

Noise and the Ear



Throughout our lives our ears are constantly listening to the sounds around us. Sometimes the sounds we experience can be loud enough to cause damage that can be temporary or permanent. This exposure to high levels of noise may come from occupational noise exposure, such as machinery, weapons or explosives or through recreational activities such as listening to music, concerts or motorcycling. It is important to identify which noise can pose a risk to hearing and how to reduce the risks.

How We Hear

The ear is made of three parts, the outer, middle and inner ear.

The outer ear is the visible part of the ear known as the pinna and the ear canal that extends to the eardrum.

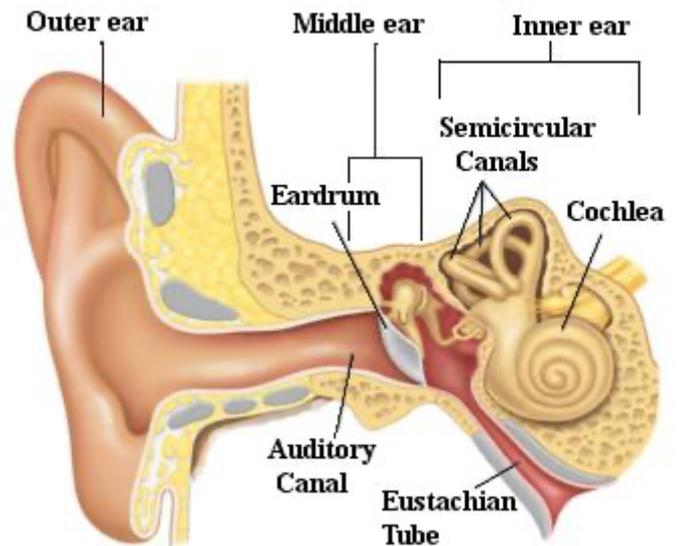
The middle ear is made up from the eardrum and three small bones that are held in the air-filled space. There are small ligaments and muscles within this space that help to reduce loud vibrations such as that of our own voice through the skull.

The inner ear contains the hearing and balance organs. The hearing organ is called the cochlea and has many specialised hair cells that convert the sound into electrical signals and send these onto the brain.

Sound travels through vibrations from the air through the outer, middle and inner ear to be perceived in the brain as sound and what we hear. Problems can occur in different parts of the pathway resulting in hearing loss and hearing difficulties.

Did you know?

The loudest noise ever recorded was the eruption of a volcano on the island of Krakatoa, Indonesia on 27th August 1883. The sound could be heard almost 5000km (3100miles) away.



Consequences of Noise

When the hair cells are damaged by noise this is termed noise-induced hearing loss. This can be temporary and recover within a few days or permanent resulting in hearing loss.

Another common risk from excessive noise exposure is tinnitus which is the condition of hearing noises in the ear/s or head without any external sound. It is important to reduce the risks posed by loud noise exposure to avoid such damage.

Did you know?

The loudest animal on earth is the sperm whale. Their calls can reach as high as 230dB.

How Loud is Too Loud?

When we consider noise exposure two things should be considered:

- The intensity (or volume) of the noise
- The time of exposure to the noise

The intensity of sound is measured in decibels (dB) and the scale on which this is measured is called logarithmic; for every 3dB increase in sound this

How Loud is Too Loud?

There are guidelines for regulations of noise someone can be exposed to in working environments. In an 8 hour day the loudest noise that someone can be exposed to is 85dB. This means that if this were to be increased by 3dB (and so the sound intensity doubled) the time exposed should be halved. Examples of maximum noise exposure have been shown below.

Intensity (dB)	Maximum unprotected time	Example
85	8 hours	Blender
94	1 hour	Lawnmower
100	15minutes	Handheld drill
115	33seconds	Emergency vehicle siren

How do I know what is 'loud'?

Without specific equipment to measure sound levels it can be difficult to know what intensity a noise is.

Despite this, there are some general rules that can be used to identify when sounds are excessively loud.

-  If you have to raise your voice to be heard by someone 1 metre away due to background noise
-  If your hearing is dulled or reduced after being exposed to noise
-  If you experience tinnitus after noise exposure
-  If a sound is uncomfortable or painfully loud

If you have concerns about your hearing or noise levels speak to your doctor or your employer. Where possible remove yourself from the sound as soon as possible and



In order to reduce the risk of damage caused by noise exposure there are some simple steps that can be taken:

-  If possible remove yourself from the noise to limit the exposure
-  If this is not possible ensure you take frequent breaks from the noise to allow the ears to recover
-  If going to a noisy environment such as a concert or club wear hearing protection to reduce the sound intensity
-  Avoid alcohol and stay hydrated. Alcohol and dehydration can make the ear more vulnerable to damage
-  Wear appropriate hearing protection if issued with hearing protection through your workplace
-  Limit the time and volume when listening to music through headphones

Military Hearing Protection

Routine hearing tests will provide essential information to allow military personnel to be better protected in times of noise exposure.

There is a range of different types and levels of ear protection available depending on the task as well as individual hearing needs.

For more information, please consult your occupational health officer.

Disclaimer

This information leaflet aims to provide an overview of noise and the ear however this is not a substitute for medical advice. Always consult your GP or medical professional.