



# UNDERSTANDING NOISE INJURY

## WORKERS ARE NOT THE ONLY ONES AFFECTED BY NOISE!

Noise induced hearing loss (NIHL) affects thousands of Australians including children and teenagers exposed to loud noise, and not included in any published statistics are the family members who are also affected by this hearing loss.

Whilst steps have been taken to reduce the noise levels in workplaces and workers are now encouraged to wear hearing protection when working in excessive noise, unfortunately for many, the damage has already been done and the hearing loss cannot be reversed.



## HOW DOES THE EAR WORK?

The ear is divided into 3 sections:

1. The **OUTER** ear: collects sounds from the environment and channels them down the ear canal to the ear drum.
2. The **MIDDLE** ear is a small cavity filled with air that enables the ear drum to vibrate. It contains 3 tiny middle ear bones which aid in vibrating the sound energy across to the inner ear.
3. The **INNER** ear, or cochlea, is a small snail shaped organ, which has 2½ turns. It is filled with fluid and contains approximately 30,000 tiny hair cells.

When the middle ear bones vibrate, this moves the fluid in the inner ear, the hair cells are stimulated, and they in turn send electrical impulses to the brain, where they are interpreted. This is how we are able to hear and recognise sound.

## WHY CAN I HEAR SOME THINGS, BUT NOT OTHERS?

If the cochlea was stretched out with the hair cells placed along the length of it, the cochlea would resemble a piano keyboard which has bass, middle and treble notes.

The hair cells at the very top of the cochlea only recognise and describe bass sounds to the brain. This section does not recognise middle and treble sounds. In speech, the bass sounds are the deeper vowel sounds such as '**a'**, '**e'**', '**i'**', '**o'** and '**u'**'.

The hair cells in the middle turn of the cochlea only recognise middle frequency sounds. In speech, the middle sounds are consonant sounds such as '**I'**', '**m'**', '**g'**', '**d'**', '**n'**', '**w'**', '**r'**'.

The hair cells in the first or basal turn of the cochlea, only recognise treble (high frequency) sounds. These are the soft unvoiced consonants such as '**t'**', '**f'**', '**s'**', '**th'**', '**p'**', '**sh'**', '**ch'**', '**k'**'.

These sounds are often at the beginning and endings of words. Exposure to loud noise destroys the hair cells in the treble area of the cochlea, making it difficult to hear these soft sounds of speech. A person with a high

frequency hearing loss can HEAR, but not always UNDERSTAND what is being said, as the beginning and endings of the words are missing.

When background noise is present, hearing is made even more difficult, as these softer sounds of speech are lost in the background noise. It is this situation which often leads to statements like 'THEY CAN HEAR WHEN THEY WANT TO!' when in fact it is closer to the truth to say, 'THEY CAN HEAR WHEN THE LISTENING CONDITIONS ARE IDEAL.'

Understanding women's and children's voices is often hard, as they usually have higher pitched (frequency) voices than men. Men's voices are lower pitched, and the hair cells which detect lower frequency sounds are not damaged by exposure to noise.

Hearing conversation from another room is difficult, as only parts of the words are heard clearly and what is missed has to be repeated. The television may need to be at a higher volume than others find comfortable, and the phone may not always be heard from a distance. It is these situations which can lead to frustration within the household or family unit.

## **WHAT CAN BE DONE TO IMPROVE HEARING?**

### **THE FAMILY:**

- ❖ Get the person's attention before speaking
- ❖ Don't speak from another room
- ❖ Face the person (this helps with lip reading)
- ❖ Don't shout – it only makes it louder not clearer
- ❖ Reduce background noise
- ❖ Have patience
- ❖ Suggest trialling devices which can assist hearing
- ❖ Recognise that some social situations where there is a lot of noise, can be hard for the person to hear and participate

### **THE HEARING IMPAIRED PERSON:**

- ❖ Protect the hearing you have left by always wearing hearing protection
- ❖ Tell others you have trouble hearing – remember hearing loss is invisible
- ❖ Face the speaker
- ❖ Reduce background noise
- ❖ Investigate hearing aids and other listening devices that assist hearing. There are devices available for many situations including TV, phone, smoke alarms and group situations.
- ❖ Have patience.

Looking for more information?  
Contact your local hearing health professional