Eustachian Tube Dysfunction

Eustachian tube dysfunction happens when the tube between the middle ear and the back of the nose (the Eustachian tube) doesn't work properly. This means that the pressure in your ear can't go back to normal. The result is muffled hearing and a popping or crackling noise in one or both ears.

What is Eustachian tube dysfunction?

Usually the Eustachian tube helps the pressure in your middle ear to 'equalise' or go back to normal. But if something blocks the tube then air can't go up and down it and you get problems.

This causes muffled hearing in the affected ear, together with a feeling of fullness or pressure in that ear. When swallowing or yawning, a 'popping' sensation is often felt.

What does the Eustachian tube do?

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

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.

How do things go wrong?

If the tube is blocked or does not open properly, air can't get into 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 so well when hit by sound waves.

What causes short-term Eustachian tube dysfunction?

- By far the most common cause is a simple cold: a blocked, runny nose and lots of production of mucus will partially block the Eustachian tube for a week or two.
- This causes the typical muffled hearing and a feeling of popping in your ears when you yawn or swallow.
- This is not usually serious and clears up by itself in a few weeks.
- Although it can be a bit sore when the ear 'pops' occasionally, this short-term problem shouldn't be very painful.
- This is a common situation in children, who often have a mild loss of hearing when they have a cold.
- Once the cold has gone the hearing returns to normal within a week or two.
What causes long-term Eustachian tube dysfunction?

- In adults, the symptoms can go on for longer. This usually has a different cause to a common cold.
- 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 having symptoms for several months.
- Smoking can make the tiny hairs that line the Eustachian tube stop working. In general, anyone who smokes and who has symptoms of long-term (chronic) Eustachian tube dysfunction will be advised 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. But these types of tumours are very uncommon.

What are the symptoms of Eustachian tube dysfunction?

For most people who experience Eustachian tube dysfunction, it settles by itself within a couple of weeks. This is especially true for children. But in some adults it seems to go on for a long time - many months. There are two types: short-term and long-term.

What is short-term Eustachian tube dysfunction?

- The main symptom is muffled or dulled hearing.
- You may also have ear pain that comes and goes because the eardrum is tensed and stretched.
- But Eustachian tube dysfunction doesn't cause constant ear pain. If your ear is hurting all the time, it may be another cause and you should see a doctor.
- Other symptoms that may also develop include a feeling of fullness in the ear, ringing or buzzing in the ear (tinnitus) and dizziness. But it is important to note that these other symptoms happen alongside muffled hearing. Eustachian tube dysfunction does not cause dizziness or tinnitus alone.
- One or both ears may be affected.
- Symptoms can last from a few hours to several weeks or more. It depends on the cause. In most cases due to a cold (the common cause) the symptoms are likely to go within a week or so.
- As symptoms are easing, you may have popping sensations or noises in the ear. Also, the dulled hearing may come and go for a short time before getting back to normal.

What is long-term (chronic) Eustachian tube dysfunction?

- Occasionally the feeling of muffled hearing and a fullness in the ear does not go away, even once the original cause (usually a bad cold) has gone away. If the feeling persists for six weeks, it is termed chronic Eustachian tube dysfunction.
- This is more common in adults than in children.
- This is quite a difficult condition to treat and often persists despite trying all the usual treatments.
- There doesn't seem to be a genetic cause of Eustachian tube dysfunction, nor does it run in families.

How is Eustachian tube dysfunction diagnosed?

**Short-term Eustachian tube dysfunction**

- There are no particular tests to diagnose Eustachian tube dysfunction. It is usually diagnosed on the basis of the story: a bad cold, with a blocked, runny nose and muffled hearing in one or both ears.
- This usually clears up in a few weeks and no further tests or checks with the doctor are necessary.

**Long-term Eustachian tube dysfunction**

- If the symptoms have gone on for longer than six weeks, you may have long-term (chronic) Eustachian tube dysfunction. It is important to check there are no underlying problems.
- This is particularly important if the hearing is getting worse, particularly on one side; or if you have persistent pain in one ear.
- If that is the case then a GP will usually refer you to an ENT specialist.
- It may be that a hearing test (called an audiogram) will be done to get an accurate idea of your hearing.
- They will also perform a tympanogram, which is a way of testing the pressure behind your eardrum.
- An ENT specialist will probably put a small flexible camera into your nose to look at the back of your nose (the nasopharynx) and to see the openings of the Eustachian tube directly.
- An ENT specialist will be able to advise you, but it may be necessary to have a scan of your ear and the side of your brain. This would probably be a CT scan (termed a 'CAT' scan in the USA).
- This will check there is nothing blocking the middle ear behind your eardrum, or that there is nothing at the back of your nose blocking the other end of the Eustachian tube.

What is the treatment for Eustachian tube dysfunction?

The treatment depends on how badly you are affected by the condition. Often, no treatment is needed.
In many cases, the muffled hearing and popping is mild and does 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. This is a particularly good thing to try if you develop ear pain when descending to land in a plane. But make sure to do it gently; otherwise, you could accidentally burst a hole in your eardrum.

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.

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 in the nose 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 any inflammation is reduced in the back of the nose then the Eustachian tube is able to work better.

Steroid nose drops

These have the same ingredient as the steroid nasal sprays, but because they are drops they can run deep into the back of the nose. You put them in lying flat on your back, with your head hanging off the end of your bed. They can only be prescribed.

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 anaesthetic. This usually helps the problem but carries its own risks such as infection.
- A treatment recently developed is called balloon dilatation. 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. Currently the treatment is only being used as part of research but may be authorised for general use if trials are favourable.

Can I go in an aeroplane?

Often people get slightly sore ears when the plane takes off or lands. This is from pressure changes around your eardrum. If you have Eustachian tube dysfunction at the time of flying, you might find that your ears get more sore than usual during take-off and landing.

Further reading & references

- Balloon dilatation of the Eustachian tube; NICE Interventional Procedure Guideline, November 2011

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