

On occasion, your doctor will require some additional tests to help him establish an accurate diagnosis. Those additional tests may need to be done at separate visits. Oftentimes, those additional tests are necessary to ensure that the most appropriate recommendations are made. We make every effort to avoid extra or unnecessary tests.

The following tests may be recommended to aid in your diagnosis:

Tests of Hearing

Pure-tone audiometry (hearing test)

This test determines how *loud* a sound must be before you are able to hear it. During the test, tones of low and high frequencies will be presented at various levels of loudness. You will be asked to acknowledge when you are able to hear a sound. The testing will evaluate each frequency independently. The test will be administered using insert ear phones (foam inserts placed into the ear canal), over the ear muffs and/or through the bone behind the ear. This allows the testing to determine if the hearing problem stems from a malfunction in the inner ear (*sensorineural hearing loss*) or from a problem with the transmission of the sound waves to the inner ear (*conductive hearing loss*) or both (*mixed hearing loss*).

In many cases it is necessary to introduce a sound, or noise, into the ear that *not* being tested. This distraction allows the audiologist to ensure that the test tones are being heard in the ear under evaluations. (*Time 20 to 30 minutes*)

Speech hearing test

These tests are used to evaluate how well your ear *understands* what it hears. Two different lists of words are presented through the ear phones or a loudspeaker. One test administers the word list at various loudness level. It is used to determine the sound level at which your ear first receives speech. (*Speech reception threshold*) The second group of words uses the thresholds determined in the pure-tone audiometry to set a sound level for presentation. That way, we can be sure that your ear is hearing the words. Then, by presenting a list of words, we can determine how well your ear *understands* what it hears. (*Speech discrimination score*) (*Time 15 to 20 minutes*)

Impedance and Acoustic Reflex Tests

This collection of tests is used to evaluate the sound-transmitting properties of the middle ear structures and hearing nerve, how well the eustachian tube is working, how well the middle ear muscles are working, and the status of the middle ear pressure.

A small ear plug is inserted into the ear canal. A low-pitched humming sound is delivered to the ear. The humming may vary in loudness and at times may seem quite loud. In addition, small pressure changes are introduced. The information obtained in these tests does not require a response from you. (*Time 15-20 minutes*)

□ *Auditory Brainstem Response Audiometry (ABR)*

ABR is a computerized hearing test that may be helpful in locating the site of an inner ear or brainstem hearing disorder. It is also used to determine the degree of hearing loss in individuals (for example, small children) who are incapable of responding to conventional hearing tests.

Small adhesive discs are placed on the skin of the ear and the scalp. These are used to record electrical responses in the brain resulting from sound stimulation. The sound is introduced through the ears using foam inserts placed in the ear canals. This information is fed into a computer which helps determine the location and type of hearing disturbance.

In infants and small children it may be necessary to sedate them (make them sleep) during the exam. (*Time 60 minutes*)

Tests of the Balance System

The balance system is very complex. Several receptor systems send their input to the brain, the central processor, which puts all the information together and gives us our sense of balance. It is a very dynamic system. The testing we do only allows us to evaluate a narrow spectrum of this dynamic system. The inner ear balance systems are responsible for keeping our eyes locked on a moving target – whether our head or the target is moving. It is called the Vestibulo-Ocular Reflex (VOR). We use this reflex in our evaluation of the balance system. By tracking your eyes in response to certain stimuli we may be able to determine where there is a problem.

□ *Videonystagmography (VNG)*

We use infrared video goggles to track your eye movements. With the goggles in position we record/track the movement of the eyes while you are put through a series of tests. One exam will record your eyes while you attempt to track a moving dot, or dots, of light. In another portion of the exam, you will be moved into certain head positions – including moving from sitting to lying down. In the final part of the exam cool and warm air (or water) are irrigated into each ear canal for 30 seconds. The resulting response of the balance system, which is typically a sensation of spinning, is expressed through the eye movements. The responses are compared to the opposite sides responses.

PRECAUTIONS: The VNG will cause you to experience dizziness. Please understand that it is a critical test and the information obtained is required for us to properly treat you. In order for the testing to be accurate certain medications must not be taken for 48 hours prior to the testing. These are medications which may suppress the response of the balance system and effect the results. These medications include: Antivert, Dramamine, Marezine, Bonine, Meclizine, behind the ear seasick patches, tranquilizers (Valium, Clonazepam, etc.), and sedatives. Do not drink alcoholic beverages 24 hours prior to the test.

In addition, please do not wear eye make-up on the day of the test. Mascara and eye shadow will interfere with the infra-red goggles. You may eat a light meal 3 hours prior to the test, if desired. (*Time 60 minutes*)

Cochlear Implant Evaluation

The evaluation for cochlear implant candidacy involves several tests. The goal is to ensure that you will do better hearing with the cochlear implant than you do with a hearing aid. The tests are performed both with the hearing aids on and with the hearing aids off. There are a series of test which are used with the intent of evaluating hearing in conditions that more realistically match the real-world conditions of speech understanding in noisy environments.

The first tests will be the standard pure-tone audiometry and speech testing described previously. Those tests will be performed with the hearing aids on and off in a quiet sound-proof booth. After that, the audiologist will administer the Minimum Speech Test Battery (MTSB).

AzBio

This test is delivered through a loudspeaker positioned about 1 meter in front of you. You will be given a list of 20 sentences. Each sentence varies from 4 to 12 words in length. (*e.g.: How long has this been going on?*) The examiner will record how many words you get correct. The test will be repeated with different levels of background noise.

CNC word test

CNC stands for “consonant-nucleus-consonant” (*e.g.: tooth, sun, dutch...*). It is a list of 50 words which are presented through a loud speaker. The examiner records the number correct.

BKB-SIN test

BKB-SIN stands for “Bamford-Kowal-Bench Sentence in Noise”. This test is administered through the loudspeaker. A list of sentences is given in the presence of background noise. You will be asked to repeat the sentences.

After the testing is complete, the audiologist will discuss cochlear implants with you. The implant process has three steps: evaluation, implantation, and activation.
(*Time 2 hours*)

Hearing Aid Consultation

Hearing aid evaluation

Hearing aids continue to advance as technology advances. Current hearing aids are incredibly advanced. They have many additional features which need to be considered. It is important to understand that there are several hearing aid manufactures, and each manufacture has a variety of aids. The process of fitting a hearing aid needs to be given the proper amount of time and attention to ensure that the correct hearing aid is selected to match the patients hearing loss. Properly fit, hearing aids will be worth every penny they cost.

The audiologist will first conduct a comprehensive hearing evaluation. They will then work to match a hearing aid to the hearing loss. They will retest you with the hearing aids on. *(Time 60 to 90 minutes)*

□ *Hearing aid check*

The purpose of this visit is to evaluate and/or adjust your hearing aid. The audiologist will also give you counseling regarding the optimal use of the instrument. *(Time 30 minutes)*

Radiologic Studies

□ *CT scan*

This imaging study uses a computer to analyze the absorption of small quantities of x-rays by the brain and skull. For the exam, you will be asked to lie on a table. They may stabilize your head. The table will move in and out of a large “doughnut” which is the scanner. If needed, a second scan may be made after iodine containing dye is run into a vein in your arm.

CT scans are especially good at evaluating bony structures within the head, including the middle ear bones. *(Time 45 minutes)*

□ *MRI (Magnetic resonance imaging)*

This study uses a computer to analyze the magnetic field in tissues that are created as you lie within a magnet. For the exam, you will be asked to lie quietly and still within a large magnet. There are no x-rays or radiation involved with an MRI. The magnet, however, is a fairly confined space and the machine often makes some noise while it is working. At times, a material is run into a vein in the arm to enhance an image.

MRIs are especially good at evaluating soft tissue structures within and around the brain. *(Time 60 minutes)*