



hearingandbalancecentre



The total hearing and balance team

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www.hearingbalance.com.au

Audiologists

- Part of the Allied Health Professions
- Hearing tests – assist in diagnosis of type of hearing loss
- Balance tests for dizziness and vertigo
- Tinnitus assessment and treatment
- Hearing aids
- Implantable hearing aids: cochlear implants, Bone Anchored Hearing Aids

Topics

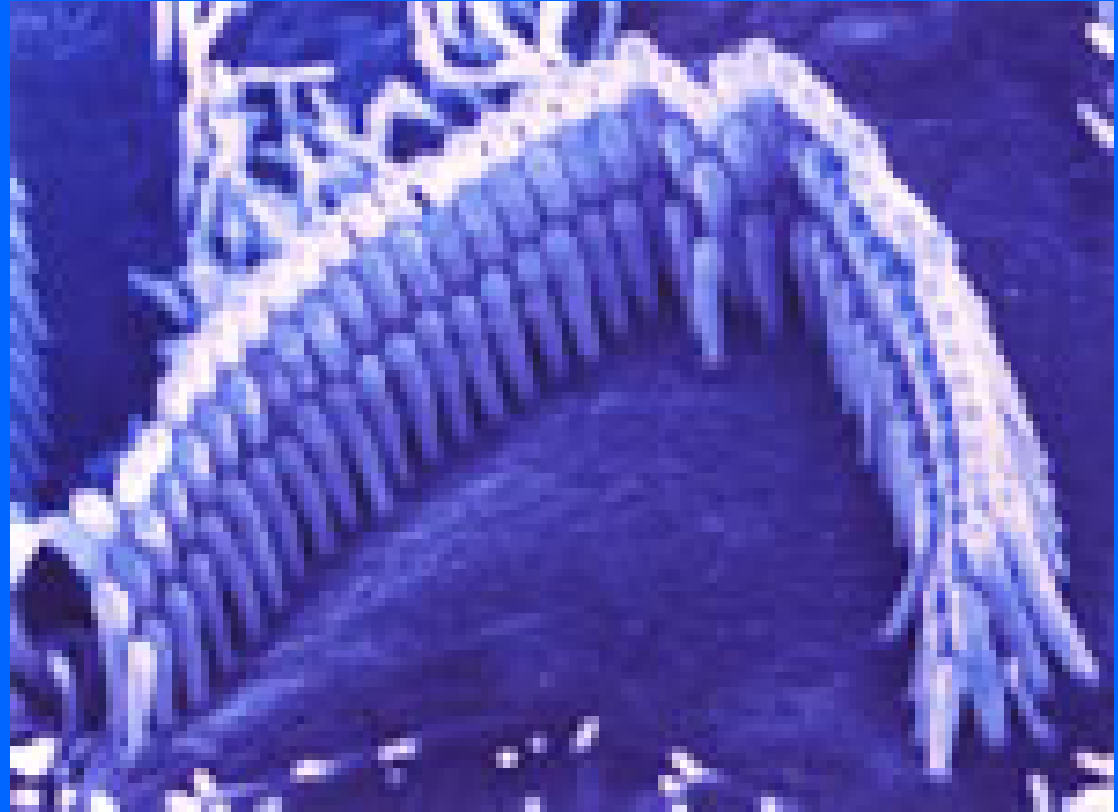
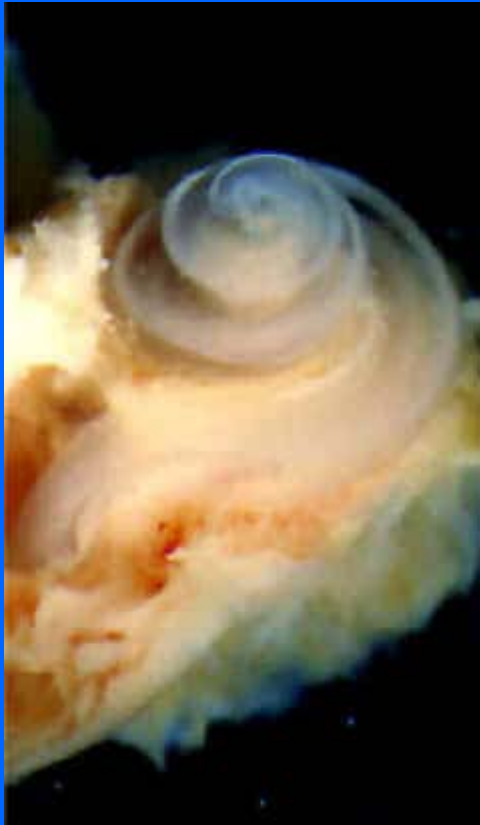
- How we hear
- Measuring hearing loss: the audiogram
- The causes of hearing loss.
- Hearing protection and noise induced hearing loss
- Tinnitus
- Solutions for hearing loss

The Ear

- Outer ear: Ear canal
- Middle ear: Ear drum (tympanic membrane)
Ossicles
- Inner ear: Cochlea
Semi-circular canals
Auditory nerve



The Cochlea – inner ear



Causes of Hearing Loss

Conductive:

Mechanical problem

- Otosclerosis
 - Exostosis
 - Atresia
- Infection (OME)

Sensorineural:

Nerve problem

- Presbycusis
- Noise Exposure
- Meniere's disease
 - Toxic drugs

Assessment of Hearing Loss

➤ Patient History

- Perceived hearing loss
- Family history
- Balance Problems
- Head injuries
- Infections
- Tinnitus
- Medications

Basic Tests

- Audiogram – ‘hearing test’.
- Speech Recognition
- Impedance Tests – test of middle ear function and acoustic reflexes

Audiogram

The softest level of sound that can be heard across a range of different pitches (frequencies).

Human ear can hear from 20Hz to 20000Hz

Test frequencies usually from 250Hz to 8000Hz
some now test to 14000Hz

Loudness level varies from 0dB to 120dB



Noise Exposure

Noise is measured in decibels (dBSPL).

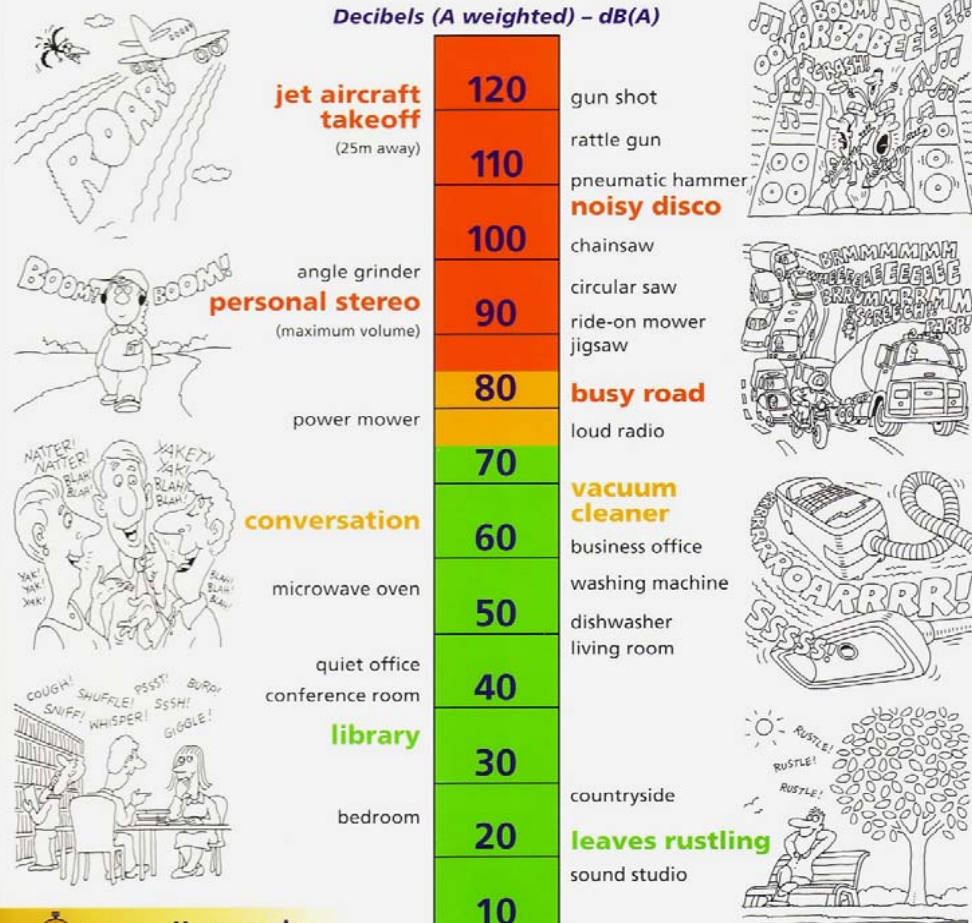
The *National Standard and Code of Practice for Occupational Noise* recommends that:

The maximum daily noise exposure is equivalent to an 8-hour period of continuous SPL of 85dbA.

Noise levels must not exceed 140dB at any time

Noise destroys your hearing

Decibels (A weighted) – dB(A)



How much noise is too much in one day?

- 110dB 1 minute
- 100dB 15 minutes
- 97dB 30 minutes
- 94dB 1 hour
- 91dB 2 hours
- 88dB 4 hours
- 85dB 8 hours

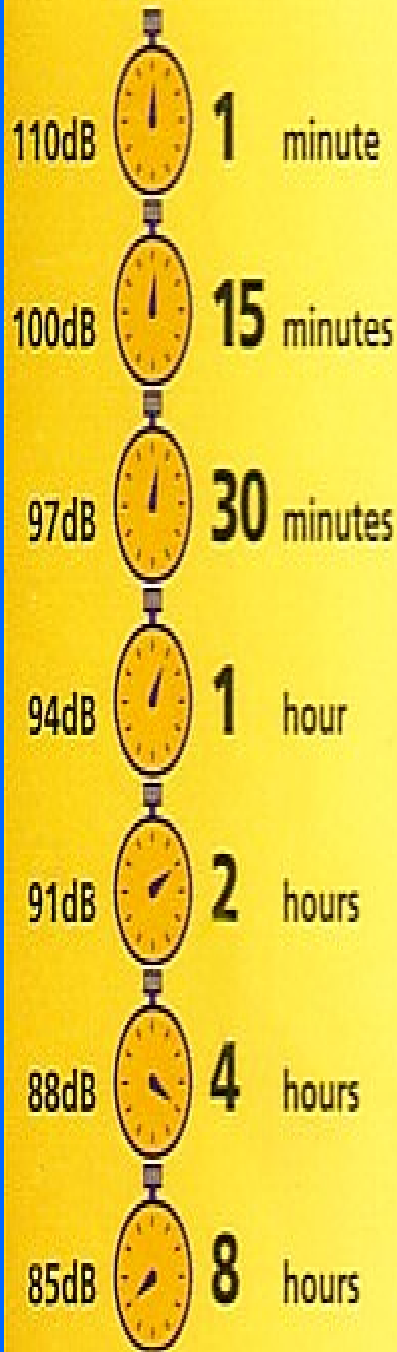
The World Health Organisation recommends a maximum continuous noise exposure of **85dB(A) for 8 hours per day**. Hearing damage risk is negligible below 75dB(A). For each extra 3 decibels louder, the noise is **twice** as strong and so the exposure time should be **halved**.

NOTE: The above noise level values are approximate only and should not be taken as specifying the noise level of a particular machine, device or event. Values indicated should be taken as a guide only.



Noise Levels

Damage your hearing and it won't come back



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Safe Noise Dose

Hearing damage by Noise

Risk of damage depends on:

1. Level of noise (dBSPL) +
2. Time of exposure
3. Frequency of sounds can also effect the degree of damage. High frequency more damaging.

Judging Harmful Noise Levels

1. Noise is as loud or louder than heavy traffic
2. You have to raise your voice to speak to someone 1 metre away
3. Things sound different after you've been exposed to noise
4. You hear ringing or other noises in your ears after you've been exposed to noise

Temporary Hearing Loss

- Noise can temporarily cause a hearing loss by “tiring out” the hair cells
- First signs: ringing in the ears after noise exposure.

Permanent Hearing Loss

- The effect of repeated noise exposure on hearing is usually permanent.
- Hair cells can not repair themselves. There is no cure for this hearing loss.

Typical signs of NIHL

Noise-Induced hearing loss results in a loss of high frequency hearing.

"I can hear you but I can't understand you"

"I have a continuous ringing in the ears"

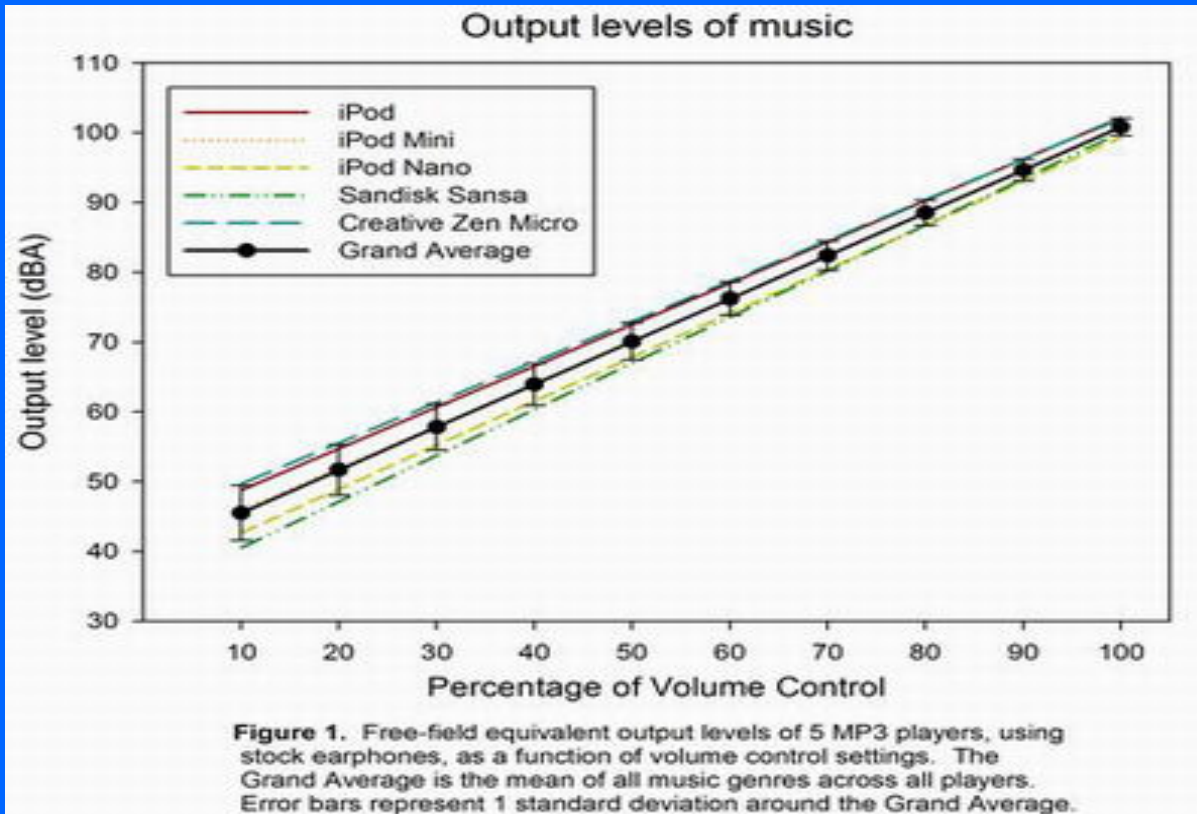
"I don't enjoy music anymore"



"I have the TV up louder than other people"

"I have no problems when it's quiet and I'm only talking to one person but when there's a group of people, I can't follow what they're all saying"

FAQ: iPods



Safe exposure limit is 85 decibels for eight hours a day.

(A typical vacuum cleaner emits 85 decibels.)

Max iPod listening time vs % volume used

% of Volume Control	Maximum listening time per day			
	Earbud	Isolator	Supra-Aural	iPod, stock earphones
10-50%	No limit	No limit	No limit	No limit
60%	No limit	14 hours	No limit	18 hours
70%	6 hours	3.4 hours	20 hours	4.6 hours
80%	1.5 hours	50 minutes	4.9 hours	1.2 hours
90%	22 minutes	12 minutes	1.2 hours	18 minutes
100%	5 minutes	3 minutes	18 minutes	5 minutes

Table 1. Maximum listening time per day using NIOSH damage-risk criteria. "Earbud" includes stock earphones and iPod In-ear earphones. "Isolator" includes Etymotic ER6i earphones and Shure E4c earphones. "Supra-Aural" includes Koss headphones that rest on top of the ear.

Tinnitus: what is it?

- Tinnitus is a physical condition experienced as hearing noises in the ears or head when there is no external noise present.
- It can be any noise: - ringing, buzzing, static, cicadas, pulsating sounds etc or static.
- Approximately 18% of Australians have tinnitus at some time of their lives.

What causes tinnitus?

- Tinnitus is usually caused by a fault in the hearing system; it is a **symptom**, not a disease in itself.
- There is no conclusive evidence of what causes tinnitus.
- Tinnitus may or may not be associated with hearing loss.

WHAT CAUSES TINNITUS ?

Although the exact mechanisms of tinnitus are not known some causes and triggers have been identified:

- Stress
- Noise exposure
- Wax against the eardrum
- Ear infections
- Some medications
- Tumour on the auditory nerve
- Meniere's Disease

Tinnitus treatments

Although there is no cure for tinnitus, there are several treatments available.

- Tinnitus Retraining Therapy (TRT)
- Cognitive Behavioural Therapy (CBT)
- Neuromonics

Tinnitus Retraining Therapy

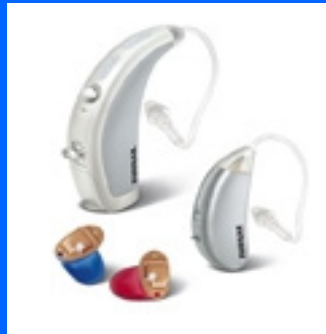
- Explains how tinnitus is processed by the brain
- Based on the belief we ALL have tinnitus but majority don't hear it.
- Emphasises a multidisciplinary approach
- Uses a psychological treatment (directive counselling) together with auditory therapy

Aims of DIRECTIVE COUNSELLING

- Reduce impact of negative counselling about tinnitus.
- Encourage neutral association to the tinnitus through acceptance of the tinnitus.

AUDITORY THERAPY

- Appropriate use of sound in environment.
- HEARING LOSS - Hearing aids



- NORMAL HEARING – WNG's &/or
Sound Machine

Australian Tinnitus Association

www.tinnitus.asn.au



Non-profit organisation. ATA's mission is to provide information, support and counselling to tinnitus sufferers and preventative education to the wider community.

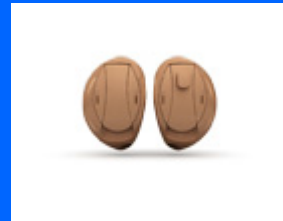
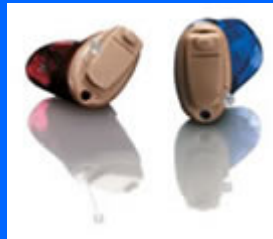
Solutions for Hearing Loss

- Focus on non-surgical/medical solutions
- Hearing aids
- Assistive Listening Devices
- Implantable Hearing Aids

Hearing Aids

- Huge improvements in the past few years
- Sound quality
- Performance in Noise
- Cosmetics and comfort

How to choose!



Ask an Audiologist

- Degree of hearing loss
- Lifestyle
- Cosmetic issues
- Most expensive not necessarily the most suitable

Implantable Hearing Aids

- Cochlear Implants
- Bone anchored hearing aids





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Thank You

For more information visit

www.hearingbalance.com.au

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