



Pulsatile Tinnitus

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What is tinnitus?

Tinnitus is the sensation of sound in the absence of an external source. The perceived sound may simply be a ringing, whistling, or rushing sound, or it may be more complex like machinery or the twittering of birds.

Although the sound may not be present all the time, when it is noticeable it tends to be a steady noise with no frequent or regular changes in its loudness.

What is different about pulsatile tinnitus?

By contrast, pulsatile tinnitus is a rhythmical noise with the same rate as the heart.

This is easily checked by feeling the pulse at the same time as listening to the tinnitus. When doctors investigate tinnitus it is rare to find a single identifiable cause for the problem.

With pulsatile tinnitus it is also unusual to find a specific cause but the chances are greater in this form of tinnitus than in the non-pulsatile form. It is therefore an important subgroup that merits detailed investigation.

What causes pulsatile tinnitus?

Pulsatile tinnitus is due to a change in blood flow in the vessels near the ear or to a change in awareness of that blood flow. The involved vessels include the large arteries and veins in the neck and base of the skull and smaller ones in the ear itself. The blood flow can be altered by a variety of factors:

Generalised increased blood flow throughout the body such as occurs in strenuous exercise or severe anaemia.

Localised increased flow this sometimes occurs when a blood vessel is narrower than it ought to be. To compensate for this other neighbouring blood vessels have to carry extra blood and this extra flow generates noise.

Turbulent blood flow If the inside of a blood vessel becomes irregular due to atherosclerosis (hardening of the arteries) the blood flow will become turbulent rather than smooth.

This flow then becomes noisy in the same way that a smoothly running river will become noisier at a set of rapids or waterfall.

Awareness can be increased by several factors:

- Conductive hearing loss such as perforated ear drums or glue ear tend to make patients more aware of sounds inside their body because they no longer have the masking effect of external sounds.
- Heightened sensitivity in the auditory pathways can alert the brain to normal noise in blood vessels in much the same way that the awareness of non-pulsatile tinnitus is generated.

How is pulsatile tinnitus investigated?

The doctor will start by taking a detailed history of the condition and any medical conditions that may affect the patient. The doctor will then examine the patient paying particular attention to the ear drums and the blood vessels of the neck.

A stethoscope may be used to listen to the neck and skull - if the doctor can hear a pulsatile noise through the stethoscope this is referred to as objective tinnitus. Patients with any form of tinnitus will have a series of hearing tests.

Patients with pulsatile tinnitus will generally then undergo some form of medical imaging. This has changed dramatically in recent years and a wider range of techniques are now available:

Ultrasound. This is a similar test to the scan performed on a pregnant woman. Modern ultrasound scanning uses a

technique called Doppler, which can show the blood flow within vessels. *CT scanning.* This uses computer controlled X-rays to generate X-ray "slices" of the body.

Magnetic resonance scanning (MRI). This produces similar pictures to CT scanning but uses magnetic fields rather than X-rays.

Magnetic resonance angiography (MRA). Some MRI scanners can produce scans of flowing blood. This produces an image of inside of the artery or vein in which the blood is flowing and can show up irregularities or narrowings of the vessel.

Angiography. This is the old fashioned and time consuming way of looking at the inside of vessels by injecting contrast medium directly into the vessel under investigation and taking a conventional x-ray.

It still produces clearer, more detailed pictures of vessels than any of the other techniques and therefore is still used in selected cases.

What can be done about pulsatile tinnitus?

If a specific cause is found this may point to a specific solution.

For example high blood pressure can be treated with medication, glue ear can be treated with grommets, perforations can be closed with grafts and narrowed segments of artery can be repaired.

Some causes are less amenable to

treatment: if a patient is born with "odd" blood vessels in the neck these may not be treatable.

For the majority of patients with pulsatile tinnitus who have no demonstrable

abnormality, standard methods of tinnitus treatment will be used. This includes techniques such as Tinnitus Retraining Therapy (TRT), counselling, sound therapy and relaxation therapy.

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This information is not a substitute for medical advice. You should always see your GP / medical professional

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