

THE EARS

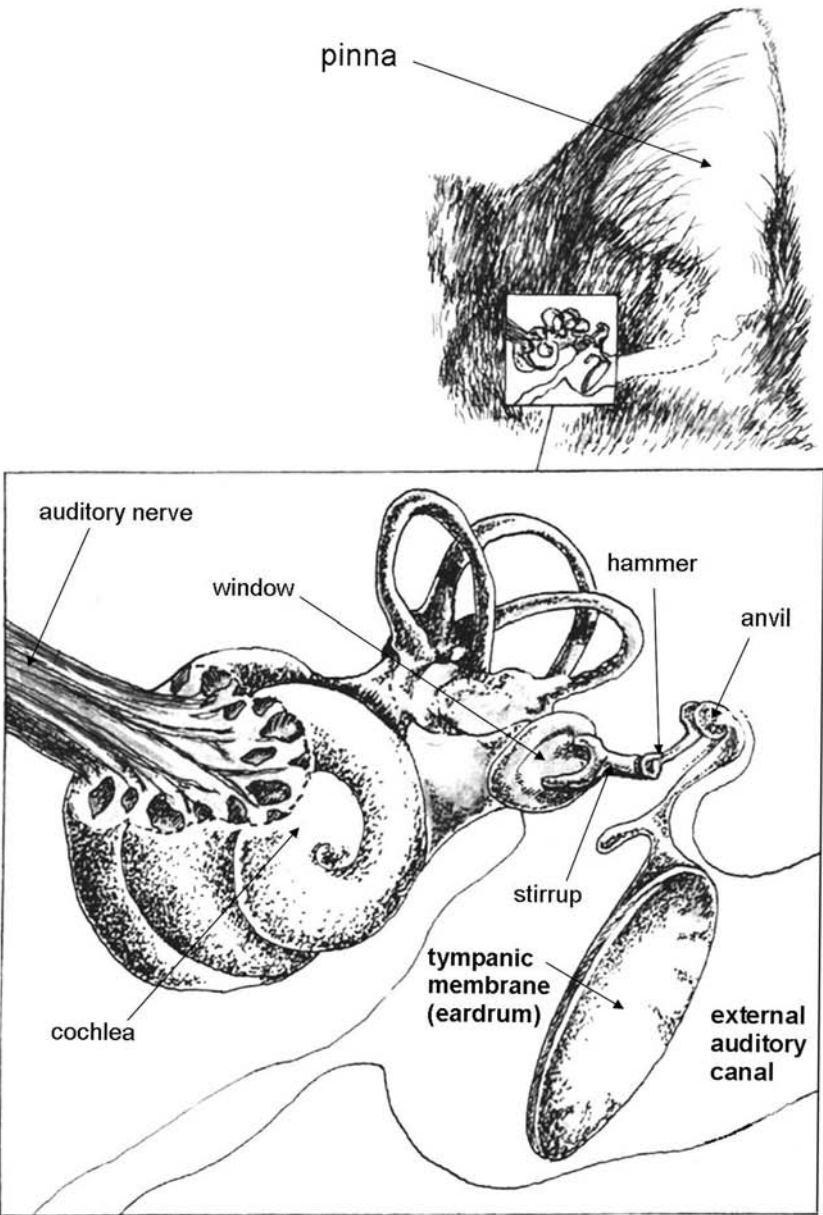
Hearing is one of a cat's keenest senses. Cats can hear sounds too faint for humans to detect. They can also hear noises pitched at a much higher frequency—even beyond the range of the dog. Cat hearing covers the range from 45 to 64,000 Hz. A cat's whole head turns toward the source of a sound. The ears move forward and backward or in a half circle to locate the angle of direction, and can move independently of one another. The eyes also focus in the direction of the sound. This combination of senses makes cats the excellent hunters they are, especially in dim light.

Cats also have a remarkable sense of equilibrium, due to a mechanism in the inner ear that enables the body to adjust with great speed and agility. When falling from a height in an upside-down position, cats can right themselves to land on their feet in less than two seconds. This is done by first rotating the forequarters to orient to the ground, and then rotating the hindquarters. With the aid of a strong tail, the body twists to bring all four feet down together for the landing. However, the fact that cats can land on all four feet does not mean they can fall from great heights without sustaining an injury. Veterinarians with urban practices report that falls from a height are a major cause of injury and death for cats. Be sure to keep screens on all your windows, because cats may jump with little or no regard for heights.

Along with hearing, cats' ears are also good indicators of mood. Ears turned sideways or back a little often indicate a cat who is getting agitated. A cat with ears flat back against the head is frightened, defensive, or aggressive. Ears forward and up mean the cat is relaxed. Ears swiveling show a cat is interested and listening.

Structure of the Ears

The ear is divided into three parts. The outer ear is composed of the ear flap (pinna) and ear canal (external auditory canal). The middle ear is made up of



The anatomy of the ear.

the eardrum (tympanic membrane) and the auditory bones or ossicles. The inner ear contains the cochlea, bony labyrinth, and auditory nerves.

Sound, which is really vibrations of air, is collected by the pinna and directed down the ear canal to the eardrum. Movements of the eardrum are



The ear shape of the Scottish Fold is caused by a mutation of a single dominant gene that is linked to a skeletal abnormality. Breeding partners must be selected carefully.

transmitted by a chain of small bones, the ossicles, to the bony canals of the inner ear. The ossicles are the hammer, the stirrup, and the anvil.

The cochlea is a system of fluid-filled tubes in which waves are created by movements of the ossicles. Here, the waves are transformed into nerve impulses and carried via the auditory nerve to the brain.

Most cats' ears are carried erect—what's called a prick ear. The skin on the back of the pinna is covered by hair and, like the rest of the body, is susceptible to the same diseases. Skin on the inside is pale pink, occasionally with spots of pigment. A small amount of brown, waxy secretion in the ear canals is normal.

When a kitten is born, her ear canals are closed and it's likely that kittens are deaf (although we don't know for sure). They begin to open at 5 to 8 days. Kittens become oriented to sound at 13 to 16 days. They learn to recognize or distinguish between different sounds at 3 to 4 weeks. Knowing this sequence can help you to judge whether your kitten's hearing is developing normally.

In a few cat breeds, the ears are not erect. The American Curl is a breed with ears that curl back at the tips. The kittens are born prick eared, but by about 4 months of age you can tell if the ears will curl and just how much.

The ears of Scottish Folds fold down at about 3 to 4 weeks of age. In this breed, it is important never to breed cats with folded ears to other cats with folded ears. That's because the genetic mutation that caused folded ears is linked to gene that causes a skeletal abnormality. This is an incomplete dominant trait, and if you breed two carriers, at about 4 to 6 months of age a degenerative joint disease will become apparent in the offspring. The lower joints in the legs of these kittens will be fused and their tails will be shortened and stiff. If you breed a cat with prick ears to a cat with fold ears, you avoid this problem.

Your cat has an ear problem if you notice ear scratching, repeated head shaking, a bad odor emanating from the ear, or large amounts of waxy discharge or pus draining. In a younger cat, the most likely cause is ear mites, but other diseases of the ears (such as allergies) do occur. Diseases of the middle ear cause head tilt and the loss of hearing. Diseases of the inner ear affect the balance center. The cat wobbles, circles, falls and rolls over, and has trouble righting herself. The cat may show rapid jerking movements of the eyes (*nystagmus*).

Basic Ear Care

If you bathe your cat, prevent water from getting into her ears by inserting cotton balls at the opening of the ear canals. Wet ear canals can predispose a cat to ear infections. If your cat has been in a fight, check the ears for any cuts or bites that may need to be treated (see *The Pinna*, page 209).

Routine ear cleaning is not required. Some wax is necessary to maintain the health of the tissues. However, ears should be cleaned when there is an



To clean very dirty ears, instill an ear-cleaning solution and massage the base of the ear.



Gently wipe out the ear with a cotton ball.

excessive amount of wax, dirt, or debris. For small amounts of waxy debris, a damp cotton ball or a cotton-tipped swab works well. Many cats tolerate this well if you sit down and hold them in your lap, facing away.

Do not put any cleaning solution in the ear unless you are confident the eardrum is intact.

To clean a very dirty ear, apply a few drops of warm mineral oil, olive oil, a dilute vinegar solution (three drops white vinegar in 1 ounce [30 ml] of water), or a special ear-cleaning solution from your veterinarian (such as Oti-Clens, Epi Otic, Clear X Cleansing Solution, Virbac, Malacetic Otic, or Tris-EDTA products) to the *external* ear canal and massage the base of the ear to loosen dirt, excess wax, and debris. Then gently wipe out the ear with a cotton ball.

Ear folds and creases at the base of the ear are best cleaned with a cotton-tipped swab moistened with oil or a cleaning solution. *Do not* direct the applicator into the ear canal because this will push the debris deeper into the canal and pack it against the eardrum. *Do not* swab out or irrigate your cat's ears with ether, alcohol, or other irritating solvents, all of which cause pain and swelling of the tissues.

Many cats object to ear cleaning and should be gently restrained, as described in *Handling and Restraint* (page 2). Try to make this a positive experience by staying calm and quiet and giving your cat a treat or some play time right after the ear cleaning. Many cats hold their ears in strange positions right after a cleaning.

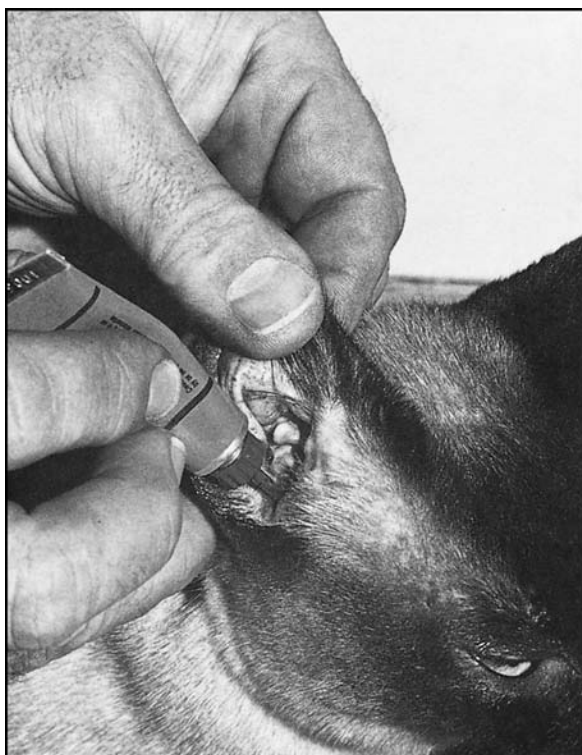
HOW TO APPLY EAR MEDICATIONS

Ear medications should be applied only to clean ear canals. Discuss with your veterinarian what cleaning solution will work best with the medications your cat needs.

Some ear medications come in tubes with long nozzles; others come with medicine droppers. Restrain your cat so the tip of the applicator does not accidentally lacerate the skin of the ear canal. Fold the ear flap back over the



Clean folds and creases with a cotton-tipped swab. Do not insert the swab into the ear canal.



To apply medication, insert the tip of the nozzle only as far in as you can see and squeeze in a small amount.

top of the head. Insert the end of the nozzle or medicine dropper into the ear canal only as far as you can see. Unless directed otherwise by your veterinarian, squeeze in a small amount of ointment or instill three to four drops of liquid.

Because most infections involve the deep, horizontal part of the ear canal, it is important for the medicine to reach this area. Massage the cartilage at the base of the ear for 20 seconds to disperse the medicine. The massaging will produce a squishy sound. Use a cotton ball to wipe any excess medication off the inside of the ear flap.

Antibiotic Ear Medications

Antibiotic medications commonly used to treat external ear infections include Panolog, Tresaderm, Gentocin Otic, Otomax, Mometamax, Baytril, and others. Others are available that contain different antibiotics or combinations of medications. All ear preparations can damage the middle ear or inner ear if the eardrum has been ruptured. Medications should not be put into ears until a veterinarian has examined the cat and determined that the eardrums are intact. Sometimes the cat will need to be sedated by your veterinarian so that the ear canal can be thoroughly cleaned of wax and debris.

Problems associated with the prolonged use of antibiotic ear preparations include allergic skin reaction, the development of antibiotic resistant strains of bacteria, and overgrowth of yeast and fungi. Follow the directions of the manufacturer about frequency of application. Expect to see improvement in two to three days. If not, consult your veterinarian because further delay can be harmful.

The Pinna

The pinna is an erect flap of cartilage covered on both sides by a layer of skin. It is fragile and easily damaged. The signs of an outer or external ear problem are discharge, shaking the head, ear scratching, and tenderness about the ear. A cat with an itchy ear ailment may scratch so vigorously that the skin becomes severely abraded. The abraded skin may then become infected, leading to an abscess. Attempts to treat the traumatized pinna may not be successful until the initiating cause of the itching and scratching has been identified and treated.

BITES AND LACERATIONS

Cats give and receive painful bites and scratches that are prone to severe infection. The pinna is a frequent site for such injuries. Some occur during mating.



An ear bandage may be required to protect an ear injured by a bite or laceration.

Treatment: All cat bite wounds should be carefully cleaned and inspected. Trim the hair from the edges of the wound. Bathe the wound with a Betadine or a chlorhexidine wound cleansing solution to remove dried blood and foreign debris. Be careful to keep all solution out of your cat's eyes. Omit this step if there is fresh bleeding.

Then apply a topical antibiotic ointment, such as triple antibiotic ointment or Neosporin. Try to distract your cat for a minute or two after applying any ointment so that she does not immediately rub or lick it off.

Because claws and teeth produce deep wounds and punctures and almost always inject bacteria into the wound, injuries caused by cat fights are often complicated by abscesses. Some can be prevented by giving your cat a course of antibiotics (often a penicillin such as amoxicillin). Do not give any antibiotics without first consulting your veterinarian.

Large lacerations and those involving the margin of the ear or the cartilage should receive veterinary attention. Surgical repair is necessary to prevent scarring and deformity. With bite wounds from unknown animals, discuss rabies with your veterinarian.

SWOLLEN PINNA

Sudden swelling about the ear is due to an *abscess* or a *hematoma*. Abscesses are more common. They are caused by an infection of the skin of the ear and often occur after a fight. Severe scratching at the ear may produce skin infection and abscess. Abscesses are usually found below the ear. They are discussed on page 164.

A hematoma is a blood clot under the skin of the pinna. It, too, can be caused by trauma or by violent head shaking and scratching at the ear. Look for an itchy ear disorder, such as ear mites, or an infection involving the ear canal—which should be treated along with the hematoma.

Treatment: Blood should be expressed from a hematoma by a veterinarian, to prevent scarring and deformity of the ear when the clot retracts. Removing it with a needle and syringe usually is not effective, because serum accumulates in the pocket formerly occupied by the blood clot and the pocket fills again. Surgery, the treatment of choice, involves removing a window of skin to provide open and continuous drainage. A drain may be placed through the area. Sutures are then made through both sides of the ear to pull the skin down and eliminate the pocket. Expect your cat to need to wear a BiteNot collar or an Elizabethan collar to prevent her from pawing at the ear.

EAR ALLERGIES

Allergies are typified by itching and skin redness without drainage. Both food allergies and atopy (inhaled allergies) may first present as an otitis. They can



Hematoma of the pinna, caused by violent head shaking. Note the swelling and deformity.

affect the skin of the ear canals as well as the pinna. An allergic ear problem can closely resemble a yeast infection or may have a yeast infection secondary to an allergy, so check with your veterinarian before applying any medication at home. For more information, see *Allergies*, page 151.

Treatment: An allergic reaction is best treated with a 1 percent hydrocortisone cream, such as Cortaid. Because of the intense itching, the cat may traumatize her ears and set the stage for a secondary bacterial infection.

FROSTBITE

Frostbite affects the ears of outdoor cats in severe winter weather, particularly when there is high wind and humidity. The ears are especially susceptible because they are exposed and only lightly protected by fur, especially at the tips. After having been frozen, the ear tips of dark-coated or Siamese cats may become rounded and develop white hairs at their tips. Drooping of the pinna is another condition that follows prolonged exposure to wind and cold.

Treatment: Treatment of frostbite is discussed on page 21.

SUNBURN

Cats with white ears are particularly susceptible to sunburn. Hair is lost from the tips and edges of the ears. Then the underlying skin becomes reddened. Finally, because the cat will scratch at the ear, the skin breaks down and forms an open sore or ulcer. The condition grows worse with each passing summer.

In time, a squamous cell skin cancer is likely to develop in the ulcerated area. Other tumors also can grow on the skin of the ears. Most are malignant. Any growth on the ear is a cause for concern. Have it examined by your veterinarian.

Treatment: A cat with this condition should ideally be kept indoors. Keeping her inside only on sunny days does not address the entire problem, because the sun's ultraviolet rays, which are responsible for skin damage, can penetrate clouds. If a cat must be outdoors, she should only be let out at night. Sun block can also be applied to the ears. Try to distract the cat after applying it so she doesn't immediately groom it off. But be aware that she will eventually groom it off, so this is a less-than-ideal solution.

Surgery is indicated for a nonhealing sore. When the ear tips are ulcerated, they are rounded off surgically and removed. Small ulcers can be excised. Large ulcers, which are often malignant, may require removal of the entire pinna.

PARASITES

Head mange is caused by the head mite called *Notoedres cati*, which lives on the skin about the head and ears of cats. Itching is the predominant sign. Clean ear canals help distinguish this condition from an ear mite infection caused by *Otodectes cynotis*. Treatment is discussed on page 141.

Fleas frequently feed on the skin of the pinna. You may be able to see the actual fleas on the ears or elsewhere on the body, or you may see only black, crumbly crusts of dried blood. Treatment is discussed on page 138.

The Ear Canal

Signs of irritation or infection in the ear canals are discharge, shaking the head, and scratching and pawing at the ear. Common causes are listed here.

EAR MITES

Ear mite infection is one of the most common health problems seen in cats. Ear mites (*Otodectes cynotis*) are tiny insects that live in the ear canal and feed by piercing the skin. Mites are prolific. Kittens can be infected by their mothers while still in the nest. Suspect ear mites when *both* ears are affected.

The most frequent sign is intense itching, characterized by scratching and violent head shaking. This is worse if the cat suffers from an allergic reaction to the mites as well as simple irritation from them. You will see a dry, crumbly, dark brown, waxy discharge when you look into the ears. The discharge looks like coffee grounds and may be foul smelling. Constant scratching at the ears



A dark brown, dry, waxy, crumbly discharge is typical of ear mites.

can cause raw areas, along with scabs and loss of hair around the ears. The initial problem may be complicated by a chronic bacterial infection.

Ear mites can be identified by your veterinarian by removing some earwax from a fold or crease with a cotton-tipped applicator and examining it under a magnifying glass, against a black background. Mites are white specks, about the size of the head of a pin, that move.

Demodex cati is another mite that can also affect the ears. Waxy debris is present; the mites can be found by examining a swab from the ears.

Ear mites can leave the ear canals and travel over the body. They are highly contagious among cats, house rabbits, ferrets, and dogs, but almost never humans. If mites are discovered on one pet, all pets in the household should be treated.

Treatment: Ear mites are a serious problem, and are deeply distressing and uncomfortable for your cat. They can crawl deep into the ear canals, where they may be difficult to treat. They can also lead to secondary infections of the ears. It is therefore very important to treat all cases of ear mites promptly and thoroughly.

Do not begin treatment until your veterinarian has positively identified ear mites as the cause of the symptoms. This is because other ear ailments can be complicated by using ear mite medications.

Clean the ears as described on page 206. This is *essential*. Dirty ear canals contain wax and cellular debris that shelters mites and makes it difficult for ear medications to destroy them.

Medicate the ears using a medication chosen by your veterinarian that is effective against mites. Some common ones are Nolvamite, Mitaclear, and

Tresaderm. Follow your veterinarian's instructions for dosage and frequency. It is very important to complete the recommended course of treatment, because a new crop of mites will reinfect your cat if the treatment is stopped too soon.

Ivermectin has been used successfully to treat ear mites. It is given as a single subcutaneous injection or with topical drops into the ear. Selamectin (Revolution) is also sometimes used for ear mites. *Demodex cati* mites are generally treated with ivermectin or lime-sulfur dips.

During treatment, mites can escape from the ear canals and temporarily take up residence elsewhere on the cat, causing itching and scratching. It is important to treat the *entire* cat with a topical insecticide preparation, as recommended by your veterinarian (see *A Suggested Flea-Control Program*, page 138). Since most cats sleep with their tail curled up next to their ears, be sure to treat the tail as well.

Clip the cat's nails to minimize injuries from scratching at the ear.

BACTERIAL OTITIS EXTERNA

Bacterial infections in the ear canal are frequently caused by scratches to the skin or cat bites. Some begin in an ear canal that contains excessive amounts of wax, cellular debris, or foreign material. Ear mite infections are often the cause of bacterial otitis.

Signs of an infected ear canal are shaking the head, scratching at the affected ear, and an unpleasant odor. The cat may tilt or carry her head down on the painful side and exhibit tenderness when the ear is touched. Examination reveals redness and swelling of the skin folds of the ear canal. There may be an excess amount of wax or a *purulent* discharge. There is often an unpleasant odor associated with the discharge.

An otoscope is needed to examine the deeper portions of the ear canal and look for a foreign body or other cause of chronic infection. This is best left to a qualified professional—your veterinarian or a veterinary technician.

Bacterial infections that progress over a long period produce thickening and reddening of the ear canal with considerable discomfort and pain. Treatment is prolonged. Inflammatory polyps and tumorlike masses may develop and block the ear passages. Surgery then becomes necessary to open the ear and promote drainage.

Treatment: The first step is to determine the cause. Mild cases—those without excessive discharge but perhaps associated with a dirty ear or the buildup of wax—may be treated at home after they have been diagnosed by a veterinarian.

Clean the ears as described on page 206. Remove crusts and serum with a cotton ball soaked in an ear-cleaning solution obtained from your veterinarian, being careful not to push the debris deeper into the canal. If there is a buildup of wax, instill a special wax-dissolving agent to soften the debris and make it easier to remove. Afterward, dry the ear canals with a cloth or cotton ball and apply an antibiotic ear medication, as described on page 207.

If the ear is extremely painful, you may need to leave your cat at the veterinary clinic for sedation and a thorough cleaning. A swab of the discharge may be examined under the microscope to look for the cause of the problem. Also, your veterinarian may take a sample for a culture and sensitivity test, especially if your cat has recurrent infections, to determine the best choice of antibiotic therapy. Some cats will need oral antibiotics as well as topical ones.

Clip the cat's nails to minimize injuries from scratching at the ear.

YEAST OR FUNGAL OTITIS EXTERNA

The prolonged use of topical antibiotics alters the natural bacterial flora in the ear canal, which improves conditions for the growth of yeast and fungi. A yeast otitis may therefore develop as a secondary problem in a cat with a long-standing bacterial or ear mite infection, or a food allergy. *Malassezia pachydermatis* is the most common culprit, including in cases of otitis related to food allergies and atopy.

Signs and symptoms of a yeast infection are not nearly as pronounced as the infection caused by bacteria. The ear is inflamed and painful, but less so. Sometimes the ear will simply be red and moist in appearance. The discharge is dark and waxy but not *purulent*. A rancid odor is characteristic.

Yeast and fungus infections tend to recur, and treatment is often prolonged.

Treatment: Your veterinarian may want to do a swab to look at cells from the ear to determine the exact cause of the problem and to determine whether the problem has cleared, because stopping treatment beforehand (not just at the remission of signs) frequently results in relapse. Topical medications may need to be supplemented with oral medications.

Treatment is similar to the treatment for bacterial otitis, except that an antifungal agent (such as nystatin or thiabendazole) is used. Panolog, which contains nystatin, is effective against the yeast *Candida albicans*. Tresaderm, which contains thiabendazole, is effective against *Candida* and most other common yeast invaders. Miconazole solutions are commonly prescribed as well.

FOREIGN BODIES OR TICKS IN THE EAR CANAL

Foreign bodies in the ear canal cause irritation and subsequent infection. Plant material (grass seeds or awns) is usually the problem; it first clings to hair surrounding the ear opening, and then drops down into the canal. Ticks can adhere to the skin of a cat's ear, or crawl into the ear canal.

Ears should be examined after a cat has been prowling in tall grass, weeds, and brush, especially if the cat is shaking her head and/or pawing at her ear.

Treatment: Foreign bodies in the ear canal should be removed by a veterinarian. When a foreign body is near the opening, it can be removed with

blunt-nosed tweezers. Do not attempt this at home. Foreign bodies deep in the ear canal must be removed with special instruments. This is a sensitive area and requires anesthesia.

If a tick is easily accessible because it is on the pinna, it can be removed as described in *Ticks* (see page 145). Ticks in the ear canal should be removed by a veterinarian.

EAR POLYPS

Ear polyps are growths that are primarily seen in cats between 1 and 4 years of age, although cats of any age can develop them. They may be related to chronic inflammation or be the result of a developmental defect. Ear polyps often start in the middle ear and either grow out through the eardrum to the external ear canal or internally to the auditory canal. Any cat with recurrent ear infections should be carefully checked for an ear polyp.

Cats will shake their heads and sometimes have a discharge from the ear. The ear may be quite painful. A head tilt and a raised third eyelid are other possible signs. Some cats will have multiple polyps or another one in the nose or throat, and those cats may have breathing problems.

Treatment: Polyps are removed surgically, with care taken to remove the entire growth; otherwise, recurrence is common. Follow-up with corticosteroids may help reduce the chances of recurrence. Rarely, nerve damage will remain after removal. However, most cats have a complete recovery.

CERUMINOUS GLAND PROBLEMS

Benign ceruminous (wax) gland cysts are not uncommon in cats' ears. These cysts appear as dark lesions throughout the ear. They may cluster and look like a bunch of grapes. If these start to block the ear canal, they should be removed; otherwise they do not generally cause a problem.

Cats are also susceptible to ceruminous gland tumors in their ears, which are often malignant adenocarcinomas. These need to be distinguished from ear polyps.

Otitis Media

This condition, a middle ear infection, is not common in cats. Most cases result from an external ear infection that ruptures the eardrum. Tonsillitis and mouth and sinus infections can travel to the middle ear through the Eustachian tube, a passage that connects the middle ear to the back of the throat. Rarely, bacteria gain entrance through the bloodstream.

The first signs of otitis media are often masked by an ear canal infection that precedes it. However, as the middle ear becomes involved, the cat shows evidence of more severe pain, crouching low and tilting her head down on the affected side. The head is held as still as possible. The gait is often unsteady because balance is affected.

An otoscopic examination by a veterinarian may show perforation or loss of the eardrum. X-rays may show bone involvement. The face may droop on the affected side if the nerve that crosses the surface of the eardrum is involved. The third eyelid may be raised. Middle ear infections can extend to involve the inner ear.

Treatment: All infections of the middle ear should be treated by a veterinarian. Antibiotics, both oral and topical, may be required, but no cleaning or medicating should be done until the eardrum is examined.

Otitis Interna

Otitis interna is an inner ear infection—often one that started out as a middle ear infection. Suspect otitis interna if your cat vomits, staggers, or falls toward the affected side, circles toward that side, or shows rhythmic jerking movements of her eyeballs. These are signs of vestibular disease.

Most ear medications are capable of causing labyrinthitis and some permanent ear damage if they make direct contact with the sensitive structures of the inner ear. For this reason, the ears should not be flushed or medicated without first having your veterinarian examine the cat's ear canals to be sure the eardrums are not punctured or ruptured.

Other disorders that produce signs like those of an inner ear infection include brain tumor, drug intoxication, poisoning, and idiopathic vestibular syndrome (see *Vestibular Disorders*, page 342). The idiopathic syndrome is the more common. You should suspect one of these disorders when a cat shows signs of labyrinthitis without a prior ear infection.

Treatment: Infections of the inner ear should be treated by a veterinarian. Surgery may be required in cases of chronic and recurrent infections that don't respond to medical treatment. In rare cases, the ear canal itself may need to be removed.

Deafness

Some cats are born without the ability to hear because of developmental defects in the hearing apparatus. Cats may also be deaf in just one ear. Congenital deafness occurs most often in white cats with blue eyes, and is the result of an incomplete autosomal dominant gene. However, not all cats with blue eyes are deaf, and that includes not all white cats with blue eyes.

Longhaired cats with blue eyes have a higher risk of deafness than shorthaired cats with blue eyes. White cats with the Siamese dilution gene may have blue eyes with no hearing impairment. Still, white cats have a higher risk of deafness than other cats in general, and blue-eyed cats also have a higher risk of deafness—even if they have only one blue eye. *Congenitally deaf cats should not be bred.*

The table below lists the common cat breeds that have the white coat pigment gene and are therefore at higher risk for congenital deafness. This risk applies only to white cats of the breeds listed.

Common Breeds with the White Coat Pigment Gene	
American Shorthair	Manx
American Wirehair	Norwegian Forest Cat
British Shorthair	Oriental Shorthair
Cornish Rex	Persian
Devon Rex	Ragdoll
Exotic Shorthair	Scottish Fold
Maine Coon Cat	Turkish Angora

There have not been extensive studies on deafness in cats. If you suspect your cat is deaf, it would be beneficial to contact George Strain, PhD, at the veterinary school at Louisiana State University (strain@lsu.edu), who is a leading deafness expert.

Cats can be tested for deafness using the brainstem auditory evoked response (BAER) test. This test can be done at most veterinary colleges and some veterinary referral centers. Hearing is tested using an electroencephalogram (EEG) to record the brain waves produced in response to sounds of different frequencies. If the brain wave pattern remains unchanged, the sound was not heard. A BAER test can tell if a cat has normal hearing, is deaf in both ears, or is deaf in just one ear. Some cats can be tested while awake, but most will need sedation.

GRADUAL HEARING LOSS

Loss of hearing can be caused by old age, middle ear infections, head injury, blockage of the ear canal by wax and debris, and by certain drugs and poisons. In particular, the antibiotics streptomycin, gentamicin, neomycin, and kanamycin, if used for long periods, can damage the auditory nerves, leading to deafness and signs of labyrinthitis.

Gradual loss of hearing occurs in some older cats. Elderly deaf cats, however, often retain their ability to hear high-pitched sounds beyond the range of human hearing.

It is difficult to tell if a cat is going deaf. The ability to hear must be judged by observing the cat's actions and how she uses her ears. Cats who hear well cock their heads and look toward a sound. The ears swivel to pinpoint the source of the sound. Accordingly, lack of attentiveness is one of the first indications that a cat is not hearing well. One way to test this is to make a loud noise while the cat is asleep. If the cat does not startle and wake up, you can assume there is a significant loss of hearing. Suddenly touching a sleeping deaf cat without a warning could result in a scratch or a bite as the cat is startled when she wakes up. Stamping on the floor will attract a deaf cat's attention, because she can feel the vibrations.

Deaf cats get along quite well. They use their senses of sight and smell and the tactile sensations transmitted through their whiskers to compensate for the hearing loss. However, deaf cats should *not* be allowed outside.