal polyps. But they don’t know why some people go on to develop polyps because of inflammation while others don’t.

Chronic sinusitis — from allergies, infection or asthma — seems to be the most common reason polyps appear. Chronic sinusitis refers to nasal and sinus inflammation that’s lasted three months or longer. But several risk factors could contribute to the development of nasal polyps.

#### **Risk factors**

A risk factor is something that increases your chance of getting a certain condition. Nasal polyp risk factors include existing health conditions like:

* Asthma.
* Allergic rhinitis (hay fever).
* Chronic sinus infections.
* Cystic fibrosis.
* Hypersensitivity to certain NSAIDs (nonsteroidal anti-inflammatory drugs).

Genetics may also play a role in the development of nasal polyps. For instance, certain gene mutations (changes) may impact how your nasal tissues react to inflammation.

**SIGNS / SYMPTOMS**

### **Nasal polyp symptoms**

Small polyps in your nose might not cause symptoms at all. But if they start to grow, you could develop:

* Nasal congestion (stuffy nose).
* Rhinorrhea (runny nose).
* Headaches.
* Loss of taste and smell.
* Nosebleeds.
* Postnasal drip.
* Sinus pressure.
* Snoring.

When polyps grow large enough, they can block your nasal passages and sinuses, leading to:

* Frequent asthma attacks (in people with asthma).
* Repeated sinus infections (sinusitis).
* Sleep apnea or other sleep disorders.
* Difficulty breathing, even in people who don’t have asthma.

**DIAGNOSIS METHODS**

To diagnose nasal polyps, a healthcare provider will start with a physical examination. During this appointment, they may:

* Look inside your nose with a scope (a thin, tubelike instrument with a camera and light).
* Review your medical history (with a focus on allergies, asthma or sinus infections).
* Ask about your symptoms and how long you’ve had them.

#### **Tests used to diagnose nasal polyps**

If your healthcare provider needs more information, they may order one of these imaging tests to help them determine the size and location of each polyp:

* CT (computed tomography) scan.
* MRI (magnetic resonance imaging).

Your provider may also recommend allergy testing. This can help them identify allergens that lead to nasal inflammation and polyps.

**TREATMENT OPTIONS**

Nasal polyp treatment depends on the severity of your condition. Medication and surgery are the two main approaches.

Even with surgical removal, nasal polyps may grow back over time. Your healthcare provider will talk to you about the likelihood of recurrence (return) and how you can manage it.

#### **Medication**

Medication usually doesn’t get rid of nasal polyps, but it can ease symptoms. Common treatments include:

* Steroid nasal sprays to shrink polyps and improve symptoms.
* Oral steroids (pills you swallow) like prednisone.
* Biologic medications, such as dupilumab injections. (Dupilumab contains monoclonal antibodies that stimulate your immune system and may shrink nasal polyps.)

Your healthcare provider also may prescribe antibiotics if you have an infection.

#### **Surgery for nasal polyps**

If medication doesn’t work — or if you have large polyps — you may need sinus surgery to remove them. Your provider may use nasal endoscopy to do one of these minimally invasive procedures:

* Polypectomy. A healthcare provider uses tiny instruments — like surgical scissors or snares — to grab onto and remove the polyps inside your nose. (A surgical snare is like a lasso that wraps around a polyp.)
* Balloon sinuplasty. A surgeon threads a small balloon through your nostril and into your sinus cavity. They slowly inflate the balloon to unblock your nasal passages. In some cases, they’ll remove nasal polyps at the same time.
* Functional endoscopic sinus surgery (FESS). A surgeon uses small instruments to remove polyps, diseased tissue, damaged bone and anything else that obstructs your nasal passages.

All these procedures are minimally invasive. That means your surgeon does everything through your nostrils. So, you won’t have visible incisions or sutures.

**PREVENTION TIPS**

It’s not always possible to prevent nasal polyps. But here are a few things you can do to reduce your risk:

* Take all medications exactly as directed.
* Avoid breathing airborne allergens or irritants that can lead to nose and sinus inflammation.
* Use a humidifier in your home to help moisten your breathing passages.
* Use a saline nasal rinse or spray to flush out allergens or other irritants.
* Practice good hygiene.

**OUTLOOK / PROGNOSIS**

Treatment can help you get rid of nasal polyps and make it easier for you to breathe through your nose. But unfortunately, polyps can come back after treatment. Some people need to stay on steroid medications or have repeat surgery to manage them.

People with loss of taste (ageusia) and loss of smell (anosmia) may not see a total improvement of symptoms after treatment. Ask your healthcare provider what you should expect in your case.

**POSSIBLE COMPLICATIONS**

Ongoing sinus infections associated with nasal polyps can result in rare but serious complications like:

* Bone infection (osteomyelitis) and bone loss.
* Abscesses (pockets of infection) that can spread to your eye sockets and brain.
* Meningitis (infection of the tissues around your brain and spinal cord).

**WHEN TO SEE A DOCTOR / RED FLAG**

Schedule an appointment with your healthcare provider if you have nasal polyp symptoms that last longer than 10 days.

Additionally, let your provider know if you notice a single growth on one side of your nose. This could be a nasal or paranasal tumor rather than a polyp.

**DIFFERENTIAL DIAGNOSIS**

The differential diagnosis of nasal polyps is extensive and includes the following conditions:

* Antrochoanal polyps
* Inverted papillomas
* Schneiderian papillomas
* Squamous cell carcinoma
* Non-Hodgkin lymphoma
* Melanoma
* Esthesioneuroblastoma
* Hemangiopericytoma
* Nasal duct cysts
* Nasal gliomas
* Encephaloceles
* Juvenile nasopharyngeal angiofibroma
* RhabdomyosarcomaHemangiomas
* Chordomas

Histologic confirmation of nasal growths is recommended in most cases. All of the above differentials may be ruled out with biopsies, especially if unilateral, which raises concern for neoplasia. For the same reason, polyps removed during endoscopic sinus surgery for chronic sinusitis should undergo histopathologic confirmation. Careful examination of preoperative imaging is essential. For example, encephaloceles may mimic inflammatory polyps during nasal endoscopy, but their true nature is revealed in computed tomography (CT) images. Biopsying an encephalocele could result in a cerebrospinal fluid fistula.

Thorough evaluation with imaging is critical if malignancy is suspected in the preoperative setting. A CT scan with intravenous contrast helps assess bony contours, vascularity of lesions, and soft tissue invasion. Magnetic resonance imaging (MRI) is useful for identifying perineural, orbital, and intracranial spread of neoplasms, as well as complicated sinusitis. Different pathologies of the nasal cavity appear differently on imaging. For instance, nasal polyposis typically presents as smooth, convex, enhancing soft tissue masses on CT scans, whereas squamous cell carcinomas may exhibit bony erosion on CT scans and a hypointense appearance on T2-weighted MRI, with homogeneous enhancement on contrast-enhanced MRI

**EPIDEMIOLOGY**

CRS affects approximately 10.9% of the European population. Prevalence estimates vary in the U.S. Around 2.1% of individuals meet the diagnostic criteria based on 2 major symptoms, while 13.0% report only 1 symptom.Among all patients with CRS, 25% to 30% are diagnosed with CRSwNP. In the U.S., CRSwNP typically presents between the ages of 40 and 60. Male individuals are more frequently affected, accounting for 62% of cases in a study, while female individuals represented 38%. Despite the lower prevalence, female patients are more likely to experience severe disease.

**PREDEFINED Q & A SETS**

### **Will nasal polyps go away on their own?**

In some cases, nasal polyps can shrink on their own over time. But they rarely go away. People who have severe symptoms will likely need treatment.

### **Can you see nasal polyps by looking up your nose?**

You usually can’t see nasal polyps by looking up your own nose. But if they grow large enough, a provider might be able to see them if they look up your nose with a nasoscope (lighted tool).

### **Can nasal polyps get dislodged?**

Trauma or blowing your nose really hard can cause nasal polyps to swell or become dislodged. Nasal steroid sprays may help reduce inflammation and help the polyps return to their original position.

### **How can I remove nasal polyps at home?**

You should never — under any circumstances — try to remove nasal polyps yourself. Doing so can lead to injury, excessive bleeding and infection.

**What are nasal polyps?**  
Nasal polyps are soft, painless, noncancerous growths that develop in the lining of the nasal passages or sinuses. They are often shaped like teardrops or grapes and can occur in groups, causing blockage and nasal congestion.

2. **What causes nasal polyps?**  
They form due to chronic inflammation of the nasal mucosa. Common triggers include chronic or recurring sinus infections, asthma, allergic rhinitis (hay fever), cystic fibrosis, aspirin-exacerbated respiratory disease (AERD), and certain types of vasculitis. Genetics may also play a role in susceptibility.

3. What are the common symptoms of nasal polyps?  
Symptoms include nasal congestion or blockage, a runny nose, postnasal drip, reduced or lost sense of smell and taste, facial pressure or pain, headache, snoring, and sometimes toothache or ear pressure. Smaller polyps may cause no symptoms.

4. How are nasal polyps diagnosed?  
Diagnosis often begins with a physical exam where a doctor inspects the nasal passages, sometimes using a lighted instrument or nasal endoscopy. Imaging tests like a CT scan of the sinuses may be ordered to determine the extent and location of polyps and any associated sinus disease.

5. Can nasal polyps become cancerous?  
No, nasal polyps are benign and do not increase the risk of cancer. They are a result of inflammation, not tumors.

6. How are nasal polyps treated?  
Treatment options include:

* Medications: Nasal corticosteroid sprays to reduce inflammation and shrink polyps. Oral corticosteroids may be prescribed for severe symptoms.
* Surgery: If medications fail, endoscopic sinus surgery can remove polyps and improve sinus drainage.
* Treatment of underlying causes like allergies or asthma is also important.

7. Can nasal polyps recur after treatment?  
Yes, nasal polyps tend to recur, especially in patients with ongoing inflammation like asthma or allergies. Long-term management may be necessary to control symptoms and prevent regrowth.

8. When should I see a doctor?  
If you have persistent nasal congestion, difficulty breathing through your nose, recurrent sinus infections, or loss of smell lasting more than 10 days, you should seek medical advice. Also, if symptoms worsen rapidly or are accompanied by vision changes, severe headache, or facial swelling, seek emergency care

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello! What brings you in today?

Patient: Hi, Doctor. I’ve been having a lot of nasal congestion lately, and I noticed I can’t smell things as well as I used to. Sometimes my nose feels really blocked on both sides.

Doctor: I see. These symptoms can be caused by nasal polyps, which are soft, noncancerous growths inside the nose or sinuses that block normal airflow and drainage. Have you noticed if your symptoms have gotten worse over time or if you have other issues like sinus infections or allergies?

Patient: Yes, I’ve had frequent sinus infections in the past year and my allergies tend to flare up occasionally.

Doctor: That fits with nasal polyps. They often develop in people with chronic sinus inflammation, allergies, or asthma. We’ll need to do a thorough examination, possibly including a nasal endoscopy to look inside your nose, and imaging like a CT scan to see how extensive the polyps are.

Patient: What treatments are available?

Doctor: Usually, we start with medications such as nasal corticosteroid sprays to reduce inflammation and shrink the polyps. Sometimes oral steroids are prescribed for more severe symptoms. Unfortunately, medication may not completely remove the polyps but can improve symptoms.

If medical treatment isn’t sufficient or if the polyps are large, minimally invasive endoscopic surgery can safely remove them to open your nasal passages. However, it’s important to know that polyps can recur, so ongoing treatment and managing underlying conditions like allergies is key.

Patient: Are there any risks with surgery? And will my sense of smell improve?

Doctor: Surgery is generally safe and done through the nostrils without external incisions. Most patients experience relief in nasal blockage and sinus infections, and many regain some sense of smell, although improvement varies.

Patient: Can I try other treatments like herbal remedies or complementary therapies?

Doctor: Some patients try complementary approaches, but there’s limited evidence on their safety and effectiveness for nasal polyps. It’s important to let me know about any such treatments you use, so I can help ensure they don’t interfere with your care.

Patient: Thanks, Doctor. What happens next?

Doctor: We’ll schedule the nasal examination and possibly imaging. Then we’ll discuss the best treatment plan tailored to your condition. Meanwhile, try to avoid allergy triggers and use any prescribed nasal sprays regularly.

Patient: Okay, I’ll follow up for those tests. Thank you!

Doctor: You’re welcome. Feel free to reach out if your symptoms worsen or you have questions.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK560746/#article-25545.s10>

<https://my.clevelandclinic.org/health/diseases/15250-nasal-polyps>

<https://www.mayoclinic.org/diseases-conditions/nasal-polyps/symptoms-causes/syc-20351888>

**Nasal septal hematoma**

**DEFINITION / DESCRIPTION**

A nasal septal hematoma is a collection of blood between the nasal septum cartilage and its overlying mucoperichondrium, usually caused by trauma. This blood accumulation disrupts blood supply to the cartilage and can lead to serious complications if untreated.

**CAUSES**

* Nasal trauma, including fractures or blunt injury
* Recent nasal surgery
* Use of blood-thinning medications
* More common in children due to thicker septal cartilage and flexible mucosa

**SIGNS / SYMPTOMS**

* Nasal congestion or blocked breathing, often worsening rapidly
* Painful swelling inside the nostrils over the septum
* Soft, fluctuant swelling on nasal septum examination (contrasts with firm, normal septum)
* Change in the shape of the nose
* Possible fever (if infection develops)
* Occasionally headache, nausea, vomiting, or fainting

**DIAGNOSIS METHODS**

* Physical examination with nasal speculum or otoscope showing bluish-reddish, soft swelling of the septum
* Palpation reveals a boggy, fluctuant mass that can be pressed gently
* Failure of nasal decongestants to reduce swelling helps distinguish hematoma from other causes
* Needle aspiration can confirm diagnosis (bloody or serosanguinous fluid), but is not always necessary

**TREATMENT OPTIONS**

A nasal septal hematoma should be drained urgently to avoid undue complications. The procedure is done under local anesthesia. However general anesthesia might be required in apprehensive adults and children.

Following equipment/instruments should be available before draining a septal hematoma:

1. Topical anesthesia
2. Light source (head-lamp or otoscope)
3. Nasal speculum
4. Suction apparatus (Frazier suction tip)
5. Gloves
6. Needle, 18-20 gauge (Ga)
7. Syringe, five mL
8. Scalpel, No. 11 blade or 15 blade
9. Commercially produced nasal tampon
10. Gelfoam (absorbable gelatin)
11. Surgicel (oxidized cellulose)
12. Small Penrose drain

The patient should lie in the reclining position with the head end of the table slightly raised. Small hematomas can be aspirated with an 18-Ga to 20 -Ga needle. Larger hematomas are drained by incising the mucosa over the most fluctuant area. The incision is given in the anteroposterior direction parallel to the nasal floor. In the case of a bilateral hematoma, a staggered incision is made to avoid through and through the septal perforation. The clot is suctioned, and saline irrigation is carried out on an 18-Ga to 20-Ga catheter. A small piece of the mucosa is excised from the incision edge for better drainage and the prevention of premature closure. A small Penrose drain is placed into the opened hematoma cavity and secured with a suture. The nose is packed on both sides to prevent the re-accumulation of blood. Systemic antibiotics are prescribed to prevent serious, infective complications. Pack and drain are usually kept in situ for 2 to 3 days and are removed only when there is no further drainage for at least 24 hours. Patients should be kept on regular follow up to prevent delayed complications.

**OUTLOOK / PROGNOSIS**

* Prompt treatment usually results in full recovery without deformity
* Delayed or missed diagnosis can result in permanent nasal deformity and functional problems

**POSSIBLE COMPLICATIONS**

A nasal septal abscess is a major complication of a septal hematoma. The abscess can easily spread to adjacent structures including the sinuses and the brain.

The expanding hematoma can cause avascular necrosis of the cartilage and collapse, leading to a saddle nose deformity.

**WHEN TO SEE A DOCTOR / RED FLAG**

* Any nasal injury with persistent nasal congestion, swelling, or pain
* Signs of infection such as fever, worsening pain, or purulent nasal discharge
* Visible nasal deformity or breathing difficulty after injury

**DIFFERENTIAL DIAGNOSIS**

* Angiofibroma
* Adenoid hypertrophy
* Chronic sinusitis
* Chondromas
* Hemangioma
* Malignancies
* Nasal polyps
* Papillomas
* Pyogenic granulomas
* Rhinitis
* Septal abscess
* Septal deformities

**EPIDEMIOLOGY**

A septal hematoma is a rare entity and can occur in any age group. The exact incidence of septal hematoma remains unknown. However, it has been reported to occur in 0.8% to 1.6% of patients with nasal injury attending ear, nose, and throat clinic. Unfortunately, a large number of cases often remain undiagnosed, especially in children, until complications occur.

**PREDEFINED Q & A SETS**

What is a nasal septal hematoma?  
A nasal septal hematoma is a collection of blood between the nasal septum cartilage and the overlying mucoperichondrium. It usually occurs after trauma to the nose and causes swelling that blocks normal blood flow to the cartilage.

2. What causes a nasal septal hematoma?  
The most common cause is nasal trauma such as a broken nose or blunt injury. It can also occur after nasal surgery or in people taking blood-thinning medications. Children are more prone due to thicker septal cartilage and a more flexible mucosal lining.

3. What are the symptoms of nasal septal hematoma?  
Symptoms include:

* Nasal congestion or blockage, often worsening quickly
* Painful swelling on the septum inside the nose
* A soft, fluctuant swelling that feels different from the normal firm septum
* Change in the shape of the nose, sometimes causing nasal deformity
* Fever may develop if infection occurs
* Occasionally, headache, nausea, vomiting, or fainting

4. How is nasal septal hematoma diagnosed?  
Diagnosis is clinical, based on nasal examination showing a soft, tender swelling on the septum that is boggy and fluctuant. The swelling usually does not decrease with nasal decongestants. Needle aspiration can confirm the diagnosis if needed.

5. Why is a nasal septal hematoma serious?  
Because blood collects under the mucosa, it blocks blood supply to the septal cartilage. Without treatment, the cartilage can die, leading to complications such as septal abscess, saddle nose deformity (nasal collapse), or septal perforation.

6. What is the treatment for nasal septal hematoma?  
Treatment requires urgent drainage by making a small incision inside the nose to evacuate the blood. After drainage, nasal packing is placed to prevent re-accumulation. Antibiotics may be given if infection is suspected.

7. What are possible complications if nasal septal hematoma is untreated?

* Septal abscess (localized infection and pus formation)
* Cartilage necrosis leading to nasal deformity (saddle nose)
* Septal perforation (hole in the septum)
* Chronic nasal obstruction and cosmetic deformity

8. When should I seek medical care?  
See a healthcare provider immediately if you have nasal trauma followed by increasing nasal swelling, congestion, pain, or changes in nasal shape. Prompt evaluation can prevent serious complications.

9. How is the prognosis after treatment?  
With timely drainage and care, full recovery is usually expected without permanent deformity. Delayed treatment significantly increases the risk of complications.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, what brings you in today?

Patient: Doctor, I recently injured my nose, and now it feels very blocked. There’s swelling inside my nose, and it’s a bit painful.

Doctor: How long ago did you have the injury?

Patient: About three days ago. At first, it was just a bit sore, but now the blockage and swelling have gotten worse.

Doctor: Based on your history and symptoms, it’s possible you have a nasal septal hematoma. This means blood has collected between the lining and the cartilage inside your nose, causing swelling and blockage.

Patient: Is that serious?

Doctor: It can be. The collection of blood can cut off blood supply to the cartilage, which might lead to cartilage damage or deformity if not treated promptly. That’s why we need to drain it soon.

Patient: How do you treat it?

Doctor: We perform a minor procedure to drain the blood from the septum. This is usually done in the clinic or operating room under local or general anesthesia. After drainage, we place nasal packing to prevent the blood from re-accumulating.

Patient: Will it hurt? How long does it take to recover?

Doctor: The drainage procedure is quick and you’ll be given medication to manage discomfort. Most patients recover well within a few days to weeks after treatment. It’s important to avoid any further nasal trauma during healing.

Patient: Are there any complications I should worry about?

Doctor: If left untreated, the hematoma can get infected, leading to a septal abscess, or cause cartilage damage that may deform your nose. Early treatment greatly reduces these risks.

Patient: Should I take any medicines?

Doctor: After the procedure, we usually prescribe antibiotics to prevent infection and recommend pain relievers as needed. You should follow up closely if you notice increasing pain, swelling, fever, or any difficulty breathing.

Patient: Okay, thank you for explaining. I want to get this treated quickly.

Doctor: That’s a good decision. We will proceed with draining the hematoma to prevent complications. I’ll explain the procedure details and answer any other questions you have.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK470247/#article-25549.s9>

<https://emedicine.medscape.com/article/149280-overview>

**Nonallergic rhinitis**

**DEFINITION / DESCRIPTION**

Nonallergic rhinitis involves sneezing or a stuffy, drippy nose. It can be a long-term problem, and it has no clear cause. The symptoms are like those of hay fever, also called allergic rhinitis. But nonallergic rhinitis isn't caused by allergies.

Nonallergic rhinitis can affect children and adults. But it's more common after age 20. Factors that trigger the symptoms vary from person to person. The triggers can include some:

* Dust, fumes and other irritants in the air.
* Weather changes.
* Medicines.
* Hot or spicy foods.
* Long-term health problems.

Health care providers often first make sure a person's symptoms aren't caused by allergies. So you may need skin or blood tests to find out if you have allergic rhinitis.

**CAUSES**

The exact cause of nonallergic rhinitis is unknown.

But experts do know that nonallergic rhinitis happens when blood vessels in the nose expand. These blood vessels fill the tissue that lines the inside of the nose. Many things could cause this. For instance, the nerve endings in the nose might react to triggers too easily.

But any cause brings on the same result: swelling inside the nose, congestion or lots of mucus.

Triggers of nonallergic rhinitis can include:

* **Irritants in the air.** These include dust, smog and cigarette smoke. Strong odors such as perfumes also can cause the symptoms to start. So can chemical fumes, including fumes some workers might get exposed to at their jobs.
* **Weather.** Changes in temperature or humidity can trigger swelling in the lining of the nose. This can cause a runny or stuffy nose.
* **Infections.** Illnesses caused by a virus often cause nonallergic rhinitis. These include a cold or the flu.
* **Foods and drinks.** Nonallergic rhinitis can happen when you eat. Hot or spicy foods are the main triggers. Drinking alcohol also can cause the tissue that lines the inside of the nose to swell. This can lead to a stuffy nose.
* **Some medicines.** These include aspirin and ibuprofen (Advil, Motrin IB, others). High blood pressure medicines such as beta blockers also can cause symptoms.  
  Medicines that have a calming effect, called sedatives, can trigger nonallergic rhinitis too. So can medicines for depression. Birth control pills and medicines that treat erectile dysfunction also can trigger the symptoms. And using decongestant nose spray or drops too often can cause a type of nonallergic rhinitis called rhinitis medicamentosa.
* **Hormone changes.** These can be due to pregnancy, periods or birth control use. Hormone problems that may trigger nonallergic rhinitis include a condition that happens when the thyroid gland doesn't make enough thyroid hormone. This is called hypothyroidism.
* **Issues linked with sleep.** Lying on your back while you sleep can trigger nonallergic rhinitis. Acid reflux that happens overnight also can be a trigger.

**RISK FACTORS**

Things that can make you more likely to get nonallergic rhinitis include:

* **Breathing in some types of unclean air.** Smog, exhaust fumes and tobacco smoke are a few of the things that can raise the risk of nonallergic rhinitis.
* **Being older than age 20.** Most people who get nonallergic rhinitis are 20 or older. That makes it different from allergic rhinitis, which people often have when they're younger than 20.
* **Using nose sprays or drops for a long time.** Don't use store-bought decongestant drops or sprays oxymetazoline (Afrin, Dristan, others) for more than a few days. A stuffy nose or other symptoms might get worse when the decongestant wears off. This is often called rebound congestion.
* **Getting pregnant or having periods.** Congestion in the nose often gets worse during these times due to hormone changes.
* **Being exposed to fumes at work.** In some lines of work, fumes from supplies can cause nonallergic rhinitis to start. Some common triggers include construction materials and chemicals. Fumes from compost also can be a trigger.
* **Some health problems.** Some long-term health problems can cause nonallergic rhinitis or make it worse. These include diabetes and a problem that happens when the thyroid gland doesn't make enough thyroid hormone.

**SIGNS / SYMPTOMS**

Nonallergic rhinitis symptoms often come and go year-round. Your symptoms might include:

* Stuffy or runny nose.
* Sneezing.
* Mucus in the throat.
* Cough.

Nonallergic rhinitis most often doesn't cause an itchy nose, eyes or throat. That symptom is linked with allergies such as hay fever.

**DIAGNOSIS METHODS**

Your health care provider will likely give you a physical exam and ask you about your symptoms. You'll need tests to find out if something other than nonallergic rhinitis is causing your symptoms.

You may have nonallergic rhinitis if:

* You have a stuffy nose.
* Your nose runs or mucus drips down the back of your throat.
* Tests for other health problems don't find causes such as allergies or a sinus problem.

In some cases, your provider might have you try a medicine to see whether your symptoms get better.

### **Checking for allergies**

Allergies often cause symptoms such as sneezing and a stuffy, runny nose. Some tests can help make sure that your symptoms aren't caused by an allergy. You may need skin or blood tests.

* **Skin test.** The skin is pricked and exposed to tiny bits of common allergens found in the air. These include dust mites, mold, pollen, and cat and dog dander. If you're allergic to any of these, you'll likely get a raised bump where your skin was pricked. If you're not allergic, your skin won't have changes.
* **Blood test.** A lab can test a sample of your blood to find out if you have an allergy. The lab checks for higher levels of proteins called immunoglobulin E antibodies. These can release chemicals that cause allergy symptoms.

Sometimes, symptoms may be caused by both allergic and nonallergic triggers.

### **Checking for sinus problems**

Your provider also will want to find out if your symptoms are due to a sinus problem. You might need an imaging test to check your sinuses.

* **Nasal endoscopy.** This test checks the sinuses with a thin tool that has a camera on the end. The tool is called an endoscope. The endoscope is passed through the nostrils to look inside the nose.
* **Computerized Tomography (CT) scan.** This test uses X-rays to make images of the sinuses. The images are more detailed than those made by typical X-ray exams.

**TREATMENT OPTIONS**

Treatment of nonallergic rhinitis depends on how much it bothers you. Home treatment and staying away from triggers might be enough for mild cases. Medicines may ease worse symptoms. These include:

* **Saline nose sprays.** Saline is a mixture of salt and water. Saline nose spray helps moisturize the nose. It also helps thin mucus and soothes the tissue that lines the inside of the nose. You can buy saline nose spray off the shelf at stores. But a home remedy known as nose irrigation might work even better. It involves using a large amount of saline or a saltwater mixture to help clean out irritants and mucus.
* **Antihistamine nasal sprays.** Antihistamines treat many health problems, including allergies. An antihistamine nose spray may ease the symptoms of nonallergic rhinitis too. Your provider may write you a prescription that lets you buy this type of spray at a pharmacy. These sprays include azelastine (Astepro, Astepro Allergy) or olopatadine hydrochloride (Patanase).  
  Antihistamines taken by mouth often don't work as well for nonallergic rhinitis as they do for allergic rhinitis. These antihistamines include diphenhydramine (Benadryl), cetirizine (Zyrtec Allergy), fexofenadine (Allegra Allergy) and loratadine (Alavert, Claritin).
* **Ipratropium nose spray.** This prescription spray can ease a runny, drippy nose. Side effects can include nosebleeds and dryness inside the nose.
* **Decongestants.** These medicines help narrow the blood vessels in the nose and lessen congestion. Side effects can include high blood pressure, heart pounding and feeling restless. Decongestants can be bought off store shelves or with a prescription. Examples include drugs with pseudoephedrine (Sudafed 24 Hour) and phenylephrine.
* **Steroids.** These medicines help prevent and treat swelling linked with some types of nonallergic rhinitis. Side effects can include a dry nose or throat, nosebleeds, and headaches. Your provider may suggest a steroid nose spray if decongestants or antihistamines don't control your symptoms. Steroid sprays that you can buy off the shelf include a fluticasone (Flonase Allergy Relief) and triamcinolone (Nasacort Allergy 24 Hour). Stronger steroid sprays also can be prescribed.

Your health care provider may suggest surgery to treat other problems that can happen with nonallergic rhinitis. For example, growths in the nose called polyps may need to be removed. Surgery also can fix a problem where the thin wall between the passages in the nose is off-center or crooked. This is called a deviated septum.

## **Self care**

Try these tips to ease the symptoms of nonallergic rhinitis:

* **Rinse the inside of the nose.** Flushing out the nose with saline or a homemade saltwater mixture can help. It works best when you do it daily. You can put the mixture into a bulb syringe or a container called a neti pot. Or you could use the squeeze bottle included in saline kits.  
  To prevent illnesses, use water that's distilled, sterile, boiled and cooled, or filtered. If you filter tap water, use a filter with a pore size of 1 micron or smaller. Rinse the device after each use with the same type of water. Leave the device open to air-dry.
* **Gently blow your nose.** Do this often if you have a lot of mucus.
* **Add moisture to the air.** If the air in your home or office is dry, set up a humidifier device where you work or sleep. Follow the device's instructions on how to clean it.  
  Or you could breathe in the steam from a warm shower. This helps loosen mucus in the nose. It also makes the head feel less stuffy.
* **Drink liquids.** Sip plenty of water, juice and caffeine-free tea. This can help loosen the mucus in the nose. Stay away from drinks that have caffeine

**PREVENTION TIPS**

If you have nonallergic rhinitis, take steps to ease your symptoms and prevent flare-ups:

* **Learn your triggers.** Find out what factors cause your symptoms or make them worse. That way you can stay away from them. Your health care provider can help you learn your triggers.
* **Don't use decongestant nose sprays or drops for too long.** Using these medicines for more than a few days at a time can make your symptoms worse.
* **Get treatment that works.** If you've tried a medicine that doesn't help enough, talk to your health care provider. A change to your treatment plan may be needed to prevent or ease your symptoms.

**OUTLOOK / PROGNOSIS**

For many people, vasomotor rhinitis is a chronic, or long-term, condition. It may come and go over time.

**POSSIBLE COMPLICATIONS**

Nonallergic rhinitis might be linked to:

* **Nasal polyps.** These are soft growths that form on the tissue that lines the inside of the nose. Polyps also can form on the lining of the spaces inside the nose and head, called sinuses. Polyps are caused by swelling, also known as inflammation. They're not cancerous. Small polyps might not cause problems. But larger ones can block the airflow through the nose. That makes it hard to breathe.
* **Sinusitis.** This is swelling of the sinuses. Long-term congestion in the nose due to nonallergic rhinitis can raise the risk of sinusitis.
* **Trouble with daily life.** Nonallergic rhinitis might affect your work or school grades. You also might need to take time off when your symptoms flare or when you need a checkup.

**WHEN TO SEE A DOCTOR / RED FLAG**

See your health care provider if you:

* Have serious symptoms.
* Haven't gotten relief from home remedies or medicines you bought at a store without a prescription.
* Have bad side effects from medicines.

**DIFFERENTIAL DIAGNOSIS**

* Viral rhinitis (common cold): Acute viral infection causing nasal congestion, runny nose, sneezing, usually self-limited.
* Vasomotor rhinitis: A nonallergic, noninfectious chronic nasal inflammation triggered by irritants like strong odors, smoke, changes in weather or temperature, spicy foods, or emotional factors.
* Hormonal rhinitis: Related to hormonal changes during pregnancy, menstrual cycle, or use of oral contraceptives.
* Drug-induced rhinitis: Nasal symptoms caused by medications such as alpha-blockers, beta-blockers, ACE inhibitors, aspirin or NSAIDs, and especially rhinitis medicamentosa from prolonged use of topical nasal decongestants.
* Nonallergic rhinitis with eosinophilia syndrome (NARES): Presents with nasal eosinophilia but no evidence of systemic allergy.
* Infectious rhinitis (bacterial or fungal sinusitis): May cause persistent nasal congestion and discharge, often with purulence and systemic symptoms.
* Structural causes: Deviated nasal septum, nasal polyps, enlarged adenoids, choanal atresia, or nasal tumors can mimic or cause rhinitis-like symptoms.
* Occupational rhinitis: Caused by exposure to irritants in the workplace such as chemicals or dust.
* Gustatory rhinitis: Triggered by eating, especially hot or spicy foods, mediated by vagal reflexes.
* Other systemic or inflammatory conditions that mimic rhinitis symptoms:
  + Granulomatosis with polyangiitis (Wegener’s granulomatosis)
  + Sarcoidosis
  + Sjögren's syndrome
  + Systemic lupus erythematosus
  + Midline granuloma
* Cerebrospinal fluid (CSF) rhinorrhea: Clear nasal discharge due to CSF leak can mimic watery nasal drip.
* Rhinitis medicamentosa: Rebound nasal congestion due to overuse of topical nasal decongestants.

**EPIDEMIOLOGY**

Rhinitis, whether allergic or nonallergic, affects roughly 20% of the population in industrialized countries. An estimated 20 to 40 million people are affected by allergic rhinitis, costing over $1.9 billion annually.An estimated 17 to 19 million Americans experience nonallergic rhinitis.Nonallergic rhinitis presents later in life, with patients developing symptoms most commonly between the ages of 30 and 60. Females are more affected by nonallergic rhinitis than men. 70% of women aged 50 to 64 experience some form of nonallergic rhinitis in any given year.

**Treatment of Nonallergic Rhinitis: Drug Options and Their Side Effects**

1. Saline Nasal Sprays and Irrigation
   * Purpose: Moisturizes nasal mucosa, thins mucus, and helps clear irritants.
   * Side Effects: Generally safe with minimal side effects; occasional nasal irritation or burning.
2. Intranasal Antihistamine Sprays (e.g., Azelastine, Olopatadine)
   * Purpose: Reduce nasal inflammation and symptoms like congestion, rhinorrhea, sneezing, and postnasal drip. Azelastine is FDA-approved for nonallergic rhinitis.
   * Side Effects: Bitter or metallic taste (most common), nasal irritation, sneezing, headache.
   * Notes: Oral antihistamines are typically less effective for nonallergic rhinitis.
3. Intranasal Corticosteroids (e.g., Fluticasone propionate, Triamcinolone, Beclomethasone)
   * Purpose: Decrease mucosal inflammation and swelling, effective especially in vasomotor rhinitis and nonallergic rhinitis with eosinophilia.
   * Side Effects: Nasal dryness, irritation, nosebleeds, sore throat, mild headache. Rarely, systemic effects if used long-term.
   * Notes: First-line therapy for moderate to severe symptoms.
4. Ipratropium Bromide Nasal Spray
   * Purpose: Used to control profuse rhinorrhea (runny nose).
   * Side Effects: Nasal dryness, nosebleeds, headache.
5. Nasal Decongestants (e.g., Pseudoephedrine, Phenylephrine)
   * Purpose: Narrow blood vessels to relieve nasal congestion.
   * Side Effects: Increased blood pressure, heart palpitations, nervousness, insomnia.
   * Precautions: Should not be used for more than 3 consecutive days to avoid rebound congestion (rhinitis medicamentosa).
6. Intranasal Capsaicin Spray
   * Purpose: Emerging treatment shown to reduce symptoms by desensitizing nasal nerve endings.
   * Side Effects: Initial burning or stinging sensation in the nose; generally well tolerated afterward.
   * Notes: Dosing varies; available over the counter in some regions (e.g., Sinol Nasal Spray).
7. Avoidance of Triggers and Environmental Control
   * It is important to identify and avoid irritants such as strong odors, tobacco smoke, pollution, and sudden temperature changes.

**PREDEFINED Q & A SETS**

What is nonallergic rhinitis?  
Nonallergic rhinitis is a chronic condition characterized by nasal symptoms such as congestion, runny nose, sneezing, and postnasal drip that mimic allergic rhinitis but occur without an allergic cause or IgE-mediated response.

2. What are the common symptoms of nonallergic rhinitis?  
Typical symptoms include nasal blockage or stuffiness, runny nose, sneezing, postnasal drip, and sometimes an itchy nose. Unlike allergic rhinitis, there are usually no associated eye symptoms.

3. What causes nonallergic rhinitis?  
Nonallergic rhinitis can be triggered by environmental irritants (like smoke, strong odors, pollution), changes in weather or temperature, hormonal fluctuations, medications, and other factors such as overuse of nasal decongestants (rhinitis medicamentosa). It is not caused by allergies.

4. How is nonallergic rhinitis diagnosed?  
Diagnosis is primarily clinical. Doctors exclude allergic rhinitis by allergy testing (skin or blood tests). Nasal examination and sometimes nasal endoscopy or imaging help rule out structural causes or nasal polyps. A detailed history of triggers and symptom patterns assists diagnosis.

5. Is there a cure for nonallergic rhinitis?  
No cure exists, but symptoms can usually be well controlled with treatment and trigger avoidance.

6. How is nonallergic rhinitis treated?

* Avoiding or minimizing exposure to triggers such as irritants and nasal irritants.
* Using saline nasal sprays or rinses to moisten nasal passages and clear mucus.
* Intranasal corticosteroid sprays to reduce inflammation.
* Intranasal antihistamine sprays (e.g., azelastine) for symptom relief.
* Combination sprays containing corticosteroids and antihistamines.
* Short-term use of anticholinergic nasal sprays or nasal decongestants (limited to 3–5 days to avoid rebound congestion).

7. Should people with nonallergic rhinitis avoid nasal decongestant sprays?  
Yes, overuse of nasal decongestant sprays can cause rebound congestion (rhinitis medicamentosa) and worsen symptoms. Use should be limited to a few days as directed by a healthcare provider.

8. Can nonallergic rhinitis be prevented?  
While it cannot be completely prevented, identifying and avoiding triggers helps reduce symptom flare-ups.

9. How does nonallergic rhinitis differ from allergic rhinitis?  
Nonallergic rhinitis lacks an allergic immune response, does not typically cause itching or eye symptoms, and allergy testing is negative. Symptoms are often year-round and triggered by irritants or environmental factors rather than allergens.

10. When should I see a doctor?  
If nasal symptoms persist or worsen despite over-the-counter treatments, or if you have difficulty breathing through the nose, frequent sinus infections, or suspect structural problems, seek medical evaluation

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello! What symptoms are you experiencing today?

Patient: Hi, Doctor. I have a stuffy and runny nose all year long. I sneeze a lot, but I don’t think it’s allergies because I don’t have itchy eyes or throat, and allergy tests were negative before.

Doctor: That’s helpful information. It sounds like you might have nonallergic rhinitis, sometimes called vasomotor rhinitis. It causes symptoms similar to allergies—like congestion, runny nose, sneezing—but it’s not caused by an allergic reaction.

Patient: What causes nonallergic rhinitis?

Doctor: It can be triggered by various factors like changes in weather, strong smells such as perfumes or smoke, pollution, certain medications, or even spicy foods. Unlike allergic rhinitis, it’s not seasonal and symptoms usually happen year-round.

Patient: Is there a cure for this?

Doctor: Unfortunately, there’s no cure, but you can manage symptoms by avoiding known triggers. We can also use medications like nasal steroid sprays or antihistamine nasal sprays to reduce inflammation and congestion.

Patient: Do oral allergy pills help?

Doctor: Oral antihistamines generally don’t work well for nonallergic rhinitis because it isn’t caused by allergies. Nasal sprays are more effective for symptom control in this condition.

Patient: What else can I do at home?

Doctor: Using saline nasal sprays or rinses can help keep your nasal passages moist and clear irritants. Avoiding irritants like smoke or strong odors and using a humidifier may reduce flare-ups.

Patient: Will I need surgery?

Doctor: Surgery is rarely needed for nonallergic rhinitis unless you have other issues like nasal polyps or structural problems. We’ll focus first on medical management and lifestyle changes.

Patient: How do you confirm this diagnosis?

Doctor: We confirm nonallergic rhinitis by ruling out allergies with skin or blood tests and reviewing your symptoms and triggers. Occasionally, imaging or nasal endoscopy is done if we suspect other causes.

Patient: How long does it usually last?

Doctor: Nonallergic rhinitis is often a chronic condition, meaning symptoms may persist for months or years, but with proper management, many people find relief and can lead normal lives.

Patient: Thank you, Doctor. That’s very helpful.

Doctor: You’re welcome. Let’s start treatment and monitor your symptoms. If anything changes or worsens, please let me know.

REFERENCES:

<https://www.allergy.org.au/images/pc/ASCIA_PC_Non-Allergic_Rhinitis_FAQ_2024.pdf>

<https://emedicine.medscape.com/article/874171-overview>

<https://www.ncbi.nlm.nih.gov/books/NBK547704/#article-31035.s8>

<https://www.mayoclinic.org/diseases-conditions/nonallergic-rhinitis/symptoms-causes/syc-20351229>

**Nasal obstruction**

**DEFINITION / DESCRIPTION**

Nasal obstruction is a common symptom that involves feeling as if there’s not enough air flowing through your nose. It happens when a condition or injury causes a complete or partial blockage in your nasal airway.

When you inhale, air enters your nostrils. It flows through your nasal and sinus passages before making its way through the rest of your respiratory system. But with nasal obstruction, something restricts the airflow. This can make breathing more difficult.

Most people describe nasal obstruction as a feeling of congestion or fullness in their nose. Symptoms that may accompany a nasal obstruction include:

* Pain or pressure in your face
* Changes to your sense of smell (dysosmia)
* Runny nose
* Mouth breathing
* Snoring

All your symptoms provide clues your healthcare provider can use to diagnose your condition and offer treatments that make breathing easier.

**CAUSES**

Causes of nasal obstruction range from temporary inflammation that blocks your nasal cavities or sinuses to structural irregularities you’re born with.

Causes of nasal obstruction include:

* Enlarged adenoids. Adenoids are the glands behind your nasal cavity. When they’re enlarged, they can narrow your airway and make it harder to breathe. Enlarged adenoids are the most common cause of nasal obstruction in children. It’s uncommon in adults.
* Inflammation in your nose or sinuses. Infections can lead to inflamed tissue that restricts airflow. Conditions include allergic rhinitis, vasomotor rhinitis, sinusitis and nasal vestibulitis.
* Deviated septum. The cartilage and bone that divide your nasal cavity into two passages is called your septum. When it’s crooked or off-center, air can’t pass through as easily.
* Nasal polyps. These noncancerous growths form in the membrane (mucosa) lining your nose and sinuses, blocking airflow.
* Nasal valve collapse. Your nasal valve is the narrowest section of your nasal airway. If it collapses, you may have trouble breathing. People with a deviated septum are at increased risk.
* Choanal atresia. With this condition, babies are born with excess tissue in one or both nasal passages that restricts airflow.
* Tumors. Benign (noncancerous) and cancerous tumors can obstruct your nasal airway. Nasal cancers are extremely rare.
* Injuries to your nose. An injury, like a broken nose, can change its structure in ways that restrict airflow. Falls, car accidents and injuries during contact sports all increase your risk.
* Nasal foreign objects. While adults know better, curious children sometimes create an obstruction by sticking objects up their noses.

**TREATMENT OPTIONS**

Otolaryngologists (ear, nose and throat specialists) treat nasal obstructions by addressing the condition causing it. They can also recommend or prescribe medications that can ease your symptoms.

Common treatments include:

* Antibiotics. You may need to take antibiotics to kill bacteria causing a nasal or sinus infection.
* Antihistamines. You may need antihistamines if an allergy is causing your rhinitis. Most come in pill form, but some are available as nasal sprays.
* Decongestants. Nasal decongestants can relieve congestion related to allergies or sinusitis. You usually only take this medicine for a few days to relieve congestion.
* Steroids. Steroids can ease inflammation that’s causing a blockage. They come in pill form and as nasal sprays.
* Breathing strips or nasal dilators. Sticking breathing strips on the outside of your nose widens your nostrils so you can breathe better. Nasal dilators widen your nostrils from inside your nose.
* OTC/Home remedies: Several home remedies can help manage a nasal obstruction related to an infection or allergies. If your child has a small, hard object (like a bead) stuck in their nose, methods like a mother’s kiss may help.
* Surgery. Your healthcare provider may need to remove growths or correct structural issues causing nasal obstruction. Surgery is usually a last resort if other treatments haven’t helped.

#### **Surgery for nasal obstructions**

Most surgeries that fix conditions related to nasal obstruction are minimally invasive. Often, ENTs use instruments that allow them to operate inside your nose without making physical cuts on your face.

The specific procedure depends on what’s causing the obstruction. Examples include:

* Adenoidectomy to remove your child’s adenoids.
* Balloon sinuplasty to unblock clogged sinus passages.
* Septoplasty to straighten a deviated septum.
* Polypectomy to remove nasal polyps.
* Turbinate reduction to decrease the size of your turbinates (bony structures inside your nose).
* Functional endoscopic sinus surgery (FESS) to remove polyps, diseased tissue, tumors, damaged bone and anything else blocking your sinus passages.
* Extended sinus surgeries to remove tumors using surgery that requires physical cuts (may be needed in addition to FESS, but this is rare).

**PREVENTION TIPS**

You can’t always prevent nasal obstruction, but you can reduce your risk. For example, you can take steps to prevent colds, like washing your hands frequently. You can try to avoid things in your environment (like mold or pet dander) that trigger your allergies.

**POSSIBLE COMPLICATIONS**

A nasal obstruction that doesn’t go away can keep you from getting a good night’s rest. In some cases, it can lead to sleep apnea. In children, it can lead to prolonged mouth breathing. This can cause your child’s teeth to develop out of alignment (malocclusion).

Although it’s unusual for cancerous tumors to cause nasal obstruction, it can happen. Without treatment, the cancer can spread. But treating it in the early stages usually cures it.

**WHEN TO SEE A DOCTOR / RED FLAG**

Some conditions that cause a nasal obstruction clear up on their own. But if you (or your child) experience an obstruction that doesn’t get better within a week, it’s time to schedule an appointment.

Contact your healthcare provider immediately if you have a nasal obstruction and notice red flags of a serious condition, like cancer. Signs include:

* Bulging eyes or double vision
* Facial numbness, swelling or severe pain
* Asymmetrical face or an obvious mass
* Pain in your ears or teeth
* Recurring nosebleeds
* Changes in your mental state
* Fever that lasts for more than a few days

**DIFFERENTIAL DIAGNOSIS**

* Allergic rhinitis
* Nonallergic (vasomotor) rhinitis
* Acute and chronic rhinosinusitis (with or without nasal polyps)
* Nasal polyps (particularly with chronic sinus disease)
* Deviated nasal septum
* Enlarged inferior turbinates
* Choanal atresia or stenosis (congenital, often in infants)
* Foreign body in the nasal cavity (especially in children)
* Nasal valve collapse or stenosis
* Benign tumors: inverted papilloma, hemangioma, angiofibroma (commonly in adolescent males)
* Malignant tumors: sinonasal carcinoma, lymphoma, sarcoma
* Encephalocele or basal cephalocele (congenital herniation of brain tissue)
* Bilateral nasolacrimal duct cysts
* Rhinitis medicamentosa (rebound congestion due to overuse of nasal decongestants)
* Enlarged adenoids (especially in children)
* Granulomatous diseases: granulomatosis with polyangiitis (Wegener’s)
* Trauma-related deformities or septal hematoma
* Cystic fibrosis and immotile cilia syndrome (causing chronic sinus problems and obstruction)
* Infectious causes: bacterial or fungal sinusitis
* Systemic diseases: Churg-Strauss syndrome, sarcoidosis (rare)
* Dental abscess or odontogenic infections impacting the sinus area

**EPIDEMIOLOGY**

Prevalence Rates:

* Globally, nasal obstruction is estimated to affect over 30% of the adult population .
* One study, utilizing the Nasal Obstruction Symptom Evaluation (NOSE) scale, found a prevalence of 60.3% among participants, with approximately half of those experiencing moderate to severe obstruction .
* In general otolaryngology clinics in the United States, 37.4% of patients, regardless of their primary reason for visit, exhibited severe to extreme nasal airway obstruction (NAO) symptoms based on the NOSE scale . Among patients specifically presenting with NAO or sinus complaints, the prevalence of severe/extreme symptoms was 76.2% and 57.2%, respectively .

Contributing Factors and Associated Conditions:

* Anatomical contributors are frequently observed. Among patients surveyed for sinonasal complaints, the prevalence of nasal valve collapse (NVC) was 67%, septal deviation was 76%, and inferior turbinate hypertrophy was 72% . In patients with severe/extreme NOSE scores, these rates were even higher: NVC at 73%, septal deviation at 80%, and inferior turbinate hypertrophy at 77% .
* Allergic rhinitis (AR) is a major contributor, with nasal obstruction affecting 80% of AR patients, and being the main symptom in 50-75% of cases . The prevalence of AR itself ranges from 10% to 40% .
* Rhinosinusitis also frequently involves nasal obstruction, which is present in 65-70% of cases .
* Other reported causes include nasal congestion (72.4%), deviated septum (28.8%), adenoid hypertrophy (15.4%), inferior turbinate hypertrophy (10.8%), and nasal polyps (3.1%) .
* Factors associated with a significantly higher prevalence of nasal obstruction include male gender, having a chronic disease, using concomitant medications, and having a family history of nasal obstruction .
* In children, choanal atresia, a congenital condition, has an estimated incidence of around 1 in 5,000 births

**PREDEFINED Q & A SETS**

What is nasal obstruction?  
Nasal obstruction is a partial or complete blockage of airflow through one or both nasal passages, making it difficult to breathe through the nose. It can affect daily activities, sleep quality, and overall comfort.

2. What causes nasal obstruction?  
Common causes include:

* Deviated nasal septum (bent or off-center septum)
* Enlarged turbinates (swollen nasal tissues)
* Nasal polyps (benign growths inside the nose)
* Enlarged adenoids (especially in children)
* Sinus infections or chronic rhinosinusitis
* Nasal congestion from allergies or infections
* Tumors (rare) or foreign bodies (especially in children)
* Structural deformities like nasal valve collapse or external nasal deformity

3. What symptoms should I expect with nasal obstruction?  
Typical symptoms are nasal blockage or stuffiness, difficulty breathing through the nose, mouth breathing, snoring or noisy breathing during sleep, reduced or lost sense of smell, nasal dryness or crusting, and sometimes nosebleeds.

4. How is a deviated septum related to nasal obstruction?  
A deviated septum occurs when the thin wall between your nostrils is displaced to one side, which can narrow one or both nasal passages and cause difficulty breathing nasal congestion or nosebleeds.

5. How is nasal obstruction diagnosed?  
Diagnosis involves a physical examination by an ENT specialist, which may include nasal endoscopy to look inside the nose, and imaging such as CT scans if needed to evaluate structural issues or sinus disease.

6. What treatments are available for nasal obstruction?  
Treatment depends on the cause and may include:

* Medications such as nasal steroid sprays, antihistamines, or decongestants (used carefully)
* Saline nasal sprays or rinses for symptom relief
* Surgery to correct structural problems like septoplasty for a deviated septum, turbinate reduction, polyp removal, or adenoidectomy in children
* Treatment of underlying infections or allergies

7. Can nasal obstruction affect sleep?  
Yes, nasal obstruction can lead to snoring and contribute to obstructive sleep apnea (OSA), a condition where breathing stops temporarily during sleep, reducing sleep quality and causing daytime fatigue.

8. When should I see a doctor for nasal obstruction?  
Seek medical advice if nasal blockage is persistent, worsens over time, causes difficulty breathing, affects sleep, or is accompanied by facial pain, nosebleeds, or other concerning symptoms.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning! What brings you in today?

Patient: Good morning, Doctor. I’ve been having trouble breathing through my nose for several weeks. It feels blocked, especially on one side, and it’s getting worse.

Doctor: I understand. Nasal obstruction can be caused by several things. When did you first notice this problem?

Patient: It started about a month ago. At first, it was occasional, but now it’s nearly constant. Sometimes I also feel pressure around my forehead.

Doctor: Have you had any recent colds, allergies, or sinus infections? Any nose trauma or previous nasal surgeries?

Patient: I have seasonal allergies, but this feels different. No recent infections or injuries that I can recall.

Doctor: Thanks for sharing that. On examination, I’ll look inside your nose to check for things like a deviated septum, nasal polyps, swollen turbinates, or signs of infection. Sometimes obstruction involves multiple areas — the septum, turbinates, valves, or sinus cavities.

Patient: What treatments are usually recommended?

Doctor: Treatment depends on the cause. For inflammation or allergies, nasal steroid sprays and antihistamines help reduce swelling. If structural issues like a deviated septum or large turbinates are the main problem, surgical options such as septoplasty or turbinate reduction may be needed. We can also consider in-office procedures for nasal valve collapse if that’s contributing.

Patient: Are these surgeries painful or risky?

Doctor: These procedures are generally safe and done under local or general anesthesia, depending on complexity. Recovery is usually smooth, though nasal congestion may persist briefly after surgery. We’ll discuss the best approach tailored to your situation.

Patient: How will we know which treatment is right for me?

Doctor: After the exam, I may recommend imaging like a CT scan if needed. We’ll review all findings and your symptoms to decide. Sometimes a stepwise approach — starting with medications and moving to procedures if necessary — works best.

Patient: Thank you. I want to breathe better soon.

Doctor: That’s our goal. Let’s do a thorough evaluation today, and I’ll guide you through the options.

REFERENCES:

<https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/hit-it-on-the-nose-deviated-septum-q-and-a>

<https://my.clevelandclinic.org/health/symptoms/nasal-obstruction>

**Nasal allergies**

**DEFINITION / DESCRIPTION**

Allergic rhinitis (hay fever) is an allergic reaction to tiny particles in the air called allergens. When you breathe in allergens through your nose or mouth, your body reacts by releasing a natural chemical called histamine. Despite being called hay fever, hay doesn’t cause hay fever and most people don’t get a fever.

Symptoms of hay fever include sneezing, nasal congestion and irritation of your nose, throat, mouth and eyes. Allergic rhinitis isn’t the same as infectious rhinitis, otherwise known as the common cold. Hay fever isn’t contagious. Also, not all rhinitis is allergic. Many people suffer from nonallergic rhinitis resulting in similar symptoms. Inflammation causes rhinitis, not allergens or histamine release.

#### **What triggers allergic rhinitis?**

Several indoor and outdoor allergens cause hay fever. Common hay fever triggers include:

* Pollen from trees, weeds and plants.
* Mold spores.
* Pet dander.
* Dust mites.
* Cockroach droppings and saliva.

#### **When do people usually get hay fever?**

You can have hay fever any time of the year. Seasonal allergies occur in the spring, summer and early fall when trees and weeds bloom and pollen counts are higher. But pollen seasons can vary depending on your location, as well. Perennial allergies can happen year-round. They result from irritants that are always around, such as pet dander, cockroaches and dust mites.

#### **How common is allergic rhinitis (hay fever)?**

Hay fever is very common. In the United States, around 20% of the population has allergic rhinitis. In 2021, one study found that more than 81 million people had seasonal allergies.

**CAUSES**

Allergic rhinitis occurs when your body’s immune system reacts to an irritant in the air. The irritants (allergens) are so tiny that you can easily inhale them through your nose or mouth.

Allergens are harmless to most people. But if you have hay fever, your immune system thinks the allergen is intruding. Your immune system tries to protect your body by releasing natural chemicals into your bloodstream. The main chemical is called histamine. It causes mucous membranes in your nose, eyes and throat to become inflamed and itchy as they work to eject the allergen from your body.

Allergic rhinitis comes from many allergens, including:

* Dust mites that live in carpets, drapes, bedding and furniture.
* Pollen from trees, grass and weeds.
* Pet dander (tiny flakes of dead skin cells).
* Mold spores.
* Cockroaches (their saliva and waste).

Food allergies can also cause inflammation in your nose and throat. Food allergies can be life-threatening, so get medical help right away if you’re concerned that a certain food is consistently causing allergy symptoms.

#### **Risk factors for hay fever**

Allergies are inherited, which means you’re more likely to have hay fever if you have a parent or immediate family member with allergies. People who have asthma or eczema are also more likely to develop hay fever.

**SIGNS / SYMPTOMS**

Hay fever symptoms can appear throughout the year. Outdoor allergies are worse in the spring, summer and early fall depending on where you live. In warm weather, weeds and flowers bloom, and pollen counts are higher. Indoor allergies, such as those from pets and dust mites, can get worse in winter because people spend more time indoors with their windows closed.

Symptoms of hay fever include:

* Nasal stuffiness (congestion), sneezing and runny nose.
* Itchy nose, throat and eyes.
* Red or watery eyes.
* Headaches, sinus pressure and dark circles under your eyes.
* More mucus in your nose and throat.
* Tiredness.
* Sore throat from mucus dripping down your throat (postnasal drip).
* Wheezing, coughing and trouble breathing.

### **How do I know if it’s hay fever or a cold?**

Symptoms of a cold and hay fever are similar, but there are some differences. Itchy, red and watery eyes are common with allergies, but not as common with a cold. A cold is more likely to cause muscle aches and pain or a fever.

Another way people can tell the difference is that allergic rhinitis usually has a trigger, like seasons changing or being around a new pet. Allergies often happen at the same time each year, like in spring and late summer, and they start quickly. On the other hand, a virus causes a cold and you catch viruses from other people. So, you may know it’s a cold if you’ve been around someone with a cold. A cold tends to go away within a week, whereas allergies will stick around until the allergen is out of the air.

**DIAGNOSIS METHODS**

Your healthcare provider will examine you, ask about your symptoms and evaluate you for other conditions, such as a cold or asthma. They can also perform allergy tests.

A blood allergy test measures antibodies to an allergen in a sample of your blood. This blood test is called an immunoglobulin E (IgE) test. It can detect most types of allergies, including food allergies.

Your provider may also recommend a skin prick and/or intradermal test to determine what allergens are causing your symptoms. In a skin prick test, your provider places a small sample of different allergens on your skin (usually on your forearm or back). They scratch or prick your skin with a needle. If you’re allergic to a specific allergen, the area will become red, itchy and irritated in 15 to 30 minutes. Intradermal testing is similar, but your allergist places the allergen underneath your skin. Your skin reacts in the same way it does for a prick test.

**TREATMENT OPTIONS**

Several allergy medications can improve symptoms and help you live with hay fever. These treatments come in many forms, including liquids, pills, eye drops, nasal sprays and injections. Talk to your provider before taking any medication, especially if you’re pregnant or have other health concerns.

#### **Antihistamines**

Antihistamine medications are available with a prescription or over the counter (OTC). They work by blocking the histamine that your body releases during an allergic response. Antihistamines come as pills, liquids, eye drops, nasal sprays and inhalers. They include:

* Loratadine (Claritin®).
* Cetirizine (Zyrtec®).
* Fexofenadine (Allegra®).
* Levocetirizine (Xyzal®).

Antihistamines can cause drowsiness. Avoid alcohol when taking antihistamines, especially if you’re going to drive.

#### **Decongestants**

These medications relieve congestion in your nose and sinuses. You can take decongestants by mouth (in pill or liquid form) or use a nasal spray. They include:

* Afrin® nasal spray.
* Phenylephrine nasal spray (Neo-Synephrine®).
* Pseudoephedrine (Sudafed®).

Decongestants can increase blood pressure and cause headaches, trouble sleeping and irritability. Nasal decongestants can be addictive when you use them for longer than five days.

#### **Corticosteroid nasal sprays**

These sprays and inhalers reduce inflammation and relieve symptoms of hay fever. The most common nasal sprays are Flonase®, Nasacort® and Rhinocort®. Side effects include headaches, nasal irritation, nosebleeds and cough.

#### **Leukotriene inhibitors**

During an allergic reaction, your body releases leukotrienes, histamine and other chemicals that cause inflammation and hay fever symptoms. Available only with a prescription, these pills block leukotriene. The most common leukotriene inhibitor is montelukast (Singulair®). Some people experience changes in mood, vivid dreams, involuntary muscle movements and skin rash when taking this medication.

#### **Immunotherapy**

This treatment works by helping your body learn to tolerate allergens. Your provider gives you a series of injections (allergy shots or subcutaneous immunotherapy) with a small amount of the allergen. Every time you get a shot, your provider increases the amount of the allergen. Over time, your immune system develops immunity to the allergen and stops launching a reaction to it.

In certain circumstances, your provider might recommend immunotherapy in the form of a pill that you place under your tongue called oral immunotherapy. Currently, oral immunotherapy is only available for allergies to trees, grass and dust mites (in the U.S.).

### **How many days does allergic rhinitis last?**

It varies. Most people find relief from hay fever within a few days with medication, but they must take it continuously until the allergen is out of the air. Some people continue to have symptoms of hay fever for several weeks or months, especially if they aren’t taking or can’t take medication to help relieve symptoms.

**PREVENTION TIPS**

There’s no way to prevent hay fever, but lifestyle changes can help you live with allergies. You can relieve hay fever symptoms by avoiding irritants as much as possible. To reduce symptoms, you should:

* Avoid touching your face and rubbing your eyes or nose.
* Close windows in your home and car during the spring, summer and early fall when pollen counts are higher.
* Put covers on pillows, mattresses and box springs to protect against dust mites.
* Keep pets off couches and beds, and close doors to bedrooms you don’t want them to enter.
* Use filters in your vacuum cleaner and air conditioner to reduce the amount of allergens in the air.
* Wash your hands often, especially after playing with pets.
* Wear a hat and sunglasses to protect your eyes from pollen when you’re outside. Change your clothes as soon as you come indoors.

**OUTLOOK / PROGNOSIS**

Hay fever can make you feel miserable, but it generally doesn’t cause serious health problems. Most people with hay fever manage symptoms with lifestyle changes and over-the-counter medication.

People with airborne allergies have a higher risk of ear infections and sinus infections. Because hay fever can make it tough to get a good night’s sleep, you may feel tired during the day. If you have asthma, hay fever can make your asthma symptoms worse.

**WHEN TO SEE A DOCTOR / RED FLAG**

Although hay fever usually doesn’t cause any serious health problems, you should see your provider to rule out other conditions, such as asthma or a sinus infection. Seek care if hay fever symptoms are:

* Getting in the way of your daily life.
* Making it hard for you to sleep.
* Not improving with allergy medication.

Your provider can help you identify the allergens that are causing a reaction and recommend treatments to help you feel better.

## **Diagnostic Considerations**

Other conditions to consider include:

* Vasomotor rhinitis or nonallergic rhinitis
* Gustatory rhinitis (vagally mediated)
* Rhinitis medicamentosa (eg, due to topical decongestants, antihypertensives, cocaine abuse)
* Hormonal rhinitis (eg, related to pregnancy, hypothyroidism, oral contraceptive use)
* Anatomic rhinitis (eg, deviated septum, choanal atresia, adenoid hypertrophy, foreign body, nasal tumor)
* NARES
* Immotile cilia syndrome (ciliary dyskinesis)
* Cerebrospinal fluid leak
* Nasal polyps
* Granulomatous rhinitis (eg, granulomatosis with polyangiitis, sarcoidosis)

## Differential Diagnoses

* Acute Sinusitis
* Chronic Sinusitis

**RECENT GUIDELINES OR UPDATES**

*Allergic Rhinitis*

* In patients aged 12 years or older, mild intermittent symptoms should be treated initially with a second-generation oral antihistamine (OAH) or intranasal antihistamine (INAH) as needed. For moderate/severe, intermittent symptoms it is similarly recommended to treat initially with a second-generation OAH or INAH as needed, with the next step adding intranasal corticosteroids (INCS) to the INAH.
* In patients aged 12 years or older, mild persistent symptoms should be treated initially with an INCS while moderate/severe persistent symptoms should have INAH and INCS combination therapy.
* Leukotriene receptor antagonists are not recommended for initial treatment of allergic rhinitis. Corticosteroid injections are no longer recommended given their side effect profile.

*Nonallergic rhinitis*

* In patients aged 12 years or older, mild intermittent symptoms as well as moderate/severe symptoms of NAR are recommended to be treated by an INAH initially.
* In patients aged 12 years or older with mild persistent symptoms of NAR, it is recommended to treat with an INAH. Moderate/severe persistent symptoms should be treated with both INAH and INCS.

Key recommendations include the following:

* For patients with a stuffy nose, nasal passage discoloration, and/or red and watery eyes, doctors should forgo sinus imaging process in favor of specific immunoglobulin E screening. Sinonasal imaging exposes patients to unnecessary radiation.
* Intranasal steroids and oral antihistamines are recommended as first lines of treatment. Oral leukotriene receptor antagonists are not.
* Sublingual or subcutaneous immunotherapy should be offered to patients who do not respond to pharmacologic therapy.

**EPIDEMIOLOGY**

### Prevalence

The prevalence of allergic rhinitis in the United States is estimated to be 7.7% affecting roughly 19.2 million adults each year. In 2018, 7.2% of children younger than 18 years reported symptoms of allergic rhinitis in the past 12 months. The development of allergic rhinitis before 20 years of age occurs in 80% of cases.

Throughout the world, the prevalence of allergic rhinitis has slightly escalated.Currently, approximately 10 to 30% of adults and 40% of children are affected.The European Community Respiratory Health survey recorded a prevalence of 10 to 41% in adults with allergic rhinitis.Scandinavian studies have demonstrated a cumulative prevalence rate of 15% in men and 14% in women.The prevalence of allergic rhinitis may vary within and among countries.Highest prevalence of severe allergic rhinitis symptoms in children were observed in Africa and Latin America.This may be due to geographic differences in the types and potency of different allergens and the overall aeroallergen burden.

### Mortality/Morbidity

While allergic rhinitis itself is not life-threatening (unless accompanied by severe asthma or anaphylaxis), morbidity from the condition can be significant. Allergic rhinitis often coexists with other disorders, such as asthma, and may be associated with asthma exacerbations.

Allergic rhinitis is also associated with otitis media, eustachian tube dysfunction, sinusitis, nasal polyps, allergic conjunctivitis, and atopic dermatitis.It may also contribute to learning difficulties, sleep disorders, and fatigue.

* Numerous complications that can lead to increased morbidity or even mortality can occur secondary to allergic rhinitis. Possible complications include otitis media, eustachian tube dysfunction, acute sinusitis, and chronic sinusitis.
* Allergic rhinitis can be associated with a number of comorbid conditions, including asthma, atopic dermatitis, and nasal polyps. Evidence now suggests that uncontrolled allergic rhinitis can actually worsen the inflammation associated with asthmaor atopic dermatitis.This could lead to further morbidity and even mortality.
* Allergic rhinitis can frequently lead to significant impairment of quality of life. Symptoms such as fatigue, drowsiness (due to the disease or to medications), and malaise can lead to impaired work and school performance, missed school or work days, and traffic accidents. Costs of allergic rhinitis have increased substantially in the United States. In 2000 the overall cost of treating allergic rhinitis was estimated at 6.1 billion dollars, while in 2005 this figure was noted to nearly double to 11.2 billion dollars. In addition to the direct costs attributed to allergic rhinitis, its economic impact is increased by associated disease processes including sinusitis and asthma.

### Demographics

Allergic rhinitis occurs in persons of all races. Prevalence of allergic rhinitis seems to vary among different populations and cultures, which may be due to genetic differences, geographic factors or environmental differences, or other population-based factors.

In childhood, allergic rhinitis is more common in boys than in girls, but in adulthood, the prevalence is approximately equal between men and women.

Onset of allergic rhinitis is common in childhood, adolescence, and early adult years, with a mean age of onset 8-11 years, but allergic rhinitis may occur in persons of any age. In 80% of cases, allergic rhinitis develops by age 20 years.The prevalence of allergic rhinitis has been reported to be as high as 40% in children, subsequently decreasing with age.In the geriatric population, rhinitis is less commonly allergic in nature.

## **Procedures**

### Rhinoscopy

While not routinely indicated, upper airway endoscopy (rhinolaryngoscopy) can be performed if a complication or comorbid condition may be present. It can be helpful for evaluating structural abnormalities (eg, polyps, adenoid hypertrophy, septal deviation, masses, foreign bodies) and chronic sinusitis (by visualizing the areas of sinus drainage).

### Nasal provocation (allergen challenge) testing

This procedure is essentially a research tool and is rarely indicated in the routine evaluation of allergic rhinitis. The possible allergen is inhaled or otherwise inoculated into the nose. The patient can then be monitored for development of symptoms or production of secretions, or objective measurements of nasal congestion can be taken. Some consider this test the criterion standard test for the diagnosis of allergic rhinitis.However, it is not a practical test to perform routinely, and only an appropriately trained specialist should perform this test.

**PREDEFINED Q & A SETS**

### **What’s the difference between hay fever and allergies?**

Hay fever is another name for allergic rhinitis. Hay fever mainly refers to seasonal allergic rhinitis, which is the allergies you experience at certain times of the year due to pollen from grass, weeds and trees. But some people use the terms interchangeably.

#### **When do most people get seasonal allergies?**

Seasonal allergies tend to occur in the spring and early fall when pollen from grass, trees and ragweed are more prevalent.

### **How do you know if you have seasonal allergies?**

Seasonal allergies tend to happen at the same time each year. They often start suddenly and can last several weeks or until the allergen isn’t in the air anymore. Taking allergy medication to see if it improves your symptoms is one way to know if your symptoms are due to allergies. Checking a weather app or website to see if pollen is high in your area can also help you decide if what you feel is related to seasonal allergies.

What are nasal allergies (allergic rhinitis)?  
Nasal allergies, or allergic rhinitis, occur when the immune system overreacts to airborne allergens such as dust mites, pollen, mold, animal dander, or cockroach debris. This causes inflammation of the nasal lining with symptoms like nasal congestion, runny nose, sneezing, and itching of the nose, throat, and eyes.

2. What causes allergic rhinitis?  
Common triggers include dust mites (particularly in humid environments), pollens from grasses, trees, and weeds, mold spores, animal dander, and cockroach debris. Exposure to these allergens provokes the immune system to release chemicals like histamine, resulting in allergy symptoms.

3. What are the symptoms of nasal allergies?  
Symptoms typically include:

* Nasal congestion and difficulty breathing through the nose
* Clear, watery runny nose
* Frequent sneezing, especially in the morning
* Itchy nose, throat, palate, and sometimes ears
* Itchy, watery, red or burning eyes
* Postnasal drip and chronic cough
* Dark circles under the eyes may also be noted.

4. How are nasal allergies diagnosed?  
Diagnosis is based on your symptoms and medical history. Allergy testing, such as skin prick tests or blood tests for specific IgE antibodies, can identify the exact allergens causing your symptoms.

5. How are nasal allergies treated?  
Treatment options include:

* Avoiding known allergens and triggers where possible
* Nasal corticosteroid sprays to reduce inflammation
* Oral or nasal antihistamines to relieve sneezing, itching, and runny nose
* Decongestants for short-term relief of nasal congestion
* Allergy immunotherapy (allergy shots or tablets) for long-term control in selected cases.

6. How can I tell if my nasal symptoms are from allergies or something else?  
Allergies usually cause clear, watery nasal discharge and itching, whereas colds or infections may cause thicker, yellowish mucus and fever. Allergic symptoms often recur seasonally or persist year-round depending on the allergen. Itchy eyes and nose are more common with allergies.

7. Can nasal allergies affect daily life?  
Yes, allergic rhinitis can impair sleep, concentration, work or school performance, and overall quality of life. Proper diagnosis and treatment are important to control symptoms effectively.

8. When should I see a specialist?  
See an allergist or ENT specialist if your symptoms are severe, persistent despite treatment, or if you need allergy testing and advanced care

**Key Genomic Findings:**

* Chromosomal Regions:  
  Multiple linkage studies have identified candidate susceptibility regions, most notably:
  + Chromosome 4q24–q27: A principal locus repeatedly associated with AR across different populations.
  + Other regions include 2q12–q33, 3q13, 4p15–q12, 5q33.1, 6p24–p23, 9q34.3, 12p13, 22q13, and Xp21.
* Candidate Genes and Polymorphisms:
  + Genes related to cytokines and their receptors, such as IL-18, IL-28RA, and variants in interleukin gene complexes, play important roles. For example, IL-18 promoter polymorphisms are associated with AR in some populations.
  + ORMDL3 (17q12–21) is strongly implicated, particularly in asthma and allergic airway diseases, influencing inflammation and Th2 responses.
  + The IL33–IL1RL1 pathway has been linked to eosinophilic inflammation common in AR.
  + Other genes include ZBTB10, CLEC16A, NFIA, TSLP, SMAD3, CDHR3, and loci involved in immune regulation and epigenetic modification.
* Epigenetics:  
  DNA methylation, histone modifications, and microRNA expression influence gene regulation in allergic responses, contributing to the interaction between genetics and environmental factors.
* Heritability and Family Studies:  
  Twin studies show strong heritability of AR, with higher concordance in monozygotic twins and a pronounced familial tendency confirming genetic predisposition.
* Population Studies:  
  Different ethnic groups exhibit variations in associated genes and polymorphisms, underlining the complex and multifactorial inheritance pattern of nasal allergies.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning! What brings you in today?

Patient: Hi, Doctor. I’ve been sneezing a lot, and my nose feels constantly stuffy and runny. My eyes are itchy too. It’s been going on for about a week.

Doctor: Those do sound like allergy symptoms. Have you noticed any specific triggers like being around pets, pollen, dust, or mold?

Patient: Actually, yes. I recently visited a friend who has a cat, and I’ve been spending more time outdoors lately. Could that cause these symptoms?

Doctor: Absolutely. Pet dander and pollen are common allergens that can trigger nasal allergies, also called allergic rhinitis. Your immune system is reacting to those substances and causing inflammation in your nasal passages.

Patient: What can I do to feel better?

Doctor: First, try to avoid exposure to known triggers like cats or dusty environments if possible. I can prescribe you nasal corticosteroid sprays, which reduce inflammation, and antihistamine tablets or nasal sprays to control sneezing and itching. Saline nasal sprays may help clear your nasal passages too.

Patient: Are these medications safe to use regularly?

Doctor: Yes, nasal steroids are safe when used as directed and are very effective. Antihistamines can cause slight drowsiness in some people, but many newer ones don’t. I’ll guide you on how to use them properly.

Patient: How long will it take before I see improvement?

Doctor: Nasal steroids may take a few days to a week to have full effect. Antihistamines usually work within hours. If your symptoms persist or worsen, please come back so we can check if other treatments like allergy testing or immunotherapy are needed.

Patient: Thank you, Doctor. I feel better knowing what’s going on.

Doctor: You’re welcome. Avoid triggers as much as possible, start the treatment, and let me know if your symptoms change or if you have concerns.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK538186/>

<https://emedicine.medscape.com/article/134825-guidelines>

[Allergic Rhinitis (Hay Fever): Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/8622-allergic-rhinitis-hay-fever#overview)

**Nasal valve collapse**

**DEFINITION / DESCRIPTION**

Nasal valve collapse occurs when the airway inside your nose, or nasal valve, narrows. Your nasal valve is the passageway that filters the air you breathe through your nostrils. It extends from the middle of your nose to the bottom.

A collapsed nasal valve prevents air from flowing freely through your nose, making breathing harder. Your nose may look thinner or sunken where your nasal valve has narrowed. A nasal valve collapse isn’t always visible.

#### **Types of nasal valve collapse**

Your nasal valve consists of two major sections, the internal nasal valve and the external nasal valve. They’re located at different places within your nasal cavity and surrounded by different supporting structures.

* Internal nasal valve collapse: This is the most common type of nasal valve collapse. Your internal nasal valve is the passageway in the middle of your nose.
* External nasal valve collapse: Your external nasal valve is at the bottom of your nose, near your nostrils. This type is rarer, but it’s easier to see because it causes one or both of your nostrils to collapse when you breathe in through your nose.

Nasal valve collapse is one of the most common causes of nasal obstruction, a condition that otolaryngologists (ear, nose and throat specialists) frequently treat. A nasal obstruction occurs when there’s a blockage that’s restricting airflow in your nasal cavity.

**CAUSES**

With nasal valve collapse, the tissue that supports your nasal valve (primarily cartilage) weakens. As a result, the airway narrows. Anatomical differences, surgery and injury can all contribute to the weakening.

#### **Risk factors**

The most common risk factors for nasal valve collapse include:

* A deviated septum. Most people with nasal valve collapse also have a deviated septum. Your septum is a thin strip of cartilage and bone in the center of your nose. A septum that’s “deviated” is crooked or bent. It divides your nasal valve into two, unequally sized parts. The uneven structure can lead to a collapse in one or both sides.
* The nasal structure you’re born with. You may be born with characteristics that increase your risk of nasal collapse, including a deviated septum. Narrow nostrils, a widened area between your nostrils (columella) and a nose that sticks out from your face (over-projecting nose) can also increase your risk.
* Nose job. A nasal valve collapse can happen following surgery on your nose (rhinoplasty). When this happens, it’s much more common to have slight narrowing rather than more severe collapse.

Other risk factors include:

* Aging. Tissue that supports your nasal valve can lose strength with age.
* Injury. Trauma to the bones and tissues inside your nose can weaken their support.

**SIGNS / SYMPTOMS**

Nasal valve collapse makes it harder to breathe through one or both nostrils.

Symptoms include:

* Trouble breathing (which may worsen during physical activity or when you’re lying down).
* Mouth breathing during the day and snoring at night.
* Nasal congestion (stuffy nose).

Your nose may look different (thinner or asymmetrical in places), especially if your external nasal valve collapsed.

**DIAGNOSIS METHODS**

A healthcare provider will ask about your medical history and symptoms. They may ask you questions from the nasal obstruction symptom evaluation (NOSE) questionnaire. NOSE ranks your symptoms from mild to extreme. Questions determine how breathing difficulties, stuffiness and trouble sleeping impact your quality of life.

Your provider will perform a thorough physical exam of your nose and throat that may include multiple tests.

#### **Nasal valve collapse tests**

Tests include:

* Endoscopy: A nasal endoscopy uses an endoscope (flexible tube with a light and camera) to look inside your nose.
* Cottle maneuver: Your healthcare provider may gently pull your cheek to the side to widen your nasal valve. They may perform a modified technique that uses a small instrument or cotton swab to widen your nostril on the affected side. The Cottle maneuver can help your provider identify where the collapse is.

**TREATMENT OPTIONS**

Nasal valve collapse often requires surgery. If your symptoms are mild, your provider may recommend managing symptoms without surgery first.

#### **Nasal valve collapse surgery**

Your healthcare provider will recommend the best surgical techniques to fix nasal valve collapse. Most surgeries are outpatient, which means you can go home the same day of your surgery.

Options include:

* Grafting: Your healthcare provider removes cartilage or bone from another part of your body, like your ear or rib, and inserts (“grafts”) the tissue into your nose. The extra tissue widens your nasal valve. There are several grafting techniques, but the most common is called the Alar Batten graft.
* Implants: Your provider implants a device that supports fallen cartilage into your nose. Implants may include a butterfly-shaped device (the titanium butterfly) and an injectable implant called Latera®.
* Suture suspension: Your provider uses sutures to connect tissue from your nasal valve to tissue beneath your eye. This procedure lifts your nasal valve upward and outward, widening the space.

You may need surgery to address structural issues that can contribute to nasal valve collapse, including:

* Septoplasty: Surgery to correct a deviated septum.
* Turbinate reduction: Surgery to decrease the size of your turbinates, bony structures inside your nose.

#### **Nasal valve collapse treatment without surgery**

* Breathing strips stick to the outside of your nose, lifting the skin and opening your nostrils. They may help you breathe easier and sleep better at night.
* Internal nasal dilators go inside each nostril, pressing the cartilage outward to widen your nasal valve. Like breathing strips, they may help you sleep easier.

**OUTLOOK / PROGNOSIS**

Not in all cases, but it’s possible. Nasal valve collapse happens when there’s weakening in the structures that support your nasal passages. Without treatment to reinforce weak areas, these structures can continue to fall.

### **What is the outlook for nasal valve collapse?**

Most people report that their symptoms improved after nasal valve collapse surgery. Fixing the collapse can help you breathe easier and sleep better.

**DIFFERENTIAL DIAGNOSIS**

* Deviated Nasal Septum: Can narrow the internal nasal valve area and contribute to or coexist with nasal valve collapse.
* Inferior Turbinate Hypertrophy: Swelling or enlargement of turbinates reduces airway size contributing to nasal obstruction.
* Nasal Polyps: May cause obstruction in the nasal airway that mimics nasal valve collapse symptoms.
* External Nasal Valve Collapse: Collapse of the nostril rim and nasal floor, visible externally, distinct but may coexist with internal valve issues.
* Post-Rhinoplasty or Nasal Trauma Sequelae: Weakening or scarring of cartilage after surgery or trauma leading to structural collapse.
* Aging-Related Cartilage Weakness: Degeneration or loss of cartilage support can cause dynamic valve collapse.
* Inflammatory or Infectious Causes: Chronic inflammation may lead to tissue edema and secondary valve narrowing.
* Nasal Valve Stenosis (Fixed Narrowing): May be due to congenital structural abnormalities or scarring causing static obstruction.
* Dynamic Nasal Valve Obstruction vs. Fixed Obstruction: Important to distinguish collapse due to airway wall weakness during inspiration versus fixed narrowing.
* Tumors or Masses: Rarely, masses near the nasal valve area can cause obstruction.
* Rhinitis Medicamentosa or Severe Mucosal Edema: May contribute to narrowed nasal airways mimicking valve collapse.

**EPIDEMIOLOGY**

* Nasal valve collapse is a common cause of chronic nasal obstruction, affecting up to 13% of patients evaluated for chronic nasal obstruction, with 88% of these cases being unilateral.
* Larger cohort studies show a much higher prevalence of NVC among patients with nasal airway obstruction (NAO). For example, in a survey of 1,906 patients with sinonasal complaints, the overall prevalence of NVC was approximately 67%, increasing to 73% among those with severe or extreme obstruction based on the NOSE (Nasal Obstruction Symptom Evaluation) scale.
* NVC frequently coexists with other anatomic contributors such as septal deviation and inferior turbinate hypertrophy. In patients with severe nasal obstruction, around 40–46% have a combination of NVC, septal deviation, and turbinate hypertrophy.
* Among patients presenting to general otolaryngology clinics, about 37.4% reported severe or extreme nasal airway obstruction symptoms, with NVC constituting a significant portion of these cases.
* Studies show that among patients who had prior septoplasty and/or inferior turbinate reduction (for nasal obstruction), 82% were found to have NVC, indicating that nasal valve issues often underlie persistent or recurrent obstruction despite prior surgery.
* The actual prevalence in the general population is harder to estimate, but some data suggest that NVC may affect up to 30% of adults with nasal obstruction symptoms.

**PREDEFINED Q & A SETS**

What is nasal valve collapse?  
Nasal valve collapse occurs when the narrowest part of the nasal airway weakens or narrows, causing difficulty breathing through the nose. This collapse can be structural or dynamic, leading to partial or complete airway obstruction.

2. What causes nasal valve collapse?  
Common causes include weakening of the nasal cartilage due to aging, trauma, previous surgery (like septoplasty or rhinoplasty), congenital weakness, or inflammation. Enlarged turbinates and a deviated septum may contribute to or exacerbate the collapse.

3. What are the symptoms of nasal valve collapse?  
Symptoms include nasal obstruction or congestion, difficulty breathing through one or both nostrils, noisy breathing, reduced sense of smell, trouble sleeping, and sometimes snoring.

4. How is nasal valve collapse diagnosed?  
Diagnosis is made through physical examination, including the Cottle maneuver (pulling the cheek to open the valve area) to see if breathing improves. Nasal endoscopy can visualize the internal structures, and specialized tests like rhinomanometry may be used. Imaging may be ordered if other causes are suspected.

5. What are the treatment options for nasal valve collapse?

* Conservative treatments: Nasal dilator strips (e.g., Breathe Right strips), nasal cones, internal nasal dilators, nasal steroid sprays, and allergy management.
* Surgical treatments: Procedures to strengthen and widen the nasal valve using cartilage grafts (often taken from the ear or septum), spreader grafts, alar batten grafts, or implants like lateral wall implants. Surgery may be combined with septoplasty or turbinate reduction when needed.

6. How effective is surgery for nasal valve collapse?  
Surgical repair typically offers significant and long-lasting improvement in nasal airflow and quality of life. Most patients experience relief of symptoms such as obstruction and improved breathing and sleep after recovery.

7. What is recovery like after nasal valve surgery?  
Recovery varies but usually includes swelling and mild congestion for 1–2 weeks. Breathing improves over several weeks, while full healing may take several months. Patients are generally advised to avoid strenuous activities for 2–4 weeks.

8. When should I see a doctor about nasal valve collapse?  
If you experience persistent nasal obstruction that does not improve with medications or nasal strips, or if you notice nostril collapse during breathing, you should seek evaluation by an ENT specialist.

9. Are there non-surgical ways to manage nasal valve collapse?  
Yes, external nasal strips, internal nasal dilators, nasal steroid sprays, nasal breathing exercises, and avoiding irritants can help reduce symptoms, especially in mild cases.

10. Can nasal valve collapse cause other problems?  
If untreated, it can contribute to poor sleep quality, snoring, chronic nasal congestion, and decreased ability to exercise comfortably.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello! What brings you in today?

Patient: Hi, Doctor. I’ve been having trouble breathing through my nose, especially when I breathe deeply or exercise. Sometimes it feels like my nostrils almost pinch shut.

Doctor: That sounds like it could be related to nasal valve collapse. It’s when part of the nasal airway narrows or collapses during breathing, making it hard for air to flow in properly.

Patient: What causes that?

Doctor: It can happen due to weakening of the cartilage that supports your nose. This could be from aging, previous nasal trauma or surgery, or sometimes it’s congenital. Allergies or a deviated septum can also contribute to the problem.

Patient: Is there any way to tell if it’s the nasal valve causing my symptoms?

Doctor: Yes, during the exam I’ll ask you to breathe normally and deeply while I observe for nostril pinching or collapse. I may also perform the Cottle maneuver, where I gently pull on your cheek to open up the nasal valve area and see if your breathing improves. We also use nasal endoscopy to look inside your nose for any other issues.

Patient: What treatments are available?

Doctor: For mild cases, nasal dilator strips or internal nasal cones can help support the nostrils and improve airflow. If the collapse is more severe, surgery to strengthen or reshape the nasal valve cartilage may be needed. This often involves placing small cartilage grafts to open the airway.

Patient: Is surgery complicated? What’s recovery like?

Doctor: The surgery is typically outpatient and well tolerated. Recovery often takes a few weeks, with some swelling and congestion initially. Most patients notice significant relief in breathing after healing.

Patient: Can nasal valve collapse cause problems beyond just stuffy nose?

Doctor: Yes, it can affect your sleep quality, cause snoring, and lead to mouth breathing, which may cause dry mouth or worsen sleep apnea in some cases.

Patient: How do I know if my nasal obstruction is due to valve collapse or something else like allergies?

Doctor: Many patients have more than one issue at once. We’ll evaluate allergies, septal deviation, turbinate swelling, and nasal valve status to design the best treatment plan tailored to your situation.

Patient: Thank you, Doctor. I look forward to the exam and learning more.

Doctor: You're welcome. We’ll thoroughly assess your nose today and discuss the best management options for you.

REFERENCES:

<https://my.clevelandclinic.org/health/diseases/24977-nasal-valve-collapse>

**Nasal fractures**

**DEFINITION / DESCRIPTION**

A broken nose (nasal fracture) is when you break or crack bones or damage cartilage in your nose. It’s a common facial fracture. You should get medical care right away if you think you have a broken nose. Prompt treatment may help you avoid permanent damage to your nose.

**CAUSES**

A broken nose is a type of blunt force trauma. This is an injury that happens if you’re hit hard by something or someone, or injured in a fall. You may break your nose if you’re:

* In a motor vehicle accident
* Hit during a physical fight
* Hurt while playing sports

**SIGNS / SYMPTOMS**

Broken nose symptoms may include:

* Bruising around your eyes and nose
* Crackling or crunching sound when you touch your nose
* Crooked nose
* Difficulty breathing through your nose
* Drainage from your nose
* Pain and tenderness
* Nasal obstruction (feeling as though something is stuck in your nose)
* Nosebleeds
* Swelling around your nose

**DIAGNOSIS METHODS**

A healthcare provider will do a physical examination. They’ll gently press around the bridge of your nose. They’ll examine the inside of your nose for signs of an obstruction. A provider may do imaging tests like X-rays or CT scans if they think you may have other facial injuries.

**TREATMENT OPTIONS**

Treatments range from putting ice on your broken nose to having surgery to repair it. The treatment that’s right for you depends on the severity of your injuries.

#### **Ice or pain relievers**

Taking over-the-counter pain relievers (like acetaminophen or ibuprofen) can help with pain. Applying ice packs can help ease swelling and other broken nose symptoms.

#### **Draining a septal hematoma**

A healthcare provider may decide to drain your septum within 24 hours after your injury. Draining it reduces the risk of serious complications.

#### **Manual realignment**

An injury can knock your nasal bones and cartilage out of place (alignment). Your healthcare provider will gently push your bones and cartilage back into place. They may wait a few days to do a manual alignment procedure. The procedure involves the following steps:

1. Your provider will numb your nose with local anesthesia. In some cases, you may receive general anesthesia if you have severe injuries.
2. They’ll move your bones and cartilage back where they belong.
3. They may place gauze packing inside your nose and a dressing on the outside of your nose.
4. They’ll place a temporary splint on your nose.
5. Your provider may give you antibiotics to prevent infection.

You’ll be able to remove the packing and dressing in about two weeks.

#### **Surgery**

You may need surgery if you have a severely broken nose, or you can’t breathe through your nose. Surgeries to fix your broken nose include:

* Septoplasty. This procedure reshapes your septum. During septoplasty, a surgeon may remove parts of your bone and cartilage, then reshape and reposition the underlying structures. This repairs any holes or perforations and improves breathing.
* Rhinoplasty. During this procedure, a surgeon creates a new nose shape and removes obstructions. They’ll reduce or rearrange the underlying bone and cartilage.

#### **How long does it take to heal a broken nose?**

That depends on your situation. In general, a broken nose heals within six to eight weeks. Your healthcare provider or surgeon will explain how long it’ll take you to recover.

**PREVENTION TIPS**

### **Can a broken nose be prevented?**

No, but you can reduce your risk of breaking your nose by:

* Being aware of your surroundings to lower your risk of falls
* Wearing protective headgear if you play contact sports

**OUTLOOK / PROGNOSIS**

You may not need anything other than ice and painkillers to treat a broken nose. But you could need treatment or surgery if you have a severe fracture, or your nose is broken in more than one place. That said, you should seek medical care if you think you have a broken nose. Getting treatment right away can reduce your risk of complications.

**POSSIBLE COMPLICATIONS**

A broken nose may cause a septal hematoma. A septal hematoma is blood pooling in your septum. Your septum is the cartilage and bone that separates your nostrils. A septal hematoma can lead to serious issues like:

* A hole (perforation) in your septum
* Saddle nose, which happens if the bridge of your nose collapses
* Tissue in your nose starting to die (necrosis)

**WHEN TO SEE A DOCTOR / RED FLAG**

You should contact your provider if:

* Your nose still hurts and/or is swollen several weeks after treatment
* You can’t breathe through your nose

You should go to the emergency room if:

* Your nose starts to bleed or keeps on bleeding after your follow-up treatment
* Your nose starts to drain clear, watery fluid that’s not mucus
* You develop a severe headache

**DIFFERENTIAL DIAGNOSIS**

* Nasal Septal Hematoma: Blood collection between septal cartilage and mucosa causing nasal obstruction and risk of cartilage necrosis. Often occurs with nasal trauma.
* Nasal Valve Collapse: Weakening or collapse of nasal valve structures can cause nasal obstruction and may result from trauma, surgery, or congenital weakness.
* Nasal Contusion or Soft Tissue Injury: Bruising and swelling without fracture causing similar pain and deformity.
* Deviated Nasal Septum: Can be pre-existing or acute post-traumatic septal deviation leading to obstruction.
* Nasal Septal Perforation: Trauma-induced hole in the septum causing crusting and obstruction.
* Nasal Bone Contusion without Fracture: Tenderness and swelling without bone fracture.
* Facial Fractures: Other fractures of maxilla, orbit, or zygomatic bones can accompany nasal trauma.
* Epistaxis from Source Other than Fracture: Bleeding may arise from mucosal lacerations or vascular injury.
* Soft Tissue Infection or Abscess: Rarely, trauma may lead to localized infection mimicking swelling.
* Allergic or Infectious Rhinitis: In some cases, nasal obstruction or bleeding may be attributed to inflammation rather than trauma.
* Foreign Body (especially in children): Can cause nasal obstruction or bleeding simulating trauma.

**EPIDEMIOLOGY**

### United States statistics

Nasal fractures occur nearly twice as often in males as in females. Athletic injuries and interpersonal altercations account for the greatest proportion of causes. Less common causes include falls and motor vehicle accidents.

In a retrospective study, Erdmann et al investigated the medical records of 437 patients with 929 facial fractures.These authors noted that the most common etiology of facial trauma was assault (36%), followed by motor vehicle collision (MVC, 32%), falls (18%), sports (11%), occupations (3%), and gunshot wounds (2%). Of the facial fractures sustained, the most common fracture type was nasal bone fracture.

A study by Hanba et al found that risk factors for facial fracture included being white, Asian, female, or ≥ 60 years of age.

A study by Plawecki et al evaluated the incidence of 20,519 patients, 55 years of age or older, who went to the ED for recreational activity-associated facial fractures. The study reported that the annual incidence of facial fractures increased by 45.3% from 2011 through 2015. Nasal fractures were the most common site of fracture (65.4%) and cycling (26.6%) was the most common cause in this cohort of older patients.

In a study of patients who presented to US emergency departments (EDs) with sports- or recreation-related nasal fracture, Xiao et al found that the most common causes of injury were basketball (23.2%), baseball (17.1%), softball (9.8%), soccer (7.4%), and football (7%). Among pediatric patients, the most frequent cause was baseball (25.1%).

### International statistics

In a retrospective study of Brazilian children aged 5-17 years, Cavalcanti and Melo found that facial injuries were most frequent in males (78.1%; 3-fold more common than in females) aged 13-17 years (60.9%), and the most common causes of these injuries were falls (37.9%) and traffic accidents (21.1%).Of the facial injuries, nasal fractures were also most common (51.3%), followed by the zygomatic-orbital complex (25.4%).

In another retrospective study, Hwang et al reviewed and analyzed the medical records of 236 patients with facial bone fractures from various sports who were treated at one hospital between 1996 and 2007.The investigators noted the age group with the highest frequency of such injuries was 11-20 years (40.3%), with a significant male predominance across all age groups (13.75:1). There were 128 isolated nasal fractures, with soccer accounting for 39% of these; baseball, 18%; basketball, 12.5%; martial arts, 5%; and skiing or snowboarding, 5%.

In a Finnish study of patients with sports-related nasal fractures, the majority of fractures (56%) were associated with team sports and contact with another player was the most frequent cause of injury (52% of fractures). Among team sports, basketball posed the highest risk of nasal fracture.

A study by Gupta et al found at a British major trauma center that the coronavirus disease 2019 (COVID-19) pandemic may have reduced the number of patients presenting to the ED with nasal fractures. The investigators reported that the number of patients with suspected or confirmed nasal fractures in 2020 was 51.4% less than in 2019.

## **Procedures**

### Closed reduction

Closed reduction of nasal fractures, including nasal septal fractures, should be performed by an otolaryngologist, plastic surgeon, or maxillofacial surgeon.

The repair technique requires specialized instruments and involves a reversal of forces that caused the injury.

An attempt at closed reduction of an obvious nasal deformity may be made in the acute setting by medical personnel who are trained in this procedure, in which only a gloved hand is used.

A study investigated the minimal and optimal duration of the nasal packing following reduction surgery of nasal bone fracture. The study demonstrated that 1-day packing had comparable postoperative outcome with reducing the patients' discomfort. A longer packing duration was not needed to achieve stable results and the study concluded that 1-day is a reasonable packing time for most nasal bone fractures.

**PREDEFINED Q & A SETS**

### **How do I sleep with a broken nose?**

Swelling from a broken nose can interrupt a good night’s sleep. You can reduce swelling and get more rest by propping your head and shoulders on a stack of pillows. Taking a decongestant may help.

What is a broken nose (nasal fracture)?  
A broken nose, or nasal fracture, occurs when the bones in your nose are injured and may become misaligned . This is the most common type of facial fracture .

2. What causes a broken nose?  
Nasal fractures are primarily caused by direct impact or trauma to the nose . Common causes include falls, sports injuries, motor vehicle accidents, and physical altercations . Relatively little force is required to fracture the nasal bones, with most fractures resulting from a lateral (sideways) blow .

3. What are the symptoms of a broken nose?  
Common symptoms include pain and tenderness in the nose area, swelling around the nose and eyes, and bruising or discoloration of the skin . You may also experience difficulty breathing through the nose due to swelling or misalignment, a visible change in the nose's shape or alignment, and nosebleeds . A discharge of clear watery fluid from one nostril can also occur .

4. How is a broken nose diagnosed?  
A doctor will assess your injury through a physical examination, which includes looking at your nose, eyes, jaw, and teeth for bruising, cuts, and swelling . They will ask how the injury occurred and how your nose looked before the injury . X-rays or CT scans may be recommended to help identify other facial fractures, though they are not always necessary for diagnosing a broken nose itself . The best indicators are if the nose looks significantly different or if breathing through it is difficult .

5. What are the treatment options for a broken nose?  
Treatment depends on the severity and type of fracture :

* No repositioning needed: If the bones are not out of position, rest and avoiding further bumps may be the only treatment required . Ice packs and pain relievers like paracetamol or ibuprofen can help manage swelling and pain .
* Repositioning (Reduction): If the bones are out of place, they may need to be manually realigned . This "reduction" can sometimes be done in the doctor's office under local anesthesia or in an operating room under general anesthesia, especially if the septum is damaged . This procedure is typically performed within the first two weeks after the injury, after initial swelling has subsided (ideally 3-14 days post-injury) .
* Nasal Splint/Cast: A plastic, plaster, or metal cast may be applied to stabilize the nose during healing, usually for about one week .
* Medication: Pain relievers and decongestants may be prescribed . Antibiotics might be given if there's a laceration over the fracture or if packing is placed in the nostrils .
* Delayed Repair: If more than two weeks have passed, immediate reduction might be less effective due to bone setting and swelling. In such cases, reconstructive plastic surgery (rhinoplasty) may be performed several months later (2-3 months), once swelling has completely reduced, to restore appearance and function .

6. What are the potential complications of a broken nose?  
An important complication to watch for is a septal hematoma, which is a collection of blood in the septum (the wall between the nostrils) . This requires urgent medical attention and drainage to prevent cartilage damage . If a nasal fracture is left untreated, it can lead to permanent changes in breathing, increased susceptibility to sinus infections, and a misshapen nose .

7. How long does it take for a broken nose to heal?  
If treated promptly, a broken nose will likely heal and return to its normal size, shape, and function . Full healing may take several weeks, but initial recovery often occurs within 1-2 weeks.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you’ve had an injury to your nose. Can you tell me what happened?

Patient: Yes, I was hit during a soccer game about two days ago, and my nose has been swollen, painful, and it feels hard to breathe through it.

Doctor: I see. Based on your symptoms and the injury, it’s possible you have a nasal fracture, which means one or both of your nasal bones may be broken. Are you experiencing any nosebleeds or clear fluid leaking from your nose?

Patient: I did have some bleeding shortly after the injury, but no clear fluid. My nose is also bruised around the eyes.

Doctor: That’s common with nasal fractures. I will examine your nose both externally and internally to look for swelling, deformity, tenderness, and check your breathing. I’ll also check for any septal hematoma, which is a blood collection inside the nasal septum that needs urgent treatment.

Patient: What does the exam involve?

Doctor: I’ll gently palpate your nose to assess for any instability or crepitus, look inside your nostrils with a lighted instrument to inspect the septum and mucosa, and ask you to breathe through each nostril. Imaging like a CT scan is usually not needed unless there’s additional facial injury.

Patient: What treatment options are there if my nose is broken?

Doctor: If the bones are out of place, we can perform a closed reduction to realign them. This is ideally done within 7 to 14 days after the injury, once swelling has decreased. The procedure might be done under local or general anesthesia. You will likely wear a nasal splint for about a week afterward. If the fracture is mild and well-aligned, we may just recommend rest, ice, and pain relief.

Patient: Will my nose look the same after it heals?

Doctor: Most patients heal with a normal appearance if treated promptly. However, some swelling, bruising, and mild deformity are common initially. If a deformity persists after healing, reconstructive surgery can be considered later.

Patient: Are there any complications to watch out for?

Doctor: Yes, watch for worsening nasal obstruction, worsening pain, persistent bleeding, or signs of infection. If you notice persistent nasal blockage or deformity, please follow up promptly.

Patient: How long will recovery take?

Doctor: Initial healing is usually a couple of weeks, but complete resolution of swelling and bruising can take a few months.

Patient: Thank you, Doctor. I appreciate the information.

Doctor: You’re welcome. Let’s do a thorough exam now and discuss the best treatment plan for you.

REFERENCES:

<https://www.royalberkshire.nhs.uk/media/fhofvsk3/nasal-fractures_dec23.pdf>

<https://emedicine.medscape.com/article/84829-workup#c7>

<https://www.aafp.org/pubs/afp/issues/2004/1001/p1315.html>

[Broken Nose: Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/17772-broken-nose#what-is-a-broken-nose)

**Neck mass in adults**

**DEFINITION / DESCRIPTION**

A neck mass may be a sign of an infection, or it may indicate a serious medical condition. It does not necessarily mean you have cancer, but it does mean you may need additional evaluation to receive an accurate diagnosis.

**CAUSES**

Neck masses are common in adults and can occur for many reasons. You may develop a neck mass due to a viral or bacterial infection. Ear or sinus infection, dental infection, strep throat, mumps, or a goiter may cause a neck mass. If your neck mass is from an infection, it should go away completely when the infection goes away.

Your neck mass could also be caused by a noncancerous (benign) tumor or a cancerous (malignant) tumor. Cancerous neck masses in adults are most often due to head and neck squamous cell carcinoma (HNSCC). Other causes for a neck mass may be due to cancers such as lymphoma, thyroid or salivary gland cancer, skin cancer, or cancer that has spread from somewhere else in the body.

Long-term tobacco use (cigarettes, cigars, chewing tobacco, or snuff) and alcohol use are the two most common causes of cancers of the mouth, throat, voice box, and tongue. Another common risk factor for cancers of the neck, throat, and mouth is a human papilloma virus (HPV) infection. HPV infection is usually transmitted sexually. HPV found in the mouth and throat is called “oral HPV.” Some high-risk types of oral HPV infection can cause head and neck cancers.

HNSCC of the tonsil and base of the tongue has gone up because of the increase in HPV infections. HPV-related cancers often lack the common risk factors of tobacco and alcohol use, and tend to affect younger adults. Patients with HPV-positive HNSCC may have some of the symptoms listed here, but many times a neck mass will be the only sign of this type of cancer.

**SIGNS / SYMPTOMS**

* The mass lasts longer than two to three weeks
* The mass gets larger
* The mass gets smaller but does not completely go away
* Voice change
* Trouble or pain with swallowing
* Trouble hearing or ear pain on the same side as the neck mass
* Neck or throat pain
* Unexplained weight loss
* Nasal blockage in one side of the nose
* Breathing difficulty
* Bleeding from nose and oral cavity
* Coughing up blood
* Skin lesion on the face or scalp that is growing or changing color

**DIAGNOSIS METHODS**

Your doctor will ask about your medical history, and examine your head and neck. They may perform (or recommend) an endoscopy, which is a procedure that inserts a small tube with an attached camera through your nose to look inside your throat, voice box, and the opening of your esophagus. If a more detailed examination is required, the endoscopy will be performed in an operating room under anesthesia.

In addition, your doctor may order tests to help diagnose your neck mass, such as a CT, MRI, or PET (positron emission tomography) scan (if needed) to get a more detailed picture of the neck mass than normal X-rays can provide.

A biopsy involves taking a sample of tissue from the neck mass to make a diagnosis. There are different types of biopsies based on your medical history and the location of your mass, including:

* *Fine needle aspiration biopsy (FNA)*—An FNA is the best initial test to diagnose a neck mass. A small needle is put into the mass and tissue is pulled out. An FNA is often done in your doctor’s office. It is well-tolerated by most patients. It can be done with or without ultrasound-guided needle biopsy.
* *Core biopsy*—A core biopsy is another way to diagnose a neck mass, typically performed if an FNA did not confirm a diagnosis. A core biopsy uses a slightly larger needle and gets a larger piece of tissue. It is well tolerated and has a low risk of complications.
* *Open biopsy*—An open biopsy should typically be done only after FNA and/or core biopsy have failed to make the diagnosis. It is the next step to diagnose a neck mass. It is a more invasive procedure. Open biopsy is done by a surgeon in the operating room and you will need anesthesia. An open biopsy may remove only portion of the mass or the whole mass. Because open biopsies are more invasive, there is a somewhat higher risk for complications.

Your doctor will explain next steps and discuss a follow-up plan once a diagnosis has been made. If the neck mass is found to be cancerous, treatment options include surgery, radiation therapy with or without chemotherapy, or a combination of these treatments depending on the diagnosis and stage of the disease. Some neck masses may be thought to be benign (not cancerous) at first, but are later found to be cancer, which is why a follow-up plan is so important. You and your doctor need to discuss the method for follow-up that works best for you. You should call for your results if you have not heard from the doctor or do not have a follow up appointment.

**TREATMENT OPTIONS**

Initial Management and Diagnosis:

* Observation/Antibiotics: If a neck mass shows signs of inflammation (fever, pain, redness) or has a history of recent infection, a single course of broad-spectrum antibiotics for one to two weeks is a reasonable initial treatment. The patient should then be reassessed . Many inflammatory lymph nodes can resolve without specific treatment, but require close observation .
* Imaging: For masses at increased risk for malignancy (e.g., present for $\geq$2 weeks without fluctuation, firm consistency, size >1.5 cm, or ulceration), a computed tomography (CT) scan or magnetic resonance imaging (MRI) with contrast of the neck is recommended . A recent chest radiograph may also be needed .
* Fine-Needle Aspiration (FNA): If the mass persists beyond four to six weeks, or if no infectious cause is found, FNA is the preferred diagnostic procedure over open biopsy . FNA has high sensitivity and specificity in experienced hands and an exceedingly low risk of tumor seeding .
* Consultation with an Otolaryngologist: Cytologic or radiographic evidence of conditions other than reactive lymphadenopathy warrants consultation for endoscopic evaluation and possible excisional biopsy or neck dissection .
* Biopsy Considerations: Biopsy should be considered for masses that show progressive growth, are located in the supraclavicular fossa, or are larger than 3 cm .

Treatment of Confirmed Conditions:

* Malignant Masses: If a neck mass is confirmed to be cancerous, treatment options include surgery, radiation therapy (with or without chemotherapy), or a combination of these modalities . If the mass is determined to be metastatic carcinoma via frozen-section examination, neck dissection may be performed .
* Other Specific Pathologies: Management recommendations for neck masses originating from thyroid, salivary gland, mandibular, or dental pathologies, while not covered by the general guidelines for undiagnosed neck masses, typically exist as separate protocols

**OUTLOOK / PROGNOSIS**

* Malignancy vs. benign: Most adult neck masses are malignant or metastatic until proven otherwise. Benign masses (e.g., inflammatory lymphadenopathy, cysts) generally have an excellent prognosis.
* Age and sex: Older age (especially >40 years), male sex, and white non-Hispanic ethnicity are associated with higher malignancy risk and thus a more guarded prognosis.
* Size and characteristics of the mass: Larger masses (>1.5–2 cm), multiple masses, and those with heterogeneous or ill-defined borders on imaging predict malignancy and potentially worse outcomes.
* Histologic type and tumor origin: Prognosis varies greatly by cancer type (e.g., squamous cell carcinoma of the head and neck versus lymphoma or thyroid cancer) and whether the neck mass is a primary tumor or a metastasis.
* Stage at diagnosis: Early-stage cancers have better outcomes; delayed diagnosis worsens prognosis. Timely evaluation and workup are crucial to improve survival.
* Response to treatment: Surgery, radiation, and chemotherapy can offer good control and potential cure in many malignant cases

**WHEN TO SEE A DOCTOR / RED FLAG**

See your doctor and/or an ENT (ear, nose, and throat) specialist, or otolaryngologist, if the lump in your neck lasts longer than two to three weeks. This is a persistent neck mass, which means that the lump has not gone away. You should also see a doctor if you are not sure how long you have had the neck mass because your neck mass may mean that you have a serious medical problem. If you have any of the head and neck symptoms listed above, in addition to the neck mass, you should see your doctor right away. It may not be cancer, but you need to be evaluated. Your doctor will discuss any tests needed for diagnosing your neck mass and your follow-up care.

**DIFFERENTIAL DIAGNOSIS**

Benign Causes:

* Congenital/Developmental:
  + Branchial cleft cyst
  + Thyroglossal duct cyst
  + Cystic hygroma (lymphangioma)
  + Dermoid cyst
  + Laryngocele
  + Bronchogenic cyst
  + Congenital vascular malformations
* Infectious/Inflammatory:
  + Reactive lymphadenopathy (response to infection)
  + Bacterial lymphadenitis (Staphylococcus aureus, Streptococcus pyogenes, tuberculosis, atypical mycobacteria, cat scratch disease, Brucella)
  + Viral lymphadenitis (Epstein-Barr virus, HIV)
  + Protozoal infections (Toxoplasmosis, Leishmaniasis)
  + Fungal infections (Histoplasmosis, Blastomycosis, Coccidiomycosis)
  + Granulomatous diseases (Sarcoidosis, foreign body reaction)
  + Sialadenitis and sialolithiasis (salivary gland infections or stones)
  + Autoimmune diseases (Sjögren’s syndrome)
* Benign Neoplasms:
  + Lipoma
  + Benign salivary gland tumors (pleomorphic adenoma)

Malignant Causes:

* Lymphoma
* Metastatic carcinoma: Usually squamous cell carcinoma from upper aerodigestive tract (oral cavity, oropharynx, nasopharynx, larynx)
* Primary head and neck cancers: Thyroid carcinoma, salivary gland malignancies
* Soft tissue sarcomas

Vascular Lesions:

* Carotid body tumor (paraganglioma)
* Aneurysm or pseudoaneurysm
* Vagal or sympathetic chain schwannoma

Other/Miscellaneous:

* Thyroid nodules or goiter
* Inflammatory thyroid disease (e.g., Graves’ disease)
* Foreign body reaction or scar tissue

**EPIDEMIOLOGY**

* The overall prevalence of neck masses is approximately 14.1% in adult populations. The prevalence tends to increase with age, with the majority of cases seen in adults over 40 years, and particularly in those above 60 years.
* Malignant neck masses are common in adults, comprising a significant proportion — one study found that about 65.7% of neck masses were malignant, most often representing metastatic lymph nodes from primary cancers in the upper aerodigestive tract. Squamous cell carcinoma is the most frequent malignancy in this group, accounting for over half (54.1%) of malignant neck masses.
* Benign neck masses predominate in younger adults, while malignancy becomes more prevalent with advancing age. In another study, 91% of neck masses in adults were benign, with 9% malignant. Common benign masses include reactive or tubercular lymphadenopathy, thyroid enlargements (goiters, thyroid nodules), congenital cysts, and benign salivary gland tumors.
* Anatomical location: The anterior triangle of the neck is the most common site for neck masses (about 54%), followed by the midline and posterior triangle. Midline masses are more often thyroid or congenital cysts, whereas lateral masses in the anterior triangle often represent lymphadenopathy or branchial cleft cysts.
* Demographics: Males show a slightly higher prevalence of neck masses (15.9%) compared to females (12.4%).
* Clinical significance: In adults, a new persistent neck mass should always raise suspicion for malignancy until proven otherwise. Early diagnosis is critical, especially given the rising incidence of head and neck cancers such as oropharyngeal squamous cell carcinoma.
* Common presenting symptoms accompanying neck masses include swelling (reported in about 33.5%), tenderness (27%), fever (21%), and weight loss (13%), which may suggest malignancy or infectious etiology

**PREDEFINED Q & A SETS**

What causes masses in the neck?  
Neck masses can arise from a wide range of causes including infections (like swollen lymph nodes from viral or bacterial infections), congenital cysts, benign growths such as lipomas, and malignant tumors including head and neck cancers (e.g., thyroid, salivary gland, lymph node metastasis from other cancers). Other causes are inflammatory conditions and cystic lesions.

2. Is the mass in the neck cancerous?  
Not all neck masses are cancerous. Many are due to benign or infectious causes. However, persistent, hard, non-tender masses—especially in adults over 40, smokers, or heavy alcohol users—carry a higher risk of malignancy. Cancerous masses often grow slowly and do not resolve over time.

3. How urgently should I be evaluated?  
Any neck mass persisting more than two weeks, especially with other symptoms such as difficulty swallowing, hoarseness, weight loss, or pain, should be evaluated promptly. Rapid growth, hard consistency, or associated systemic symptoms warrant urgent assessment by a healthcare provider.

4. Is the mass in the neck hereditary?  
Most neck masses are not hereditary. Congenital cysts or familial syndromes may rarely cause inherited neck masses, but the majority are acquired due to infections, inflammation, or neoplasms.

5. What investigations are needed to diagnose the neck mass?  
Diagnosis begins with a thorough history and physical exam including evaluation of ear, nose, and throat regions. Investigations may include:

* Blood tests (CBC, infection markers)
* Imaging such as ultrasound of the neck, CT scans, or MRI to delineate the mass characteristics and extent
* Fine Needle Aspiration Biopsy (FNAB) or core needle biopsy to obtain tissue for pathological diagnosis
* Endoscopic examination (nasopharyngolaryngoscopy) to inspect areas of the airway and upper digestive tract not otherwise visible

6. What are the treatment options for neck mass?  
Treatment depends on the cause:

* Infections may require antibiotics or antiviral medications.
* Congenital cysts or benign tumors may be surgically removed if symptomatic.
* Malignancies often require a combination of surgery, radiation therapy, and/or chemotherapy based on cancer type and stage.

7. When will I hear back from you with the results of the biopsy?  
Biopsy results typically take 3 to 7 business days, depending on the pathology lab and the tests required. Your healthcare provider will inform you of the timeline and follow-up arrangements after the procedure.

If you notice any new or worsening symptoms like difficulty breathing, swallowing, or severe pain, seek immediate medical attention.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I understand you've noticed a lump in your neck. When did you first notice it?

Patient: About three weeks ago. It hasn't gone away and feels firm to me.

Doctor: Thank you for telling me. It’s important we evaluate this carefully. In adults, any neck mass that lasts longer than two weeks without signs of infection should be checked thoroughly because it can sometimes indicate something more serious, including cancer.

Patient: That sounds worrying. What will you do to find out what it is?

Doctor: The first step is a detailed history and physical examination, including looking at your neck and inside your mouth and throat, to assess the lump’s size, mobility, and if it’s fixed to surrounding tissues. Then, we usually recommend imaging, such as a CT or MRI scan with contrast, to get a clearer picture of the mass and nearby structures.

Patient: Will you need to take a sample from the lump?

Doctor: Yes, very often we use a procedure called a fine-needle aspiration, which is a safe and minimally invasive way to collect cells from the mass. This helps us determine if it’s an infection, a benign condition, or cancer.

Patient: If it’s cancer, what happens next?

Doctor: If the results suggest malignancy, we would refer you promptly to a specialist in head and neck cancers for further evaluation and treatment planning. Treatment may include surgery, radiation, or chemotherapy depending on the type and stage.

Patient: What if it’s not cancer?

Doctor: If the mass is due to infection or inflammation, we might treat you with antibiotics or other appropriate therapies and monitor your progress carefully. Some masses can be benign cysts or swollen lymph nodes.

Patient: Is there anything I should watch for in the meantime?

Doctor: Yes, if you notice the lump growing quickly, becoming painful, or if you develop other symptoms like difficulty swallowing, breathing problems, or significant weight loss, please contact us immediately. Early diagnosis and treatment are very important.

Patient: Thank you, Doctor. I appreciate you explaining everything clearly.

REFERENCES:

<https://www.aafp.org/pubs/afp/issues/2015/0515/p698.html>

[Neck Mass in Adults - ENT Health](https://www.enthealth.org/conditions/evaluation-of-neck-mass-in-adults/)

**Obstructive sleep apnea**

**DEFINITION / DESCRIPTION**

Obstructive sleep apnea (OSA) is a condition where a blockage or narrowing in your airway keeps air from moving through your windpipe when you’re asleep.

The blockage and lack of airflow can cause your blood oxygen levels to drop. This triggers a survival reflex in your brain that wakes you up just enough to breathe again. While that reflex is key in keeping you breathing, it also disrupts your sleep.

If you have frequent wakeups at night, you won’t feel rested in the morning. That can lead to a wide range of symptoms, many of which can affect your daytime functioning. Over time, these symptoms can lead to dangerous and sometimes life-threatening complications.

A healthcare provider can help you manage symptoms of OSA.

OSA affects up to 1 billion people around the world who are between the ages of 30 and 69.

**CAUSES**

A blockage in your upper airway causes obstructive sleep apnea. Your muscles relax when you sleep, even the ones that allow air to flow into your lungs. But there should still be enough room for air to get into your body. With sleep apnea, relaxed muscles and tissues block the airway. This prevents airflow, which causes you to stop breathing.

#### **What are the risk factors for obstructive sleep apnea?**

OSA can happen to anyone at any age or any body size. It’s more common if you have any of the following:

* Excess body weight (obesity)
* Structural abnormalities like having an underbite, small lower jaw, large tongue, large tonsils or large adenoids, a large neck or collar size (16-17 inches/41-43 centimeters)
* Genetic conditions that affect how your head and neck develop (like Down syndrome or Prader-Willi syndrome)

OSA is more common as you age but it can also affect children.

**SIGNS / SYMPTOMS**

Symptoms of obstructive sleep apnea that you or a sleeping partner will notice at night include:

* Frequent wakeups in the middle of the night
* Pauses in breathing while asleep
* Waking up out of breath (like you’re choking)
* Snoring
* Night sweats
* Feeling restless

Daytime symptoms may include:

* Fatigue, sleepiness or exhaustion
* Mood changes (depression and anxiety)
* Difficulty concentrating or remembering
* Headaches (often when waking up)
* Sexual dysfunction

#### **What does OSA sound like?**

You might notice the following characteristics in a sleeping partner who has OSA:

* Loud snoring that usually starts soon after falling asleep
* Snoring stops suddenly (while breathing stops)
* A snort or gasp for breath before snoring starts again

**DIAGNOSIS METHODS**

A healthcare provider will diagnose OSA after taking your medical history, performing a physical exam and recommending tests. During the exam, your provider will examine your mouth, neck and throat. They’ll also ask you about what symptoms you experience at night and during the daytime.

Two tests can help diagnose OSA, including:

* Overnight sleep study (polysomnogram): This is an overnight test where you sleep in a medical facility where they monitor your sleep.
* Home sleep apnea testing: This is similar to an overnight sleep study but doesn’t involve brain wave monitoring and other types of sensors and you get to stay home.

If you suspect you or a loved one has OSA, you might be able to help a healthcare provider diagnose it. You can take video and audio recordings of the person sleeping with their permission. This key evidence may help speed up the diagnostic process.

**TREATMENT OPTIONS**

Treatment for OSA may include:

* Making lifestyle changes like sleeping position adjustments (not sleeping on your back) or maintaining a weight that’s healthy for you
* Using a continuous positive airway pressure (CPAP) machine
* Wearing oral appliances (mouthpieces)
* Undergoing surgery

#### **Obstructive sleep apnea surgery**

Common types of surgeries to open your airway and treat OSA include:

* Uvulopalatopharyngoplasty (UPPP): Removing tissue from the back of your throat
* Tracheostomy: Opening your windpipe to bypass a blockage
* Tonsillectomy/adenoidectomy: Removing tonsils or adenoids
* Nerve stimulation: Implanting a device to stimulate airway muscles during sleep

**PREVENTION TIPS**

You can’t prevent all cases of OSA. But you can take steps to reduce your risk and improve your overall sleep by:

* Eating nutritious foods and participating in regular physical activities
* Maintaining a healthy weight
* Practicing good sleep hygiene (like setting a bedtime routine and turning off electronic devices before bed)
* Managing any existing health conditions, such as high cholesterol, high blood pressure and Type 2 diabetes
* Not smoking and not drinking beverages that contain alcohol before bed
* Seeing your healthcare provider annually for a check-up

**OUTLOOK / PROGNOSIS**

Untreated OSA may reduce your life expectancy and increase your risk of dangerous complications. But OSA is a treatable condition. A healthcare provider is the best person to talk to about what you can expect, as this answer is very unique to you.

### **What’s the outlook for obstructive sleep apnea?**

The outlook for OSA depends on many factors like the severity and whether you have other underlying conditions, too. However, you can expect a positive outcome if you stick to your treatment plan after you and your healthcare provider find one that works best for you.

**POSSIBLE COMPLICATIONS**

Obstructive sleep apnea can lead to dangerous and sometimes life-threatening complications that may include:

* Daytime drowsiness (dangerous if you’re driving or doing something that needs your full, undivided attention)
* Heart damage and heart failure
* Chronic health conditions like high blood pressure (hypertension) or Type 2 diabetes
* Arrhythmias (atrial fibrillation)
* Stroke
* Sudden cardiac death

**WHEN TO SEE A DOCTOR / RED FLAG**

Visit a healthcare provider if you suspect you or a loved one have symptoms of sleep apnea. It may help to record your breathing at night so your provider can learn more about what’s going on.

If you have OSA, stay regular with your follow-up appointments. Your provider will want to make sure your treatment is working effectively. Be honest with them if you’re having trouble wearing a PAP mask at night or changing your sleeping habits. They may have recommendations to make things easier.

If you have trouble breathing when you wake up or have symptoms of potentially life-threatening complications like a heart attack (chest pain, heartburn, cold sweats) or stroke (sudden weakness or numbness on one side, confusion, dizziness), contact your local emergency services number right away.

## **Diagnostic Considerations**

A diagnosis of narcolepsy may be delayed if obstructive sleep apnea (OSA) is considered the only condition. Patients should be routinely screened clinically for symptoms of narcolepsy. These patients do not typically have normal sleepiness when OSA has been treated; they may experience improvement in sleepiness, but it is important to question the diagnosis of sleepiness due to OSA despite ideal treatment.

## Indices for sleep-disordered breathing

The indices commonly used to assess sleep disordered breathing (SDB) are the apnea-hypopnea index (AHI) and the respiratory disturbance index (RDI).

The AHI is defined as the average number of episodes of apnea and hypopnea per hour. The RDI is defined as the average number of respiratory disturbances (obstructive apneas, hypopneas, and respiratory event–related arousals [RERAs]) per hour. If the AHI or RDI is calculated based on less than 2 hours of continuous recorded sleep, the total number of recorded events to calculate the AHI or RDI during sleep testing is at least the number of events that would have been required in a 2-hour period.

No universal consensus exists on whether the AHI or the RDI should be the standard index used to determine treatment by specialists and insurance carriers, with Medicare being the most confusing as it varies by region as to whether AHI and RDI can be used. This needs to be resolved as soon as possible. One study found that 30% of symptomatic patients would have been left untreated if the AHI were used rather than the RDI.

In the authors’ view, the RDI is preferable to the AHI because it includes flow-limitation events that end with arousals. The RDI is better suited to meet the new American Academy of Sleep Medicine (AASM) diagnostic criteria for OSA (see below). One study has demonstrated that use of the

Diagnostic criteria for OSA

According to the Centers for Medicare & Medicaid Services criteria for the positive diagnosis and treatment of obstructive sleep apnea,a positive test for OSA is established if either of the following criteria using the AHI or the RDI is met:

* AHI or RDI greater than or equal to 15 events per hour, or
* AHI or RDI greater than or equal to 5 and less than or equal to 14 events per hour with documented symptoms of excessive daytime sleepiness (EDS); impaired cognition; mood disorders; insomnia; or documented hypertension, ischemic heart disease, or history of stroke

The AASM has developed its own criteria, as listed in the *International Classification of Sleep Disorders: Diagnostic and Coding Manual, Second Edition.*At least 1 of the following criteria must apply for OSA to be diagnosed:

* The patient reports daytime sleepiness, unrefreshing sleep, fatigue, insomnia, and/or unintentional sleep episodes during wakefulness. The patient awakens with breath holding, gasping, or choking. The patient’s bed partner reports loud snoring, breathing interruptions, or both during the patient’s sleep.
* Polysomnography (PSG) shows more than 5 scorable respiratory events (eg, apneas, hypopneas, RERAs) per hour of sleep and/or evidence of respiratory effort during all or a portion of each respiratory event.
* PSG shows more than 15 scorable respiratory events (eg, apneas, hypopneas, RERAs) per hour of sleep and/or evidence of respiratory effort during all or a portion of each respiratory event.
* Another current sleep disorder, medical or neurologic disorder, medication use, or substance use does not better account for the patient’s condition.

Accreditation of sleep centers by the AASM is critical because there are still more centers that are unaccredited than there are centers that have chosen to meet the highest standards in the field (as evidenced by achieving AASM accreditation). Whether AASM accreditation translates into insurance companies deciding to pay for studies performed at an AASM-accredited center has yet to be determined, although in the authors’ opinion, payment should depend on achieving AASM accreditation.

Diagnostic considerations include the following:

* Chronic insufficient sleep
* Dyspnea due to pulmonary edema
* Idiopathic hypersomnia
* Nocturnal panic attacks
* Nonobstructive alveolar hypoventilation
* Obesity-hypoventilation syndrome (pickwickian syndrome)
* Periodic limb movement disorder
* Simple snoring
* Approximately 25% of narcoleptic persons also have obstructive sleep apnea)

## **Differential Diagnoses**

* Asthma
* Central Sleep Apnea Syndromes
* Chronic Obstructive Pulmonary Disease (COPD)
* Depression
* Gastroesophageal Reflux Disease
* Hypothyroidism
* Narcolepsy
* Periodic Limb Movement Disorder

**RECENT GUIDELINES OR UPDATES**

The recommendations for the indications and performance of polysomnography include the following:

* Sleep stages are recorded via an electroencephalogram, electro-oculogram, and chin electromyogram
* Heart rhythm is monitored with a single-lead electrocardiogram
* Leg movements are recorded via an anterior tibialis electromyogram
* Breathing is monitored, including airflow at the nose and mouth (using both a thermal sensor and a nasal pressure transducer), effort (using inductance plethysmography), and oxygen saturation
* The breathing pattern is analyzed for the presence of apneas and hypopneas (as per definitions standardized by the American Academy of Sleep Medicine)
* Clinical tools, questionnaires and prediction algorithms should not be used to diagnose OSA in adults without polysomnography or home sleep apnea testing (HSAT) .
* Polysomnography or home sleep apnea testing with a technically adequate device, should be used for the diagnosis of OSA in uncomplicated adult patients with clinical signs of an increased risk of moderate to severe OSA.
* When a single HSAT is negative, inconclusive, or technically inadequate, polysomnography should be performed for the diagnosis of OSA.
* Polysomnography should be used for the diagnosis of OSA in adults with significant cardiorespiratory disease, potential respiratory muscle weakness due to neuromuscular condition, awake hypoventilation or suspicion of sleep-related hypoventilation, chronic opioid medication use, history of stroke or severe insomnia.
* Referral to a sleep surgeon for alternative treatments should be discussed with patients with BMI < 40 kg/m2 if the patient's adherence and tolerance does not support adequate PAP or if the patient rejects PAP.
* Referral to a bariatric surgeon should be discussed with adults with OSA and obesity as an alternative treatment option if the patient's adherence and tolerance does not support adequate PAP or if the patient rejects PAP.
* Discussion regarding a referral to both sleep and bariatric surgeons to discuss management options may be appropriate in patients with a BMI range of 35–40 kg/m2. ​
* PAP should be the initial therapy for adults with OSA and a major upper airway anatomic abnormality prior to referral for upper airway surgery

**EPIDEMIOLOGY**

SDB is common in the United States. The National Commission on Sleep Disorders Research estimated that minimal SDB (RDI >5) affects 7-18 million people in the United States and that relatively severe cases (RDI >15) affect 1.8-4 million people. The prevalence increases with age. SDB remains undiagnosed in approximately 92% of affected women and 80% of affected men.

OSA is increasingly prevalent, in both adults and children, in modern society. The estimated prevalence has been 2% for women and 4% for men.Similar data have been found in an epidemiologic study from Pennsylvania.More recent research indicates a prevalence of 4% for women and 9% for men. Data from the Wisconsin Cohort Study indicate that the prevalence of OSA in people aged 30-60 years is 9-24% for men and 4-9% for women.

The prevalence in children is less certain, but the author’s sleep center is seeing increasing numbers of adolescent patients, who are often obese and present similarly to many of their adult counterparts, with the important exception that they may be sleepy and/or hyperactive. A 2007 study has suggested that approximately 6% of adolescents have weekly SDB.

### International statistics

The prevalence of OSA in non-American populations has only been studied in men and has been found to be as low as 0.3% (England) and as high as 20-25% (Israel and Australia). The prevalence of OSA in Australian men is estimated to be 3%.

### Age distribution for OSA

Aging is an important consideration of risk for OSA. OSA prevalence increases 2-3 times in older persons (>65 y) compared with individuals aged 30-64 years,with an estimated rate as high as 65% in a community sample of people older than 65 years.

After age 65 years, no further relative disparity is noted in the incidence of OSA. One explanation for this plateau is the relative increase in mortality in persons older than 65 years; however, data to support this contention, as attractive as it appears, are insufficient. Scant data are available to help clinicians determine if clinical management should differ between the age cohorts.

### Sex distribution for OSA

The male-to-female ratio in community-based studies is 2-3:1.Androgenic patterns of body fat distribution (deposition in the trunk, including the neck area) predispose men to OSA. In general, sex hormones may affect neurologic control of UA-dilating muscles and ventilation.

In population studies that have examined the incidence of OSA, women were not only less likely than men to have OSA but also less likely to be diagnosed early in the disease process. Survival rates are lower for women than for men, after an OSA diagnosis has been established by PSG, presumably due to the delayed OSA diagnosis.

Three large epidemiologic studies have demonstrated that the prevalence of OSA in women appears to increase after menopause.In these studies, women on hormone replacement therapy (HRT) had a prevalence similar to that of premenopausal women. Postmenopausal women are 3 times more likely to have moderate-to-severe OSA compared with premenopausal women. Women who are on HRT are half as likely to have OSA compared with postmenopausal women who are not on HRT.

Premenopausal women with OSAHS tend to be more obese than men with the same severity of disease. Thin women with symptoms of OSAHS appear to have an increased frequency of craniofacial abnormalities.

Evidence indicates that women underreport the symptoms of loud snoring and witnessed apneas, leading to underreferral to sleep centers. This may explain the marked male predominance (male-to-female ratio of approximately 8:1) in sleep center–based studies. Additionally, women have lower AHIs than men, even after correcting for other demographic factors such as BMI and neck circumference.

### Prevalence of OSA by race or ethnicity

African American individuals appear to be more predisposed to SDB than white persons. This increased predisposition varies according to age. The odds ratio is greater than 3 in children younger than 13 years and is 1.88 in persons younger than 25 years. In elderly African Americans, the risk is increased 2-fold. Examination of craniofacial morphology found that brachycephaly is associated with an increased AHI in whites but not in African Americans.

Chinese patients with OSA have a more crowded upper airway and relative retrognathia compared with their white counterparts, with statistical controls for BMI and neck circumference.Asians are known to have a shorter cranial base and a more acute cranial base flexure, increasing OSA risk, with BMI and neck circumference being roughly equal. Therefore, interestingly, obesity plays a more prominent role in OSA predisposition in whites than in Chinese persons. This may serve to underscore the role that craniofacial factors have in Chinese patients.

Other populations that may be at increased risk include Mexican Americans and Pacific Islanders.

**PREDEFINED Q & A SETS**

What is Obstructive Sleep Apnea (OSA)?  
Obstructive Sleep Apnea (OSA) is a sleep disorder characterized by recurrent episodes of partial or complete collapse of the upper airway during sleep, leading to reduced or absent airflow despite ongoing breathing efforts . These events cause a drop in blood oxygen levels and can disrupt sleep, leading to symptoms like daytime sleepiness .

2. What are the common symptoms of OSA?  
Common symptoms include habitual loud snoring, witnessed breathing interruptions (apneas) or gasping/choking during sleep, non-restorative sleep, excessive daytime sleepiness, and fatigue . Other symptoms can include insomnia, morning headaches, nocturia (frequent urination at night), decreased concentration, memory loss, decreased libido, and irritability .

3. What are the risk factors for developing OSA?  
Key risk factors include obesity (BMI > 30 kg/m²), male sex, age between 40 and 70 years, a large neck circumference (over 17 inches in men, 16 inches in women), and a family history of OSA . Other risk factors include retrognathia (a recessed chin), an enlarged tongue (macroglossia), enlarged tonsils, a high-arched hard palate, and certain medical conditions like hypertension, congestive heart failure, atrial fibrillation, type 2 diabetes, and stroke .

4. How is OSA diagnosed?  
Diagnosis typically involves a comprehensive evaluation by a healthcare provider, including a medical history, physical exam, and specialized sleep tests . The primary diagnostic test is polysomnography (PSG), which can be performed overnight in a sleep laboratory or sometimes at home . PSG monitors various bodily functions during sleep, including brain activity, heart rate, breathing patterns, blood oxygen levels, and limb movements .

5. What is measured during a sleep study to diagnose OSA?  
A sleep study measures the Apnea-Hypopnea Index (AHI), which is the total number of apneas (complete airflow obstruction for at least 10 seconds) and hypopneas (partial airflow obstruction with oxygen desaturation or arousal for at least 10 seconds) per hour of sleep .

* An AHI of 5 or more predominantly obstructive respiratory events per hour, along with symptoms (like sleepiness, fatigue, or cardiovascular comorbidities), is diagnostic of OSA .
* An AHI of 15 or more predominantly obstructive respiratory events per hour is diagnostic of OSA even without symptoms .

6. What are the severity classifications for OSA?  
OSA severity is classified based on the AHI:

* Mild OSA: AHI between 5 and less than 15 events per hour .
* Moderate OSA: AHI between 15 and 30 events per hour .
* Severe OSA: AHI greater than 30 events per hour .

7. Why is diagnosing OSA important?  
Diagnosing OSA is crucial because if left untreated, it can lead to serious health complications such as hypertension, heart disease (including coronary artery disease, congestive heart failure, and atrial fibrillation), stroke, and type 2 diabetes . It also impacts quality of life through excessive daytime sleepiness, which can impair cognitive function and increase the risk of accidents .

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Good morning! What brings you in today?

Patient: Hi, Doctor. My spouse says I snore loudly, and sometimes I seem to stop breathing during sleep. I often wake up tired, even after a full night's sleep.

Doctor: Those symptoms are common signs of obstructive sleep apnea, or OSA. It happens when your airway partially or fully collapses during sleep, causing breathing pauses. Have you noticed any episodes where you gasp or choke at night?

Patient: Yes, I sometimes wake up feeling like I can’t catch my breath, and I also feel very sleepy during the day.

Doctor: Excessive daytime sleepiness is a frequent consequence of OSA and increases risks like motor vehicle accidents. Other symptoms can include morning headaches, dry mouth, or difficulty concentrating. Do you have any risk factors such as obesity, a large neck circumference, or high blood pressure?

Patient: I am overweight, and my neck feels a bit thick. No high blood pressure, though.

Doctor: Those do increase your risk. The best way to confirm the diagnosis is with a sleep study. It can be done overnight in a sleep lab or sometimes at home. This test monitors your breathing, oxygen levels, and sleep patterns.

Patient: What happens if I am diagnosed with OSA?

Doctor: Treatment usually starts with lifestyle changes like weight loss and avoiding alcohol before bedtime. The most effective treatment is a CPAP machine, which gently keeps your airway open by delivering air pressure through a mask at night. For some patients, oral appliances or in select cases surgery may be options. Recently, there are also medications and implantable devices being used in certain cases.

Patient: Is CPAP hard to use?

Doctor: Some people find it uncomfortable at first, but it’s important to keep trying and work with your care team to find the right mask and settings. There are programs to help with adaptation, and often symptoms improve significantly with good compliance.

Patient: How soon can I expect to feel better?

Doctor: Many patients notice improved daytime alertness and better sleep within a few weeks of starting treatment. Long-term, effective therapy reduces risks of heart disease, stroke, and other complications.

Patient: Thank you, Doctor. I’m ready to get tested and start treatment.

Doctor: Great. We’ll schedule your sleep study and follow up with the results and a plan. Meanwhile, try sleeping on your side and avoid alcohol near bedtime.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK459252/>

<https://emedicine.medscape.com/article/295807-guidelines>

<https://www.mayoclinic.org/diseases-conditions/obstructive-sleep-apnea/diagnosis-treatment/drc-20352095>

[Obstructive Sleep Apnea (OSA): Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/24443-obstructive-sleep-apnea-osa#overview)

**Otosclerosis**

**DEFINITION / DESCRIPTION**

Otosclerosis *(oh-tuh-skli-ROH-sis)* is a condition that causes hearing loss. The term “oto” means “of the ear” and “sclerosis” means “abnormal hardening of body tissue.”

Otosclerosis happens when irregular bone remodeling/growth occurs in your middle ear or, more rarely, your inner ear. Bone remodeling is a lifelong process in which existing bone tissue repeatedly restores itself. In otosclerosis, irregular bone remodeling interferes with sound’s ability to travel through your ear.

People with otosclerosis can develop mild to severe hearing impairment. The condition rarely results in total deafness. It typically affects both ears, but one ear is usually worse than the other.

Over 3 million Americans have otosclerosis. It’s the most common cause of middle ear mechanical hearing loss among young adults.

Otosclerosis can affect anyone, but it occurs most often in white females between the ages of 20 and 45. Sometimes, otosclerosis runs in families.

**SIGNS / SYMPTOMS**

The most common symptom of otosclerosis is hearing loss which happens gradually. People with otosclerosis may notice that they can no longer hear whispering or low-pitched tones/sounds. In most cases, people with otosclerosis have hearing loss in both ears. Approximately 10% to 15% of individuals with otosclerosis have hearing loss in one ear.

Other possible otosclerosis symptoms include:

* Balance issues.
* Vertigo.
* Ringing in your ears (tinnitus).
* Dizziness.

If you have otosclerosis, you may speak quietly because your voice sounds loud to you.

**CAUSES**

Deep inside your ear, there are three tiny bones (ossicles) that vibrate to amplify the sound waves that pass through them. These sound waves travel to the cochlea in your inner ear, where they convert into signals before moving on to your brain. Otosclerosis most often develops when the stapes bone (a small, triangular bone in your middle ear) fuses with the surrounding bone tissue. As a result, sound can’t travel effectively.

Think about the musical instrument, the triangle. When held properly by the loop at the top, the triangle hangs free and creates a rich sound through vibration when struck. But if you place your hand around the triangle itself, the sound gets muffled. The stapes bone reacts in a similar way when excess bone grows around it.

#### **Otosclerosis risk factors**

A risk factor is something that increases your chance of developing a certain health condition. Possible risk factors for otosclerosis include:

* Family history. You’re more likely to develop otosclerosis if a parent, sibling or grandparent has it.
* Sex. Females are more prone to developing otosclerosis.
* Race. Overall, white people have a higher chance of getting otosclerosis.
* Pregnancy. People who are already prone to otosclerosis may develop the condition while they’re pregnant.
* Osteogenesis imperfecta (OI). Also known as brittle bone disease, OI increases your risk of otosclerosis.

## **Diagnosis and Test**

If your primary care physician thinks you might have otosclerosis, they’ll refer you to an otolaryngologist (ear, nose and throat specialist). First, they’ll rule out other health conditions that share similar symptoms. Next, they’ll run hearing tests to determine the extent of hearing loss.

These tests may include a/an:

* Audiogram, which measures your hearing across a range of frequencies.
* Tympanogram, which tells your provider how well your eardrum works.

Your healthcare provider may also request a CT (computed tomography) scan. This imaging test helps your provider see the bones and tissues inside your ear in more detail.

## **Management and Treatment**

Otosclerosis treatment depends on the location of irregular bone and the severity of your condition. Many people successfully manage otosclerosis-related hearing loss with hearing aids. In select cases, stapedectomy (a type of surgery) can help improve your hearing. If you have cochlear otosclerosis (in your inner ear), your provider may recommend a cochlear implant.

#### **Hearing aids**

Hearing aids amplify the sounds around you to help you hear better. An audiologist can customize the settings on your hearing aid according to your specific needs.

While hearing aids can improve your hearing, they can’t keep otosclerosis from getting worse. Ask your healthcare provider whether hearing aids are right for your situation.

#### **Stapedectomy**

“Stapedectomy” *(stay-puh-DEK-tuh-mee)* is the medical term for otosclerosis surgery*.* During this procedure, an otolaryngologist places a prosthesis (replacement hearing bone) in your middle ear. This prosthesis bypasses the stapes bone, allowing sound waves to travel to your inner ear. As a result, your hearing improves.

If otosclerosis affects both of your ears, your surgeon will operate on one ear at a time so each has time to heal. Once the first surgery is complete, you’ll probably have to wait at least six months to schedule your next procedure.

#### **Cochlear implants**

Cochlear implants can improve hearing in people with cochlear otosclerosis. (Your cochlea is a spiral, fluid-filled structure in your inner ear that helps with hearing.) A cochlear implant bypasses your inner ear structures and creates a new pathway on which sounds can travel to your brain.

**PREVENTION TIPS**

Unlike some other hearing conditions, there are no preventable risk factors for otosclerosis (like exposure to loud noises). Some people are more prone to it from a genetic standpoint. As a result, there’s no way to prevent otosclerosis from developing.

**OUTLOOK / PROGNOSIS**

Otosclerosis usually gets worse slowly, over the course of many years. But the timeframe can vary from person to person. It often begins in one ear and spreads to the other ear over time. In rare cases, otosclerosis can progress quickly.

If you notice sudden changes in your hearing, schedule an appointment with your healthcare provider.

### **How do you fix otosclerosis?**

You can’t cure otosclerosis, but you can manage it with treatment. You’ll likely need a hearing aid or surgery, depending on your specific situation. Or your provider may monitor your condition and recommend treatment only if symptoms worsen.

### **What happens if otosclerosis is left untreated?**

Without treatment, otosclerosis may get worse over time. In some cases, it can spread to your inner ear and cause cochlear otosclerosis. Your healthcare provider can discuss your options with you and tell you whether they recommend monitoring your condition or moving forward with treatment.

**WHEN TO SEE A DOCTOR / RED FLAG**

Any time you notice a change or decrease in your hearing ability, you should schedule an appointment with your healthcare provider. Prompt diagnosis and treatment can help ease troublesome symptoms and improve your quality of life.

**DIFFERENTIAL DIAGNOSIS**

* Cerumen Impaction (Ear Wax Blockage):  
  Causes sudden painless hearing loss; confirms complete canal occlusion with physical exam.
* Chronic Otitis Media with Effusion (Glue Ear):  
  Usually presents with a retracted or immobile tympanic membrane and middle ear fluid.
* Chronic Suppurative Otitis Media and Cholesteatoma:  
  May present with retracted or perforated tympanic membrane, chronic drainage, and progressive hearing loss.
* Tympanic Membrane Retraction or Scarring:  
  Causes conductive hearing loss with normal or immobile membrane but no bone fixation.
* Ossicular Chain Discontinuity or Fixation:  
  Due to trauma, congenital malformations, or middle ear disease causing conductive or mixed hearing loss.
* Glomus Tumors (Paragangliomas):  
  Present as pulsatile tinnitus, conductive hearing loss with a reddish-blue pulsating mass behind an intact tympanic membrane; confirmed by imaging.
* Anomalous Carotid Artery or High Jugular Bulb:  
  Vascular anomalies mimicking middle ear masses.
* Paget’s Disease of Bone:  
  Otodystrophy affecting the temporal bone causing conductive or sensorineural hearing loss.
* Fibrous Dysplasia / Osteogenesis Imperfecta:  
  Rare genetic bone disorders affecting the temporal bone.
* Other Causes of Conductive Hearing Loss:  
  Otitis externa with canal debris, tympanosclerosis, and middle ear tumors.

**EPIDEMIOLOGY**

### Frequency

Otosclerosis affects 10% of the white population. Frequency, as mentioned above, is thought to be decreasing secondary to measles vaccination.

Otosclerosis is inherited in an autosomal dominant pattern with incomplete penetrance. Women are 2 times more likely to develop the disease than men. Otosclerosis is generally limited to the white population.

**PREDEFINED Q & A SETS**

### **Otospongiosis vs. otosclerosis: What’s the difference?**

“Otospongiosis” refers to the early stages of otosclerosis. During this time, soft bone begins to form. Over time, these areas of bone scar and become hardened. Once this occurs, providers call it “otosclerosis.”

## What is Otosclerosis?

Otosclerosis is an abnormal bone remodeling disease affecting the temporal bone of the middle and inner ear, particularly the otic capsule and the stapes bone. This abnormal bone growth results in stiffening or fixation of the stapes, preventing it from vibrating properly and thus impairing sound transmission, leading primarily to conductive hearing loss.

## What are the main symptoms of Otosclerosis?

* Hearing loss, typically progressive and most often affecting low frequencies initially, sometimes becoming bilateral.
* Tinnitus (ringing or buzzing in the ear) is common and can vary in severity.
* Sometimes vertigo or dizziness may occur.
* The hearing loss can eventually involve a sensorineural component at later stages.

## What causes Otosclerosis?

The exact cause remains unclear, but factors may include:

* Genetic predisposition (autosomal dominant inheritance with incomplete penetrance).
* Possible links to measles infection, immune system/cytokine imbalances, or stress fractures in bone tissue.
* Women are 2–3 times more commonly affected than men.

## How is Otosclerosis diagnosed?

Diagnosis relies on:

* Clinical history and symptoms.
* Audiometric tests showing characteristic conductive hearing loss with features like the Carhart notch.
* Imaging (CT scan) can help confirm diagnosis and extent.
* Occasionally, aural acoustic tests and exploratory surgery may be used.

## How is Otosclerosis treated?

* Hearing aids may be used for mild cases to amplify sound.
* Surgery is the definitive treatment for significant hearing loss, particularly a stapedectomy or stapedotomy, where the immobilized stapes bone is partially or fully removed and replaced with a prosthesis to restore sound conduction.

## What is the prognosis?

* With treatment, especially surgery, many patients experience significant improvement in hearing.
* Untreated, hearing loss may progressively worsen.
* Tinnitus may or may not improve.

## **Key Genomic Findings:**

* A 2023 GWAS identified 27 loci associated with otosclerosis, including 23 novel loci. Significant loci include those near genes *LTBP3* and *SCYL1*, with one locus on chromosome 11 associated in multiple cohorts.
* Earlier linkage studies found nine loci for monogenic otosclerosis, but specific causative genes remain mostly unidentified.
* Candidate genes repeatedly associated with otosclerosis susceptibility include:
  + RELN, a novel candidate region identified by GWAS.
  + TGFB1 (transforming growth factor beta 1): Variants like −509C>T and a de novo promoter mutation −832G>A reduce TGFB1 gene expression and are linked to increased otosclerosis risk, implicating the TGF-β1 signaling pathway as central to disease pathogenesis.
  + BMP2 and BMP4 (bone morphogenetic proteins), involved in bone formation, are also implicated and interact within the TGF-β1 pathway.
  + MEPE, associated with bone homeostasis, is significantly linked to otosclerosis and also to increased risk of bone fractures.
  + SERPINF1 and ACAN: Additional candidate genes identified by next-generation sequencing, related to bone remodeling and cartilage matrix.
* The genetic model is *multifactorial*, involving complex interactions of multiple genes and environmental triggers such as viral infections, hormones, and immune factors

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you've been experiencing some hearing loss. Can you tell me more about your symptoms?

Patient: Yes, I feel like my hearing is getting worse, mostly in one ear. Sometimes my own voice sounds really loud or funny to me, and sometimes I hear a ringing noise.

Doctor: That sounds consistent with otosclerosis, a condition where abnormal bone growth in the middle ear affects how sound is conducted. It often starts gradually in one ear but can affect both ears over time. People often notice muffled sounds from their environment but exaggerated internal sounds, like chewing or talking.

Patient: What causes this condition?

Doctor: The exact cause isn’t fully understood, but it involves abnormal bone remodeling around the smallest bones in the ear, especially the stapes bone. It can run in families and sometimes progresses slowly over the years.

Patient: How do you diagnose it?

Doctor: We start with hearing tests to see how well you hear different sounds and check the movement of the middle ear bones. Sometimes we use tuning fork tests and may do imaging like CT scans if needed. These confirm if hearing loss is due to mechanical issues, like stapes fixation, rather than inner ear damage.

Patient: What treatment options do I have?

Doctor: There are a few options. Hearing aids can help amplify sounds and are a good non-surgical approach, especially in early or mild cases. If your hearing loss worsens and affects your quality of life, surgery called a stapedotomy or stapedectomy can replace the fixed stapes bone with a tiny prosthesis to restore sound conduction. The surgery has a high success rate, with over 90% of patients improving their hearing significantly, and recovery is usually straightforward.

Patient: Are there risks with surgery?

Doctor: Like any surgery, there are risks such as worsening hearing loss, tinnitus, dizziness, or taste changes, so you would need careful monitoring after the procedure. We always weigh the benefits and risks before proceeding.

Patient: So what should I do now?

Doctor: The first step is to perform a comprehensive hearing evaluation. From there, we’ll discuss the best plan tailored to your situation. If hearing aids are appropriate, we can begin that and monitor your progress closely. If surgery becomes the best option later, we’ll prepare you thoroughly for that.

Patient: Thank you, that helps me understand what to expect.

REFERENCES:

<https://www.ncbi.nlm.nih.gov/books/NBK560671/>

<https://emedicine.medscape.com/article/859760-overview#a7>

[Otosclerosis: Symptoms, Causes & Treatment](https://my.clevelandclinic.org/health/diseases/22033-otosclerosis#overview)

**Ozena (atrophic rhinitis)**

**DEFINITION / DESCRIPTION**

Atrophic rhinitis is nasal dryness that occurs when tissue inside of your nose thins or atrophies. Eventually, the tissue hardens. As a result, the nasal cavities where air flows through your nostrils widen. Your nasal passages become too dry, causing a foul-smelling nasal crust to form.

#### **What do the terms “atrophic” and “rhinitis” mean?**

You might better understand this condition when you break it down:

* Atrophic or atrophy is the medical term for the shrinking, thinning or loss of tissue. With atrophic rhinitis, a thin layer of expandable tissue called mucosa inside of your nose becomes thinner and then hardens. This tissue covers bones called the turbinates that warm, humidify and filter the air you breathe. The turbinate bones may also shrink or become thinner.
* Rhinitis is swelling (edema) and inflammation of your nasal passages. This inflammation affects your respiratory system, causing breathing problems.

Atrophic rhinitis is a type of nonallergic rhinitis. The common cold is another type. At any given time, as many as 30 million Americans have some type of nonallergic rhinitis.

#### **Nonallergic rhinitis and allergic rhinitis**

Allergic rhinitis (hay fever) is triggered by allergens that trigger an immune response. These triggers include (but aren’t limited to) pollen, mold, pet dander or other allergens. Symptoms include chronic nasal congestion, runny nose, sneezing, sore throat and postnasal drip.

With nonallergic rhinitis, triggers like odors, smoke, medications and hormonal imbalances generally cause you to sneeze or have a runny nose. You may also have a chronic cough from postnasal drip.

### **Types of atrophic rhinitis**

There are two types of atrophic rhinitis:

* Primary atrophic rhinitis is rare in North America. It affects about 1% of adults who live in hot, dry climates like India, Africa and Saudi Arabia. This type can also affect livestock like pigs and cows.
* Secondary atrophic rhinitis mostly affects people who get sinus surgeries. It can occur after a turbinate reduction. This surgical procedure for nasal congestion removes part or all of the turbinates and reduces (shrinks) your mucosa tissue.
* Rhinitis medicamentosa: This condition may lead to rhinitis in people who are taking nasal decongestants (such as oxymetazoline and phenylephrine) for long periods. Using these nasal sprays for more than three consecutive days isn’t generally recommended. The condition may lead to atrophic rhinitis.

**CAUSES**

In addition to nasal surgeries, other potential risk factors for secondary atrophic rhinitis include:

* Autoimmune diseases.
* Granulomatosis with polyangiitis (GPA, formerly called Wegener’s).
* Infections, including sinus infections.
* Radiation therapy.
* Sarcoidosis.
* Syphilis.
* Trauma or injury to your nose.
* Chronic use of nasal decongestants.

Potential causes of primary atrophic rhinitis include:

* Allergies.
* Bacterial infections.
* Estrogen hormone imbalance.
* Family history of atrophic rhinitis.
* Lack of iron or vitamins A or D.
* Structural changes to nasal passages present at birth (congenital).

**SYMPTOMS**

Atrophic rhinitis can cause a foul-smelling crust to form inside your nostrils. Your nose may bleed if you try to dislodge it. You may also have bad breath (halitosis). You might not notice these odors, but others will.

Other symptoms of atrophic rhinitis include:

* Chronic nosebleeds (epistaxis).
* Nasal discharge of pus.
* Nasal dryness and crusting.
* Sinus infections (sinusitis)

**DIAGNOSIS METHODS**

You receive care from an otolaryngologist, a medical doctor who specializes in ear, nose and throat (ENT) conditions. Your healthcare provider will perform a physical exam and may initially diagnose the condition based on your symptoms.

You may also receive:

* Allergy tests to confirm or rule out allergies.
* CT scan to get detailed images of your nasal cavities.
* Nasal endoscopy using a flexible tube with a camera (endoscope) to view the inside of your nostrils and check for nasal polyps or other problems.
* Nasal inspiratory flow test to measure airflow when you breathe.

**TREATMENT OPTIONS**

There isn’t a cure for atrophic rhinitis, but treatments can reduce the foul-smelling crust and minimize symptoms. They include:

* Antibiotic ointments that you apply inside of your nose.
* Moisturizing nasal ointments.
* Estrogen in a pill or nasal spray.
* Vitamins.
* Humidifier.

### **Surgical treatments for atrophic rhinitis**

Although rare, some people get surgery to treat the condition. There are different surgical procedures. Your healthcare provider can discuss the best option for you.

Surgery can:

* Close off one nostril and nasal cavity, sometimes with a prosthetic (artificial) device.
* Make your nasal passages smaller.
* Intranasal injections.

### **Home remedies for atrophic rhinitis**

You can take these steps to ease symptoms of atrophic rhinitis:

* Lubricate nasal passages with nasal sprays or drops as recommended by your healthcare provider.
* Moisturize the air with a humidifier.
* Rinse out your nasal passages with a saltwater solution (nasal irrigation).

**OUTLOOK / PROGNOSIS**

Atrophic rhinitis is a chronic (long-term) condition. You can take steps to keep your nasal passages moist and minimize symptoms.

**POSSIBLE COMPLICATIONS**

In rare instances, atrophic rhinitis can cause you to lose your sense of smell (anosmia). You may also develop empty nose syndrome. This condition can make you feel like there’s something blocking your nasal passages, yet they’re wide open. As a result, you may constantly feel short of breath even though your lungs are taking in sufficient oxygen.

## **Prevention**

Unfortunately, there isn’t any way to prevent atrophic rhinitis.

**WHEN TO SEE A DOCTOR / RED FLAG**

Call your healthcare provider if you experience:

* Difficulty breathing.
* Diminished sense of smell.
* Chronic cough.
* Nasal dryness and crusting.
* Nasal obstruction (feeling like there’s something blocking your open nasal passages).
* Recurrent nosebleeds.

**DIFFERENTIAL DIAGNOSIS**

* Chronic sinusitis (especially with mucosal thickening and crusting)
* Allergic rhinitis (characterized by sneezing, nasal congestion, itching rather than mucosal atrophy)
* Nasal polyps (can cause obstruction and crusting but with distinct polypoid growths)
* Other forms of nonallergic rhinitis (e.g., vasomotor rhinitis)
* Granulomatous diseases such as sarcoidosis or Wegener's granulomatosis involving the nasal mucosa
* Infectious rhinitis secondary to tuberculosis, syphilis, or leprosy (especially in areas where these are endemic or if systemic symptoms are present)
* Nasal neoplasms which can cause foul odor and obstruction due to tissue destruction
* Empty nose syndrome (often post-surgical, characterized by paradoxical nasal obstruction despite wide nasal passages)
* Secondary atrophic rhinitis caused by prior nasal surgery, trauma, or radiation
* Foreign body or chronic irritant exposure (e.g., chronic cocaine abuse causing mucosal atrophy and crusting)

**EPIDEMIOLOGY**

* Prevalence: Atrophic rhinitis is relatively uncommon, with prevalence ranging from approximately 0.3% to 1% in regions where it is endemic, particularly in tropical countries such as India. The incidence has been decreasing globally, likely due to improved hygiene and antibiotic use.
* Age distribution: It primarily affects adults, with the highest number of cases occurring in the 51-60 years age group, followed by those aged 61-70 years. However, cases have been reported from adolescence (as young as 12 years) to older adults.
* Gender: The condition is more common in females, with female-to-male ratios reported as high as 4.7:1 to 2.5:1 in different studies.
* Socioeconomic impact: Lower socioeconomic status is a significant predisposing factor, linked to poor hygiene and nutritional factors. Many patients come from rural or less-developed areas.
* Geographical distribution: It shows higher prevalence in tropical and subtropical regions, particularly in India and similar countries with warm climates.
* Types:
  + Primary atrophic rhinitis is less common nowadays but still persists in some populations.
  + Secondary atrophic rhinitis, arising due to trauma, surgery, infection, or radiation exposure, is more commonly encountered in industrialized countries.
* Chronicity: Most patients present with chronic symptoms lasting from 1 to over 10 years, and many cases are diagnosed at an advanced stage

**PREDEFINED Q & A SETS**

## What is atrophic rhinitis?

Atrophic rhinitis is a chronic condition where the nasal mucosa thins (atrophies) and hardens, leading to widening of the nasal passages, nasal dryness, crusting, and sometimes foul odor. It may also cause a decreased or lost sense of smell (anosmia) and contribute to conditions like empty nose syndrome.

## What causes atrophic rhinitis?

It can be either:

* Primary atrophic rhinitis, often associated with infections like Klebsiella, poor nutrition, hormonal imbalances, and possible genetic predisposition.
* Secondary atrophic rhinitis, resulting from nasal surgery (like turbinectomy), trauma, chronic infections, or systemic diseases.

## What are the main symptoms?

* Nasal dryness and crusting
* Widened nasal cavities
* Foul-smelling nasal discharge
* Nasal congestion despite wide nasal passages
* Loss or reduction of smell (anosmia)
* Feeling of nasal blockage (may be related to empty nose syndrome).

## How is atrophic rhinitis diagnosed?

Diagnosis is based on clinical history and examination, including:

* Nasal endoscopy to inspect mucosa and secretions
* Imaging (CT scan) to evaluate bony and mucosal changes
* Microbiological testing if infection is suspected.

## What treatments are available?

* Conservative measures: Nasal hygiene with saline irrigations or nasal douches, moisturizing nasal sprays (avoiding oily drops due to risk of lipoid pneumonia), smoking cessation, and nutritional support.
* Topical antibiotics: For secondary infection, e.g., gentamicin nasal irrigation targeting bacteria like Klebsiella.
* Systemic supplements: Iron, vitamins A and D, zinc, and protein supplements for malnourished patients.
* Surgical options: To reduce nasal cavity size or grafting procedures, especially in empty nose syndrome or severe cases unresponsive to medical treatment.
* Emerging treatments: Hormonal nasal drops such as estradiol in select cases (primary type 1 only).

## Can atrophic rhinitis be prevented?

There is no guaranteed prevention, but good nasal hygiene, early treatment of nasal infections, avoiding trauma and unnecessary nasal surgeries, maintaining good nutrition, and smoking cessation may reduce the risk.

## How does atrophic rhinitis affect quality of life?

It is a chronic condition that can cause significant discomfort due to nasal crusting, foul odor, nasal obstruction sensations, and reduced smell, impacting daily activities and social interactions. Effective management can improve symptoms and quality of life

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, you mentioned you've been experiencing some issues with your nose. Can you tell me more about what's been bothering you?

Patient: Yes, my nose feels constantly dry, and I have these thick crusts that form inside. Sometimes, there's a really bad smell, and my breathing feels strange, even though my nose seems wide open.

Doctor: I see. Those symptoms you're describing—nasal dryness, crusting, and a foul odor—are classic for a condition called atrophic rhinitis. It’s a chronic inflammatory disease where the lining inside your nose, the mucosa, thins and hardens. This can make your nasal passages feel unusually roomy, yet paradoxically, you might still feel obstructed due to the crusting.

Patient: Atrophic rhinitis? I've never heard of that. What causes it?

Doctor: There are two main types. Primary atrophic rhinitis often doesn't have a clear cause, but it can be linked to factors like certain infections, nutritional deficiencies, or even hormonal changes. The other type is secondary atrophic rhinitis, which can develop after nasal surgeries, especially those that reduce the turbinates, or after trauma or chronic infections. Have you had any nose surgeries or significant nasal injuries in the past?

Patient: No, no surgeries. So, what can be done about this? Is there a cure?

Doctor: While there isn't a definitive cure, we have several treatments aimed at managing symptoms and improving your quality of life. The mainstays of treatment involve good nasal hygiene. This includes regular saline nasal irrigations or douches to keep the nose moist and help remove crusts. We might also recommend specific nasal drops to moisturize the lining.

Patient: So, just washes and drops?

Doctor: Those are the foundation. If there's any sign of infection, we might use topical antibiotics. In some cases, we look at your overall nutrition, as certain deficiencies can play a role. If these medical treatments aren't sufficient, or if the nasal passages are extremely wide, there are surgical options that aim to reduce the size of the nasal cavity or improve the condition of the mucosa.

Patient: Will I get my sense of smell back?

Doctor: Atrophic rhinitis can cause a decreased or lost sense of smell, also known as anosmia. While treatment can sometimes improve this, it's not always fully reversible. The primary goal is to alleviate the dryness, crusting, and odor, which can significantly improve your comfort.

Patient: What if the bad smell is still there, and I don't notice it?

Doctor: That's a common characteristic of atrophic rhinitis; patients often can't detect the foul odor themselves, but others around them might. This is part of why managing the crusting and dryness is so important. We'll work to reduce the source of the odor.

Patient: Okay, so where do we start?

Doctor: We'll begin with a more thorough examination, possibly including a nasal endoscopy to look inside your nose. This helps us confirm the diagnosis and assess the extent of the condition.

REFERENCES:

<https://my.clevelandclinic.org/health/diseases/22886-atrophic-rhinitis>

<https://onewelbeck.com/news/chronic-rhinitis-causes-and-treatment/>

**Otitis media**

ALTERNATIVE NAMES

**EAR INFECTION**

**DEFINITION / DESCRIPTION**

An ear infection, also called acute otitis media, is a sudden infection in your middle ear. The middle ear is the air-filled space between your eardrum and inner ear. It houses the delicate bones that transmit sound vibrations from your eardrum to your inner ear so you can hear.

Eustachian tubes are canals that connect your middle ear to the back of your throat. They regulate air pressure in your ear and prevent fluid from accumulating in your middle ear space.

If a eustachian tube doesn’t function well, fluid has a hard time draining from your middle ear space and can cause muffled hearing. Ear infections (from viruses and bacteria) also cause middle ear fluid. In these cases, the middle ear fluid is infected and often causes discomfort in addition to muffled hearing.

Middle ear infections are the most common childhood illness other than colds. Ear infections occur most often in children between 6 months and 2 years. They’re common until age 8.

Older children and adults can get ear infections, too, but they don’t happen nearly as often as in young children.

##### **Why are children more likely to get ear infections than adults?**

Children get ear infections more often than adults because:

* Their eustachian tubes don’t function as well as adults, and this encourages fluid to gather behind the eardrum.
* Their immune system, the body’s infection-fighting system, is still developing.
* They’re more likely to catch illnesses from other children.

**CAUSES**

Bacteria and viruses cause ear infections. Often, ear infections begin after a cold or another upper respiratory infection. The germs travel into your middle ear through the eustachian tube. Once inside, the virus or bacteria can cause your eustachian tubes to swell. The swelling can cause the tube to become blocked, leading to poor eustachian tube function and infected fluid in your middle ear.

#### **Are ear infections contagious?**

Ear infections aren’t contagious, but the virus and/or bacteria causing the infection are. Multiple types of bacteria and viruses cause ear infections, including ones that cause colds and the flu.

#### **Risk factors for ear infections**

Risk factors for ear infections include:

* Age: Infants and young children (between 6 months and 2 years) are at a greater risk for ear infections.
* Family history: Getting ear infections can run in the family.
* Colds: Having a cold increases your risk of developing an ear infection. Children in daycare and group settings are at a greater risk of ear infections because they’re more likely to be around children with colds or other contagious respiratory illnesses.
* Chronic illnesses: Long-term illnesses, including immune deficiency and chronic respiratory diseases (such as cystic fibrosis and asthma), can increase your risk of ear infections.
* Ethnicity: Children who are Native American, Hispanic and Alaska Natives have more ear infections than children of other ethnic groups.
* Poor air quality and smoky environments: Exposure to toxins in the air, secondhand smoke, increase your risk of getting an ear infection.

**SIGNS / SYMPTOMS**

Symptoms of an ear infection often begin after a cold. They include:

* Ear pain.
* Loss of appetite.
* Trouble sleeping.
* Trouble hearing in the ear that’s blocked.
* A feeling of fullness or pressure in your ear.
* Yellow, brown or white drainage from your ear. (This may mean that your eardrum has broken.)

Don’t place anything in your ear canal if you have drainage from your ear. An item touching a torn (ruptured) eardrum can cause more damage.

#### **Infants and children**

Since small children and infants can’t always communicate their symptoms, it’s important to recognize the signs. A child with an ear infection may:

* Rub or tug on their ears.
* Cry more than usual or act fussy.
* Have a fever ranging from 100.5 to 104 degrees Fahrenheit (38 to 40 degrees Celsius). (Half of children have fevers with ear infections.)
* Start mouth breathing or have increased snoring. Mouth breathing may be a sign of enlarged adenoids. (Adenoids are small pads of tissue above your throat, behind your nose and near your eustachian tubes.) Adenoids may become infected/inflamed with the same viruses or bacteria that cause ear infections.
* Refuse to eat during feedings. (Pressure in the middle ear changes as your child swallows, causing more pain and less desire to eat.)

**DIAGNOSIS METHODS**

Most healthcare providers can tell if your child has an ear infection based on their symptoms, a physical exam to check for signs of a cold and an ear exam. For the ear exam, your child’s healthcare provider will view your child’s eardrum using a lighted instrument called an otoscope. An inflamed, swollen or red eardrum is a sign of an ear infection.

Your child’s provider may use a pneumatic otoscope to check for fluid in your child’s middle ear. A pneumatic otoscope blows a puff of air at the eardrum, which should cause it to move back and forth. It won’t move easily if there’s fluid inside your child’s ear.

#### **Are there additional tests my child may need?**

Your child may need other tests, including:

* Tympanometry: This test uses air pressure to check for fluid in your child’s middle ear.
* Acoustic reflectometry: This test uses sound waves to check for fluid in your child’s middle ear.
* Tympanocentesis: This procedure allows your child’s provider to remove fluid from your child’s middle ear and test it for viruses and bacteria. Their provider may recommend tympanocentesis if other treatments haven’t cleared the infection.
* Hearing tests: A provider called an audiologist might perform hearing tests to determine if your child has hearing loss. Hearing loss is more common in children with long-lasting or frequent ear infections or fluid in the middle ear that doesn’t drain.

**TREATMENT OPTIONS**

Treatment depends on many factors, including:

* Your child’s age.
* The severity of the infection.
* The nature of the infection (first-time, ongoing or repeat infection).
* Whether fluid remains in the middle ear for a long time.

Often, ear infections heal without treatment. Your provider may monitor your child’s condition to see if it improves before prescribing treatments. Your child may need antibiotics or surgery for infections that don’t go away. In the meantime, pain medicines can help with symptoms like ear pain.

#### **Antibiotics**

Your child may need antibiotics if bacteria are causing the ear infection. Healthcare providers may wait up to three days before prescribing antibiotics to see if a mild infection clears on its own. If an infection is severe, your child may need to start antibiotics immediately.

The American Academy of Pediatrics provides guidelines on when a child should receive antibiotics and when it’s better to observe. Factors include your child’s age, the severity of their infection and their temperature. The table below summarizes the recommendations.

American Academy of Pediatrics Treatment Guide for Acute Otitis Media (AOM)

| **Child’s Age** | **Severity of AOM / Temperature** | **Treatment** |
| --- | --- | --- |
| 6 months and older; in one or both ears. | Moderate to severe for at least 48 hours or temp of 102.2 degrees F (39 degrees C) or higher. | Treat with antibiotics. |
| 6 months through 23 months; in both ears. | Mild for less than 48 hours and temp less than 102.2 degrees F (39 degrees C). | Treat with antibiotics. |
| 6 months to 23 months; in one ear. | Mild for less than 48 hours and temp less than 102.2 degrees F (39 degrees C). | Treat with antibiotics OR observe. If observe, start antibiotics if the child’s condition worsens or doesn’t improve within 48 to 72 hours of start of symptoms. |
| 24 months or older; in one or both ears. | Mild for less than 48 hours and temp less than 102.2 degrees F (39 degrees C). | Treat with antibiotics OR observe. If observe, start antibiotics if the child’s condition worsens or doesn’t improve within 48 to 72 hours of start of symptoms. |

Even if symptoms improve, don’t stop taking the medicine until your provider tells you to stop. The infection can return if your child doesn’t take all antibiotics as prescribed.

#### **Pain-relieving medications**

Your healthcare provider may recommend over-the-counter (OTC) medicines, such as acetaminophen (Tylenol®) or ibuprofen (Advil®, Motrin®), to relieve pain and reduce fever. They may prescribe pain-relieving ear drops. Follow your provider’s instructions about what medicines are safe for your child.

Never give aspirin to children. Aspirin can cause a life-threatening condition called Reye’s syndrome.

#### **Ear tubes (tympanostomy tubes)**

Your child may need ear tubes if they experience frequent ear infections, infections that don’t improve with antibiotics or hearing loss related to fluid buildup. An ear, nose and throat (ENT) specialist places the tubes during a tympanostomy. It’s a short (approximately 10-minute) procedure. Your child can go home that same day.

During a tympanostomy, a provider inserts a small metal or plastic tube into a tiny incision (cut) in your child’s eardrum. The procedure to perforate (pierce a hole into) and drain the eardrum is called a myringotomy. Once the tubes are in place, they let air into the middle ear and allow fluid to drain.

The tube usually stays in place for 12 to 18 months. It may fall out on its own, or your child may need surgery to remove it. Once the tubes are gone, the hole in your child’s eardrum will heal and close.

**PREVENTION TIPS**

Here are some ways to reduce your or your child’s risk of ear infections:

* Prevent colds and other respiratory illnesses. Be proactive in preventing colds, especially during your child’s first year. Teach them about frequent handwashing and coughing or sneezing into their elbow. Don’t allow them to share food, cups or utensils. If it’s an option, avoid large daycare centers until they’re older.
* Avoid secondhand smoke. Avoid exposure to secondhand smoke, and don’t allow others to smoke around your child.
* Breastfeed your baby. If possible, breastfeed your baby during the first six to 12 months. Antibodies in breast milk fight viruses and bacteria that cause infections.
* Bottle-feed your baby in an upright position. If you bottle-feed, hold your baby upright so their head is higher than their stomach. This position can prevent formula or other fluids from flowing backward and collecting in their eustachian tubes.
* Stay up to date on vaccinations. Ensure your child’s immunizations are current, including yearly flu shots for children 6 months and older. Ask your child’s pediatrician about vaccines for pneumococcal disease and meningitis.

**OUTLOOK / PROGNOSIS**

### **Can an ear infection go away on its own?**

Yes, most infections go away on their own. This is why your healthcare provider may wait before prescribing medications like antibiotics. In the meantime, pain relievers can help with symptoms like ear pain.

Depending on your child’s age, symptoms and temperature, they may need antibiotics to heal. If your child has ongoing or frequent infections, or if fluid remains in the middle ear and puts their hearing at risk, your child may need ear tubes. Follow your healthcare provider’s guidance about caring for your child.

### **When can my child return to normal daily activities?**

Children can return to school or daycare when their fever is gone.

**POSSIBLE COMPLICATIONS**

Most ear infections don’t cause long-term issues. When complications happen, they’re usually related to repeated or ongoing ear infections. Complications include:

* Hearing loss: Temporary hearing loss or changes in your hearing (muffling or sound distortions) are common during an ear infection. Repeated or ongoing infections or damage to internal structures in your ear can cause more significant hearing loss.
* Delayed speech and language development: Children need to hear to learn language and develop speech. Muffled hearing or hearing loss for any length of time can significantly delay development.
* Torn eardrum: About 5% to 10% of children with an ear infection develop a small tear in their eardrum. Often, the tear heals on its own. If it doesn’t, your child may need surgery.
* Spread of the infection: Untreated infections or infections that don’t improve on their own can spread. Infection can spread to the bone behind your ear (mastoiditis). Occasionally, an infection can spread to the membranes surrounding your brain and spinal cord (meninges) and cause meningitis.

**WHEN TO SEE A DOCTOR / RED FLAG**

Call your healthcare provider immediately if:

* Your child develops a stiff neck.
* Your child acts sluggish, looks or acts very sick, or doesn’t stop crying despite all efforts.
* Your child’s walk isn’t steady.
* Your or your child’s ear pain is severe.
* Your or your child has a fever over 104 degrees F (40 degrees C).
* Your child shows signs of weakness in their face. (Look for a crooked smile.)
* You see bloody or pus-filled fluid draining from the ear.

Call your healthcare provider during office hours if:

* A fever remains or comes back more than 48 hours after starting an antibiotic.
* Ear pain isn’t better after three days of taking an antibiotic.

**DIFFERENTIAL DIAGNOSIS**

* Acute Sinusitis
* Apert Syndrome
* Bacteremia
* Cholesteatoma
* Colic
* Diarrhea
* Down Syndrome
* Fever in the Infant and Toddler
* Fever Without a Focus
* Hearing Impairment
* Pediatric Nasal Polyps
* Nasopharyngeal Cancer
* Otitis Externa
* Human Parainfluenza Viruses (HPIV) and Other Parainfluenza Viruses
* Passive Smoking and Lung Disease
* Pediatric Allergic Rhinitis
* Pediatric Bacterial Meningitis
* Pediatric Cleft Lip and Palate
* Pediatric Gastroenteritis
* Pediatric Gastroesophageal Reflux
* Pediatric Haemophilus Influenzae Infection
* Pediatric Head Trauma
* Pediatric HIV Infection
* Pediatric Mastoiditis
* Pediatric Otosclerosis
* Pediatric Pharyngitis
* Pediatric Pneumococcal Infections
* Primary Ciliary Dyskinesia
* Respiratory Syncytial Virus Infection
* Rhinovirus (RV) Infection (Common Cold)

**RECENT GUIDELINES OR UPDATES**

The following were listed as strong recommendations:

* Topical antibiotic ear drops alone, without oral antibiotics, should be prescribed for children with uncomplicated acute TT otorrhea.
* The child's ears should be examined within 3 months of TT insertion, AND families should be educated regarding the need for routine periodic follow-up until the tubes extrude.

The following were listed as recommendations:

* TT insertion should not be performed in children with a single episode of otitis media (OM) with effusion (OME) of < 3 months' duration from the date of either onset (if known) or diagnosis (if onset is unknown).
* A hearing evaluation is indicated if OME persists for ≥3 months *or* before surgery when a child becomes a candidate for TT insertion.
* Bilateral TT insertion should be offered to children with bilateral OME for ≥3 months *and* documented hearing difficulties.
* Children with chronic OME who do not receive TTs should be reevaluated at 3- to 6-month intervals until effusion is no longer present, significant hearing loss is detected, or structural abnormalities of the tympanic membrane or middle ear are suspected.
* TT insertion should not be performed in children with recurrent acute OM (AOM) who do not have middle-ear effusion (MEE) in either ear at assessment for TT candidacy.
* Bilateral TT insertion should be offered to children with recurrent AOM who have unilateral or bilateral MEE at assessment for TT candidacy.
* Efforts should be made to determine whether a child with recurrent AOM or with OME of any duration is at increased risk for speech, language, or learning problems from OM because of baseline factors.
* In children who meet criteria for TT insertion, long-term tubes should not be placed initially unless specifically warranted by anticipated need for prolonged middle-ear ventilation beyond what a short-term tube supplies.
* In the perioperative period, caregivers of children with TTs should be educated regarding expected duration of tube function, recommended follow-up schedule, and detection of complications.
* Antibiotic ear drops should not be routinely prescribed after TT placement.
* Routine prophylactic water precautions should not be encouraged for children with TTs.

The following were listed as options:

* TT insertion may be performed in children with unilateral or bilateral OME for ≥3 months (chronic OME) *and* symptoms likely to be attributable to OME, including (but not limited to) balance (vestibular) problems, poor school performance, behavioral problems, ear discomfort, or reduced quality of life.
* TT insertion may be performed in at-risk children with unilateral or bilateral OME that is likely to persist as reflected by a type B (flat) tympanogram or a documented effusion for ≥3 months.
* Adenoidectomy may be performed as an adjunct to TT insertion in children with symptoms directly related to the adenoids *or* in children aged ≥4 years as a potential means of reducing future recurrence of OM or need for repeat TT insertion.

**EPIDEMIOLOGY**

### United States statistics

OM, the most common specifically treated childhood disease, accounts for approximately 20 million annual physician visits. Various epidemiologic studies report the prevalence rate of AOM to be 17-20% within the first 2 years of life, and 90% of children have at least one documented MEE by age 2 years. OM is a recurrent disease. One third of children experience six or more episodes of AOM by age 7 years.

### International statistics

Incidence and prevalence in other industrialized nations are similar to US rates. In less developed nations, OM is extremely common and remains a major contributor to childhood mortality resulting from late-presenting intracranial complications. International studies show increased prevalence of AOM and chronic OM (COM) among Micronesian and Australian aboriginal children.

### Age-related demographics

Peak prevalence of OM in both sexes occurs in children aged 6-18 months. Some studies show bimodal prevalence peaks; a second, lower peak occurs at age 4-5 years and corresponds with school entry. Although OM can occur at any age, 80-90% of cases occur in children younger than 6 years. Children who are diagnosed with AOM during the first year of life are much more likely to develop recurrent OM and chronic OME than children in whom the first middle ear infection occurs after age 1 year.

### Sex-related demographics

Several studies have now shown equal AOM prevalence in males and females; many previous studies had shown increased incidence in boys.

### Race-related demographics

For some time, the prevalence of OM in the United States was reported to be higher in black and Hispanic children than in white children. However, a study that controlled for socioeconomic and other confounding factors showed equal incidence in blacks and whites. Hispanic children and Alaskan Inuit and other American Indian children have higher prevalence of AOM than white and black children in the United States.

**PREDEFINED Q & A SETS**

### **Do I need to cover my child’s ears if they go outside with an ear infection?**

No, you don’t need to cover their ears to go outside.

### **Can my child go swimming with an ear infection?**

Swimming is OK as long as your child doesn’t have a tear (perforation) in their eardrum or drainage from their ear.

### **Can I travel by air or be in high altitudes if I have an ear infection?**

Air travel or a trip to the mountains is safe, although you may feel temporary pain during takeoff and landing when flying. Swallowing fluids or chewing gum during descent can help with the pain. If your small child has an ear infection, have them suck on a pacifier to relieve discomfort during air travel.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand your child has been complaining of ear pain. Can you tell me when it started and what other symptoms you’ve noticed?

Patient (Parent): Yes, it started last night. She’s been tugging at her ear and seems a bit fussy. No fever today, but she did have some runny nose and cough earlier this week.

Doctor: That sounds like it could be an ear infection called acute otitis media, which is quite common in young children, especially after a cold or respiratory infection. The infection causes inflammation and fluid buildup behind the eardrum, which leads to the pain and fussiness you see.

Patient: How do you know it’s an ear infection? Can’t it just be fluid or something else?

Doctor: Good question. We use a small instrument to look inside the ear canal and check the eardrum. In an ear infection, the eardrum often looks red, swollen, and sometimes bulging. Sometimes there's fluid — we call that an effusion — which can also cause muffled hearing. Not all fluid means infection, so it’s important to see if your child has signs of infection like fever or severe pain.

Patient: What can we do to help her? Does she need antibiotics?

Doctor: For children over 6 months who are generally well and have mild symptoms, we often start with watchful waiting for 48 to 72 hours because many ear infections get better on their own. You can give her pain relievers like acetaminophen or ibuprofen to help with the discomfort. If her symptoms worsen, she develops a high fever, or doesn’t improve, we consider starting antibiotics.

Patient: What if the infection keeps coming back?

Doctor: Some children have recurrent ear infections. In those cases, or if fluid persists for several months affecting hearing, we might consider referral to a specialist. They may recommend procedures like placing tiny tubes in the eardrum to help drain fluid and prevent infections.

Patient: Is there anything I can do to prevent this from happening again?

Doctor: Yes, good preventive steps include avoiding exposure to cigarette smoke, keeping up with vaccinations like the pneumococcal and flu vaccines, and encouraging breastfeeding if possible as it helps build immunity.

Patient: Thank you, Doctor. That helps me understand what to watch for and what we should do.

REFERENCES:

<https://emedicine.medscape.com/article/994656-guidelines>

<https://my.clevelandclinic.org/health/diseases/8613-ear-infection-otitis-media>

**Otitis media with effusion**

**ALTERNATIVE NAMES**

GLUE EAR

**DEFINITION / DESCRIPTION**

Glue ear is a common condition that occurs when fluid builds up in your child’s middle ear, which is the space behind their eardrum. The medical terms for glue ear are otitis media with effusion (OME) or secretory otitis media. Glue ear can affect one or both of your child’s ears. It often follows an [ear](https://my.clevelandclinic.org/health/diseases/8613-ear-infection-otitis-media) infection, but it can happen for other reasons. The condition is usually temporary, but long-term glue ear can affect your child’s hearing.

### **Who does glue ear affect?**

Glue ear is most common in babies and children younger than 6 years old. But glue ear can occur in adults too.

Glue ear is a very common childhood condition. One in every five preschool-aged children may have glue ear at any one time. About eight out of every 10 children will develop the condition some time before they turn 10 years old.

### **How does glue ear affect my child’s body?**

To hear normally, your child’s middle ears need to be clear and full of air. Air travels through your child’s Eustachian tubes, which connect your child’s middle ears to their throat. The Eustachian tubes help drain fluid and prevent it from filling up in your child’s ears. The fluid drains from the Eustachian tubes and your child swallows it unconsciously.

Eustachian tubes in children are wider and more horizontal than they are in adults, so they don’t work as well. When your child’s Eustachian tubes have a blockage, air can’t enter their middle ears. When this occurs, the cells lining their middle ears start to make a thick, sticky fluid. This is where the name “glue ear” came from.

When fluid blocks your child’s middle ears, it can be harder for their eardrums to vibrate and pass sound through to their inner ears. This can make it more difficult for your child to hear.

CAUSES

Glue ear frequently occurs after ear infections. This happens when fluid that built up during the infection remains after it has cleared. But glue ear doesn’t always occur due to ear infections. A blockage in your child’s Eustachian tubes can cause the condition for many reasons. Blockages may occur due to:

* Colds and flu.
* Allergies.
* Enlarged adenoids, which are glands located near your child’s ears where their throat meets their nasal passages.
* Irritants, including passive cigarette smoke.
* Genetic conditions such as Down syndrome.
* Cleft palate.
* GERD (chronic acid reflux).
* Drinking while lying down, such as when you’re feeding your baby.
* Increase in air pressure, including flying or scuba diving.

Ear wax buildup doesn’t cause glue ear. Getting water in your ear while showering or swimming doesn’t cause the condition either.

**SIGNS / SYMPTOMS**

The most common symptom of glue ear in children and adults is hearing loss. It can affect one or both ears at the same time. It may seem like you’re wearing earplugs, muffling the noises around you. Prolonged hearing loss in your child may cause a speech delay and affect their language development. For instance, they may not clearly pronounce words.

Your child may also experience ear pain or hear a buzzing or ringing sound (tinnitus). They may have a feeling of pressure, fullness or popping in their ears when swallowing.

Young children may not be able to tell you they can’t hear, so you’ll have to look for signs of the condition. Glue ear symptoms in your baby or toddler may include:

* Changes in their behavior.
* Sleepiness.
* Lack of concentration.
* Wanting to play alone.
* Not responding to you when you call their name.
* Asking you to repeat what you’ve said.
* Wanting you to turn up the volume on the TV.
* Speaking loude

**DIAGNOSIS METHODS**

Your child’s healthcare provider will examine your child’s ears to diagnose glue ear. They’ll use a small scope to look for fluid in your child’s ears.

Your child’s provider may have you watch your child’s condition to see if it clears up on its own. If your child’s symptoms continue for several months, they’ll recommend you return for testing and treatment.

### **What tests will be done to diagnose glue ear?**

If your child’s healthcare provider recommends testing, they’ll refer you to a specialist such as an audiologist or an ear, nose and throat doctor.

The specialist will examine your child’s ears using a tympanometry test. This type of test measures how well your child’s eardrums can move. They’ll place a special device with a microphone and a sound source into your child’s ear canal. Sound waves bounce off your child’s eardrum as the device compares the pressure in their ear canal. If your child has fluid in their middle ears, their eardrums won’t move correctly. The specialist uses a graph called a tympanogram to see the results.

The specialist may also perform a hearing test. The hearing test will check to see if the fluid is affecting your child’s hearing. Hearing tests can determine how severe any hearing loss is and what may be causing it.

**TREATMENT OPTIONS**

Glue ear often goes away naturally without treatment. Your child’s healthcare provider will usually wait several months to see if the fluid clears up on its own. If your child’s symptoms don’t improve naturally, treatment options may include:

#### **Antibiotics**

If your child is experiencing any pain along with the buildup of fluid, they may have an ear infection. In this case, their provider may prescribe an antibiotic to clear it up.

#### **Myringotomy**

Your child’s specialist may perform a surgery called myringotomy. During this procedure, the specialist will make a small cut in your child’s eardrum to allow fluid to drain from their middle ear. The specialist may place a tiny, hollow ear tube in the cut. The tube helps balance the pressure in their eardrum with the pressure in their middle ear. It also provides drainage from your child’s middle ear to their outer ear. The tube usually falls out on its own within a year.

#### **Adenoidectomy**

If enlarged adenoids are the cause of your child’s glue ear, their specialist may perform an adenoidectomy. Specialists often do this procedure at the same time as a myringotomy. During an adenoidectomy, your child’s specialist will remove their enlarged adenoids.

#### **Hearing aids**

Hearing aids are devices that make sounds louder. To help with temporary hearing loss, your child’s healthcare provider may recommend hearing aids. Children often use them while they’re waiting for glue ear to resolve. They also use them when a myringotomy isn’t possible.

#### **Are there any potential complications after surgery for glue ear?**

Your child most likely won’t experience any issues after a myringotomy. You may see discharge coming from your child’s ear for a couple days after glue ear surgery. If discharge lasts longer than a few days, reach out to your child’s healthcare provider.

### **How can I fix my child’s glue ear naturally?**

You may be able to treat your child’s glue ear at home. Glue ear exercises you can have your child try to temporarily clear their middle ear include:

#### **Valsalva maneuver**

The Valsalva maneuver is a breathing technique that your child can use to try to unclog their ears. To perform the maneuver, have your child pinch their nostrils and keep their mouth closed. Then tell them to try forcibly blowing air out through their nostrils. Your child may feel their ears “pop.”

#### **Otovent nasal balloon**

The Otovent® glue ear treatment helps drain fluid from your child’s ears. Your child sticks a nasal balloon nozzle in one of their nostrils while blocking their other nostril with a finger. Then they attempt to inflate the balloon with their nose. This can help drain their Eustachian tube by forcing air from the back of their throat to their middle ear.

**PREVENTION TIPS**

You can prevent your child from getting glue ear by reducing their risk of ear infections. Ways to reduce your child’s chances of developing an ear infection include:

* Breastfeeding: Breastmilk provides vital nutrients that your baby needs to help fight off infections. Research has shown that breastfed babies are less likely to get glue ear.
* Holding your baby upright during feeding: Whether you breastfeed or bottle-feed, place your baby in a seated position rather than laying them flat. This may help prevent fluid from entering their Eustachian tubes during feeding.
* Avoiding cigarette smoke: Children who spend time around cigarette smoke are at a higher risk of developing glue ear. Try to keep smoke out of your house and car as much as possible.
* Testing for allergies: Many common allergens are known causes of swelling of the Eustachian tubes. These include pollen, dust mites and fur. Ask your child’s healthcare provider about allergy testing if you think this might be the cause of your child’s glue ear.
* Cleaning and disinfecting: Teach your child proper hand-washing skills. Have them use soap and water to wash their hands for at least 20 seconds. Also, wipe surfaces and clean toys frequently.

**OUTLOOK / PROGNOSIS**

Glue ear is a very common condition that usually resolves on its own. But if symptoms continue for several months, your child may experience hearing loss. This can affect their speech and language development. These issues can lead to learning problems as well as communication and socialization problems. However, even if fluid remains in your child’s ears for months, they usually won’t experience long-term hearing loss.

#### **How long does glue ear last?**

Most cases of glue ear go away on their own within two to three weeks. Sometimes, the condition persists for several months. If it hasn’t resolved on its own within three months, speak with your child’s healthcare provider about appropriate treatment.

## **Diagnostic Considerations**

In adults, recognizing unilateral otitis media (OME) with effusion is crucial. This entity must be considered a nasopharyngeal mass until definitively proven otherwise. Note that the single greatest pitfall in otitis media with effusion is the failure to fully evaluate a potential nasopharyngeal mass in an adult patient who has recurrent unilateral otitis media with effusion. At minimum, indirect mirror examination or flexible nasopharyngoscopy should be performed. Imaging studies and possibly even biopsies may be indicated.

Other pitfalls include the failure to note hearing loss and the failure to recognize a potential delay in language development in children; these failures could have a lasting effect in the patient.

The following are conditions that should be considered when evaluating patients with suspected otitis media with effusion:

* Benign nasopharyngeal masses
* Nasopharyngeal carcinoma
* Acute otitis media (AOM)
* Adenoid hypertrophy
* Congenital defects affecting the eustachian tube and its egress
* Ciliary dyskinesia
* Immunoglobulin G (IgG) subclass deficiencies

## **Differential Diagnoses**

* Eustachian Tube Function
* Malignant Tumors of the Nasal Cavity
* Malignant Tumors of the Temporal Bone
* Middle Ear Function
* Middle Ear, Eustachian Tube, Inflammation/Infection
* Myringitis (Middle Ear, Tympanic Membrane, Inflammation)
* Patulous Eustachian Tube
* Reconstructive Surgery for Cleft Palate
* Sinonasal Manifestations of Cystic Fibrosis

**RECENT GUIDELINES OR UPDATES**

* Document the presence of middle ear effusion with pneumatic otoscopy
* Pneumatic otoscopy should be used to assess for OME in a child with otalgia and/or hearing loss
* If the diagnosis is uncertain after performing pneumatic otoscopy, tympanometry should be obtained
* Counsel parents of infants with OME who fail a newborn hearing screen regarding the importance of follow-up to ensure that hearing is normal when OME resolves and to exclude an underlying sensorineural hearing loss (SNHL)
* Determine if the child is at increased risk for speech, language, or learning problems because of baseline sensory, physical, cognitive, or behavioral factors
* Children at high risk for developing otitis media with effusion—ie, those with an increased likelihood due to developmental issues or a syndrome or condition—should be screened for OME when the risk factor is diagnosed and again between age 12 and 18 months
* Routine screening of children for OME who are not at risk and do not have symptoms that may be attributable to OME, such as hearing difficulties, balance (vestibular) problems, poor school performance, behavioral problems, or ear discomfort, is not recommended

Presenting features for OME often include the following:

* Hearing difficulties (eg, hearing incorrectly when looking away from the person speaking, having trouble hearing in a group, needing things to be repeated)
* Delayed speech and language development
* Ear discomfort
* Tinnitus

OME can also be associated with the following:

* Behavioral problems (particularly difficulty concentrating or paying attention), being withdrawn, or irritability, or
* Poor educational advancement, or
* Balance difficulties (eg, clumsiness)

According to the 2023 NICE guidelines, the following features should raise suspicion of OME, although their absence does not rule out the condition’s presence:

* A history of upper respiratory tract infections or acute otitis media
* Craniofacial anomalies, such as cleft palate or features of Down syndrome
* Asthma
* Wheezing
* Dyspnea
* Eczema
* Paroxysmal sneezing/nasal itching
* Urticaria
* Potentially harmful sucking habits (eg, sucking on a finger or pacifier and bottle feeding) and mouth breathing
* Conjunctivitis
* Snoring

According to the 2023 NICE guidelines, the chance that OME is present is reduced when the following are absent:

* Nasal obstruction
* Rhinorrhea
* Current or past adenoid hypertrophy

### **Treatment**

Updated guidelines on the use of tympanostomy tubes in children were published in February 2022 by the AAO-HNSF. Action statements include the recommendation that a hearing evaluation be performed in children who have had otitis media with perfusion (OME) for at least 3 months or should be carried out prior to surgery in pediatric patients who have become candidates for tympanostomy tube insertion.

* Watchful waiting for 3 months from the date of effusion onset or, if the onset date is unknown, 3 months from the date of diagnosis for children who are not at risk for speech, language, or learning problems
* Medical therapy for OME—including systemic antibiotics, systemic steroids, intranasal steroids, antihistamines, and decongestants—should be employed only in exceptional circumstances
* An age-appropriate hearing test should be given if OME persists for more than 3 months or should be administered to any at-risk child with OME regardless of duration
* At 3- to 6-month intervals, reevaluate children with chronic OME until the effusion is no longer present, significant hearing loss is identified, or structural abnormalities of the eardrum or middle ear are suspected
* Tympanostomy tube insertion when surgery is performed in a child under age 4 years; adenoidectomy should not be performed unless an indication for adenoid removal, such as nasal obstruction or chronic adenoiditis, is present
* Tympanostomy tube insertion, adenoidectomy, or both when surgery is performed in a child aged 4 years or older

Children who, as mentioned above, may be at risk for speech, language, or learning problems, according to the AAO-HNSF, include the following:

* Children with permanent hearing loss independent of OME
* Those with suspected or diagnosed speech and language delay or disorder
* Those with autism spectrum disorder or other pervasive developmental disorders
* Children with syndromes (eg, Down syndrome) or craniofacial disorders that include cognitive, speech, and language delays
* Those who are blind or have uncorrectable visual impairment
* Children with cleft palate, with or without an associated syndrome
* Children with developmental delay

specific guidelines on use tympanostomy tube insertion for children with otitis media that included the following recommendations:

* Tympanostomy tube insertion should not be performed in children with a single episode of OME of less than 3 months' duration
* Bilateral tympanostomy tube insertion should be offered to children with bilateral OME of more than 3 months' duration and documented hearing difficulties
* Tympanostomy tube insertion may be considered in children with unilateral or bilateral OME of more than 3 months' duration and symptoms that include balance problems, poor school performance, behavioral problems, ear discomfort, or reduced quality of life
* Children with chronic OME who do not receive tympanostomy tubes should be reevaluated at 3- to 6-month intervals until the effusion is no longer present, significant hearing loss is detected, or structural abnormalities of the tympanic membrane or middle ear are suspected
* Tympanostomy tube insertion may be offered to at-risk children with unilateral or bilateral OME that is unlikely to resolve quickly, as reflected by a type B (flat) tympanogram or persistence of effusion for more than 3 months
* Educate caregivers of children with tympanostomy tubes regarding the expected duration of tube function, recommended follow-up schedule, and detection of complications
* Clinicians should prescribe topical antibiotic eardrops only, without oral antibiotics, for children with uncomplicated acute tympanostomy tube otorrhea
* Encourage routine, prophylactic water precautions (use of earplugs or headbands; avoidance of swimming or water sports) for children with tympanostomy tubes

With regard to the management of OME, the 2023 NICE guidelines recommend the following:

* Antibiotics should not be used to treat OME
* Oral or nasal corticosteroids should not be used to treat OME or OME-associated hearing loss
* Antihistamines, leukotriene receptor antagonists, mucolytics, proton pump inhibitors and anti-reflux medications, or decongestants should not be used to treat OME or OME-associated hearing loss

The NICE’s 2023 recommendations regarding surgery and the management of grommet insertion–associated otorrhea include the following:

* It is recommended that temporary grommets or ventilation tubes be inserted to ventilate the middle ear
* Consider administering a single intraoperative dose of ciprofloxacin during grommet insertion
* When grommet insertion is planned, adjuvant adenoidectomy should be considered unless there is indication of a palate abnormality
* Patients should keep the ear dry for 2 weeks post surgery, avoiding swimming and being careful when bathing or washing their hair
* Five to 7 days of treatment with non-ototoxic topical antibiotic ear drops (eg, ciprofloxacin) should be considered for otorrhea occurring subsequent to grommet insertion
* When isolated otorrhea occurs following grommet insertion, water precautions (eg, avoidance of swimming and being careful when bathing or washing hair) should be advised to keep the ear dry
* The use of earplugs or headbands should be advised when children with recurrent otorrhea following grommet surgery come in contact with water

### Coronavirus disease 2019 (COVID-19)

Bann et al compiled a set of recommendations for best pediatric otolaryngology practices with regard to the coronavirus disease 2019 (COVID-19) pandemic. These included the following for procedures involving the oral cavity, oropharynx, nasal cavity, or nasopharynx:

* Whenever possible, defer procedures involving the nasal cavity, nasopharynx, oral cavity, or oropharynx, as these pose a high risk for COVID-19 owing to the high viral burden in these locations
* Whenever possible, preoperative COVID-19 testing should be administered to patients and caregivers prior to surgical intervention
* Employment of enhanced personal protective equipment (PPE), with a strong recommendation for the use of a powered air-purifying respirator (PAPR), should be undertaken with any patient with unknown, suspected, or positive COVID-19 status
* Limit the use of powered instrumentation, including microdebriders, to reduce aerosol generation

With regard to audiologic evaluation and otologic surgery, the recommendations include the following:

* Perform routine newborn hearing screening and early intervention as indicated in the Joint Committee on Infant Hearing (JCIH) recommendations
* Defer tympanostomy tube placement for unilateral otitis media with effusion
* Although it should be prioritized, intervention for bilateral otitis media with effusion and hearing loss may be deferred based on the availability of COVID-19 testing
* Surgery involving the middle ear and mastoid, owing to their continuity with the upper aerodigestive tract, should be considered high risk for COVID-19 transmission
* Whenever possible, defer mastoidectomy, but if the surgery is required, employ enhanced PPE and avoid the use of high-speed drills
* Employment of a PAPR is strongly recommended when, in patients with unknown, suspected, or positive COVID-19 status, high-speed drills are required for otologic procedures

With regard to head and neck surgery and deep neck space infections, the recommendations include the following] :

* Defer surgical excision of benign neck masses
* A multidisciplinary tumor board should decide the most appropriate treatment modality for pediatric patients with solid tumors of the head and neck, including thyroid cancer, with the availability of local resources taken into account
* Prior to surgical intervention, medical management of infectious conditions should, whenever possible, be attempted; on admission, patients and caregivers should be tested for COVID-19 and strictly quarantined pending test results

With regard to craniomaxillofacial trauma, the guidelines include the following:

* When urgent or emergent bedside procedures, including closure of facial lacerations, are required, patients should be presumed positive for COVID-19, even if they are asymptomatic; carry out procedures in a negative-pressure room using enhanced PPE
* Employ closed-reduction techniques, when possible, until preoperative COVID-19 testing is available
* Avoid the use of high-speed drills, to reduce aerosol formation
* When urgent or emergent surgical intervention is required, patients should be presumed positive for COVID-19, even if they are asymptomatic

**EPIDEMIOLOGY**

In the United States, middle ear infections are the most common medical problem in infants and children of preschool age, and they are the most frequent primary diagnoses in children younger than 15 years who are examined at physicians' offices.

Clinical guidelines from a joint commission of specialties document that screening surveys of healthy children between infancy and age 5 years show a 15-40% point prevalence in middle ear effusion (MEE). Furthermore, among children examined at regular intervals for 1 year, 50-60% of child care attendees and 25% of school-aged children were found to have a middle ear effusion at some point during the examination period, with peak incidence during the winter months.

Between 84% and 93% of all children experience at least 1 episode of acute otitis media (AOM). Furthermore, approximately 80% of children have had an episode of otitis media with effusion (OME) when younger than 10 years. At any given time, 5% of children aged 2-4 years have hearing loss due to a middle ear effusion that lasts 3 months or longer. The prevalence of otitis media with effusion is highest in those aged 2 years or younger, and it sharply declines in children older than 6 years.

A 7-year study of otitis media conducted in the greater Boston area revealed the frequency of acute otitis media. In children younger than 1 year, 62% had at least 1 episode of acute otitis media, and 17% had 3 or more episodes. In children younger than 3 years, 83% had at least 1 episode of acute otitis media, and 46% had 3 or more episodes.

In another study, 12.8 million episodes of otitis media occurred in children younger than 5 years. Of children younger than 2 years, 17% had recurrent disease. Because at least 30% and as many as 45% of children with acute otitis media had otitis media with effusion after 30 days, and 10% had otitis media with effusion after 90 days, at least 3.84 million episodes of otitis media with effusion occurred the year studied; of these, 1.28 million episodes persisted at least 3 months.

### Racial and sexual differences in incidence

The prevalence of otitis media with effusion is higher in Native Americans, particularly Navajo and Inuit peoples, than in other races. The reason for the higher frequency in these populations has been attributed to a number of factors, but no findings have confirmed the most likely etiologies. No difference in prevalence rates between white and black populations exists.

Although no statistically significant difference exists between the sexes in terms of incidence or prevalence, some findings suggest that males may have a slightly higher frequency.

**PREDEFINED Q & A SETS**

### **Can my child swim or bathe with glue ear?**

If your child has tubes, their healthcare provider may recommend keeping their ears dry for two to four weeks after surgery. That means no swimming or showers. Your child can take a bath as long as their ears don’t get wet. After that time frame, your child shouldn’t have any restrictions on bathing or swimming pools.

Some children may have to take extra precautions if they’re at a higher risk of infection. If so, your child’s healthcare provider may recommend:

* Avoiding jumping or diving into water.
* Using earplugs and a swim cap while swimming.
* Staying out of lakes and non-chlorinated swimming pools.
* Being careful to avoid getting water in your child’s ears while washing their hair.

### **Is it OK if my child flies if they have glue ear?**

Most children won’t experience any issues with flying if they have glue ear. But you’ll want to check with your child’s healthcare provider about your child’s specific condition. Fluid in your child’s middle ears can expand during take-off and landing, which can cause discomfort. This is called airplane ear. Eating and drinking during take-off and landing can help open your child’s Eustachian tubes, which can prevent discomfort.

## What is otitis media with effusion?

Otitis media with effusion (OME), also known as glue ear, is the presence of non-infected fluid in the middle ear behind the eardrum. Unlike acute otitis media, there is no active infection or severe pain.

## What causes otitis media with effusion?

OME usually results from poor function or blockage of the eustachian tube, which connects the middle ear to the back of the throat. Causes include recent colds, allergies, enlarged adenoids, or anatomical factors. Fluid collects because it cannot drain properly.

## What are the symptoms of OME?

The most common symptom is hearing difficulty or muffled hearing. Some may feel a sensation of pressure, fullness, or popping noises in the ear. Less commonly, children may have mild balance problems. Often, there is no pain or fever.

## How is OME diagnosed?

Diagnosis is based on clinical examination with an otoscope showing a dull, non-transparent tympanic membrane often with visible fluid levels or bubbles behind it. Hearing tests and tympanometry may be used to assess fluid presence and hearing impact.

## How is otitis media with effusion treated?

Many cases resolve spontaneously within 3 months, so active surveillance is the initial approach. If fluid persists beyond 3 months and is associated with hearing loss (>25-30 dB), or if there are concerns about speech and language development, surgical insertion of grommets (ventilation tubes) may be recommended. Hearing aids are an option if surgery is not suitable.

## Do antibiotics help in OME?

Generally, antibiotics are not recommended for OME since there is no active infection. Antibiotics are reserved for acute infections or if fluid becomes infected.

## Can OME affect development?

Yes, persistent OME can affect speech, language development, and learning due to temporary hearing loss, so timely assessment and management are important in young children.

## How can OME be prevented?

Preventive measures include reducing risk factors such as exposure to tobacco smoke, avoiding bottle feeding while lying down, promoting breastfeeding, vaccinations against respiratory infections, and managing allergies.

## When should I see a doctor?

If hearing problems persist beyond a few months, you notice speech delays, recurrent ear infections, or if the child has difficulty balancing, consult your healthcare provider.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you've been concerned about your child’s hearing. Can you tell me what you’ve noticed?

Parent: Yes, recently my child seems to ask "what?" a lot, speaks loudly, and sometimes doesn’t respond when I call from behind. I’m worried something’s wrong with their ears.

Doctor: Those are common signs of glue ear, which is when fluid builds up behind the eardrum and can affect hearing temporarily. It doesn’t usually cause pain, but it can make hearing muffled or seem like your child has a cold in their ear.

Parent: Is this serious? Will it get better on its own?

Doctor: Most cases of glue ear improve on their own within a few months. We call this period watchful waiting, where we monitor the fluid and hearing. However, if the fluid and hearing loss persist beyond 3 months or affect speech and learning, we may consider treatment options such as inserting tiny tubes called grommets to drain the fluid. In some cases, temporary hearing aids might help.

Parent: What can I do to help my child while this is happening?

Doctor: You can help by using basic communication tips like speaking clearly, facing your child when talking, reducing background noise, and repeating information calmly if needed. Encourage your child to listen carefully and follow instructions. Additionally, make sure they attend regular hearing tests so we can track any changes.

Parent: Can glue ear cause speech delays?

Doctor: Yes, if hearing loss lasts a long time, it might affect your child’s speech and language development, which is why we keep a close eye on it and intervene if necessary. Early detection and management can prevent these problems.

Parent: Should I be worried about infections or needing surgery?

Doctor: Glue ear is often related to eustachian tube dysfunction, not acute infection. Surgery is a minor procedure and generally safe, but we only recommend it if fluid and hearing loss don’t improve after a few months. If your child has repeated infections, we’ll evaluate that separately.

Parent: Is there anything I should avoid?

Doctor: Avoid exposing your child to cigarette smoke, and try to keep their ears dry to prevent infections. Also, tell us if they have any other health conditions like cleft palate or Down’s syndrome, as these may need earlier assessment.

Parent: Thank you, Doctor. I feel better knowing what to expect and how to help my child.

REFERENCES:

<https://emedicine.medscape.com/article/994656-overview>

<https://www.ncbi.nlm.nih.gov/books/NBK538293/>

<https://emedicine.medscape.com/article/858990-guidelines>

**Otomycosis(FUNGAL EAR INFECTION)**

**DEFINITION / DESCRIPTION**

A fungal ear infection usually involves your ear canal — the tube that starts at your outer ear and ends at your eardrum (tympanic membrane). Funguses like *Aspergillus* and *Candida* cause this condition. A fungal ear infection can also affect your middle ear, but this is uncommon.

Ear fungal infections are more likely to occur when the temperatures are warm and the air is humid. In the United States, fungal ear infections are most common during the summer months. They’re also more common in people who swim, surf or participate in other watersports.

Other names for a fungal ear infection include otomycosis and fungal otitis externa.

Fungal ear infections are less common than bacterial ear infections. Fungal infections of the ear make up about 10% of all outer ear infections (otitis externa).

**CAUSES**

Many different types of funguses can cause ear infections. But the most common fungal ear infection causes include *Aspergillus* and *Candida*. *Aspergillus* causes about 90% of fungal ear infections, and *Candida* causes the rest.

#### **Risk factors for fungal ear infections (otomycosis)**

Earwax (cerumen) protects your ear canal and gives it a water-resistant lining. Anything that reduces the amount of earwax in your ears makes you more vulnerable to fungal ear infections.

You’re more likely to get a fungal infection in your ear if you:

* SCUBA dive.
* Swim, waterski, surf or participate in other types of watersports.
* Use cotton swabs, hair pins or other instruments to clean earwax from your ears.
* Have a weakened immune system.
* Have ear eczema or other skin conditions affecting your ear.
* Have ear injuries and trauma.

#### **Are fungal ear infections contagious?**

No, you can’t pass a fungal ear infection to another person. However, the fungus that causes these infections can spread from person to person while swimming in infected water.

Even though fungal ear infections aren’t contagious, you should call a healthcare provider right away if you think you have one. Treating the issue early helps reduce the risk of infection spreading to other parts of your body.

**SIGNS / SYMPTOMS**

Ear fungal infections can affect one or both ears. Fungal ear infection symptoms vary from person to person but may include:

* Earache.
* Discoloration (red, yellow, purple or gray) of your outer ear or ear canal.
* Intense itching.
* Flaky skin around your ear canal.
* Pain or burning.
* Headaches.
* Inflammation.
* Discharge that’s yellow, green, black, white or gray.
* Tinnitus (ringing in your ears).
* A feeling of fullness in your ears.
* Hearing loss.

Some people develop:

* Dizziness.
* Fever.
* Severe ear pain.

When *Aspergillus* causes a fungal ear infection, you may see yellow or black dots and fuzzy white patches in your ear canal. If *Candida* is the culprit, you might see a thick and creamy white discharge coming from your ear.

If you develop any of the above symptoms, call a healthcare provider. Fungal ear infections aren’t likely to go away without treatment.

**DIAGNOSIS METHODS**

A healthcare provider will examine your ears with an otoscope. (An otoscope is a handheld magnifying device that providers use to look inside your ear.) They’ll also ask about your symptoms and medical history.

In addition, they may run lab tests to confirm your diagnosis. To do this, they’ll swab your ear for fluid or discharge. Then they’ll send a sample to a lab for further testing

**TREATMENT OPTIONS**

There are several options for treating a fungal infection of the ear. Your healthcare provider can help you determine which one is right for you.

Fungal ear infection treatments include:

Cleaning

Healthcare providers can use special rinses to thoroughly clean your ears. This helps remove discharge.

Don’t try to clean inside your ears at home. You should only use cotton swabs on the outside of your ear — never in your ear canal.

Medications

Many people need oral medications to treat ear fungal infections. In addition to antifungal medications like itraconazole, your provider may recommend over-the-counter pain relievers for any discomfort.

Be sure to follow your provider’s instructions closely, even if your ear starts to feel better. If you don’t, a fungal ear infection can come back and be harder to treat.

Ear drops

Antifungal ear drops, such as fluconazole and clotrimazole, can treat many types of fungal ear infections. Your provider may also recommend aluminum acetate or acetic acid ear drops to reduce inflammation in your ear canal. Be sure to use ear drops exactly as directed.

Creams and ointments

If a fungal ear infection affects the outer part of your ear, your provider may recommend a topical cream or ointment. Examples include clotrimazole, ketoconazole and econazole. You apply these creams and ointments to your external ear rather than inside your ear canal.

Home remedies

Home remedies can help ease fungal ear infection symptoms. But you should always talk to your healthcare provider before trying any treatments at home.

One common fungal ear infection home remedy is diluted hydrogen peroxide. This helps remove discharge and buildup from your ears. You can also try carbamide peroxide eardrops or a 1:1 mixture of rubbing alcohol and white vinegar.

**PREVENTION TIPS**

It’s not always possible to avoid fungal ear infections. But there are things you can do to reduce your risk:

* Wear earplugs when swimming, surfing or participating in other watersports.
* Don’t stick cotton swabs in your ears.
* Dry your ears with a hairdryer after showering.
* Avoid scratching your ears

**OUTLOOK / PROGNOSIS**

Most people respond well to antifungal treatment. But if you have a weakened immune system, the ear infection could linger or come back.

It’s best to avoid watersports while you’re undergoing treatment. If you go right back to swimming, for instance, the infection could return.

With prompt treatment, fungal ear infections usually don’t cause long-term complications.

#### **How long does a fungal ear infection last?**

Most fungal ear infections last about three weeks. You’ll need to take antifungal medication or use antifungal ear drops until the infection clears up.

##### **When can I go back to work or school?**

Fungal ear infections aren’t contagious, so you can return to work, school and other routines as soon as you feel up to it.

**WHEN TO SEE A DOCTOR / RED FLAG**

Fungal ear infections don’t usually go away without treatment. So, you should schedule an appointment with a healthcare provider if you develop pain, itchiness, discharge or other symptoms.

If you’re already undergoing treatment for a fungal ear infection, call your provider if you develop severe pain, dizziness or fever.

**DIFFERENTIAL DIAGNOSIS**

* Bacterial otitis externa: A more common infection of the external ear canal caused by bacteria (e.g., *Pseudomonas aeruginosa*, *Staphylococcus aureus*), generally presenting with ear pain, redness, and purulent discharge. Often difficult to distinguish from otomycosis without microbiological assessment.
* Acute or chronic otitis media: Infections or inflammation of the middle ear; typically associated with middle ear effusion, tympanic membrane abnormalities, and sometimes systemic symptoms.
* Cholesteatoma: A chronic destructive lesion of the middle ear and mastoid that may cause foul-smelling discharge and hearing problems, sometimes confused with fungal debris in otomycosis.
* Foreign body in the external auditory canal: May cause irritation, discharge, or pain mimicking infection.
* Contact dermatitis or eczema of the ear canal: Can cause itching, redness, scaling, and discomfort similar to fungal infection.
* Malignant (necrotizing) otitis externa: A severe infection, often in diabetics or immunocompromised patients, presenting with persistent pain and canal ulceration, which may be mistaken for fungal infection early on.
* Herpes zoster oticus (Ramsay Hunt syndrome): Viral infection causing ear pain, vesicular rash in the ear canal, and occasionally facial paralysis; the rash may be confused with fungal debris.
* Tympanic membrane perforations or other ear canal abnormalities that cause persistent discharge.

**EPIDEMIOLOGY**

* Global distribution: Otomycosis is a *worldwide disease* but is especially common in *tropical and subtropical regions* due to hot and humid climates.
* Prevalence: The prevalence varies widely, ranging from about *9% to 40%* among patients presenting with external ear infections or otitis externa symptoms. In some African countries, prevalence has been reported as high as *39.6%*.
* Age: Most commonly affects *young and middle-aged adults*, typically between *20 and 40 years old*, though cases occur from childhood (as young as 1 year) to elderly patients. The lowest prevalence is generally found in children under 10 years and adults over 60 years.
* Gender: Some studies report a *slightly higher prevalence in females* (female:male ratios around 1.5:1), while others show *equal or male predominance*. Overall, otomycosis does not have a consistent gender predilection worldwide.
* Occupation: People working in *agriculture, outdoor labor, or dusty environments* have higher exposure to fungal spores and thus a greater risk, though some studies show no strong occupational link.
* Seasonality: Though often associated with humid and wet seasons favoring fungal growth, some studies find no significant seasonal variation in otomycosis cases.
* Predisposing factors: Include *warm, humid climate*, *ear trauma*, *use of topical antibiotics/steroids*, *immunosuppression*, *hearing aid use*, and *poor ear hygiene*.
* Common causative agents: *Aspergillus species* (especially *A. niger*) and *Candida albicans* are the most frequent fungi isolated worldwide

**PREDEFINED Q & A SETS**

### **Is ear fungus serious?**

In general, fungal ear infections aren’t serious. But they can spread and worsen in some cases — especially in people who have weakened immune systems or chronic skin conditions.

Fungal ear infections usually cause some degree of pain and discomfort. The best thing you can do is see a healthcare provider at the first sign of trouble.

### **What happens if ear fungus is left untreated?**

Most fungal ear infections don’t go away without treatment. At best, an untreated fungal ear infection will linger or return. At worst, it could spread to nearby tissues or other parts of your head and neck, resulting in:

* Meningitis.
* Mastoiditis.
* Fungal osteomyelitis (very rare, but life-threatening).

### **How do I know if my ear infection is fungal or bacterial?**

Sometimes, health providers can tell the difference just by looking inside your ear. However, they can run lab tests to confirm the diagnosis. They’ll take a sample of any fluid or discharge in your ear and look at it under a microscope.

### **Why does my fungal ear infection keep coming back?**

There are a few reasons why a fungal infection in your ear may linger or return, including:

* A weakened immune system.
* Absence of earwax.
* Sticking cotton swabs in your ear.
* Living in a hot or humid climate.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello! I understand you've been having itching and discomfort in your ear. Can you tell me more about your symptoms?

Patient: Yes, my ear feels itchy and sometimes I get some flaky material or discharge. It’s been a bit painful too, especially after I recently went swimming.

Doctor: It sounds like you may have a condition called otomycosis, which is a fungal infection of the outer ear canal. It’s pretty common, especially in warm and humid climates or after water exposure.

Patient: A fungal infection? How do I get that?

Doctor: Fungi like warm, moist environments, and the ear canal can become a perfect spot if water gets trapped there — like after swimming or bathing — or if the ear is scratched or treated with certain ear drops. This allows fungi like *Aspergillus* or *Candida* to grow and cause irritation.

Patient: Is it serious? How do you treat it?

Doctor: Otomycosis isn’t usually serious, but it can be quite uncomfortable. Treatment involves cleaning the ear canal, sometimes removing the debris and flaky material, and applying antifungal ear drops or creams for about one to two weeks. It’s important to keep the ear dry during treatment.

Patient: Should I stop swimming? How long will it take to get better?

Doctor: Yes, it’s best to avoid swimming or getting water in the ear until your ear heals. Most people start feeling better within a week or two with proper treatment.

Patient: Can I use cotton swabs or put anything else in my ear?

Doctor: I strongly recommend avoiding cotton swabs or inserting any objects in your ear. They can irritate the skin further or push the infection deeper. Let us handle the cleaning safely.

Patient: What if it keeps coming back?

Doctor: Sometimes, otomycosis can recur, especially if you frequently expose your ears to water or have other risk factors. We can discuss preventive measures such as drying your ears well, avoiding ear trauma, and using protective earplugs while swimming.

Patient: Thank you, Doctor, that helps me understand what’s going on.

REFERENCES:

[Fungal Ear Infection (Otomycosis): Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/25009-fungal-ear-infection#overview)

<https://pubmed.ncbi.nlm.nih.gov/33516991/>

**Oral mucositis**

**ALTERNATIVE NAMES**

STOMATITIS

**DEFINITION / DESCRIPTION**

Stomatitis, or oral mucositis, is inflammation in the mucous membranes (mucosa) that line your mouth or lips. It’s a type of mucositis, which includes inflammation involving your oral mucosa or any of the mucous membranes lining your gastrointestinal (GI) tract.

Inflammation is your body’s natural response to an injury, which means that most anything that damages the mucosa in your mouth can lead to stomatitis. This is why it’s important to know the signs. Many causes of the inflammation aren’t serious and heal on their own. But others require prescriptions or other treatments that involve seeing a healthcare provider.

#### **Types of stomatitis**

The two most common types of stomatitis are canker sores and cold sores. Canker sores (aphthous stomatitis) appear inside your mouth, in places like your inner lip. Cold sores (herpetic stomatitis) are fluid-filled blisters that appear alone or in clusters on your lip or around your mouth.

Less common types of stomatitis include:

* Angular cheilitis (angular stomatitis): Involves irritation, cracks and sores in the corners (“angles”) of your mouth.
* Thrush (candidal stomatitis): Involves an overgrowth of candida fungi in your mouth.
* Contact stomatitis: Involves inflammation that happens inside your mouth because of an allergic reaction.
* Denture stomatitis: Involves irritation in your mouth that often happens alongside candidal stomatitis. It mostly affects people who wear dentures.
* Gingivostomatitis: A viral or bacterial infection that leads to inflammation of your mouth or gums.
* Nicotine stomatitis: Affects people who smoke or use tobacco. Signs include white, cobblestone-like patches of tissue in the roof of your mouth.

**CAUSES**

Stomatitis can have many causes, including viral infections, mouth injuries and immune system conditions — among others

* Infections: The most common infectious disease that causes stomatitis is HSV-1, the herpes virus that causes cold sores. But other viral infections, as well as bacterial and fungal infections, can also cause stomatitis.
* Mouth injuries: Most anything that damages the delicate mucous membrane inside your mouth triggers your body’s healing response, causing inflammation. Causes range from ill-fitting dentures that scrape the inside of your mouth to heat damage from smoking cigarettes.
* Allergic reactions or mouth irritation: Substances that you’re allergic to or that irritate your mouth can cause oral mucositis. Causes may include ingredients in dental products (like mouthwash), cosmetics (like lipstick) or spicy foods.
* Treatments: Oral mucositis is a common cancer treatment side effect. Treatments like chemotherapy and radiation therapy kill cancer cells, but they can damage healthy cells in the process. The cells in the mucous membranes lining your mouth are particularly vulnerable.
* Medications: Certain types of medications associated with oral mucositis include beta-blockers, immunosuppressants and nonsteroidal anti-inflammatory drugs (NSAIDs).
* Systemic conditions: Conditions that impact entire body systems can cause stomatitis. These include inflammatory diseases, like Behçet’s disease and celiac disease. Skin conditions, like Bullous pemphigoid and lichen planus, can also cause stomatitis.
* Nutritional deficiencies: Not getting enough of the nutrients your body needs to repair damaged mucosa in your mouth can lead to stomatitis. This includes deficiencies in folate, iron, vitamins B12 and C, and zinc.

#### **Risk factors for stomatitis**

You’re more at risk of developing stomatitis if you:

* Don’t regularly clean your teeth: Neglecting dental care increases your risk of infections.
* Have dry mouth: Saliva (spit) provides a protective layer for your mucosa. Not having enough of it increases your risk of injury and infection.

**SIGNS / SYMPTOMS**

Signs and symptoms of stomatitis include:

* Redness and swelling inside your mouth.
* A tiny blister (or cluster of blisters) that appears on or around your lips.
* One or more sores inside your mouth that are usually white, gray or yellow, with a red border.
* White or gray patches on your tongue, the roof of your mouth or inside your cheeks.
* The sensation that your tongue and the roof of your mouth are burning.
* Mild to severe pain or discomfort that may make it difficult to eat, swallow or talk.

**DIAGNOSIS METHODS**

Your provider will likely be able to recognize most types of stomatitis, like canker sores and cold sores, just by looking. Reviewing your medical history and symptoms helps, too. For example, knowing that you’re getting cancer treatment may suggest that your oral mucositis is a treatment side effect. Symptoms impacting parts of your body other than your mouth may suggest a systemic disease.

You may also need tests to diagnose stomatitis, including:

* Tests to check for viruses, bacteria or fungi.
* Blood tests to check your overall health or for signs of systemic diseases.
* Allergy tests to check for allergens causing stomatitis.
* Biopsy to check for unusual cells that may be signs of a more serious condition (rarely, only when the other tests don’t lead to a diagnosis).

It may take some trial and error if what’s causing your oral mucositis is a reaction to a chemical or other irritant. For example, if your provider suspects your mouthwash is causing the inflammation, they may recommend switching brands to see if your mouth heals.

**TREATMENT OPTIONS**

Treatment for stomatitis depends on what’s causing it. The only way to cure stomatitis is to treat or manage the issue that’s creating problems. Treatments include:

* Over-the-counter (OTC) medications for canker sores and cold sores.
* Prescription medications for infections, like antivirals, antibiotics and antifungals.
* Vitamins or supplements so you’re getting the nutrients you need.
* Steering clear of foods or products triggering your inflammation.
* Practicing good oral hygiene to keep your mouth free of harmful bacteria while your mouth heals.

In the meantime, your healthcare provider may recommend treatments to manage pain, including topical anesthetics, magic mouthwash and corticosteroids.

**PREVENTION TIPS**

### **Can oral mucositis be prevented?**

You can’t prevent all causes of stomatitis, but you can reduce your risk by:

* Brushing twice a day, flossing daily and getting regular dental cleanings.
* Eating balanced meals and getting enough water daily.
* Choosing not to smoke or use tobacco (or quitting if you do).
* Avoiding shared foods, drinks or lip balm and intimate contact (kissing, oral sex) with someone with a cold sore.

**OUTLOOK / PROGNOSIS**

Some types of stomatitis go away on their own. For example, both canker sores and cold sores usually clear up on their own within two weeks, often without treatment. Medications can speed healing. Since there’s no cure for the herpes virus that causes mouth sores, outbreaks usually come and go throughout life. But they’re usually not serious.

For other types of stomatitis, your outlook depends on what’s causing it. Most causes are treatable or manageable

**POSSIBLE COMPLICATIONS**

Sometimes, the pain and swelling from stomatitis are so bad that it hurts to eat or drink. Sometimes, that’s all the encouragement needed to skip meals. But not getting the nutrients or fluid you need can pose serious health risks like malnutrition and dehydration.

Although infections can cause stomatitis, they’re also a potential complication. Having an injured mucosa makes you more vulnerable to germs that can trigger more inflammation and tissue damage.

It’s important to see a healthcare provider and get treated to prevent things from getting worse.

**WHEN TO SEE A DOCTOR / RED FLAG**

Contact your provider if you have a mouth sore and you’re immunocompromised. If you’re a parent or caregiver of a newborn and notice they have a cold sore, contact their pediatrician right away. Stomatitis can lead to serious infections in these instances.

You should also schedule an appointment if you have a mouth sore that doesn’t get better within 10 days and you’re noticing other signs and symptoms, like:

* A fever higher than 100.4 degrees Fahrenheit (38 degrees Celsius).
* A blister or rash on your skin.
* Eye pain, redness, blurred vision or swelling.

**DIFFERENTIAL DIAGNOSIS**

* Traumatic ulcers: Due to mechanical irritation or injury; typically solitary with irregular edges.
* Aphthous ulcers (canker sores): Shallow, round or oval ulcers with an erythematous halo, usually recurrent and painful.
* Erosive lichen planus: Chronic inflammatory disease presenting with multiple shallow painful ulcers and characteristic Wickham’s striae (white lacy patterns).
* Herpetic stomatitis (Herpes simplex virus infection): Painful grouped vesicles and ulcers, often on keratinized mucosa like the hard palate or gingiva.
* Herpetiform ulcers: Multiple small, coalescing ulcers resembling herpes but not caused by the virus.
* Oral candidiasis (thrush): White curd-like plaques that can be wiped off, sometimes with underlying erythema.
* Vesiculobullous disorders: Such as pemphigus vulgaris or mucous membrane pemphigoid, presenting with painful erosions and bullae.
* Graft-versus-host disease (GVHD): In patients post hematopoietic stem cell transplant, presenting with mucosal erythema, ulceration, and lichenoid changes.
* Malignant ulcers: Non-healing ulcers with indurated, raised edges; may indicate oral squamous cell carcinoma or other neoplasms.

**EPIDEMIOLOGY**

* The prevalence of oral mucositis varies widely depending on patient populations and treatment types but is generally high among cancer patients receiving chemotherapy and/or radiotherapy.
* In patients with advanced cancer, the prevalence is about 22.3% overall, with higher rates seen in those with head and neck cancers.
* Among patients receiving radiotherapy for nasopharyngeal carcinoma, the incidence of radiotherapy-induced oral mucositis is extremely high, close to 99%.
* Studies report an overall oral mucositis incidence in head and neck cancer patients undergoing treatment of approximately 89.4%, with varying degrees of severity.
* In chemotherapy patients with breast cancer, around 55% develop oral mucositis during treatment.
* In a cohort study of adult and elderly cancer patients receiving chemotherapy, the incidence rate was 90.16%, highest on the buccal mucosa.
* Oral mucositis significantly impacts patients’ ability to eat or drink and is associated with reduced quality of life and nutritional status.
* Risk factors for developing oral mucositis include type and intensity of cancer therapy (chemotherapy, radiotherapy), cancer location (head and neck), poor oral hygiene, older age, and possible comorbidities like malnutrition

**PREDEFINED Q & A SETS**

## What is oral mucositis?

Oral mucositis is inflammation and ulceration of the mucous membranes lining the mouth, often causing redness, pain, burning, and sores. It commonly occurs as a side effect of cancer treatments like chemotherapy and radiotherapy.

## What causes oral mucositis?

It is caused by damage to rapidly dividing epithelial cells in the oral mucosa due to cancer therapies, leading to loss of the protective barrier, ulcers, and increased risk of infection. Other factors like poor oral hygiene, nutritional deficiencies, smoking, and existing infections may worsen it.

## What are the symptoms?

Symptoms include:

* Redness and swelling of the mouth and gums
* Pain and burning sensations
* Ulcers or open sores in the mouth or throat
* Difficulty eating, swallowing, or talking
* Bleeding or increased mucus production

## How common is oral mucositis?

It affects a majority of patients receiving chemoradiotherapy, especially in head and neck cancers. Prevalence can be as high as 90% in patients with head and neck cancer undergoing treatment.

## How long does oral mucositis last?

Mucositis usually develops within 5-10 days of starting chemotherapy and can last 1-6 weeks. Radiation-induced mucositis may last 6-8 weeks or longer depending on treatment duration.

## How is oral mucositis diagnosed?

Diagnosis is clinical, based on symptoms, oral examination showing erythema and ulcers, and patient treatment history.

## How is oral mucositis treated?

* Good oral hygiene with gentle brushing and soft toothbrushes
* Regular mouth rinses with saline or baking soda solutions
* Pain management using topical anesthetics or systemic analgesics
* Avoiding irritants like alcohol, spicy or acidic foods
* Hydration and nutritional support
* In severe cases, specialized therapies such as low-level laser therapy or prescription medications may be used

## Can oral mucositis be prevented?

Preventive strategies include dental evaluation before cancer therapy, maintaining oral hygiene, using protective mouth rinses, and minimizing risk factors such as smoking and poorly fitting dentures.

## When should I seek medical advice?

If you develop severe pain, difficulty swallowing or opening your mouth, bleeding, or signs of infection during treatment, contact your healthcare provider promptly.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I see you’ve been experiencing soreness and ulcers in your mouth during your cancer treatment. This is a fairly common side effect called oral mucositis. Have you noticed pain or difficulty eating?

Patient: Yes, the soreness is quite bad, and it hurts to eat anything. Sometimes my mouth feels very dry and irritated.

Doctor: That can happen because the chemotherapy or radiotherapy damages the cells lining your mouth, making them inflamed and ulcerated. This inflammation makes eating, drinking, and even talking uncomfortable.

Patient: Is this going to get worse? How long will it last?

Doctor: Oral mucositis usually starts within the first one to two weeks of treatment and can last several weeks, depending on the therapy. The good news is that it tends to heal once your treatment is completed or paused.

Patient: What can we do to help the pain and prevent it from getting worse?

Doctor: We will focus on good oral care—this includes gentle brushing with a soft toothbrush, rinsing your mouth regularly with saline or special mouthwashes, and avoiding irritants like alcohol, spicy or acidic foods. For pain, we can use topical anesthetics or rinses, and if needed, stronger pain medications.

Patient: Are there other ways to prevent or treat this?

Doctor: Yes. In some cases, treatments like low-level laser therapy can reduce severity, and keeping well hydrated and nourished is very important. We’ll also monitor you closely to manage any infections that might develop as a result of mucosal breakdown.

Patient: Will this affect my cancer treatment?

Doctor: If mucositis becomes severe, it can sometimes require a break or dose adjustment in your cancer therapy. That’s why managing mucositis effectively is so important—we want to keep your treatment on track while minimizing discomfort.

Patient: What should I do if my symptoms get worse?

Doctor: If you develop severe pain, difficulty swallowing, signs of infection like fever, or inability to eat and drink, please contact us immediately. We can provide additional support and adjust your care as needed.

Patient: Thank you, Doctor. It’s good to know what to expect and how to handle this.

REFERENCES:

<https://emedicine.medscape.com/article/1079570-differential>

<https://www.ncbi.nlm.nih.gov/books/NBK565848/#article-19378.s9>

<https://wmcanceralliance.nhs.uk/images/Documents/SaCT/Network_Guidelines_for_the_Oral_Care_of_Patients_receiving_SACT_v4.pdf>

[Stomatitis (Oral Mucositis): Types, Symptoms & Treatment](https://my.clevelandclinic.org/health/diseases/stomatitis-oral-mucositis#overview)

**Palatal myoclonus**

**DEFINITION / DESCRIPTION**

Myoclonus is a brief, sudden muscle movement (like a twitch, jerk or spasm). It happens when muscles incorrectly activate and usually lasts just a fraction of a second. It can affect a single muscle or a group of them. Some causes are more likely to affect muscles in your hands or feet, shoulders or hips, back or face.

Myoclonus (pronounced “my-OCK-lon-us”) can happen in people who are healthy at some point in their life. However, it’s also a possible symptom of several medical conditions, some of which are serious.

There are two main ways myoclonus happens:

* Positive myoclonus: This is when muscles contract or flex suddenly.
* Negative myoclonus: This is when muscles relax suddenly (the technical term for this is “asterixis,” and experts often describe it as a “hand-flapping tremor”).

### **What are some other forms of myoclonus?**

There are many forms of myoclonus, but some happen only in certain age groups or in very specific ways, including:

* Benign neonatal sleep myoclonus.
* Middle ear myoclonus.
* Opsoclonus myoclonus.
* Palatal myoclonus.

#### **Benign neonatal sleep myoclonus (BNSM)**

Benign neonatal sleep myoclonus (BNSM) is a condition that affects newborn babies. Newborns with this condition will have sudden, jerky movements of their limbs or bodies in their sleep.

Diagnosing this condition requires an electroencephalogram (EEG). This condition can look similar to seizures, but EEG testing in babies with BNSM won’t show seizure activity in their brains. This condition is harmless. About 95% of cases go away by 6 months of age.

#### **Middle ear myoclonus**

Middle ear myoclonus is when you have uncontrolled muscle movements of the tensor tympani, a muscle in your ear. Ordinarily, the tensor tympani tightens to protect your inner ear (like placing your hand on the top of a drum to dampen the sound). This usually happens when you talk, eat, cough, laugh or make other sounds through your mouth.

Middle ear myoclonus means the tensor tympani flexes at the wrong times. That can cause repetitive clicking, cracking or thumping sounds. It’s disruptive, but it isn’t dangerous. It’s often treatable with surgery or other methods.

#### **Opsoclonus-myoclonus syndrome**

Opsoclonus is similar to myoclonus, but it involves uncontrollable movements of the muscles that direct where you point your eyes. Opsoclonus-myoclonus syndrome (OMS) is a rare condition that involves both symptoms happening at the same time.

OMS sometimes happens because your immune system incorrectly attacks your own nervous system. In children, this faulty immune reaction may happen because of a type of brain cancer called neuroblastoma. In adults, it can happen with lung cancer, breast cancer or ovarian cancer. Other cases may have a connection to metabolic disturbances or infections. In many cases, healthcare providers aren’t able to identify a cause

#### **Palatal myoclonus**

Palatal myoclonus (also known as palatal tremor) is a form of myoclonus that affects a specific area inside your mouth. The soft palate is at the upper back of your mouth. It includes the uvula (the dangling teardrop-shaped piece of tissue) and surrounding soft tissue.

Myoclonus here can cause you to hear an unusual clicking sound. It can be inherited (essential palatal myoclonus) or as a symptom of a lesion in your brain. It can be disruptive. It’s often possible to treat it with medication.

## **Symptoms of Palatal Myoclonus**

Palatal myoclonus can cause symptoms like rhythmic movements or twitching in the muscles of the roof of the mouth, throat, or sometimes even the ears. These movements are usually involuntary and can be quite bothersome. Patients may experience a clicking sound in the ear, a sensation of a lump in the throat, or even difficulties with speech or swallowing. Palatal myoclonus can impact daily activities and quality of life, so it's essential to consult a healthcare provider for proper evaluation and management.

* Palatal myoclonus may present with rhythmic contractions of the soft palate, causing clicking or popping sounds in the ear.
* Patients with palatal myoclonus may experience involuntary movements of the uvula, leading to discomfort or a sensation of something stuck in the throat.
* Some individuals with palatal myoclonus report a persistent feeling of a lump in the throat, known as globus sensation.
* Palatal myoclonus can be associated with involuntary movements of the tongue or jaw, impacting speech and chewing abilities.
* Patients may also exhibit symptoms such as difficulty swallowing (dysphagia) or changes in voice quality due to palatal myoclonus.

## **Causes of Palatal Myoclonus**

The primary cause of palatal myoclonus is believed to be dysfunction within the brainstem, particularly in the region called the inferior olivary nucleus. This dysfunction can result from various factors, including brainstem lesions, stroke, multiple sclerosis, or brain trauma. In some cases, the exact cause may remain unknown, termed idiopathic palatal myoclonus. The abnormal muscle contractions associated with palatal myoclonus can lead to symptoms such as clicking sounds in the ear, speech disturbances, and swallowing difficulties.

* Palatal myoclonus can be caused by brainstem lesions affecting the Guillain-Mollaret triangle, leading to involuntary rhythmic contractions.
* Vascular insults such as stroke or aneurysm can disrupt the normal function of the brainstem, resulting in palatal myoclonus.
* Certain neurodegenerative disorders like multiple system atrophy can manifest with palatal myoclonus as a symptom.
* Traumatic brain injuries or head trauma may trigger abnormal neuronal firing in the brainstem, contributing to palatal myoclonus.
* Infections such as encephalitis or brain abscesses can lead to inflammation and damage in the brainstem, causing palatal myoclonus.

**Types Of Palatal Myoclonus**

Palatal myoclonus, a rare movement disorder, can be classified into two main types: essential palatal tremor and symptomatic palatal tremor. Essential palatal tremor is considered idiopathic, with no known cause, and is characterized by rhythmic contractions of the muscles in the soft palate. On the other hand, symptomatic palatal tremor is secondary to underlying neurological conditions such as brainstem lesions or multiple sclerosis. Both types typically present with involuntary, repetitive movements of the soft palate, resulting in symptoms like clicking noises in the ear or a sensation of something moving in the throat.

* Rhythmic Palatal Myoclonus: Characterized by rhythmic contractions of the muscles in the soft palate.
* Symptomatic Palatal Myoclonus: Arises secondary to underlying neurological conditions such as brainstem lesions.
* Essential Palatal Myoclonus: Occurs without any identifiable cause and is considered a primary form of the condition.
* Task-Specific Palatal Myoclonus: Triggered by specific activities or movements, such as speaking or swallowing.
* Non-Essential Palatal Myoclonus: Refers to cases where the condition is associated with an underlying cause, unlike essential palatal myoclonus.

## **Risk Factors**

While the exact cause of palatal myoclonus is not fully understood, several risk factors have been identified. These include brainstem lesions, such as stroke or multiple sclerosis, as well as neurodegenerative disorders like Parkinson's disease. Additionally, trauma or injury to the brain or brainstem, infections, or genetic predisposition may also contribute to the development of palatal myoclonus. Understanding these risk factors is crucial for the diagnosis and management of this condition.

* Brainstem or cerebellar lesions are a risk factor for Palatal myoclonus due to their impact on neurological function.
* Neurodegenerative diseases such as multiple system atrophy can increase the likelihood of developing Palatal myoclonus.
* Prior history of stroke or traumatic brain injury may predispose individuals to Palatal myoclonus.
* Genetic predisposition or family history of movement disorders can contribute to the development of Palatal myoclonus.
* Certain medications or drug exposure, such as dopamine receptor antagonists, can be a risk factor for Palatal myoclonus.

## **Diagnosis of Palatal Myoclonus**

A neurologist may perform specific tests to assess the involuntary movements of the soft palate and other muscles involved. Electromyography (EMG) can help confirm abnormal muscle activity. The diagnostic process may also include a neurological evaluation to check for associated symptoms like hearing loss or balance issues. Collaborating with a multidisciplinary team can aid in accurately diagnosing palatal myoclonus and developing a comprehensive treatment plan.

* Diagnosis of Palatal myoclonus involves physical examination and detailed neurological assessment by a healthcare provider.
* Magnetic resonance imaging (MRI) of the brain is commonly used to identify structural abnormalities related to Palatal myoclonus.
* Electromyography (EMG) can help evaluate abnormal muscle activity in the palate, aiding in the diagnosis of Palatal myoclonus.
* Video fluoroscopy may be utilized to observe real-time movements of the palate during swallowing to detect myoclonic jerks.
* Blood tests may be conducted to rule out other potential causes of symptoms associated with Palatal myoclonus.

## **Treatment for Palatal Myoclonus**

Treatment options aim to alleviate symptoms and improve quality of life for affected individuals. Medications such as benzodiazepines, anticonvulsants, and muscle relaxants may be prescribed to help control the myoclonic movements. In some cases, botulinum toxin injections into the soft palate muscles can effectively reduce the intensity of the contractions. Speech therapy and counselling may also be beneficial in managing any speech or swallowing difficulties and addressing the emotional impact of the condition. In severe or refractory cases, surgical interventions like selective denervation of the soft palate muscles may be considered as a

* Palatal myoclonus, a rare neurological condition characterized by involuntary rhythmic movements of the soft palate, can be challenging to treat effectively. Treatment options for Palatal myoclonus primarily focus on managing symptoms and improving overall quality of life for the individual.
* One common approach is the use of medications such as clonazepam, a benzodiazepine that can help reduce the intensity and frequency of the myoclonic movements. This medication acts on the central nervous system to promote relaxation and decrease muscle contractions in the palate.
* In some cases, botulinum toxin injections may be considered as a treatment option for Palatal myoclonus. Botulinum toxin, commonly known as Botox, can be injected.

**CAUSES OF MYOCLONUS**

Myoclonus can happen for many reasons. Some of those reasons are normal and expected. Others happen because of specific conditions and disorders that affect various systems in your body. Experts divide myoclonus into four main categories.

#### **Normal forms of myoclonus**

Several processes in your body can cause myoclonus to happen for normal reasons. Experts call these examples of “physiological myoclonus.” They include:

* Hiccups (which are normal unless they last a couple of days or more).
* Sleep myoclonus (also known as hypnic jerks, these are sudden sharp muscle movements that happen as you fall asleep or wake up).
* Startle reflexes (a jump-like movement you can’t control when you’re surprised or scared).

#### **Epileptic myoclonus**

Myoclonus can happen with or because of seizures (especially myoclonic seizures). This includes seizures due to different forms of epilepsy, such as Lennox-Gastaut syndrome or juvenile myoclonic epilepsy.

#### **Secondary myoclonus**

When myoclonus is a symptom of another condition, experts call this “secondary myoclonus.” Secondary myoclonus can happen for a wide range of reasons. Some of these only affect your brain or other areas of your nervous system. Others can affect many systems throughout your body.

Causes of secondary myoclonus include:

* Autoimmune diseases: These are conditions where your immune system mistakenly attacks your own body, such as celiac disease.
* Blood and body chemistry imbalances: These can happen with kidney or liver diseases and conditions affecting your thyroid. It can also happen because of vitamin or mineral deficiencies and electrolyte imbalances.
* Brain lesions: These are damaged areas of brain tissue. The damage disrupts how these areas work, which in turn causes myoclonus. Examples include damage from lack of oxygen (cerebral hypoxia) or lack of blood flow from a stroke.
* Degenerative brain diseases: Examples of these include Alzheimer’s disease and Lewy body dementia. It can also happen with Parkinson’s disease-related dementia.
* Genetic disorders: These conditions happen because of DNA mutations, including mutations you can inherit from your biological parents. Examples include Krabbe disease and Wilson disease.
* Infections: These often involve viral or bacterial infections that attack your brain or other parts of your nervous system, such as herpes simplex virus or Lyme disease.
* Nerve and spinal cord injuries: Damage to your spinal cord or nerves can interrupt your brain’s normal communication with parts of your body. Without that communication, those body parts may act spontaneously, causing myoclonus.
* Non-medical drugs and substances: Examples include alcohol, amphetamines, cocaine, ecstasy, heroin and more. Inhalants like toluene and gasoline can also cause myoclonus.
* Prescribed medications: Over a dozen different types of medication can cause myoclonus. These include anti-seizure medications, antidepressants, blood pressure medications, antibiotics, opioid painkillers and anesthetics.
* Poisons and toxins: Poisoning from heavy metals, such as lead, manganese and mercury, can cause myoclonus. It can also happen with other toxins, such as insecticides like methyl bromide.

#### **Essential myoclonus**

Essential myoclonus is a condition that runs in families. This genetic form of myoclonus isn’t harmful and usually doesn’t get worse over time. But muscle movements may become more noticeable after drinking alcohol.

**TREATMENT OPTIONS OF MYOCLONUS**

Normal forms of myoclonus typically don’t need treatment. The treatment for other forms of myoclonus can vary widely. The treatments usually depend on the underlying cause, your medical history and more. Because the treatments can vary, a healthcare provider is the best person to tell you about the treatment options and which they recommend.

### **How can this symptom be prevented?**

Myoclonus happens very quickly and often without warning. The normal and essential forms of it aren’t preventable.

However, some of the causes of secondary myoclonus are preventable. You may also be able to reduce how often epileptic myoclonus happens or how severe it is. Some things you can do include:

* Avoid non-medical drug use. This means avoiding the use of non-prescription drugs and using prescribed drugs in any way other than how your provider prescribed them. Tell your healthcare provider if you notice myoclonus after starting a new medication or non-medical drug use. Their job is to help you, not judge you, and they need to know about anything and everything you've taken so they can treat you safely and effectively.
* Protect your nervous system. Protective gear, such as helmets and safety belts, can help you prevent injuries to your brain, spinal cord and other parts of your nervous system.
* Manage chronic conditions. Epilepsy, thyroid disorders and other chronic conditions can cause myoclonus. Managing these conditions, as recommended by your provider, can help prevent myoclonus or reduce how often it happens.

**DIFFERENTIAL DIAGNOSIS**

## Symptomatic Palatal Myoclonus

* Due to identifiable brainstem or cerebellar lesions affecting the central tegmental tract or inferior olivary nucleus (most commonly strokes, demyelinating diseases like multiple sclerosis, trauma, tumors)
* Usually presents with rhythmic palatal movements plus other neurological deficits

## 2. Essential (Isolated) Palatal Myoclonus

* No structural brain lesion detected on imaging
* Pure rhythmic palatal contractions with ear clicking, often benign and sometimes familial

## 3. Middle Ear Myoclonus

* Involuntary contractions of the tensor tympani or stapedius muscles in the middle ear
* Produces clicking or buzzing tinnitus distinct from palatal myoclonus because no palatal movement is involved

## 4. Orofacial or Buccal Dystonia

* Focal dystonia involving facial muscles, sometimes affecting the soft palate; differs in sustained muscle contractions and posture rather than rhythmic jerks

## 5. Other Myoclonic Disorders

* Cortical, subcortical, or spinal myoclonus affecting other muscle groups; differentiation is based on clinical distribution and electrophysiology

## 6. Tics or Habitual Movements

* Voluntary or semi-voluntary repetitive movements involving the oropharyngeal area

## 7. Palatal Tremor Mimics

* Rhythmic clicking due to Eustachian tube dysfunction, patulous Eustachian tube, or temporomandibular joint (TMJ) disorders must be considered.

**EPIDEMIOLOGY**

* Palatal myoclonus is a rare neurological disorder characterized by involuntary rhythmic jerking of the soft palate muscles.
* The prevalence varies across populations and neurological conditions, reported as high as 0.5% to 1% among people with neurological disorders.
* It is more common in patients with other neurological diseases such as chorea, dystonia, and epilepsy—over 30% of epilepsy patients may have palatal myoclonus-like symptoms.
* Palatal myoclonus occurs in both adults and children, though presentation may differ in pediatric cases.
* Essential palatal tremor (a form of palatal myoclonus without identifiable brain lesions) is considered rare, with an unknown exact incidence and no gender predilection.
* Symptomatic palatal tremor, often associated with brainstem or cerebellar lesions (such as stroke or demyelination), represents the more common clinical type and is usually diagnosed in middle-aged adults (around 40-50 years) with a slight male predominance reported in some cohorts.
* In a cohort of 27 symptomatic palatal tremor patients, the mean age was 47 years, with a male to female ratio of approximately 1.5:1

**PREDEFINED Q & A SETS**

## What is palatal myoclonus?

Palatal myoclonus is a rare neurological disorder characterized by involuntary, rhythmic contractions of the muscles of the soft palate (roof of the mouth). These repetitive muscle jerks can cause clicking noises in the ear and may affect speech and swallowing.

## What are the main symptoms of palatal myoclonus?

* Rapid, rhythmic twitching of the soft palate
* Audible clicking or snapping sounds caused by contraction and opening of the Eustachian tube
* Speech difficulties and swallowing problems may occur
* In some cases, muscle spasms may extend to related areas such as the tongue, throat, or face.

## How is palatal myoclonus diagnosed?

Diagnosis involves:

* Detailed clinical history and neurological examination
* Observation of rhythmic palatal movements and clicking sounds
* Imaging studies such as MRI and CT scans to exclude brainstem or cerebellar lesions
* EEG may be used to rule out epileptic activity
* Blood tests to exclude infections or other systemic causes.

## What causes palatal myoclonus?

* Symptomatic palatal myoclonus: Usually caused by lesions in the brainstem or cerebellum (e.g., stroke, multiple sclerosis, trauma) affecting pathways controlling palatal muscles
* Essential (idiopathic) palatal myoclonus: No structural brain lesions found, and symptoms are isolated without other neurological signs
* Other rare causes include congenital abnormalities.

## What treatments are available for palatal myoclonus?

Treatment focuses on symptom relief, including:

* Medications such as clonazepam, valproic acid, levetiracetam, benzodiazepines to reduce muscle contractions
* Botulinum toxin (Botox) injections into the soft palate muscles to decrease spasms and clicking sounds
* Speech therapy and cognitive therapy for managing speech/swallowing difficulties and emotional impact
* Surgical options (e.g., selective denervation) are rarely used, reserved for refractory cases.

## What is the prognosis of palatal myoclonus?

* The course varies depending on the underlying cause.
* Symptoms may resolve completely, remain stable, or progress chronically
* Complications can include depression or anxiety due to chronic symptoms.

## Can palatal myoclonus occur in children?

Yes, it can occur in children, sometimes associated with congenital abnormalities. Symptoms in children may improve or decrease over time.

## How is palatal myoclonus distinguished from similar conditions?

* Middle ear myoclonus: Involuntary twitching of middle ear muscles causing clicking tinnitus but without palatal movement
* Orofacial dystonia: Sustained muscle contractions rather than rhythmic jerks
* Tics or habitual movements: Suppressible and voluntary to some extent
* Differentiation relies on clinical observation, audiological tests, and imaging

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: Hello, I understand you’ve been hearing some clicking sounds in your ear and feeling unusual movements at the back of your mouth. Can you tell me more about these symptoms?

Patient: Yes, for a few months now, I keep hearing a clicking noise in my ear, almost like a clock ticking. Sometimes I feel twitching or spasms in the roof of my mouth. It’s quite distracting.

Doctor: What you’re describing sounds like palatal myoclonus, which is a rare condition where the muscles of the soft palate—the soft part at the back of your mouth—contract rhythmically and involuntarily. This muscle movement can cause the clicking noise you hear.

Patient: Is it dangerous? What causes it?

Doctor: Palatal myoclonus can occur for a few reasons. Sometimes it happens by itself with no underlying brain problem; we call this essential palatal myoclonus. Other times, it may be a sign of a lesion or damage in certain brain regions like the brainstem or cerebellum, often due to stroke, trauma, or other neurological conditions. We’ll do imaging tests to check for that.

Patient: Will it go away on its own? How is it treated?

Doctor: In some cases, especially essential palatal myoclonus, symptoms may persist without worsening but can be managed. Treatment usually focuses on reducing the muscle spasms and the clicking. Medications like clonazepam or valproic acid may help. Additionally, botulinum toxin injections into the palate muscles have been effective at reducing symptoms temporarily.

Patient: Are there any things I can do to help myself?

Doctor: Avoiding stress and caffeine might help reduce muscle spasms. Also, if you notice your symptoms worsening or developing new neurological signs like weakness or coordination problems, please report them promptly. We will monitor you and adjust treatment as needed.

Patient: Does this affect my hearing or speech?

Doctor: The clicking sound is caused by the muscle contractions, but actual hearing loss is uncommon. Some patients may have mild speech or swallowing difficulties if spasms are severe, but that is less common.

Patient: How long will I need treatment?

Doctor: It depends on how you respond. Some patients have symptoms for months to years, and treatments like botulinum injections may need to be repeated periodically. We will personalize your care plan to manage your symptoms effectively.

Patient: Thank you, Doctor. It helps to understand what’s going on.

REFERENCES:

<https://my.clevelandclinic.org/health/symptoms/15301-myoclonus-muscle-twitch>

<https://www.mayoclinic.org/diseases-conditions/myoclonus/diagnosis-treatment/drc-20350462>

<https://www.medicalnewstoday.com/articles/myoclonus>

**Tonsil cancer**

**DEFINITION / DESCRIPTION**

Tonsil cancer is a growth of cells that starts in a tonsil. The tonsils are two oval-shaped pads in the back of the mouth. They help the immune system fight germs.

Tonsil cancer can cause difficulty swallowing. It may make it feel like something is caught in the throat. Tonsil cancer is often diagnosed late in the disease. Often, the cancer has spread to nearby areas, such as the lymph nodes in the neck.

Tonsil cancer is considered a kind of throat cancer. Tonsil cancer happens in the part of the throat that's behind the mouth, called the oropharynx. Cancer that starts in this part of the throat is sometimes called oropharyngeal cancer.

Treatments for tonsil cancer include surgery, radiation therapy and chemotherapy.

**CAUSES**

Tonsil cancer happens when cells in the tonsils develop changes in their DNA. A cell's DNA holds the instructions that tell a cell what to do. In healthy cells, the DNA gives instructions to grow and multiply at a set rate. The instructions tell the cells to die at a set time. In cancer cells, the changes give different instructions. The changes tell the cancer cells to make many more cells quickly. Cancer cells can keep living when healthy cells die. This causes too many cells.

The cancer cells might form a mass called a tumor. The tumor can grow to invade and destroy healthy body tissue. In time, cancer cells can break away and spread to other parts of the body. When cancer spreads, it's called metastatic cancer.

It's not always clear what causes the DNA changes that lead to tonsil cancer. For many tonsil cancers, human papillomavirus is thought to have a part. Human papillomavirus, also called HPV, is a common virus that's passed through sexual contact. For most people, HPV doesn't cause any problems. For others, it causes changes in the cells that may one day lead to cancer. Tonsil cancer caused by HPV tends to occur at a younger age and is more likely to respond well to available treatments.

**Risk factors**

Factors that may increase the risk of tonsil cancer include:

### **Using tobacco**

All forms of tobacco increase the risk of tonsil cancer. This includes cigarettes, cigars, pipes, chewing tobacco and snuff.

### **Drinking alcohol**

Frequent and heavy drinking increases the risk of tonsil cancer. Using alcohol and tobacco together increases the risk even more.

### **Being exposed to human papillomavirus**

Human papillomavirus, also called HPV, is a common virus that's passed through sexual contact. For most people, it causes no problems and goes away on its own. For others, it causes changes in the cells that can lead to many types of cancer, including tonsil cancer.

**SIGNS / SYMPTOMS**

Signs and symptoms of tonsil cancer include:

* Difficulty swallowing.
* A sensation that something is caught in the back of the throat.
* Swelling and pain in the neck.
* Earache.
* Jaw stiffness.

**DIAGNOSIS METHODS**

To diagnose tonsil cancer, a healthcare professional might start by looking closely at your mouth and throat. Other tests and procedures might include imaging tests and a procedure to remove some cells for testing.

### **Examining the throat and neck**

A healthcare professional may use a mirror or tiny camera to examine your mouth and throat. The health professional may feel your neck to check for swollen lymph nodes.

### **Removing a tissue sample for testing**

Your healthcare professional may recommend a biopsy to get some tonsil cells. A biopsy is a procedure to remove a sample of tissue for testing in a lab. To get the sample, a healthcare professional may cut away some cells from the tonsil. Or the health professional may use a needle to draw some cells out from a swollen lymph node in the neck.

In the lab, doctors called pathologists look for signs of cancer in the tissue sample. The tissue sample also will be tested for human papillomavirus, also called HPV. If your cancer cells show signs of HPV, this greatly impacts your prognosis and your treatment options.

### **Taking imaging tests**

Imaging tests make pictures of the body. They may help your healthcare team better understand the size of your cancer. Imaging tests also can look for signs that cancer may have spread beyond your tonsils.

Imaging tests used for tonsil cancer may include:

* Computerized tomography, also called CT.
* Magnetic resonance imaging, also called MRI.
* Positron emission tomography, also called PET.

### **Tonsil cancer staging**

Your healthcare team uses information from these procedures to assign your cancer a stage. The stage tells your healthcare team about the extent of your cancer and about your prognosis.

The stages of tonsil cancer range from 0 to 4. The lowest numbers indicate a small cancer that may only be in the tonsil or may have spread to a few nearby lymph nodes. As the cancer gets bigger or spreads to more lymph nodes, the stages get higher. A stage 4 tonsil cancer is one that has grown beyond the tonsil or has spread to many lymph nodes. A stage 4 tonsil cancer also may have spread to other parts of the body.

The stages of tonsil cancer are different for cancers that show signs of HPV infection and those that don't. Talk with your healthcare team about your tonsil cancer stage and what it means for your outlook.

**TREATMENT OPTIONS**

Treatments for tonsil cancer include surgery, radiation therapy and chemotherapy. Other treatments include targeted therapy and immunotherapy.

Your healthcare team considers many factors when creating a treatment plan. These factors might include the cancer's location and how fast it's growing. The care team also may look at whether the cancer has spread to other parts of the body and the results of tests on the cancer cells. Your care team also considers your overall health and your preferences.

Your treatment also may depend on whether your cancer cells show signs of human papillomavirus, also called HPV. Researchers are studying whether people with HPV-related tonsil cancer can be treated with lower doses of radiation and chemotherapy. This less intense treatment causes fewer side effects. Studies have found that it seems to be as effective as higher doses. If your tonsil cancer is found to be HPV-related, you and your healthcare team might consider a clinical trial studying less intense treatments.

### **Surgery**

The goal of surgery for tonsil cancer is to remove as much of the cancer as possible. Surgery can be used to treat all stages of tonsil cancer.

Surgery is most often done through the mouth. Doing surgery in this way is called transoral surgery. Surgeons pass tools through the mouth to access the cancer. The surgeons remove the cancer with cutting tools or lasers.

In certain situations, it may be necessary to make a large incision in the neck. This approach lets surgeons remove larger cancers and cancers that have spread to the lymph nodes. Reconstructive surgery and rehabilitation may be needed to restore your ability to eat, speak and swallow.

### **Radiation therapy**

Radiation therapy treats cancer with powerful energy beams. The energy can come from X-rays, protons or other sources. During radiation therapy, a machine directs beams of energy to specific points on the body to kill the cancer cells.

Radiation therapy might be used alone to treat small cancers that haven't grown beyond the tonsil. Sometimes radiation therapy is used after surgery if the cancer can't be removed completely. It also may be used after surgery if there's a risk that the cancer may have spread to the lymph nodes.

Radiation also can be combined with chemotherapy. The chemotherapy makes the radiation work better. Radiation and chemotherapy together is sometimes used as the first treatment for tonsil cancer. Or radiation and chemotherapy might be used as extra treatment after surgery.

### **Chemotherapy**

Chemotherapy treats cancer with strong medicines. For tonsil cancer, chemotherapy is usually combined with radiation therapy. It also can be used alone to slow the growth of tonsil cancer that has come back or has spread to other areas of the body.

### **Targeted therapy**

Targeted therapy uses medicines that attack specific parts of cancer cells. By blocking these parts, targeted treatments can cause cancer cells to die. Targeted therapy might be used to treat tonsil cancer that spreads to other parts of the body or comes back after treatment.

### **Immunotherapy**

Immunotherapy is a treatment with medicine that helps the body's immune system kill cancer cells. The immune system fights off diseases by attacking germs and other cells that shouldn't be in the body. Cancer cells survive by hiding from the immune system. Immunotherapy helps the immune system cells find and kill the cancer cells. Immunotherapy might be used when tonsil cancer spreads to other parts of the body and other treatments haven't helped.

### **Rehabilitation services**

If treatment affects your ability to speak and eat, you might need rehabilitation services. Rehabilitation specialists who work with people with tonsil cancer include those in speech therapy, swallowing therapy, dietetics, physical therapy and occupational therapy. These services can help with your recovery after tonsil cancer treatment.

**PREVENTION TIPS**

Things that can help lower the risk of tonsil cancer include making healthy choices and having regular checkups. To lower your risk of tonsil cancer:

### **Don't use tobacco**

If you don't use tobacco, don't start. If you currently use tobacco of any kind, talk with your healthcare professional about strategies to help you quit.

### **Limit alcohol if you choose to drink**

If you choose to drink alcohol, do so in moderation. For healthy adults, that means up to one drink a day for women and up to two drinks a day for men.

### **Have regular health and dental exams**

During your appointments, your dentist, doctor or other healthcare professional can check your mouth for signs of cancer and precancerous changes.

### **Consider the HPV vaccine**

A vaccine can help prevent infection with human papillomavirus, also called HPV. HPV infection raises the risk of tonsil cancer and other cancers. Receiving a vaccination to prevent HPV infection may reduce the risk of HPV-related cancers. Ask your healthcare professional whether the HPV vaccine is right for you.

**OUTLOOK / PROGNOSIS**

Overall, 85% of people with tonsil cancer and HPV were alive five years after their diagnosis. Tonsil cancer survival rates may vary based on several factors, including whether the tonsil cancer is HPV-positive or negative or if the tumor is spreading.

When you think about cancer survival rates, it’s also important to remember:

* These rates are estimates based on the experiences of other people who had tonsil cancers. What was true for them may not be true for you.
* Experts update survival rates every five years, and it’s possible tonsil cancer survival rates are different.
* A survival rate isn’t an estimate for how long you’ll live, or your life expectancy if you have tonsil cancer.

Survival rate data can be complicated and confusing. If you have tonsil cancer, ask your oncologist about survival rate estimates and how they apply to your situation.

#### **Is cancer of the tonsils curable?**

Statistically, tonsil cancer isn't likely to be fatal. As with most cancers, treatment is most successful when the condition is detected and treated in the early stages.

**WHEN TO SEE A DOCTOR / RED FLAG**

If you had tonsil cancer surgery, contact your surgeon right away if:

* Your surgery site is bleeding more than you expect or that you can’t control.
* You have signs of infection like fever, pus or fluid oozing from the site or the site looks red or is warm to the touch.

If you didn’t have surgery, contact a provider if you have symptoms like:

* New sore throat symptoms.
* Blood in your saliva.
* Your tonsils look different, like red, swollen or white spots.

**DIFFERENTIAL DIAGNOSIS**

* Tonsillitis
  + Description: Inflammation of the tonsils, most often caused by bacterial or viral infections .
  + Distinguishing features: Commonly affects children, while tonsil cancer is more frequent in older adults (over 55) . Symptoms often include red and swollen tonsils, sudden sore throat, pain when swallowing, fever, and swollen lymph nodes . Tonsillitis can also present with white spots on the tonsils . Unlike tonsil cancer, tonsillitis symptoms typically resolve within a few days or weeks with appropriate treatment .
* Other infections (viral or bacterial)
  + Description: General throat infections that can cause symptoms like sore throat, pain, and discomfort .
  + Distinguishing features: These infections usually resolve on their own or with antibiotics if bacterial . Tonsil cancer symptoms, in contrast, are persistent, lasting longer than a few days or weeks without improvement .
* Other throat conditions
  + Description: Various non-cancerous conditions can cause throat discomfort, a sensation of something stuck in the throat, or difficulty swallowing .
  + Distinguishing features: These conditions typically lack the specific red flags of tonsil cancer, such as a persistent unilateral (one-sided) tonsil enlargement, unexplained ear pain (especially on one side not caused by infection), or a persistent lump in the neck .
* Lymphoma
  + Description: While most tonsil cancers are squamous cell carcinomas, a small number can be lymphomas, which are cancers of the lymphatic system .
  + Distinguishing features: The treatment for lymphomas is different from squamous cell carcinoma, requiring specific diagnostic approaches to differentiate the two .
* Other oropharyngeal cancers
  + Description: Tonsil cancer is a type of oropharyngeal cancer, meaning it occurs in the part of the throat behind the mouth . Other cancers can arise in this area (e.g., base of tongue, soft palate, back wall of the throat) .
  + Distinguishing features: While sharing similar symptoms like difficulty swallowing, ear pain, or a neck lump, the precise location and biopsy findings differentiate these

**EPIDEMIOLOGY**

Large epidemiological studies have shown tonsils are the most common site of oropharyngeal cancer, compromising 23.1% of all malignancies in this anatomical region, with an overall incidence rate of 8.4 cases per 100,000 Of concern, the rate of tonsil and oropharyngeal cancers has increased dramatically in the last 40 years. This significant rise has been attributed to the "viral epidemic" of HPV, with western countries seeing an increase in the proportion of HPV-associated cancers from 42.5% before 2000 to 72.2% between 2005 and 2009. Conversely, was not a significant increase in the rate of non-HPV oropharyngeal cancers within the same period

**PREDEFINED Q & A SETS**

## What is tonsil cancer?

Tonsil cancer is a type of oropharyngeal cancer that begins in the tonsils, which are part of the immune system located at the back of the throat. It involves abnormal malignant cell growth in the tonsillar tissue.

## What causes tonsil cancer?

The main risk factors include:

* Infection with human papillomavirus (HPV), especially HPV-16
* Tobacco smoking
* Heavy alcohol consumption
* Combination of tobacco and alcohol increases risk significantly

## What are the common symptoms of tonsil cancer?

* Persistent sore throat
* Difficulty or pain when swallowing
* Feeling of something stuck in the throat
* Swelling or pain in the neck due to enlarged lymph nodes
* Ear pain (referred pain)
* One tonsil appearing swollen or larger than the other
* Jaw stiffness
* Unexplained weight loss or voice changes in advanced cases

## How is tonsil cancer diagnosed?

* Physical examination of the mouth, throat, and neck, often using a small camera or mirror
* Biopsy of suspicious tonsil tissue to confirm cancer and test for HPV (p16 testing)
* Imaging tests such as CT, MRI, or PET scans to assess the size and spread of the tumor and lymph nodes
* Staging the cancer (from stage 0 to IV) guides treatment planning

## What are the treatment options for tonsil cancer?

* Surgery: Often done transorally (through the mouth) to remove the tumor; may include neck dissection for lymph nodes
* Radiation therapy
* Chemotherapy
* Combination chemoradiotherapy
* Targeted therapy and immunotherapy drugs, especially in advanced or recurrent cases
* Treatment choice depends on cancer stage, HPV status, overall health, and patient preference

## What is the significance of HPV in tonsil cancer?

HPV-positive tonsil cancers tend to:

* Occur in younger patients and nonsmokers
* Have a better prognosis and higher survival rates
* Sometimes be treated with less intense chemoradiation protocols in clinical trials

## What is the prognosis for tonsil cancer?

* HPV-positive tonsil cancer has a 5-year survival rate of about 70-71%
* HPV-negative cancers have a lower 5-year survival rate around 46%
* Early detection and treatment improve outcomes significantly

## Can tonsil cancer occur without tonsils?

Yes, cancer can arise from residual or surrounding oropharyngeal tissue even after tonsillectomy.

## When should I see a doctor about tonsil cancer?

Consult a healthcare professional if you have persistent symptoms such as a sore throat lasting more than a few weeks, a painless neck lump, persistent ear pain, difficulty swallowing, or asymmetric tonsil enlargement.

**DOCTOR-PATIENT CONVERSATIONS**

Doctor: I understand you’ve been experiencing some persistent sore throat and a lump in your neck. After examining you and reviewing your tests, I want to talk about the possibility of tonsil cancer.

Patient: Cancer? That sounds scary. What exactly does that mean?

Doctor: Tonsil cancer is a type of oropharyngeal cancer that starts in the tissue of the tonsils, which are located at the back of the throat. It can cause symptoms like a sore throat that doesn’t go away, ear pain, difficulty swallowing, and lumps in the neck due to swollen lymph nodes.

Patient: What causes this kind of cancer?

Doctor: A major cause, especially nowadays, is infection with a virus called human papillomavirus, or HPV. Other important factors include smoking and heavy alcohol use. However, many patients with HPV-related tonsil cancer do not smoke. HPV-positive tonsil cancers often affect younger people and tend to respond better to treatment.

Patient: How do you know for sure I have this cancer?

Doctor: To confirm it, we do a biopsy—a small tissue sample taken from the tonsil for examination under a microscope. Imaging tests such as a CT or MRI scan help show how much the cancer has spread. This information helps us stage the cancer and plan your treatment.

Patient: What treatments are available? Is it curable?

Doctor: Yes, many cases are treatable and potentially curable, especially when caught early. Treatment usually involves surgery to remove the tumor, radiation therapy, chemotherapy, or a combination of these. For HPV-positive cancer, outcomes are generally better. We have advanced surgical techniques, including minimally invasive robotic surgery, which can reduce recovery time and complications.

Patient: What about side effects? Will I be able to swallow and speak normally after treatment?

Doctor: Our goal is always to preserve your ability to speak and swallow. Newer treatments and surgical methods are designed to minimize damage and maintain quality of life. Some patients need speech therapy or swallowing support after treatment. We will closely monitor and support you throughout the recovery.

Patient: How long does treatment take, and what is the prognosis?

Doctor: Treatment duration depends on your individual case and cancer stage. Typically, radiation and chemotherapy last several weeks. Surgery recovery may take a few weeks. Prognosis varies, but HPV-positive patients often have a 5-year survival rate above 70%. Early diagnosis and treatment improve outcomes significantly.

Patient: Is there anything I can do to help myself during treatment?

Doctor: Yes, maintaining good nutrition, avoiding tobacco and alcohol, and following your treatment plan are important. Also, having strong support from family or friends helps emotionally. We encourage you to ask questions anytime, and we will guide you through every step.

Patient: Thank you, Doctor. It helps to understand what’s happening and what to expect

REFERENCES:

<https://my.clevelandclinic.org/health/diseases/21931-tonsil-cancer>

<https://cancerblog.mayoclinic.org/2025/04/02/how-to-talk-to-family-and-friends-about-a-head-and-neck-cancer-diagnosis/>

<https://www.cancerresearchuk.org/about-cancer/head-neck-cancer/tonsil/about>

<https://www.cancer.org/cancer/types/oral-cavity-and-oropharyngeal-cancer/about/key-statistics.html>

<https://www.ncbi.nlm.nih.gov/books/NBK537238/>