

Otosclerosis

What is Otosclerosis?

Otosclerosis is a disease of ear bone degeneration that most commonly develops during the teen or early adult years. In otosclerosis, the consistency of the sound-conducting bones of the ear changes from hard, mineralized bone to spongy, immature bone tissue (otosclerosis is sometimes called otospongiosis for this reason). Such degeneration can cause a buildup of excess bone tissue around the stapes (a bone in the middle ear), which in turn causes the stapes to become fixed. This immobilization prevents the stapes from vibrating as it normally does while processing sound. When sound is prevented from being conducted to the inner ear, a person experiences a conductive hearing loss. In otosclerosis the nerve associated with hearing may also be affected, causing sensorineural hearing loss. The cause of nerve damage associated with otosclerosis is not fully understood, but may occur because of toxic enzymes released into the cochlea. If hearing loss is caused by both conductive and sensorineural hearing loss, it is called mixed hearing loss.

What Causes Otosclerosis?

Although the cause is unknown, the tendency to develop otosclerosis is familial. Bilateral otosclerosis (occurring in both ears) occurs more frequently in women than in men, prompting more women than men to seek treatment. The disease can also be exacerbated during pregnancy.

Symptoms of Otosclerosis

Hearing loss in otosclerosis may occur in one or both ears. Since hearing loss develops slowly in otosclerosis, people may not be aware that their hearing is deteriorating until others make note of it. In fact, an estimated 90% of people with otosclerosis are unaware of symptoms and do not seek treatment. Many compensate for this slow hearing loss by learning to read lips. About three quarters of people with otosclerosis also experience tinnitus, or the sensation of background noise in the ear. Tinnitus may take the form of a hissing sound, tones, or pulses. Tinnitus may be severe, especially if the nerve has been impacted by the otosclerosis. Several hearing tests, including tympanometry, audiometry and tuning fork tests, are performed to determine the extent and nature of the hearing loss in order to diagnose otosclerosis. A number of other diseases may affect the ossicles (small bones of the middle ear) or mobility of the tympanic membrane; it is important to determine the precise cause of hearing loss in order to properly treat it.

Treating Otosclerosis

Otosclerosis is usually treated by a surgical procedure called a stapedectomy, which replaces the stapes with an artificial prosthesis and usually restores normal hearing. Other options include the use of a hearing aid or oral sodium fluoride therapy.

Sodium Fluoride for Otosclerosis

Taking oral sodium fluoride can stabilize the hearing loss associated with otosclerosis in about 80% of patients. This reduces bone absorption and enhances the calcification of new bone, essentially stopping further progression of otosclerotic damage. Sodium fluoride can also reduce tinnitus and any symptoms of imbalance. The usual dose of sodium fluoride is 20 – 40 mg per day. Side effects of sodium fluoride include rash, arthritis, and gastrointestinal distress. Dosage for children and pregnant women is reduced. After two years of treatment, if the disease has stabilized, patients may take a life-long maintenance dose of about 25 mg per day. Stopping the sodium fluoride can cause reactivation of the disease. Sodium fluoride may also be used for 6 – 12 months prior to stapedectomy to induce maturation of the diseased area and reduce chances that the disease will progress after surgery.