PROCEDURE

Fusion of the ear bones

Surgery reconnects or stabilizes the tiny middle-ear bones so they can carry sound more effectively.

PURPOSE
Reconnect middle-ear bones to improve sound transmission

PROCEDURE TYPE
Therapeutic surgery through the ear canal or nearby incision

WHERE IT IS DONE
Operating theatre

ANAESTHESIA
General, or local with moderate sedation in selected adults

HOW LONG IT TAKES
About one to three hours

PREPARATION
Fasting and a medication plan from the treating facility

RECOVERY
Same day or overnight; no driving until medically cleared

MAIN RISKS
Worse hearing, dizziness, taste changes, prosthesis displacement

RESULTS
Hearing assessed after healing, usually six to twelve weeks

Overview

"Fusion of the ear bones" usually refers to surgery that reconnects or stabilizes the three middle-ear bones: the malleus, incus, and stapes. Together, they form the ossicular chain , which carries sound vibrations from the eardrum to the inner ear.

The operation is often called ossicular chain reconstruction or ossiculoplasty. The surgeon may join or reshape existing bones or insert a small prosthesis to bridge a gap.

This treats conductive hearing loss , in which sound does not move efficiently through the outer or middle ear. It does not directly repair damage to the inner ear or hearing nerve.

The exact operation varies. If the stapes is fixed because of otosclerosis, a stapedotomy or stapedectomy may be more appropriate. Ask which procedure is listed on your consent form

and which bones will be treated.

Why the procedure is performed

The aim is to create a stable pathway for sound between the eardrum and inner ear. Surgery may be offered when the ear bones are fixed, damaged, missing, or disconnected because of:

Reconstruction may accompany eardrum repair or cholesteatoma removal. Sometimes it is delayed until the middle ear has healed.

Improved hearing is the goal, but normal hearing cannot be guaranteed. Results depend on the eardrum, stapes, middle-ear lining, and inner ear.

- Long-term middle-ear infection or inflammation
- Cholesteatoma, an abnormal collection of skin cells
- Ear or skull injury
- Previous ear surgery
- Scarring or calcium deposits
- Abnormal middle-ear development

Who should and should not have it

You may be considered for surgery if hearing tests show conductive hearing loss and examination or imaging suggests a damaged or fixed ossicular chain.

Surgery may be avoided or delayed when:

Some are temporary reasons to wait. Your surgeon should explain the likely benefit, the possibility that hearing may not improve, and whether another operation could be needed.

- There is an active ear infection or ongoing discharge
- Cholesteatoma or another unsafe condition needs priority treatment
- The middle ear is severely inflamed or poorly ventilated
- Hearing loss mainly comes from the inner ear or hearing nerve
- A hearing aid provides acceptable hearing with less risk
- Your health makes anaesthesia or surgery unusually risky
- The affected ear is your only hearing ear and the risk is unacceptable to you

How to prepare

Follow your treating facility's instructions, which take priority over general advice.

You will usually have an ear examination and hearing test. A CT scan may be requested if the anatomy is uncertain or cholesteatoma is suspected.

Give the team a complete list of medicines, vitamins, and supplements. Tell them about blood thinners and diabetes medicines. Do not stop prescribed medicine unless the team tells you when and how.

Follow the facility's exact fasting instructions before anaesthesia. Arrange for an adult to take you home, and plan for help during the first night if advised.

Tell the team about any new fever, cold, breathing illness, or ear discharge before surgery. These may affect whether the procedure should go ahead.

What happens during the procedure

After anaesthesia, the surgeon reaches the middle ear through the ear canal or a small incision near or behind the ear. The eardrum is lifted to expose the bones.

The surgeon checks their movement and may remove scar tissue, damaged bone, or diseased tissue. Reconstruction may use:

The choice depends on which bones remain and whether the stapes moves. The eardrum is then returned to position, and soft packing may be placed in the ear canal. Any outside incision is closed and dressed.

- Reshaped bone or cartilage from your body
- A manufactured prosthesis
- Medical bone cement for selected defects

Recovery and what to expect afterward

Mild to moderate pain, pressure, or a blocked sensation is common. Brief dizziness, popping sounds, or altered taste can also occur. Symptoms should gradually improve.

Rest for the first few days. Keep the ear dry and do not remove packing unless instructed. Avoid forceful nose blowing, heavy lifting, straining, swimming, and major pressure changes. Sneeze with your mouth open and ask when flying is safe.

Do not drive home. After anaesthesia or sedation, avoid driving for the period specified by the facility and longer if you remain dizzy, use sedating medicine, or cannot move your head comfortably.

Many people return to desk work within several days to two weeks. Physical work may require longer. Hearing can seem worse while packing, swelling, or fluid remains and often improves gradually.

Risks and possible complications

Possible risks include:

Severe inner-ear hearing loss or facial nerve injury is uncommon but important. Anaesthesia also has risks specific to your health and planned anaesthetic.

- No meaningful improvement or worse hearing
- Prosthesis movement, blockage, or extrusion
- Dizziness or balance problems
- Tinnitus
- Temporary or lasting taste changes
- Infection, bleeding, or poor eardrum healing
- Need for revision surgery

Results and follow up

Follow-up is needed to examine the ear, check or remove packing, and assess healing. Keep these appointments even if recovery seems uncomplicated.

Packing and swelling prevent an immediate assessment. A formal hearing test is commonly performed after healing, around six to twelve weeks.

Some people improve but still need a hearing aid. Others have little benefit because of scarring, poor ventilation, prosthesis movement, or inner-ear hearing loss. Later hearing tests may be recommended.

Alternatives

Observation may be reasonable when hearing loss is mild, stable, or not troublesome. It avoids surgical risk but does not correct the mechanical problem.

A conventional hearing aid makes sounds louder and avoids surgery, although it requires fitting, maintenance, and regular use.

A bone-conduction device sends sound through the skull and may help when a standard hearing aid cannot be worn because of drainage or ear-canal problems. Some types require surgery.

A stapedotomy or stapedectomy may be more suitable when the stapes is fixed, particularly with otosclerosis.

If infection or cholesteatoma is present, making the ear safe may take priority. Hearing reconstruction can sometimes be performed later.

When to call your healthcare team

Contact your surgical team promptly for increasing pain, worsening redness, fever, foul-smelling drainage, persistent vomiting, dizziness that is not settling, or hearing that suddenly worsens after starting to improve.

Seek urgent medical assessment for new weakness or drooping on one side of the face, severe spinning dizziness, or sudden major hearing loss.

Call emergency services for difficulty breathing, collapse, severe chest pain, or swelling of the tongue or throat.

Mild blood-stained drainage, fullness, reduced hearing from packing, and temporary taste changes can occur. Report them sooner if severe, worsening, or different from the instructions you received.

Common questions

Will I be asleep?

Most procedures use general anaesthesia. Selected adults may receive local anaesthesia with sedation.

Can I drive home?

No. Arrange transport and do not drive again until anaesthetic restrictions have passed and you have no distracting pain, dizziness, or sedating medication effects.

How painful is it?

Pain is usually mild to moderate and eases over several days. Pressure or blockage may be more noticeable.

When will I know whether it worked?

You may notice changes after packing is removed, but the result is usually assessed with a hearing test six to twelve weeks after surgery.

Will my hearing return to normal?

It may improve without becoming normal. Results depend on the eardrum, remaining bones, middle-ear health, and inner-ear function.

Can the prosthesis move later?

Yes. It can shift or stop transmitting sound effectively, especially if the eardrum retracts or middle-ear pressure remains poor. Revision surgery may be considered.

Sources

- American Academy of Otolaryngology-Head and Neck Surgery. Clinical Indicators: Ossiculoplasty
- Young A, Ng M. "Ossiculoplasty." StatPearls . StatPearls Publishing, updated 2023.
- Yung M. "Long-term results of ossiculoplasty: reasons for surgical failure." Otology & Neurotology . 2006;27(1):20-26.
- Merchant SN, Rosowski JJ. "Auditory physiology and middle-ear mechanics." In: Glasscock-Shambaugh Surgery of the Ear . People's Medical Publishing House, 2010.
- National Institute on Deafness and Other Communication Disorders. Otosclerosis