

Michigan Ear Institute

Otosclerosis



www.michiganear.com

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WELCOME

Welcome to the Michigan Ear Institute, one of the nation's leading surgical groups specializing in hearing, balance and facial nerve disorders. The Michigan Ear Institute is committed to providing you with the highest quality diagnostic and surgical treatment possible.

Our highly experienced team of physicians, audiologists and clinical physiologists have established international reputations for their innovative diagnostic and surgical capabilities, and our modern, attractive facility has been designed with patient care and convenience as the foremost criteria.

It is our privilege to be able to provide care for your medical problems and we will strive to make your visit to the Michigan Ear Institute a positive and rewarding experience.

OTOSCLEROSIS

Otosclerosis is a disease of the middle ear bones and sometimes the inner ear. Otosclerosis is a common cause of hearing impairment and is rarely hereditary.

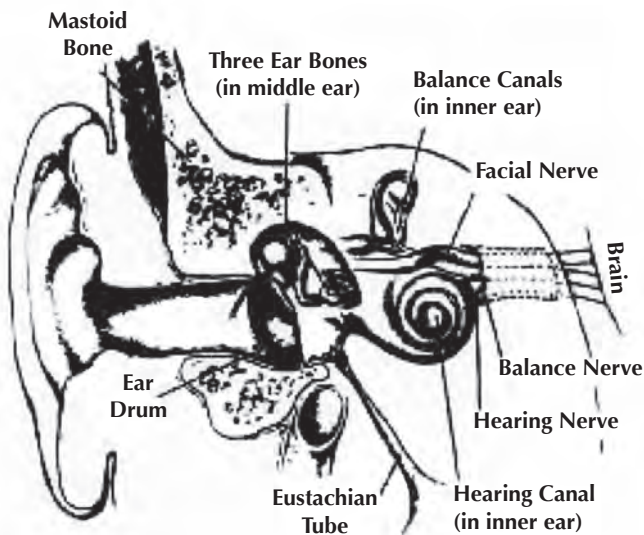
FUNCTION OF THE NORMAL EAR

The ear is divided into three parts; the external ear, the middle ear, and the inner ear. The external ear collects sound, the middle ear mechanism transforms the sound and the inner ear receives and transmits the sound.

Sound vibrations enter the ear canal and cause the eardrum to vibrate. Movements of the eardrum are transmitted across the middle ear to the inner ear fluids by three small ear bones. These middle ear bones (hammer or malleus, anvil or incus and stirrup or stapes) act as a transformer changing sound vibrations in air into fluid waves in the inner ear. The fluid waves stimulate delicate nerve endings in the hearing canals. Electrical impulses are transmitted on the nerve to the brain where they are interpreted as understandable sound.

TYPES OF HEARING IMPAIRMENT

The external ear and the middle ear conduct sound; the inner ear receives it. If there is some difficulty in the external or middle ear, a conductive hearing impairment occurs. If the trouble lies in the inner ear, a sensorineural or nerve hearing impairment is the result. When there is difficulty in both the middle and the inner ear a mixed or combined impairment exists. Mixed impairments are common in otosclerosis.



Our tests reveal your hearing level to be:

Right Ear _____ Decibels

Left Ear _____ Decibels

Conversion to degree of handicap

25 dB	0%	55 dB (Moderate)	45%
30 dB (Mild)	8%	65 dB (Severe)	60%
35 dB (Mild)	15%	75 dB (Severe)	75%
45 dB (Moderate)	30%	85 dB (Severe)	90

HEARING IMPAIRMENT FROM OTOSCLEROSIS

If we had been able to examine your middle ear under the microscope before a hearing impairment developed we could have seen minute areas of both softening and hardening of the bone. This process may spread to the stapes, the inner ear, or to both sides.

Cochlear Otosclerosis

When otosclerosis spreads to the inner ear a sensori-neural hearing impairment may result due to interference with the nerve function. This nerve impairment is called cochlear otosclerosis and once it develops it may be permanent. On occasion the otosclerosis may spread to the balance canals and may cause episodes of unsteadiness.

Stapedial Otosclerosis

Usually otosclerosis spreads to the stapes or stirrup bone, the final link in the middle ear transformer chain. The stapes rests in the small groove, the oval window, in intimate contact with the inner ear fluids.

Anything that interferes with its motion results in a conductive hearing impairment. This type of impairment is called stapedial otosclerosis and is usually correctable by surgery.

The amount of hearing loss due to involvement of the stapes and the degree of nerve impairment present can be determined only by audiometric examination (hearing tests).

TREATMENT OF OTOSCLEROSIS

Medical

There is no local treatment to the ear itself or any medication that will improve the hearing in persons with otosclerosis.

In some cases a nutritional supplement containing fluoride may be prescribed to slow or stop the loss of hearing. The supplement should not be taken by young children or pregnant women.

Surgical

The stapes operation (stapedectomy) is recommended for patients with otosclerosis who are candidates for surgery. This operation is usually performed under local anesthesia and requires but a short period of hospitalization and convalescence. Over 90 percent of these operations are successful in restoring the hearing permanently.

Hearing Aids

For patients who are not surgical candidates or do not wish to have surgery, a hearing aid or hearing aids may be an alternative.

Your Hearing

Hearing is measured in decibels (dB). A hearing level of 0 to 25 dB is considered normal hearing for conversational purposes. We will do a hearing test to determine your level of hearing.

SURGERY RECOMMENDATIONS

- You have a minor degree of stapedial otosclerosis. As such we do not advise surgery at this time.
- You have unilateral (one ear) otosclerosis. If the stapes operation is successful you will have improved hearing from the involved side, will have less difficulty in determining the direction of sound, and should hear better in difficult listening situations.
- You have good hearing nerve function and are a very suitable candidate for the stapes operation.
- Your hearing had deteriorated slightly. If the stapes operation is successful, serviceable hearing will be restored to you.
- Your hearing nerve has deteriorated to some extent. If the stapes operation is successful, you should

be able to hear in many situations without an aid, but you may need an aid for distant hearing.

Your hearing nerve has deteriorated considerably. If the stapes operation is successful, you will gain more benefit from the use of a hearing aid.

Your hearing nerve has deteriorated severely. For this reason the chances of surgery improving your hearing are reduced. If surgery should prove successful your hearing should be improved to the extent that you may be able to use a hearing aid.

Your hearing loss is due to inner ear and nerve involvement. As such, surgery would not be of benefit to you at this time. Many of the operations performed today were not available a few years ago. Through ear research we hope to be able to help sensorineural (nerve) hearing impairment in the future.

THE STAPES OPERATION

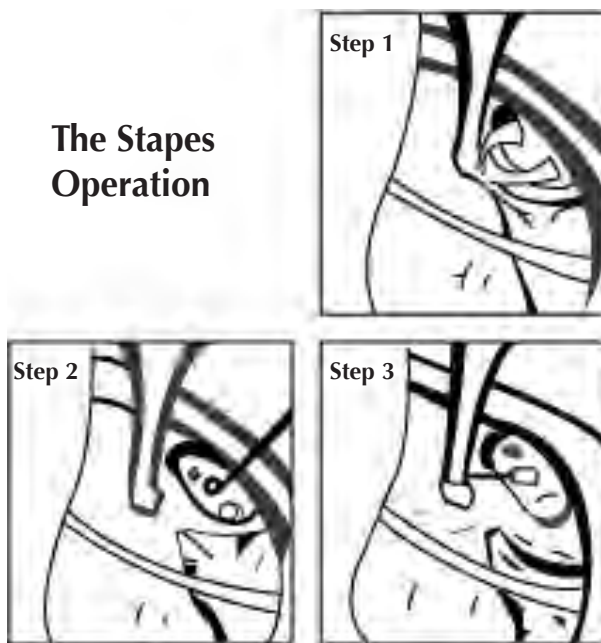
Stapedectomy or stapedotomy is performed through the ear canal under local or general anesthesia. At times an incision may be made behind the ear to remove muscle tissue for use in the operation.

With the use of the operating microscope the eardrum is turned forward. The laser may be used to vaporize parts of the stapes. The remainder of the stapes is removed with an instrument. A small opening is made in the footplate of the stapes with the laser. A stainless steel or titanium and platinum piston is then placed into this opening and connected to the second bone of hearing, or the incus. The eardrum is then returned to its normal position. While stainless steel pistons in current use are safe with lower power MRI scanners (1.5 Tesla or less) only titanium, platinum and plastic prostheses are compatible with MRI scanners of all strengths. You should ask your

surgeon what material is to be implanted and keep this information for future reference. The stapes prosthesis allows sound vibrations to again pass from the eardrum membrane to the inner ear fluids. The hearing improvement obtained is usually permanent. Most stapes surgery patients may go home the same evening or the next morning. Most patients may return to work in seven to ten days depending on the occupational requirements.

One should not plane to drive a car home from the hospital. Air travel is permissible three weeks following surgery. Automobile travel is usually permissible immediately.

The Stapes Operation



STAPES OPERATION AFTER FENESTRATION SURGERY

The stapes operation can be performed on previously fenestrated ears, providing the hearing nerve function is essentially the same as necessary for an initial stapes operation. Seventy percent (70%) of these operations are successful in improving the hearing.

HEARING IMPROVEMENT FOLLOWING STAPES SURGERY

Hearing improvement may or may not be noticeable at surgery. If the hearing improves at the time of surgery it usually decreases in a few hours due to swelling in the ear. Improvement in hearing may be apparent within three weeks of surgery. Maximum hearing, however, is obtained in approximately six months.

The degree of hearing improvement depends on how the ear heals. In the majority of patients the ear heals perfectly and hearing improvement is as anticipated. In some the hearing improvement is only partial or temporary. In these cases the ear usually may be re-operated upon with a good chance of success.

In two percent (2%) of the cases the hearing may be further impaired due to the development of scar tissue, infection, blood vessel spasm, irritation of the inner ear or a leak of inner ear fluid (fistula).

In less than one percent, complications in the hearing process may be so great that there is a severe loss of hearing in the operated ear, to the extent that one may not be able to benefit from an aid in that ear. For this reason the poorer hearing ear is usually selected for surgery.

When further loss of hearing occurs in the operated ear, head noise (tinnitus) may be more pronounced. Unsteadiness may persist for some time.

TINNITUS

Most patients with otosclerosis notice tinnitus (head noise) to some degree. The amount of tinnitus is not necessarily related to the degree or type of hearing impairment.

Following successful stapedectomy, tinnitus is often decreased in proportion to the hearing improvement but may be worse.

RISKS OF COMPLICATIONS OF STAPEDECTOMY

Dizziness

Dizziness is normal for a few hours following a stapedectomy and may result in nausea and vomiting. Some unsteadiness is common during the first few postoperative days; dizziness on sudden head motion may persist for several weeks. On rare occasions dizziness is prolonged.

Taste Disturbance and Mouth Dryness

Taste disturbance and mouth dryness are not uncommon for a few weeks following surgery. In five percent of the patients this disturbance may persist.

Loss of Hearing

Further hearing loss develops in two percent (2%) of the patients due to some complications of the hearing process. In one percent (1%) this hearing loss is total and may prevent the use of an aid in the operated ear. In some patients an originally good connection between the prosthesis and anvil bone

becomes looser resulting in hearing loss that may require revision surgery or a hearing aid. This may be due to loosening of the wire or osteoporosis of the incus.

Tinnitus

Should the hearing be worse following stapedectomy tinnitus (head noise) likewise may be more pronounced.

Eardrum Perforation

A perforation (hole) in the eardrum membrane is an unusual complication of the surgery. It develops in less than one percent (1%) and usually is due to an infection. Fortunately, should this complication occur, the membrane may heal spontaneously. If healing does not occur surgical repair (myringoplasty) may be required.

Weakness of the Face

A very rare complication of stapedectomy is temporary weakness of the face. This may occur as the result of an abnormality or swelling of the facial nerve.

HEARING AIDS

If you are a suitable candidate for surgery you are also suitable to benefit from a properly fitted hearing aid. If you have otosclerosis and are not suitable for stapes surgery, you still may benefit from a properly fitted aid.

Fortunately, patient with otosclerosis very seldom go "totally deaf" but will be able to hear with an electronic aid. The older the patient the less the tendency for further hearing loss due to the otosclerosis process.

GENERAL COMMENTS

If you are a suitable candidate for surgery and do not have the stapes operation at this time, it is advisable to have careful hearing tests repeated at least once a year.

Michigan Ear Institute



Otosclerosis

Received by

Patient Signature

Date

For more information on the services and staff of the Michigan Ear Institute, call us at (248) 865-4444 or visit our web site at www.michiganear.com

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ATTENTION: If you speak a language other than English, language assistance services, free of charge, are available to you. Call 1-586-753-1888 (TTY: 1-313-343-3126).

ATENCIÓN: si habla español, tiene a su disposición servicios gratuitos de asistencia lingüística. Llame al 1-586-753-1888 (TTY: 1-313-343-3126).

ملحوظة: إذا كنت تتحدث انكر اللغة، فإن خدمات المساعدة اللغوية تتوافر لك بالمجان. اتصل برقم 586-753-1888 (رقم هاتف الصم والبكم: 1-313-343-3126).