Eustachian tube dysfunction

Peer reviewed by **Dr Toni Hazell, MRCGP**
Last updated by Dr Surangi Mendis, MRCGP
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Meets Patient's **editorial guidelines**
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Eustachian tube dysfunction (ETD) can cause dulled hearing and a feeling of pressure or fullness in the affected ear. It is usually just lasts for a few weeks during and after a cold. There are various other causes and sometimes it lasts longer. Often no treatment is needed but decongestants, antihistamines or a steroid nasal spray sometimes help.

In this article:

What is Eustachian tube dysfunction?

Eustachian tube dysfunction occurs when the eustachian tube is blocked or does not open properly . The term 'dysfunction' simply means that the tube is not working correctly. In cases of Eustachian tube dysfunction, air cannot enter the middle ear.

Therefore, the air pressure on the outer side of the eardrum becomes greater than the air pressure in the middle ear. This pushes the eardrum inwards. The eardrum becomes tense and does not vibrate well when hit by sound waves.

What is the Eustachian tube?

The Eustachian tube is a narrow tube that connects the space behind the ear (the middle ear) with the back of the nose. In adults it is about 3-4 cm long. The middle ear is normally filled with air.

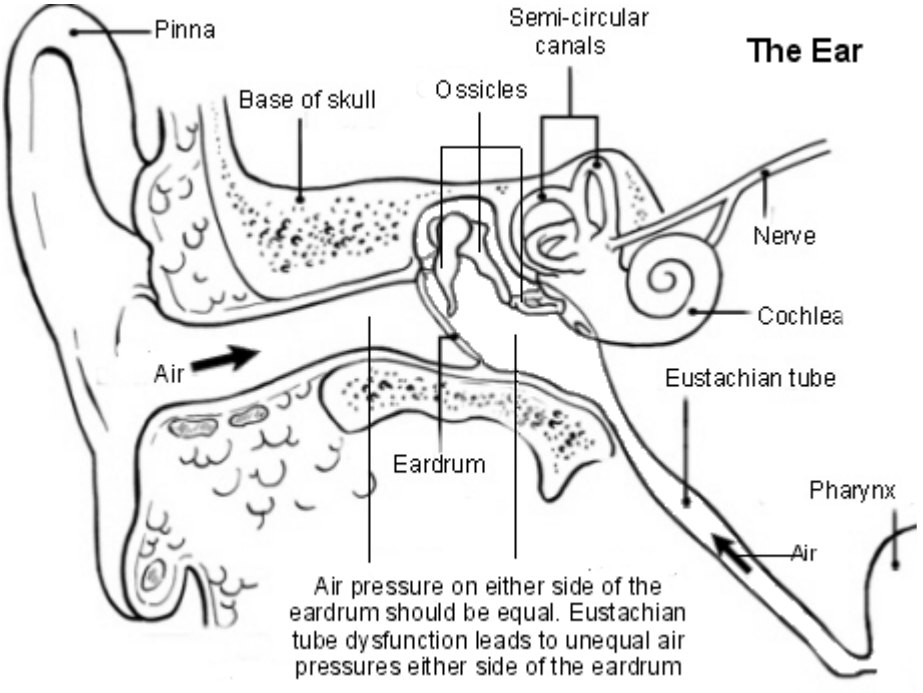
The air is constantly being absorbed, so fresh supplies of air are needed to get into the middle ear from time to time. The air can't get in through the eardrum as this is a complete seal, so it gets in from the back of the nose when the Eustachian tube opens.

What does the Eustachian tube do?

The Eustachian tube is normally closed but opens when we swallow, yawn or chew. This allows air to get into the middle ear and any mucus to get out. This keeps the air pressure equal on either side of the eardrum.

Having equal air pressure on each side of the eardrum - and the middle ear free of mucus - helps the eardrum to vibrate. This vibration is needed for us to hear properly.

Ear - Eustachian tube dysfunction



How do we hear?

Sound waves hit the eardrum. Vibrations of the eardrum pass on to tiny bones (the ossicles) in the middle ear. These bones transmit the vibrations to the cochlea in the inner ear. Sound signals are sent from the cochlea to the ear nerve and then on to the brain. See the separate leaflet called Hearing loss if you would like more details.

What are the symptoms of Eustachian tube dysfunction?

One or both ears may be affected. The main symptoms are:

- Dulled or muffled hearing.
- A sensation of popping in the ear.
- Ear pressure or mild pain.
- Ringing or buzzing in the ear (tinnitus).
- Mild dizziness may occur.

Ear pain is caused by the eardrum becoming tense and stretching. This pain may come and go; however Eustachian tube dysfunction rarely causes constant or severe ear pain. If your ear is hurting all the time, it may be due to a different cause and you should see a doctor. See the separate leaflet called Earache (Ear pain) for more details.

Ringing or buzzing in the ear (tinnitus) can occur alongside muffled hearing. Eustachian tube dysfunction does not usually cause tinnitus on its own.

How long do symptoms last?

Symptoms may last from just a few hours to several weeks or more, depending on the cause. In many cases, the cause is a common cold and the symptoms are likely to go within a week or so.

As it improves, it is common to hear popping noises in the ear. It is also common for hearing to go back to normal suddenly but then become dulled again before going completely back to normal.

What causes Eustachian tube dysfunction?

Eustachian tube dysfunction happens if the Eustachian tube becomes blocked, if the lining of the tube swells, or if the tube does not open fully to allow air to travel into the middle ear.

Common colds and other ear, nose, throat or sinus infections

- The most common cause of Eustachian tube dysfunction is the common cold (upper respiratory tract infection).
- The blocked nose or thick mucus that develops during a cold or other infections may block the Eustachian tube.
- An infection may also cause the lining of the Eustachian tube to become inflamed or swollen.
- Symptoms may last for a week or so (sometimes longer) after the other symptoms of the infection have gone. This is because the trapped mucus and swelling can take a while to clear even when the germ causing the infection has gone.

- Sometimes the infection that causes the Eustachian tube dysfunction is very mild.

Glue ear

- Glue ear is a condition where the middle ear fills with glue-like liquid.
- It is a common condition in children.
- The Eustachian tube becomes congested and prevents the free flow of air into the middle ear, causing the difference in air pressure mentioned above. The eardrum becomes tight, reducing its ability to vibrate. This results in dulled hearing. The situation is made worse by the glue-like fluid damping down the vibration of the eardrum even further.
- It clears by itself in most cases but some children need an operation to drain the fluid away.

See the separate leaflet called Glue ear for more details.

Allergies

Allergies that affect the nose, such as persistent rhinitis and hay fever, can cause extra mucus and inflammation in and around the Eustachian tube and lead to symptoms for several months.

Altitude change

Eustachian tube dysfunction can occur after exposure to altitude change (travelling by plane, driving high above sea level, scuba diving).

Smoking

- Smoking can stop the tiny hairs that line the Eustachian tube from working.
- Smoking can also cause tissues at the back of the nose and throat (including the adenoids) to enlarge, blocking the Eustachian tube.
- If you smoke and are having problems with long-term (chronic) Eustachian tube dysfunction, you should try to stop smoking.

Blockages

- Anything that causes a blockage to the Eustachian tube can cause muffled hearing - for example, enlarged adenoids in children.
- Rarely, a tumour behind the eardrum or at the back of the nose (the nasopharynx) can mimic the symptoms of Eustachian tube dysfunction. These types of tumours are very uncommon and usually cause other symptoms in addition to ETD, such as headache, a hoarse voice and a constantly blocked nose.

What causes long-term Eustachian tube dysfunction?

For most people who experience Eustachian tube dysfunction, it settles by itself within a couple of weeks. But in some people it seems to go on for a long time - many months. It is not known why some people are more prone to this happening than others.

Some common causes of long-term (chronic) Eustachian tube dysfunction:

- Chronic sinusitis - up to half of people with chronic Eustachian tube dysfunction.
- Persistent rhinitis.
- Smoking-related changes to the nose and throat.

In around 1 in 5 people who have long-term Eustachian tube dysfunction, no cause is found. There is no evidence that there is a genetic cause and it does not appear to run in families.

Do I need any tests for Eustachian tube dysfunction?

Usually not. Most cases are due to a cold, the symptoms are typical and it usually clears up after a few weeks.

If your symptoms have continued for more than six weeks:

- It is important to see your doctor to make sure there is no underlying problem. This is especially important if your hearing is getting worse, particularly on one side.
- Your doctor will want to examine your ears and also your throat and nose.

- You may need to be referred to a doctor who specialises in the Ears, Nose and Throat (an ENT specialist).
- Further tests that may then be done include:
  - A hearing test (called an audiogram).
  - Tympanogram, to test the pressure levels behind your eardrum.
  - Nasopharyngoscopy, in which a small flexible camera is used to look at the back of your nose (the nasopharynx) to see the opening of the Eustachian tube directly.

What is the treatment for Eustachian tube dysfunction?

The treatment options for Eustachian tube dysfunction depends on how badly you are affected and what has caused it.

No treatment

In most cases, the muffled hearing and popping are mild and do not last longer than a few days or a week or so. This is common after a cold. No particular treatment is needed and the symptoms often soon go.

Try to get air to flow into the Eustachian tube:

- Air is more likely to flow in and out of the Eustachian tube if you swallow, yawn or chew.
- Also, try doing the following: take a breath in. Then breathe out gently with your mouth closed and pinching your nose (the Valsalva manoeuvre). In this way you are gently pushing air into the Eustachian tube. If you do this you may feel your ears go 'pop' as air is forced into the middle ear. This sometimes eases the problem. Occasionally doing this can make you dizzy so make sure you are sitting down. This is a particularly good thing to try if you develop ear pain when descending to land in a plane. See the separate leaflet called Ears and flying for more advice.

Decongestant nasal sprays or drops

A decongestant may be advised by your doctor if you have a cold or other cause of nasal congestion. You can buy these from pharmacies. They may briefly relieve a blocked nose. However, you should not use a decongestant spray or drops for more than 5-7 days at a time. If they are used for longer than this, they may cause a worse rebound congestion in the nose and can damage the lining of your nose. They are not recommended for use in children.

Antihistamine tablets or nasal sprays

Antihistamines may be advised by your doctor if you have an allergy such as hay fever. In this situation they will help to ease nasal congestion and inflammation.

Steroid nasal spray

A steroid nasal spray may be advised if an allergy or other cause of persistent inflammation, such as chronic sinusitis or persistent rhinitis, is suspected. It works by reducing inflammation in the nose. It takes several days for a steroid spray to build up to its full effect.

Therefore, you will not have an immediate relief of symptoms when you first start it. However, if inflammation is reduced in the back of the nose then the Eustachian tube is able to work better.

Steroid nose drops

Betamethasone nose drops are steroid nose drops. They are very similar to the steroid nasal sprays but because they are drops they can run deep into the back of the nose. They must be prescribed and are not available over the counter from a pharmacy. For more details, see the leaflet called How to use nose drops.

Referral to a specialist

- If symptoms continue or the cause of the Eustachian tube dysfunction is not clear, you may be referred to an ear specialist for assessment.
- Treatment options depend on any underlying cause that may be found.
- A small plastic tube (a grommet) can be inserted through the eardrum, under an

- Occasionally a treatment known as balloon dilatation may be recommended. This involves inserting a tiny tube with a small balloon on the end into the Eustachian tube through the nose. The balloon is filled with salt water and left in place for a few minutes in order to stretch the Eustachian tube. This procedure was approved in the UK in December 2019 for routine use within the NHS.

Can Eustachian tube dysfunction be prevented?

It is not possible to completely prevent eustachian tube dysfunction from occurring. However the risk can be reduced by:

- wearing ear plugs whilst ascending or descending in a plane.
- drinking the recommended amount of water per day, 2-3 litres for adults, to keep the fluid lining the nose and throat passages thin.

Further reading and references

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Last updated by

Dr Surangi Mendis, MRCGP

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Dr Toni Hazell, MRCGP