Vibrations are transmitted throughout the otic capsule and cochlear fluids by direct compression of otic capsule. Differential outward motion of the OW and RW, due to unequal impedance of these two structures. Pressure difference across the cochlear membrane enables sound perception.

Conductive Hearing Loss
Sound wave transmission to cochlea
CT>MRI

Sensorineural Hearing Loss
Sound wave processing in cochlea

Outline
- Physiology of hearing
- Types of hearing loss
- Lesions causing conductive hearing loss
- 3rd window lesions
There is dampened energy transmission from the OW to the RW (X). The decrease in pressure gradient across the cochlear membrane results in DECREASED sound perception.

There is decreased motion of the OW (X) on the scala vestibuli side but the motion of the RW on the scala tympani side is unchanged. This artificially elevates the pressure difference across the cochlear membrane resulting in INCREASED sound perception.

The difference in vibration between the OW and RW generates a pressure gradient across the cochlear membrane, activating hair cells and creating the perception of sound.

Differential outward motion of the OW and RW, due to unequal impedance of these two structures, results in unequal impedance-related differences in vibration.

There is decreased motion of the OW (X) on the scala vestibuli side but the motion of the RW on the scala tympani side is unchanged. This artificially elevates the pressure difference across the cochlear membrane, enabling sound perception.

Tullio phenomenon
Hennebert sign
Autophony
CHL
Vertigo

Audiogram of right superior semicircular canal dehiscence with increased bone conduction (brackets) and decreased air conduction (crosses). Air-bone gap exceeds 10 decibels at low sound frequencies (less than 1 KHz), for which acoustic energy is readily dissipated. At higher frequencies, there is small or no gap since proportionally less acoustic energy is shunted by the third window at these frequencies.

Superior semicircular canal dehiscence syndrome

- Tullio phenomenon
- Hennebert sign
- Autophony
- CHL
- Vertigo

Air-bone gap at low frequencies
**SSC obliteration**

**Other third window lesions**

**Enlarged vestibular aqueduct**

**Minor Malformation-Isolated Ossicular dysplasia (no EAC or TM inv)**
- Bony bar
- Defects
- Oval window atresia
- Facial N dehiscence
Malleus Bar

Monopod stapes, oval window stenosis, facial n dehiscence

Isolated Dehiscent facial N

Orthotic resorption of the long process of the incus
OM, isolated or after stapes prothesis placement
C/o Dr. Hugh Curtin

Isolated Inflammatory Ossicular Lesion

Hyperemic resorption of the long process of the incus

Hyperemic Resorption of the Incus

Normal

Thank You!