# Hearing Loss Problems in The Middle Ear

## Otitis media

**Do you or your young child have earache and a slight hearing loss? Find out about otitis media – or middle ear infection – and the treatments available.**

Otitis media is an infection of the middle ear that is caused when a bacterial or viral infection spreads from your nose or throat into the middle ear.

Anyone can get middle ear infections, but they're most common in young children.

The infection can lead to a build-up of fluid in the middle ear, which makes the eardrum bulge outwards, causing earache. The fluid can also cause a slight hearing loss, as the ossicles (the tiny bones in your ear) won't be able to move freely and pass sound waves to the inner ear.

In severe cases the eardrum can tear, with a sudden discharge of pus and blood into the outer ear canal.

## How is otitis media treated?

Most cases of otitis media clear up within a few days to a week without the need for treatment. But get advice from your GP anyway, because, although rare, complications from an ear infection can be serious.

If there's no improvement after several days, or if you're very unwell, you may be prescribed antibiotics. If so, you must take the entire course.

## Glue ear

**Regularly turning up the TV, behaviour changes or a delay in speech development could be signs your child has glue ear.**

Glue ear, also known as otitis media with effusion (OME), is most common in young children, where it often occurs after otitis media (middle ear infection), but it can also affect adults.

Fluid can build up in the middle ear and fails to drain back down the Eustachian tube, the narrow tube that runs from the middle ear to the back of the throat. This can cause temporary hearing loss in one or both ears. If this persists in a young child, it may lead to noticeable deafness, changes in behaviour and a delay in speech development.

## How is glue ear treated?

In most cases, glue ear clears up naturally within three months. If it doesn't get better, an ear, nose and throat (ENT) surgeon may recommend an operation where a tiny ventilation tube called a grommet is inserted temporarily into the eardrum. This allows air into the middle ear and allows the fluid to drain back down the Eustachian tube.

Hearing aids may be recommended if surgery isn't suitable because of other health problems, or if there is another reason to avoid inserting grommets – for example, if grommets haven't worked in the past and glue ear keeps coming back.

## What is otosclerosis?

Otosclerosis is a condition that mainly affects the stapes, one of the tiny ossicles (bones) in the middle ear. For you to hear properly, the ossicles need to be able to move freely, so they can pass sound waves into the inner ear. In otosclerosis, abnormal bone gradually grows around, and onto, the stapes, which reduces its movement. This causes hearing loss, because the ossicles can't pass sound waves into the inner ear as efficiently as they used to. Eventually, the stapes becomes fixed so it can't move at all – this can cause severe hearing loss.

In most cases, otosclerosis just affects the stapes. But sometimes the cochlea is affected too.

Otosclerosis usually affects both ears, but sometimes just one.

## What causes otosclerosis?

Bone is a living tissue that is continually being broken down and remade. In otosclerosis, it seems that the process for making new bone doesn't work properly and abnormal bone forms. The reason why this only affects the stapes, and sometimes the cochlea, isn't entirely clear.

While the exact cause of otosclerosis is unclear, between a quarter and a half of cases are thought to be caused by a faulty gene being inherited from a parent. Research that we've funded has recently identified the first gene to be linked to otosclerosis.

In people who don't inherit a faulty gene, it's been suggested that the condition may be linked to a number of factors, including the measles virus. But it's still unclear what role – if any – these factors actually play in otosclerosis.

## Who gets otosclerosis?

As otosclerosis tends to run in families, people who have a family history of the condition are more likely to develop it. But some people with otosclerosis have no family history of the condition.

Otosclerosis usually develops in people in their late 20s or their 30s, but it can develop in younger people too.

Twice as many women as men are diagnosed with otosclerosis. Some women report that the condition gets worse during pregnancy; it's thought that this may be due to the high concentration of the hormone oestrogen during pregnancy.

If you have otosclerosis and are worried that pregnancy may affect your hearing, see your doctor. You may have to have a hearing test from time to time to monitor your hearing.

**Surgery**

The operation, called a stapedectomy, aims to improve your hearing by replacing the stapes with an artificial bone made of plastic or metal. If both of your ears are affected by otosclerosis, you'll usually have the operation on the ear that has the most hearing loss. Further down the line, it may be possible to have surgery on your other ear.

The operation usually takes about an hour. You'll either have a general anaesthetic (to put you to sleep) or a local anaesthetic (to numb your ear), so you won't feel anything. The surgeon will make a cut inside your ear canal and remove the top part of the stapes. They will make a small opening at the base of the stapes and insert the artificial bone, so that it can transfer sound waves from the remaining ossicles into the inner ear.

Eight out of 10 people find the operation a success and report a good improvement in their hearing. The operation may not cure tinnitus, however, and it won't improve your hearing if otosclerosis has affected the hair cells in the cochlea.

# Are there any risks to having surgery?

Although rare, there are some complications that can arise if you have a stapedectomy. Your surgeon should discuss with you the risks and benefits of the operation before you have the surgery.

The potential complications include:

• losing more or all of your hearing – this may happen if your inner ear is accidentally damaged during the operation
• vertigo (spinning dizziness) – this is usually temporary
• a hole in the eardrum
• altered sense of taste – this is usually temporary
• tinnitus (new or worsened)
• weakness of the muscles in your face – this is rare and usually only short-lived.

# What happens after the operation?

It's likely that you'll be able to go home the same day as the operation, or the day after. You may have some earache but the hospital can give you painkillers. You may also get a small amount of discharge from your ear canal.

For the first few days after surgery, you may feel dizzy when you make sudden head movements or stand up quickly. Rarely, this dizziness can last several weeks. Speak to your surgeon if you experience this or any other problems after you leave the hospital.

You may need to take up to three weeks off work, depending on how you feel.

After the operation, you should:

- keep your ear dry for a few weeks
- avoid straining and lifting anything heavy for a few weeks
- only blow your nose gently

- avoid air travel for two months
- avoid diving or flying when you have a cold, if possible.

You'll receive an appointment to go back to the hospital two to three weeks after the operation to have the stitches and the dressing in your ear canal removed.

Your hearing won't return to normal straight away, as your inner ear, including your eardrum, will need time to recover

– this can take up to three months.

Once your eardrum has healed, it's likely that you'll notice an improvement in your hearing.

# What otosclerosis research is Action on Hearing Loss funding?

Identifying the genetic causes of otosclerosis is crucial to finding effective treatments for it. Until recently, no

genes had been definitively linked to otosclerosis, but now, in research funded by us, a team led by Dr Sally Dawson at the UCL Ear Institute has discovered the first gene to be linked to the ear condition.

Dr Dawson and her collaborators collected DNA samples from people with inherited otosclerosis and studied them, looking

for 'changes' in their DNA that may be

linked to the condition. In doing so, they identified a gene that causes otosclerosis in some families.

Knowing the genes that are involved

in causing a condition means that the underlying processes can be better understood. This in turn can lead to the development of treatments that target these processes and correct them when they go wrong.