

## CLINICAL CONSULTATION

# Symptoms: Plugged Ears and Sound Sensitivity

By Hamid R. Djalilian, MD

**A** 45-year-old man complaining of a constant ear-plugging sensation and sound sensitivity presents to the office. He's had these symptoms for one year, he reports.

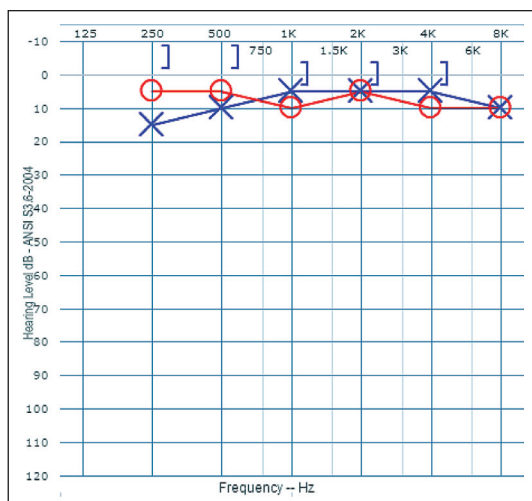
A few weeks before the onset of the sound sensitivity, the patient had gone scuba diving to a depth of 90 feet. He did not have trouble clearing his ears at the time, he says.

The sound sensitivity primarily occurs when somebody speaks very loudly in his right ear. Once when the patient was at a concert, a very loud whistling sound made him fall to his left.

He had a tympanostomy tube placed by an outside otolaryngologist, but that did not relieve the symptoms. The patient's audiogram is shown on the right.

**What is your diagnosis? See p. 12.**

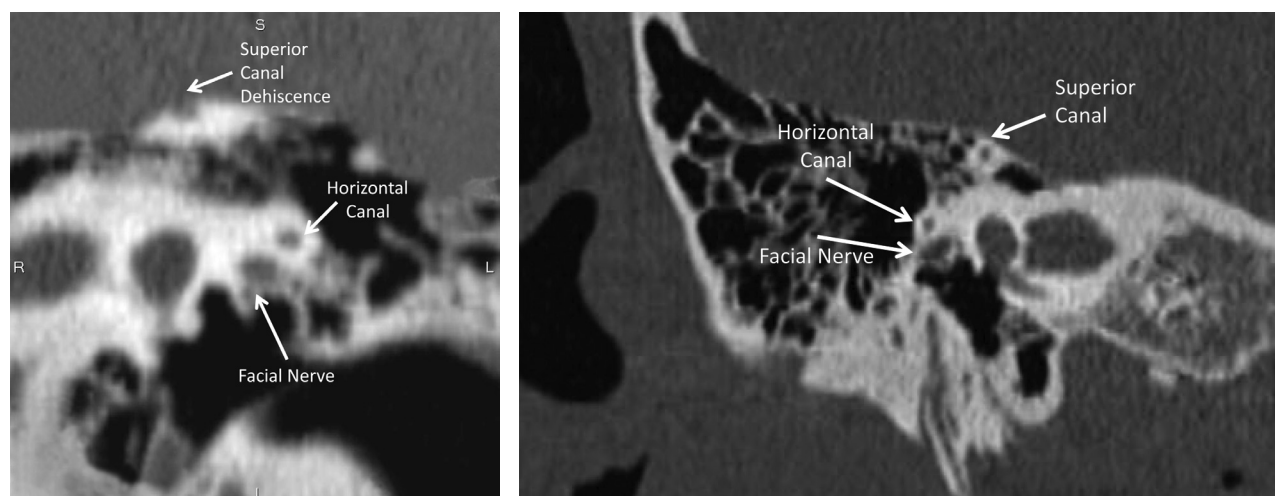
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In the patient's audiogram, note the suprathreshold bone conduction and the low-frequency conductive hearing loss.

# Diagnosis: Superior Canal Dehiscence

By Hamid R. Djalilian, MD



**Left:** This coronal CT image of the left ear shows superior canal dehiscence. No white area (bone) is seen above the gray circle. **Right:** This coronal CT image of the patient's right ear shows an intact superior canal (gray circle) covered on top with bone (white area).

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**T**he complaint of plugged ears sometimes poses a vexing problem. It is not always easy to differentiate the various etiologies, and the uncommon issues do not come to mind on the patient's first visit.

Most commonly, plugged ears are caused by Eustachian tube dysfunction. In addition to ear plugging, patients with this condition may or may not have significant intermittent crackling of their tympanic membranes.

Generally, any process that causes an inflammatory change in the nasal or nasopharyngeal mucosa can lead to Eustachian tube dysfunction. The most common etiologies include allergic rhinitis, chronic sinusitis, upper respiratory viral infections, smoking, and laryngopharyngeal reflux disease.

Otolaryngologists and primary care physicians generally treat Eustachian tube dysfunction with nasal steroid sprays to address any nasal inflammatory disease. While laryngopharyngeal reflux very often is behind Eustachian tube dysfunction, it's also one of the most commonly ignored potential causes. Its diagnosis requires clinical suspicion and laryngoscopy for evaluation of the larynx.

Another frequent cause of plugged ears is a variant of migraine aural pressure. Migraine is a genetic condition resulting in hypersensitivity of the brain. Signals from the periphery are amplified significantly and can lead to unusual reactions.

Plugged ears sometimes present as the sole manifestation of a migraine, though that's uncommon. When it does happen, the patient may experience a constant sensation of plugged ears instead of a headache.

Such patients often have a history of headaches or significant motion sickness. Other sensitivities include light, sound, heat, odors, motion, visual motion (e.g., movement on a television or computer screen), and atmospheric pressure changes. Diagnosis is based on the patient's history and is made after ruling out other causes of plugged ears.

A rare cause of plugged ears is spontaneous cerebrospinal fluid (CSF) leakage. In this condition, the thin bone that separates the brain's covering, or dura, from the mastoid/middle ear system erodes, leading to CSF leakage into the mastoid or middle ear. In patients with a pneumatized petrous apex, which is the medial-most part of the temporal bone, leakage into the air cells occasionally can occur.

Cerebrospinal fluid leakage causes some irritation of the mucosa and, potentially, symptoms of Eustachian tube dysfunction. The condition is most commonly caused by increased intracranial pressure, often seen in patients with obesity.

## SIGNS OF DEHISCENCE

This patient had superior canal dehiscence (SCD). Dehiscence of the superior or posterior semicircular canal can cause a sensation of plugging in the ear. Other symptoms seen in canal dehiscence include autophony (hearing one's own voice in the ear), pulsatile tinnitus, and pressure- or sound-induced vertigo, as well as hearing the eyes move.

The etiology of canal dehiscence is not clearly understood. Posterior canal dehiscence is most commonly related to the jugular bulb or the posterior fossa (the posterior surface of the temporal bone), whereas a superior canal dehiscence is

# iPad Extra!

## CLINICAL CONSULTATION VIDEO: VISUAL DIAGNOSIS

Read this month's Clinical Consultation column by Hamid R. Djalilian, MD, and then watch the accompanying video to see images from the patient's CT, which demonstrate the superior canal dehiscence on multiple slices.

This bonus feature is exclusively available in the November iPad issue.



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open into the middle cranial fossa (superior surface of the temporal bone). It has been thought that superior canal dehiscence can result from increased intracranial pressure.

The diagnosis of superior canal dehiscence requires an ultrathin-slice CT of the temporal bones. The images need to be about 0.6-mm thick to prevent the appearance of a false-positive abnormality on the CT.

**Patients with superior canal dehiscence frequently have a conductive or mixed hearing loss.**

The imaging finding is confirmed with a cervical vestibular evoked myogenic potential (VEMP). In this test, the patient's head is flexed and turned so as to put the sternocleidomastoid muscle (large muscle on the front and side of the neck) under tension.

An auditory signal is placed in the ear, and the response is recorded. Patients with a superior or posterior canal dehiscence often have a lower VEMP threshold than the normal population.

Patients with superior canal dehiscence frequently have a conductive or mixed hearing loss. The hearing loss most commonly occurs in the low frequencies, but it can happen in other frequencies as well.

Suprathreshold bone conduction (e.g., 0 dB, -5 dB, or -10 dB) is often seen in these patients. As such, the observation of suprathreshold bone conduction thresholds should bring superior canal dehiscence to the top of the differential

diagnosis for patients with plugged ears or other symptoms of SCD.

## SEVERITY DICTATES NEXT STEPS

The treatment of superior canal dehiscence depends on the degree of symptoms. Patients with disabling sound-induced vertigo (Tullio phenomenon) or autophony may elect surgical plugging of the affected canal. The surgery generally is effective, but it may require a craniotomy.

If it's anatomically possible, the transmastoid procedure also can produce good results. In that approach, both limbs of the superior canal are isolated. The canals are gently opened with a small diamond bur without opening the membranous labyrinth. Each canal is then plugged with bone wax.

Series of canal-plugging surgeries have shown efficacy in about 70 percent to 90 percent of patients. The procedure carries a small risk of sensorineural hearing loss. Additional problems include dizziness with head motion in the plane of the plugged canal, which generally requires physical therapy for treatment.

Superior canal dehiscence causes a third window into the inner ear (the other two are the round and oval windows). Therefore, plugging one of the two natural windows may relieve symptoms. In fact, a less invasive option of round window plugging has been proposed and has shown some success in a limited series.

Our patient was not greatly bothered by the symptoms, as he experiences dizziness only with very loud sound, and he works in a quiet environment. Therefore, no treatment was undertaken. 