



Faculty of Medicine, Dentistry & Health Sciences

Melbourne Audiology & Speech Pathology Clinic



Noise Induced Hearing Loss Information Sheet

WHAT IS NOISE-INDUCED HEARING LOSS?

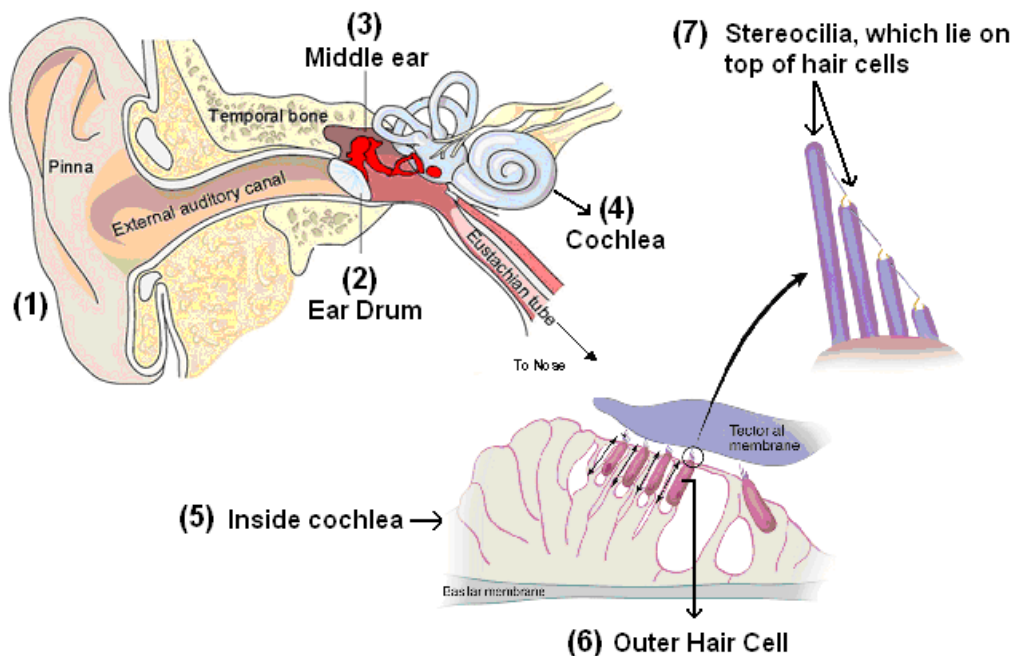
Sound is something we experience in our environment everyday – this can range from sounds generated by radios, televisions, household appliances, traffic etc. Generally these sounds are at safe listening levels and don't cause any damage to our hearing. However, sounds can be harmful if they are too loud – this can be over a short period of time or over longer durations. When a sound is at a harmful level it can cause damage to the inner hearing organ which results in noise-induced hearing loss (NIHL)

NIHL can occur immediately after exposure to an injurious level of sound or it can occur gradually over time. It can cause a hearing loss that is temporary or permanent and it can affect either one ear or both.

The effects of hazardous amounts of noise on our hearing may not be noticeable immediately however, over time it may become apparent. It may manifest as difficulty hearing conversations in background noise or over the telephone. No matter how it may affect you, it is important to remember that NIHL is preventable.

WHO CAN BE AFFECTED BY NIHL?

Exposure to harmful levels of noise can occur at any age. It is estimated that approximately 17% of Australians (aged between 15-69 years of age) have a hearing loss that may be attributed to noise exposure from either work or leisure activities.



MECHANISM OF HOW NOISE CAN DAMAGE OUR HEARING.

To understand the mechanism behind NIHL, we first have to understand how we hear. Hearing is dependent on a sequence of events, which act to change vibrations in the air (sound waves) into electrical signals that can be interpreted by the hearing centres in our brain. The diagram above demonstrates the pathway of how sound is heard. Sound waves travel down the ear canal (1) and vibrate the eardrum (2). This vibration causes 3 tiny bones in the middle ear (3) to move against the cochlea (4) and transmit the sound vibrations from the air to fluid vibrations within the cochlea. This fluid surrounds the mechanisms that allow us to hear (5) for example, the outer hair cells (6). On top of the outer hair cells are tiny projections called stereocilia (7). When sound waves travel along the 'basilar membrane' inside the cochlea they move the outer hair cells and its stereocilia. Stereocilia bend as they push up against the tectorial membrane. When the sound is too loud, the stereocilia are forced against the tectorial membrane, causing these tiny projections to break. The vast majority of NIHL results from the damage and death of these tiny projections. This hearing loss may be temporary or permanent.

NOISE AND DAMAGE TO OUR EARS

Following exposure to a loud noise, the stereocilia can be damaged or broken and the outer hair cells swell. This causes a hearing loss as the mechanisms, which allow us to hear, are malfunctioning. This hearing loss may be temporary or permanent. A Temporary Threshold Shift (TTS) causes reduced hearing ability and tinnitus (head noises). Although the effects usually last less than an hour, it is possible for symptoms to last many hours or even days as the cochlea regenerates and reduces the swelling of the hair cells. If the damage in TTS is extensive the hearing loss becomes permanent. Permanent Threshold Shift (PTS) occurs when there is incomplete recovery after TTS. The swollen hair cells rupture beyond repair as a result of prolonged noise exposure.

NOISE INTENSITY AND DURATION

Noise can be steady, fluctuating, intermittent or impulsive, but all can be equally damaging. With increasing noise volume, a person is at increased risk of TTS or PTS. The longer the time that a person is exposed to a loud noise, the greater the risk of TTS or PTS. For example, a moderately loud sound may be tolerated for 8 hours before causing damage; however a very loud noise may cause damage in less than one hour. As the noise increases in intensity, damage becomes more likely. The longer the exposure to the noise, the more likely damage will occur.

HOW CAN AN AUDIOLOGIST HELP?

A detailed history and hearing assessment is necessary to help with the diagnosis and management of noise-induced hearing loss. We can also provide suitable recommendation regarding hearing protection appropriate for the noise levels and situations you are exposed to. Furthermore, regular hearing assessments are recommended in order to track any changes in hearing ability that may be due to noise exposure.

CONTACT US

Ground Floor
550 Swanston Street
Carlton, Victoria 3053
Australia

☎ +61 3 9035-5333

☎ +61 3 9347-1535

✉ aud-reception@unimelb.edu.au

📍 umac.org.au