AD229e

Tests

Air Conduction Audiometry

Short description: Hearing threshold levels can be determined by air-conduction. The test signal is presented to the test subject by earphones and the test subject responds to the signal by pressing a patient response switch.

Purpose: The purpose of air-Conduction audiometry is to establish the hearing sensitivity at various frequencies. The test can specify the air conduction loss but cannot distinguish between abnormality in the conductive mechanism and sensor neural mechanism.

Bone Conduction Audiometry

Short description: In bone-conduction audiometry, the test signal is presented by a bone vibrator placed on the mastoid or forehead of the test subject. It is recommended to start hearing threshold level determinations with air-conduction measurements followed by bone-conduction measurements.

Purpose: The bone vibrator generates vibrations of the skull to stimulate the cochlea directly. The bone conduction threshold thereby provides a measure of the cochlea function regardless of the outer and middle ear function. In case of a middle ear disorder the bone conduction threshold will not be normal and only the air conduction be affected (Stach 1998).

Speech Audiometry

Short description: Speech audiometry employs speech signals and can be used to examine the processing ability and if it is affected by disorders of the middle ear, cochlea, auditory nerve, brain stem pathway, and auditory centers of the cortex. Speech audiometry is an important part of the audiological evaluation as it uses signals of everyday communication (Stach 1998).

Purpose: The goal of speech audiometry is to quantify the patient's ability to understand everyday communication. Note that there is a predictable relationship between the patients pure tone threshold and speech threshold. Speech audiometry may therefore be useful as a cross-check of the pure tone audiogram (Stach 1998).

Master Hearing Aid

Short description: Master Hearing Aid (MHA) is a hearing aid fitting procedure consisting of three hearing aid simulating high pass filters of -6 dB, -12 dB, -18 dB per octave and a HFE filter (High Frequency Emphasis). The filters can be activated individually on both channels enabling the audiometer to serve as a 2 channel master hearing aid.

Purpose: The MHA is addressed towards the patient and adds different filters to the hearing loss through the headphones. This gives a sense of the benefits of a hearing aid in relation to their daily life and what they have been missing before.

Stenger Test

Short description: The Stenger test is a test for feign a hearing loss and is based on the auditory phenomenon "The Stenger Principle" that states that only the louder of two similar tones presented to both ears at the same time will be perceived. As a general rule it can be recommended to perform the Stenger test in cases of unilateral hearing losses or significant asymmetry (Stach 1998).

Purpose: The Stenger Test is a test for malingering hearing loss. Speech or tone stimuli are presented to both ears at a level of 20 dB over threshold in the better ear and in the worse ear 20 dB below the level of the good ear. The patient will react as he is able to hear the signal in the better ear. The test continues by increasing the intensity level of the worse ear. If the hearing loss in the worse ear is genuine the patient will keep responding to the signal presented to the better ear (Negative Stenger). If the patient is feigning the hearing impairment he will stop responding when the level of the worse ear exceeds the signal presented to the good ear (Positive Stenger). This is due to the Stenger Principle and the fact that the signal will only be perceived by the worse ear where the signal is louder (Stach 1998).

Free Field Audiometry / Visual Reinforcement Audiometry (VRA)

Short description: Free field audiometry is a behavioral audiometric tests obtained in a sound-treated room. Through two calibrated loudspeakers sounds are presented to a patient (mostly children seated on a parent's lap or in a chair). In visual reinforcement audiometry, the infant's eye-shift or head-turn response to the sound source is rewarded by activating a lighted mechanical toy or picture on a screen near the loudspeaker.

Purpose: The purpose of free field audiometry is to establish the hearing sensitivity at various frequencies. But note that a free field testing gives an audiogram for the better-hearing ear if an ear difference in hearing is present. Free field audiometry is also used for testing with hearing aids.

Weber

Short description: The Weber test distinguishes between conductive and sensorineural hearing loss by means of a tuning fork. Strike it softly and place the fork in the middle of the patients head. If the patient hears the tone better in the poorer ear the hearing loss is conductive, and the tone is heard better in the better ear the hearing loss is sensorineural at the given frequency.

Auto Threshold

Short description: Hughson Westlake is an automatic pure tone test procedure. Threshold is defined as 2 out of 3 (or 3 out of 5) correct responses at a certain level in a 5 dB increase and 10 dB decrease test procedure.

Pupose: The Hughson Westlake is used to obtain pure tone thresholds automatically.

OSHA

Short description: OSHA (Occupational Safety and Health Association) is an automatic pure tone test procedure. Threshold is defined as 2 out of 3 (or 3 out of 5) correct responses at a certain level in a 5 dB increase and 10 dB decrease test procedure.

First the test procedure will automatically find the hearing threshold at 1000 Hz followed by 500 Hz. Hereafter the hearing threshold at 1000 Hz is being re-tested in order to verify the stability of the response. If the stability of the response is accepted the test procedure will continue testing the remaining standard audiometric frequencies.

Pupose: The OSHA is used to obtain pure tone thresholds automatically.

ABLB – Fowler

Short description: ABLB (Alternate Binaural Loudness Balancing) is a test to detect perceived loudness differences between the ears designed for people with unilateral hearing loss. It serves as a possible test for recruitment.
The test is performed at frequencies where recruitment is presumed. The same tone is presented alternately to both ears. The intensity is fixed in the impaired ear (20 dB above pure tone threshold). The task of the patient is to adjust the level of the better ear until the signal in the two ears is of equal intensity. Note however that the test may also be performed by fixing the intensity in the normal hearing ear and having the patient set the tone for the impaired ear (Stach 1998).

Purpose: When one ear is normal recruitment can be measured using the ABLB. The test is interpreted be assessing the loudness differences at high intensity levels. If the loudness perception is the at the same intensity level for both ears Complete Recruitment has occurred in the hearing impaired ear which is consistent with a cochlear disorder. Decruitment may occur in case of a retrocochlear disorder. In these cases loudness in the impaired ear increases more slowly than for the normal hearing ear (Stach 1998).

SISI

Short description: SISI (Short Increment Sensitivity Index) is designed to test the ability to recognise 1 dB increase in intensity during a series of bursts of pure tones presented 20 dB above threshold.

Purpose: The SISI test differentiates between cochlear and retrocochlear disorders. A patient with a cochlear disorder will be able to perceive the increments of 1 dB, a patient with a retrocochlear disorder will not (Stach 1998).

Langenbeck (Tone In Noise)

Short description: The Langenbeck test is designed to locate the hearing impairment. The Langenbeck test is recommended for testing Patients with falling or drop off hearing curves.

Békésy (Fixed)

Short description: Békésy is a type of automatic audiometry where the patient controls the attenuation of the signal. By pushing a button the patient increases the test signal until it is audible. When the patient is able to hear the signal the button is released and until the signal is inaudible again (Stach 1998)

Purpose: Békésy is diagnostically important from the classification of the results into one of five types (after Jerger, et al) when responses to continuous and pulsed tones are compared.

Békesy Type 1: Continues and pulsed tone overlapped (Cochlear disorder)

Békésy Type 2: Continuous tracing slightly worse than pulsed tone tracing (Cochlear disorder)

Békésy Type 3: Continuous drops off the graph as a result of adaptation to the tone (Retrocochlear disorder)

Békésy Type 4: Continuous tracing is 20 dB lower that pulsed tone tracing (Retrocochlear disorder)

Békésy Type 5: Pulsed tone tracing below continuous tracing (feigning hearing loss)

The results are displayed on a plotter or computer screen and the thresholds are calculated as the midpoint of the excursion between audible and inaudible (Stach 1998).