



Hearing Screening in Primary Care

*And why you need a
Tympanometer*

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Screening Goals

- To differentiate between those with a problem and those without
- Decide on appropriate onward referral
- Management of middle ear problems in children and adults
- Detecting adults with acquired hearing loss
- *Important: Parental concern in the absence of m.e. probs in children referral to Audiology*

Adult Hearing Screening

Older adults:

- Gradually acquire their hearing loss
- Often lack insight into their communication problems
- May suffer relationship problems, isolation and depression

Tools:

- Tympanometry
- Audiometry
- Bay screener
- HHIE-S
- Online screening tests

How well do you hear?

» Online hearing test

What hearing loss sounds like

Causes & types of hearing loss

Hearing loss in children

What you should do next

How hearing aids work

Cochlear implants

LOGIN

Username

Continue

Please play the sound and set the volume

Please conduct the screening in quiet surroundings and use the slider to set the volume so you can hear the words clearly. Click "Next" to continue.

» Hear sound

Can you HEAR the WORLD?

Please adjust the volume using the slider so you can hear the words clearly. If you have headphones, please use them.

« Back

Next »

Screening Version of the Hearing Handicap Inventory for the Elderly (HHIE-S)

ITEM	YES (4 pts)	SOMETIMES (2 pts)	NO (0 pts)
Does a hearing problem cause you to feel embarrassed when you meet new people?			
Does a hearing problem cause you to feel frustrated when talking to members of your family?			
Do you have difficulty hearing when someone speaks in a whisper?			
Do you feel handicapped by a hearing problem?			
Does a hearing problem cause you difficulty when visiting friends, relatives, or neighbors?			
Does a hearing problem cause you to attend religious services less often than you would like?			
Does a hearing problem cause you to have arguments with family members?			
Does a hearing problem cause you difficulty when listening to TV or radio?			
Do you feel that any difficulty with your hearing limits or hampers your personal or social life?			
Does a hearing problem cause you difficulty when in a restaurant with relatives or friends?			

RAW SCORE _____(sum of the points assigned each of the items)

INTERPRETING THE RAW SCORE

0 to 8 = 13% probability of hearing impairment (no handicap/no referral)
10 to 24 = 50% probability of hearing impairment (mild-moderate handicap/refer)
26 to 40 = 84% probability of hearing impairment (severe handicap/refer)

Source: Ventry, I, Weinstein B. (1983). Identification of elderly people with hearing problems. ©American Speech-Language-Hearing Association, July, 37-42.

Next step?



- Hearing Therapist
 - Free Govt funded service
 - Hearing screening, support and advice
- Hearing Association
 - Support organisation
- Private Audiology Services
 - Hearing assessment, Hearing aid fitting
 - Audiologists who are members of NZ Audiological Society
 - Govt subsidy
- Public Audiology
 - Limited or no access for adults

Public Health Hearing Screening Initiatives in NZ



- Universal Newborn Hearing Screening and Early Intervention
- B4 School Check





Newborn Hearing Screening

- Free for all babies in NZ
- Began in 2007
- Automated Otoacoustic Emissions and/or Automated Auditory Brainstem Response testing
- Performed by trained screeners
- Babies pass or are referred to Audiology



Goal of Newborn Hearing Screening

Early detection of permanent hearing loss and intervention to allow best access to language

- Offer hearing screening to all eligible babies by 1 month of age
- Diagnostic audiology by 3 months
- Provide intervention by 6 months
 - Hearing Aids through Audiology
 - Early intervention from Ministry of Education



Well Child Hearing Screening

- Part of the B4 School check
- At 4 years prior to school or 1st year of school if not tested at 4.
- By Vision and Hearing Technicians
- Screening hearing test
- Plus tympanometry if does not pass





GP role

- Children are referred to their GP if they do not pass both the audiogram and tympanogram for:
 - Followup tympanometry
 - If OME persists → ENT
 - If OME resolves hearing should be rescreened by VHT's

Note: Children who fail hearing screening and pass tympanometry are referred to Audiology

Assumptions Underlying the B4 School Check

- All GPs have access to tympanometry
- Does NOT assume the GP will refer directly to Audiology or ENT, but:
 - Many GP Practices don't have a tympanometer
 - Staff who use it may require upskilling/training
- So today is about learning how to use a tympanometer and what it tells you.

What does tympanometry do?

- Gives an objective measure of middle ear function.
- A useful adjunct in the diagnosis and follow-up of middle ear disease.
- Provides appropriate onward referral information to Audiology and ENT
 - Appropriate triage
 - History you provide assists with setting a priority for surgery

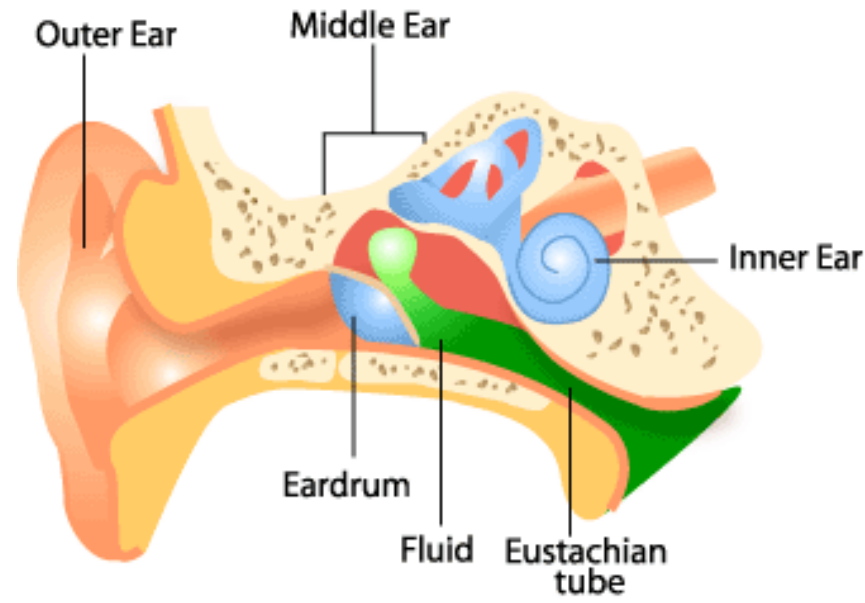
How does Tympanometry work?

- Measures sound reflected off the ear drum during pressure change
- Therefore tells us how well sound is being passed through the middle ear to the cochlear
- Tympanometer
 - Produces a tone at 226Hz
 - Pumps pressure positive and negative relative to normal atmospheric pressure
 - Microphone measures sound reflected back



What can be detected by Tympanometry

- Otitis Media with Effusion
- Eustachian tube dysfunction
- Perforated TM
- Ventilation Tubes
 - Patent
 - Blocked or out

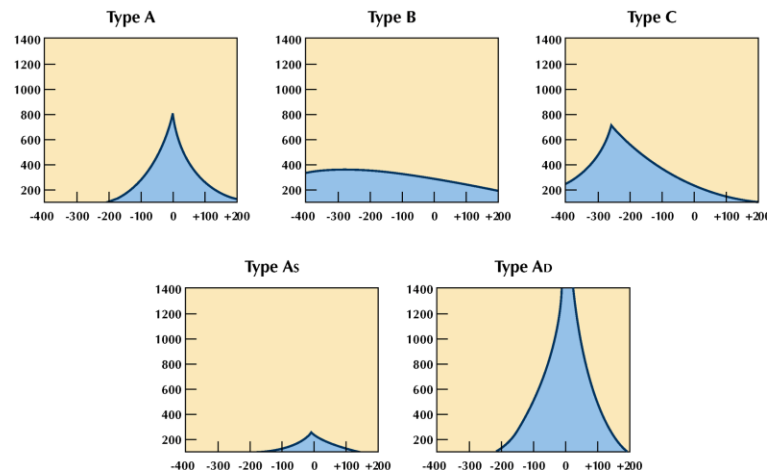


Tympanometry

- Key variables on the screen are:
 - Admittance or Compliance: *how much the eardrum moves*
 - Ear canal volume: *The physical space between the tip of the probe and the tympanic membrane.*
 - Peak pressure: *relative to normal atmospheric pressure*

Tympanogram categorisation

- Tympanograms are then categorised as A,B or C
 - The shape of the tympanogram
 - The numerical values on the tympanometer
- These different types relate to different middle ear pathologies



Tympanometry Norms

When the numbers on the tympanometer fall within the range below middle ear functioning is normal.

	Adults	Children
Ear Canal Volume	0.6 -1.5	0.4 – 1.0
Peak pressure	Greater than -100	Greater than -100
Eardrum movement (admittance or compliance)	0.3 – 1.4	0.2 – 0.9

Type A - Normal



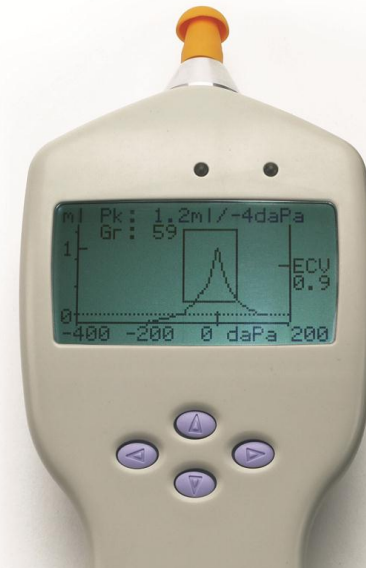
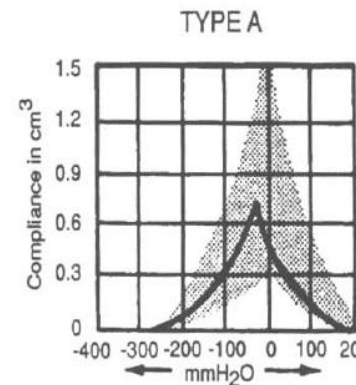
Type A

- Normal middle ear pressure
- Normal eardrum movement
- Normal ear canal volume

➤ Normal middle ear



Figure 9.2 Normal tympanic membrane (Right)

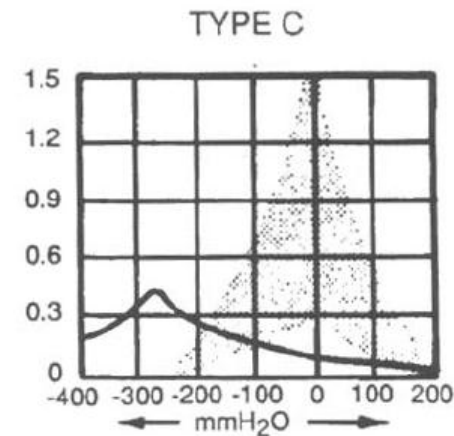


Type C- Eustachian Tube Dysfunction (or resolving OME)



Type C

- Excessive negative middle-ear pressure
 - Normal or reduced compliance
 - Normal ear canal volume
-
- Eustachian tube dysfunction, initiation or resolution of middle-ear fluid
 - “Sniffling” children



Type B- Otitis Media with Effusion



Type B (normal volume)



Figure 5.8 Acute otitis media

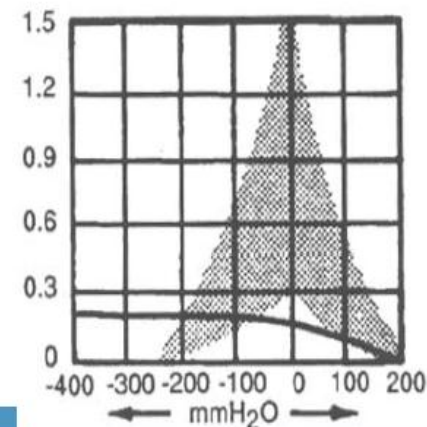


Figure 5.17 Sensor otitis media

- “Flat”
- No compliance or pressure peak indicated
- Normal ear canal volume

➤ Middle-ear fluid

TYPE B



Type B – patent grommet or perforation



Type B (increased volume)

- “Flat”
 - No compliance or pressure peak indicated
 - Increased ear canal volume
-
- Perforated TM
 - Patent P.E. Tubes

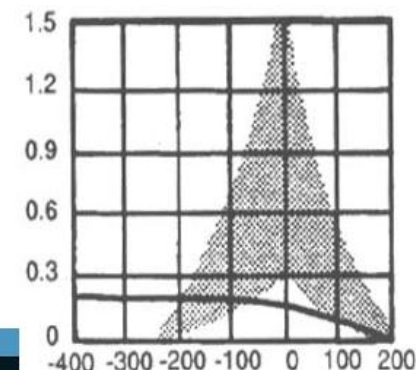


Figure 5.19 ventilation tube

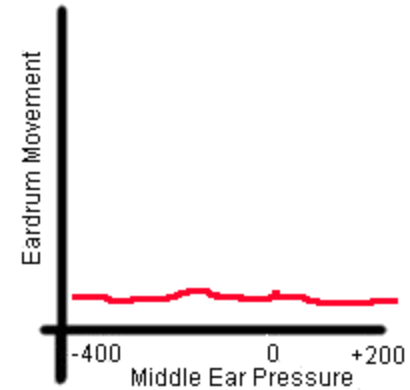
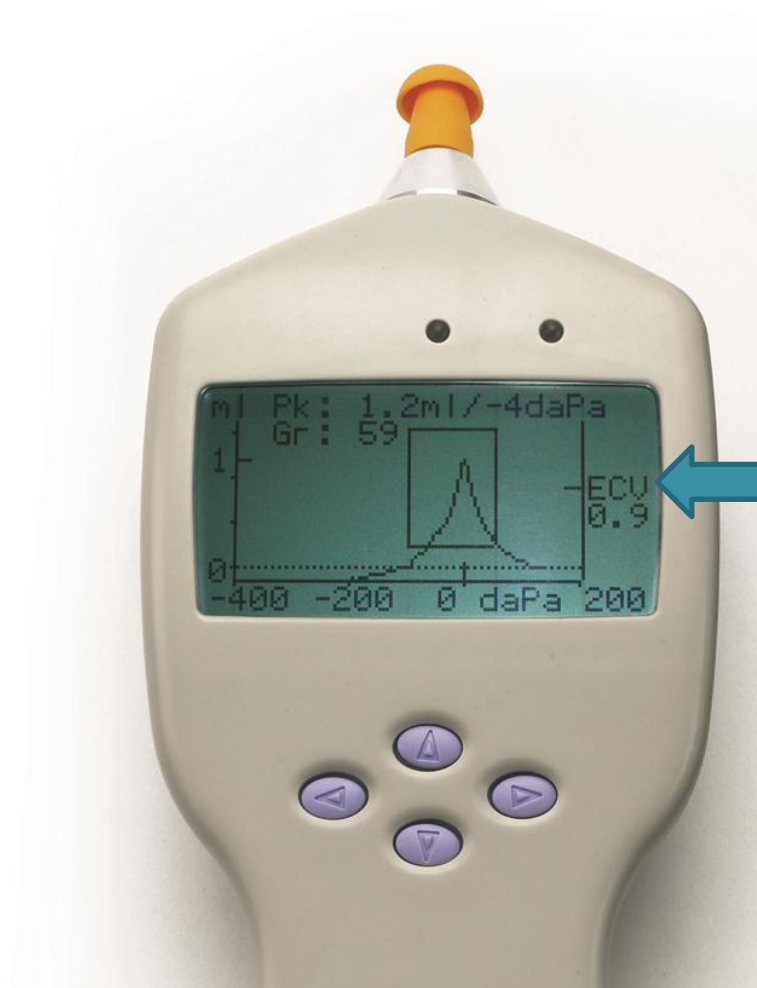


Figure 5.34 Perforation

TYPE B



How to tell what sort of Type B



Look for the ECV (Ear Canal Volume) value

Steps to a good measurement

- Otoscopy to check for any obstruction in the ear canal
- Tips must seal the ear canal to allow the pump to change pressure
 - Throw out those old tips
 - Consider single use tips
- Talking, crying moving will effect the measurement

Hands on Section

- Try using the tympanometers
- Find the peak pressure
 - What does this number tell you
- Find the number that tells you how much the ear drum moves.
- Find the ECV value.
 - What does this number tell you

Pricing

- Otowave approx \$3,500
- Interacoustics MT10 approx \$5800
- Interacoustics Titan approx \$6300