Tests for Hearing Loss

There are two types of hearing loss, Conductive and Sensorineural. We can screen for hearing loss through the finger rub test and by whispering. Tuning fork tests are used to differentiate between the types of hearing loss. Weber's Test determines if lateralization of sound is present. The Rinne Test compares bone conduction with air conduction.

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Types of Hearing Loss

Conductive Hearing Loss

Musical-Conductor with Plugged-ears

The external ear conducts sound from outside to the tympanic membrane. The middle ear amplifies and transmits the sound to the inner ear through the footplate of the stapes. Any pathology in the outer or middle ear causes defective sound conduction and conductive hearing loss.

Sensorineural Hearing Loss

Sensor-nerve Headphone-broken

The cochlea transduces the mechanical sound waves into an electrochemical gradient as action potentials that are carried by the auditory nerve to the brain. Any pathology in the inner ear or vestibulocochlear nerve causes sensorineural hearing loss.

Screening

Finger Rub

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In the finger rub test, the examiner rubs his or her fingers together near the patient's ear and asks the patient whether they have heard the sound. This is a crude and easy test for screening for hearing loss.

Whispering

Whisper

Screening tests should be easy and have high sensitivity. Whispering in one ear with another covered after maximal expiration can be used as a screening tool for hearing loss. However, the utility is limited.

Tuning Fork Tests

Weber's Test

Web giving Weber's Test

In Weber's test, we compare hearing in both ears together. We strike the tuning fork on the ulnar surface of our hand and then put it over the midpoint between the eyebrows. This point is also known as the glabella. If the patient hears sound better in one ear, the sound is said to be lateralized to that ear.

Lateralization

Ladder

If there is lateralization of the sound, one hears vibrations in one ear only. It means the hearing loss is unilateral. If the hearing loss is due to a defect in the conduction of sound, then the sound of the tuning fork will be heard on the affected side. This is because the sound waves are attenuated when they pass through the air and in a conduction block they travel only through solid bones. If the hearing loss is due to a sensorineural deficit, no sound or less sound is perceived irrespective of patency of conduction, so the sound is heard better in the opposite ear.

Rinne Test

Rhinoceros giving Rinne's Test

The Rinne test is a tuning fork test that is used to assess the conduction of sound. We ask the patient to tell us when they stop hearing the vibrations. First, we will ring the tuning fork and hold it just in front of the external auditory canal. Once the patient reports no longer being able to hear the fork, it is pressed firmly against the mastoid bone. Usually, conduction of sound in air is faster than bone so even after the patient has stopped hearing at the external auditory canal the vibrations are still perceivable through the mastoid. If there is a conduction block present in the external and middle ear then sounds are not perceivable later at the mastoid signifying that bone conduction is faster than air conduction.

Bone Conduction vs Air Conduction

Bone Conductor vs Air Conductor

Sound travels faster in the air than in liquids or solids. In the ear, the sound first travels through the external auditory canal and then is transferred to the ear ossicles by the movement of the tympanic membrane. In the first part, the sound travels through the air in the external auditory canal and in the later part through the ossicles in the middle ear. If there is any defect in the external ear then the sound is carried by the mastoid to the middle ear.