Introduction to Tympanometry

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Definition

- Tympanometry measures the compliance of the TM and ossicular chain and estimates middle ear pressure.
- Compliance = Freedom of Movement (cc)
Anatomy of the Ear
Anatomy of the Ear

- External Ear
- Middle Ear
- Inner Ear
- Pinna
- Auditory Canal
- Tympanic Membrane

Ossicular Chain
- Malleus
- Incus
- Spapes

Stapedial Muscle
- Oval Window
- Cochlea
External Anatomical Landmarks of the Ear
Hearing

• Sound energy stimulates the TM (eardrum) vibrating the ossicular chain. Vibratory motion of the stapes is transmitted through the oval window into the cochlea.

• Cochlea translates the sound energy into meaningful neuronal impulses to the brain.
Cranial Nerve VIII

- inner ear apparatus
- acoustic n. VIII
- Tensor Tympani
- auditory tube
- int. carotid a.
- ext. acoustic meatus
- mastoid process
- tympanic membrane
- styloid process
- middle ear
- int. carotid a.
How it Works

Tympanometry utilizes two energy sources:
• Pressure
• Sound

Units:
1. Pressure = daPa (deca Pascals)
2. Sound = Hz (Frequency) dB (Loudness)
3. Compliance = cc
How it Works

• Pressure is introduced from +200 to – 300
• Sound is constant at 226 Hz and 85 dB
• Compliance is measured in terms of volume (cc)
How it Works

- Pressure changes on the x-axis (horizontal)
- Compliance changes on the y-axis (vertical)
Values

ECU 1.7 cm³ PEAK 0.7 cm³ L
GR 70 daPa - 10 daPa

1.5 cm³

Graph showing values and pressures.
Values

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NAME ____________________________
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ECV: 1.5 cm³  PEAK: 0.5 cm³ R
GR: 65 daPa  -85 daPa

Range of Normals
Ear Canal Volume 0.2 to 2.0
Compliance Peak 0.2 to 1.4
Pressure Peak -150 to +100
Gradient 60 to 150 Child
50 to 110 Adult
Acoustic Reflex Yes
Clinical Indications

- Nonspecific ear complaints
- Hearing Loss
- Ear pain without observed problems
- Subtle TM changes
- Middle ear effusion; Serous Otitis
- Resolved Otitis Media
- Ear Tubes
- Screening
Normal Ear
Otitis Media
Tympanostomy Tube - Functional
Compliance of the TM & Ossicles
Flat TM: Serous Otitis
Flat TM: Patent Tube

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NAME

DATE

ECV: 3.5 cm³
GR: daPa

PEAK: NP cm³
NP daPa L

1.5 cm³

-400 -200 0 +200
daPa
Normal
Abnormal: Negative Pressure
Abnormal: Negative Pressure Wide GR, maybe air pockets in mid ear
Abnormal: Hyperflaccid TM