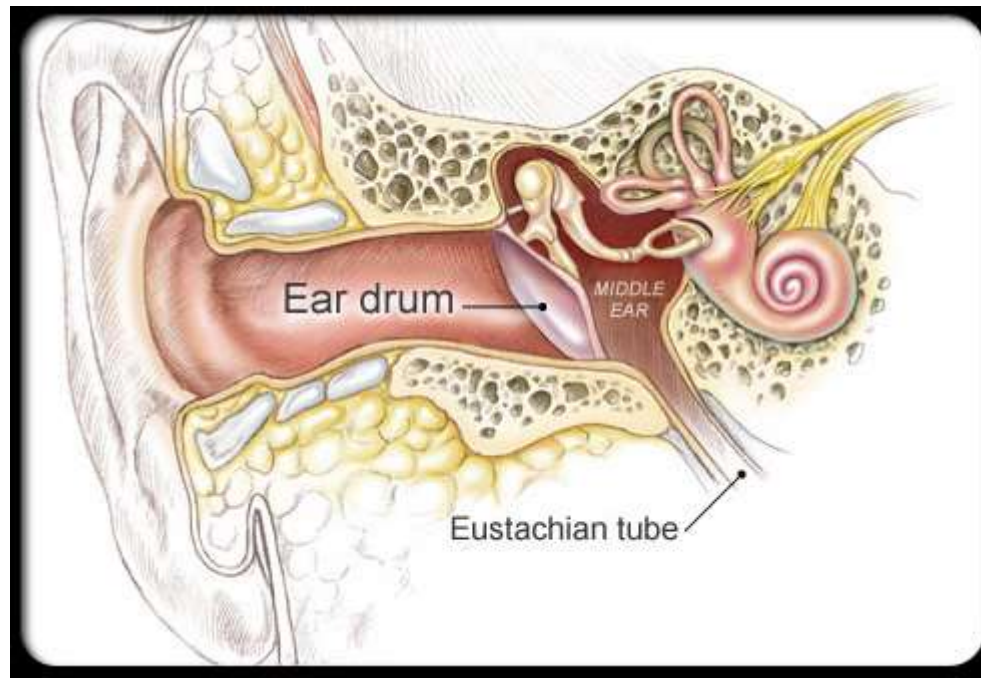


- Infection can affect the ear canal ([otitis externa](#)), the [eardrum](#), or the middle ear ([otitis media](#)).
- Most ear injuries are caused by pressure changes during direct injury (such as a blow to the ear) or [sport scuba diving](#), but, a persistently painful ear may signal an infection that requires treatment.

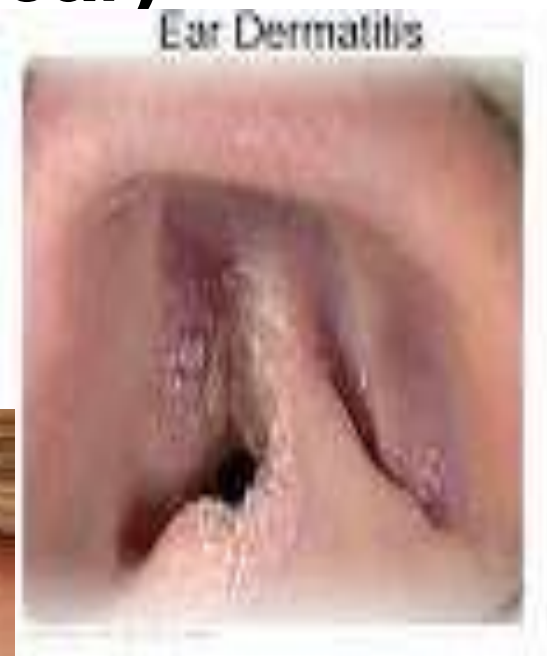


Anatomy of an Inner Ear Infection

- **The Eustachian tube is a canal that connects the middle ear to the throat.**
- **It is lined with mucus, just like the nose and throat; it helps clear fluid out of the middle ear and maintain pressure levels in the ear.**
- **Colds, flu, and allergies can irritate the Eustachian tube and cause the lining of this passageway to become swollen.**

Problems

- **Dermatitis**
- **Otitis Externa (Swimmer's ear)**



- Furunculosis
- Impacted cerumen (wax)
- Otitis media



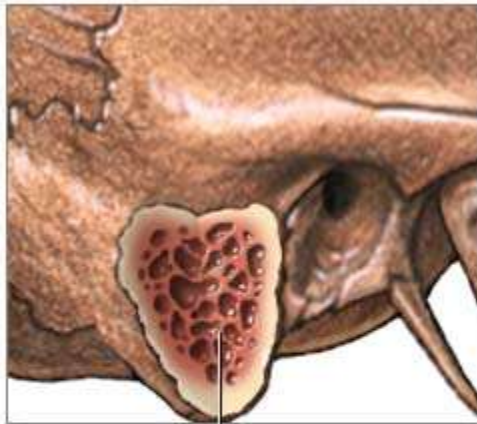


Normal Eardrum



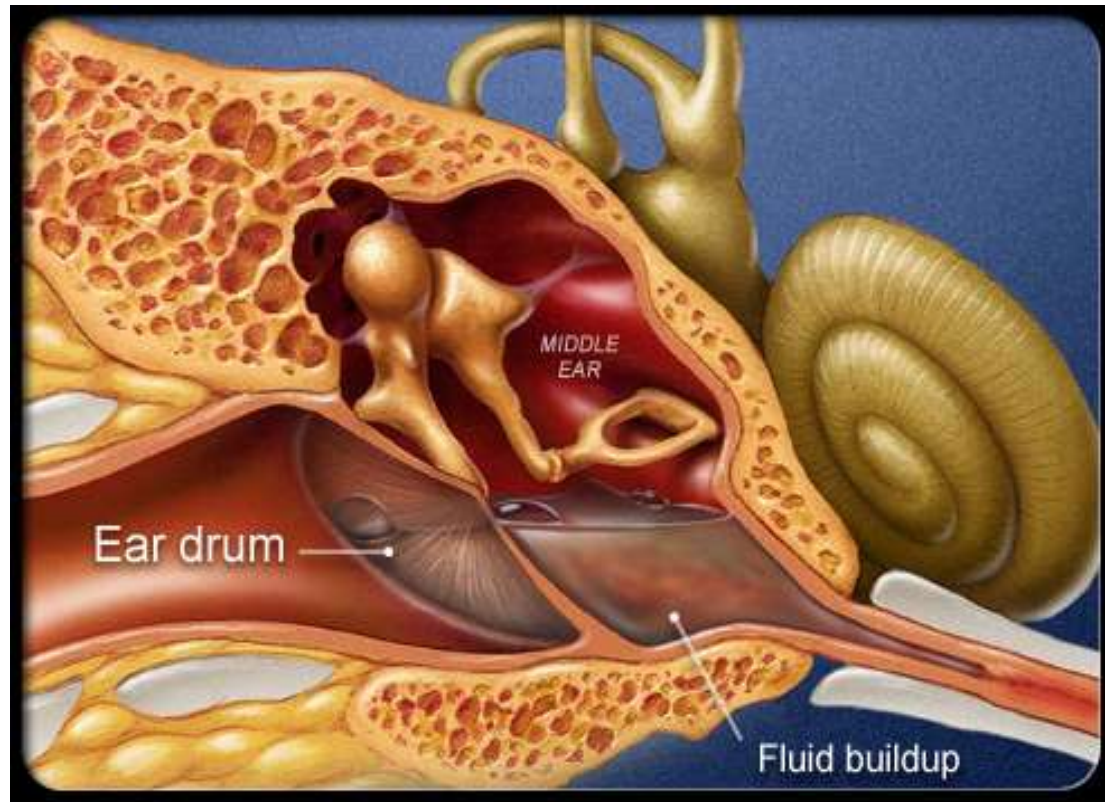
Acute Otitis Media (ear infection)

- **Mastoiditis**
- **Hearing impairment**



Infection of mastoid
air cells (mastoiditis)





Fluid in the Ear

- If the Eustachian tube becomes blocked, fluid builds up in the middle ear.
- This creates a haven for bacteria and viruses, which can cause infection.
- Doctors can detect fluid in the middle ear with a **pneumatic otoscope**.
- This device blows a small amount of air at the eardrum, making the eardrum vibrate.
- If fluid is present, the eardrum will not move as much as it should.



Ruptured Eardrum

- **When too much fluid builds up in the middle ear, it can put pressure on the eardrum until it ruptures .**
- **Signs of a ruptured eardrum include yellow, brown, or white fluid draining from the ear.**
- **Pain may disappear suddenly because the pressure of the fluid on the eardrum is gone.**
- **Although a ruptured eardrum sounds frightening, it usually heals itself in a couple of weeks.**
- **Unless it happens repeatedly, ruptures have no permanent effect on hearing.**



Diagnosing an Ear Infection

- Doctors usually diagnose an ear infection by looking at the outer ear and the eardrum with a device called an **otoscope**.
- A healthy eardrum (shown here) appears transparent and pinkish-gray. An infected eardrum looks red and swollen.



Ear Infections: All Too Common

Ear infections are extremely common, especially in runny-nosed kids. The latest research indicates that when young children get colds, they end up with an ear infection 61% of the time.



Ear Infection Symptoms

The hallmark of an acute ear infection is sudden, piercing pain in the ear. The pain may be worse when lying down, making it difficult to sleep. Other symptoms include:

- Trouble hearing
- Fever
- Fluid drainage from ears
- Dizziness
- Congestion



Ear Infection Symptoms:

Babies

- **Signs to watch for are crankiness, trouble sleeping, and loss of appetite.**
- **Babies may push their bottles away because pressure in the middle ear makes it painful to swallow.**



Ear Infection Symptoms

- Symptoms of ear infection include:
 - ear pain,
 - fullness in the ear, hearing loss,
 - ringing,
 - discharge from the ear,
 - Nausea,
 - vomiting , and
 - vertigo.
- Symptoms may follow a respiratory infection such as the common cold.

When to Seek Medical Care

- Seek medical treatment **as soon as** possible for an examination of the ear if an ear infection is suspected.



Ear problems Treatment

- Rest: avoid further scuba dives, coughing, sneezing, bending, and attempts to equalize the ears.
- Pain may be relieved with [acetaminophen](#) (Tylenol) every four hours and/or [ibuprofen](#) (Advil, Motrin) every 6-8 hours.
- Oral [antibiotics](#) (amoxycillin, erythromycin, cephalosporin). If infection develops, continue antibiotics for at least five days after all signs of infection have cleared.
- Antiallergics, antifungals, steroids, antipyretics
- Hot fomentation
- Irrigation (syringing)
- Tympanotomy / plasty
- Myringotomy, Mastoidectomy





Ear Tubes

- If child has recurrent ear infections or fluid that just won't go away, hearing loss and a delay in speech may be a real concern.
- One solution is insert small tubes through the eardrum.
- Ear tubes let fluid drain out of the middle ear and prevent fluid from building back up.
- This can decrease pressure and pain, while restoring hearing.
- The tubes are usually left in for 8 to 18 months until they fall out on their own.



Surgery to Remove the Adenoids

- **Adenoids are lymph nodes located high in the back of the throat.**
- **They can become enlarged from repeated ear infections and can affect the Eustachian tubes that connect the middle ears and the back of the nose.**
- **An adenoidectomy (removal of the adenoids) may be done when chronic or recurring ear infections continue despite antibiotic treatment or when enlarged glands cause a blockage that impairs breathing.**



Home Care for Ear Infections

- **Applying a warm washcloth or heating pad can be soothing. (Only use a heating pad if your child is old enough to say when it's too hot.)**
- **Ear drops provide rapid pain relief**
- **Painkillers, such as ibuprofen and acetaminophen, are also an option. DO NOT give aspirin to children under 16.**



Complications of Ear infections

- If an ear infection doesn't improve on its own after a couple days, medical treatment is essential.
- Left untreated, severe and recurrent middle ear infections can have long-term complications.
- These include **scarring of the eardrum with hearing loss, speech and language developmental problems, and meningitis.**
- A hearing test may be needed if child suffers from frequent ear infections.



Preventing Ear Infections

- The biggest cause of ear infections is the common cold, so one strategy for prevention is to **keep cold viruses at bay.**
- The most effective way to do this is **frequent and meticulous hand washing.**
- Other lines of defense against ear infections include **avoiding secondhand smoke** and **breastfeeding** the baby for the first year of life.



Allergies and Ear Infections

- Like colds, allergies can irritate the Eustachian tubes and contribute to middle ear infections.
- Getting allergies under control can help reduce frequent ear infections.



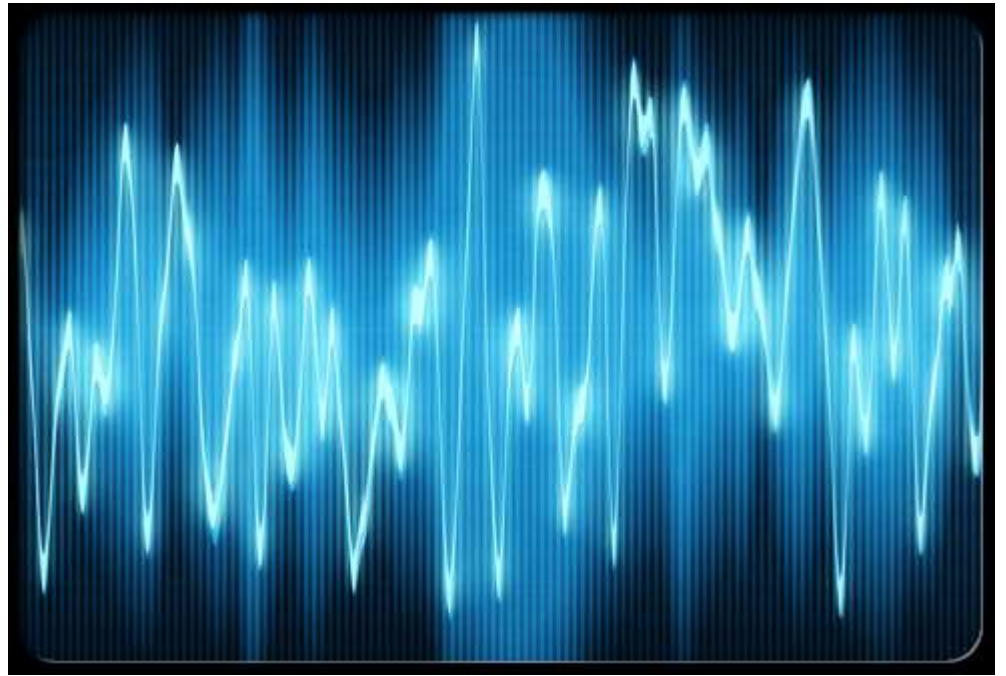
Swimmer's Ear

- Swimmer's ear is an infection that occurs when water is trapped in the external ear canal.
- Bacteria breed in the water and cause pain, swelling, and itching of the outer ear.
- Although it's often associated with swimming, anyone can get swimmer's ear.
- The condition is usually treated with ear drops and is not a cause of middle ear infections.



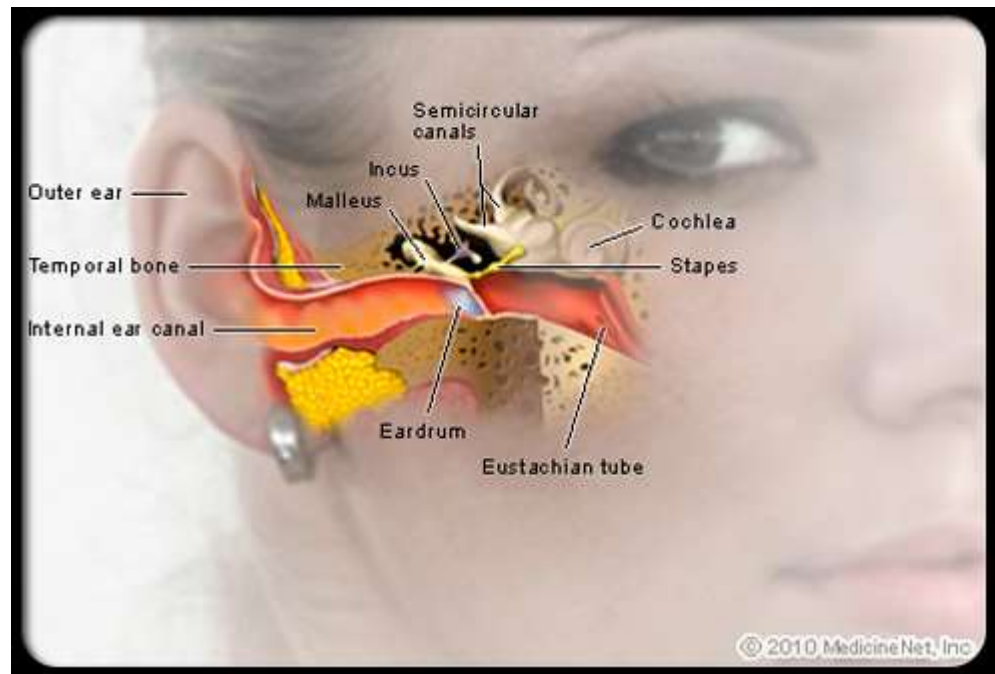
What Is Tinnitus?

- Tinnitus is a ringing, swishing, or other type of noise that seems to originate in the ear or head. In many cases, it is not a serious problem but rather a nuisance that eventually resolves. Rarely, however, tinnitus can represent a serious medical health condition.
- It is not a single disease but a symptom of an underlying condition. In almost all cases, only the affected person can hear the noise.



Some Head Noise Is Normal

- **If a person goes into a soundproof booth and normal outside noise is diminished, he or she becomes aware of these normal sounds.**
- **We usually are not aware of these normal body sounds, because outside noise masks them.**
- **Anything, such as ear wax or a foreign body in the external ear, that blocks these background sounds will cause us to be more aware of the sounds in our heads.**



What Causes Tinnitus?

- Tinnitus can originate from any of the following areas: the outer ear, middle ear, inner ear; or it can be due to abnormalities in the brain. Common causes of tinnitus include the following:
- Fluid, infection, or disease of the middle ear bones or ear drum (tympanic membrane)
- Damage to the microscopic endings of the hearing nerve in the inner ear (advanced aging is generally accompanied by a certain amount of hearing nerve impairment)
- Loud noise exposure, such as loud noises from firearms, and highly intense music
- Medications (for example, aspirin)
- Meniere's syndrome
- In rare situations, tinnitus can be a symptom of serious problems such as a brain aneurysm or tumor.



How Is Tinnitus Evaluated?

- **A medical history, physical examination**
- **hearing test (audiogram)**
- **Auditory brain stem response (ABR), a computerized test of the hearing nerves and brain pathways,**
- **Computer tomography scan (CT scan),**
- **Magnetic resonance imaging (MRI scan)**



Tinnitus Medications

- **In many cases, there is no specific treatment for tinnitus. It may simply resolve on its own, or it may be a permanent disability that the person will have to "live with."**
- **Some otolaryngologists (ear specialists) have recommended niacin to treat tinnitus. However, there is no scientific evidence to suggest that niacin helps reduce tinnitus,**
- **The drug gabapentin (Neurontin, Gabarone) was studied in high doses and was found to reduce the annoyance level of the tinnitus in some patients,**
- **Antidepressant for patients who suffer from related depression,**
- **In a 2009 study by Jalai, alprazolam (Xanax) improved VAS (visual analog scale) scores in patients with tinnitus who did not have anxiety or depression disorders.**



Relief Remedies for Tinnitus

- **Reduce or avoid caffeine and salt intake, and quit smoking.**
- **zinc supplementation.**
- **Melatonin may help those who suffer with tinnitus, particularly those with disturbed sleep due to tinnitus.**
- **Some behavioral and cognitive therapies**



Can Tinnitus Be Prevented?



Tinnitus Prevention Tip #1

- Do not use cotton swabs (Q-tips) to clean your ears. This can cause a wax impaction against your eardrum, which can cause tinnitus.



Tinnitus Prevention Tip #2

- Protect your hearing at work. Your workplace should follow Occupational Safety & Health Administration (OSHA) regulations. Wear earplugs or earmuffs and follow hearing conservation guidelines set by your employer.



Tinnitus Prevention Tip #3

- When around any noise that bothers your ears (a concert, sporting event, hunting) wear hearing protection to reduce noise levels.
- Wear protective earplugs or earmuffs if you cannot avoid loud noises.
- Do not use wadded-up tissue or cotton balls since they may become lodged in the ear canal and do not protect adequately against the more dangerous high frequencies and loud noises.



Tinnitus Prevention Tip #4

- Be careful when using music headphones. If the music is so loud that others can hear it clearly or you can't hear other sounds around you, the volume is too high.



Tinnitus Prevention Tip #5

- Even everyday noises, such as blow-drying your hair or operating a lawn mower, can require hearing protection. Keep earplugs or earmuffs handy for these activities.



Tinnitus Prevention Tip #6

- Cut back on or stop drinking alcohol and beverages that contain caffeine.
- Don't smoke or use smokeless tobacco products (secondhand smoke also affects those around you and may contribute to SIDS, ear infections, and asthma in children).
- Nicotine use may cause tinnitus by reducing blood flow to the structures of the ear.



Tinnitus Prevention Tip #7

- Tinnitus occurs more frequently in obese adults. Exercising regularly and maintaining a healthy weight improves blood flow to the structures of the ear and may prevent tinnitus.



Is There Anything to Lessen the Intensity of Tinnitus?

- **Avoid exposure to loud sounds and noises.**
- **Control your blood pressure.**
- **Decrease your salt intake.**
- **Avoid nerve stimulants such as coffee and colas (caffeine) and tobacco (nicotine).**
- **Reduce your anxiety.**
- **Stop worrying about the tinnitus. The more you worry and concentrate on the noise, the louder it will become.**
- **Get adequate rest and avoid fatigue.**
- **Exercise regularly.**
- **Utilize a masking noise (for example, a competing sound such as a ticking clock, a radio, a fan).**
- **Avoid aspirin or aspirin products**