Audiometry

Audiometry is a technique used by an **audiologist** (a professional in non-medical diagnosis and management of hearing and balance disorders) or an **otolaryngologist** (a physician who specializes in the ear, nose, and throat) to measure hearing. Audiometry is performed when hearing loss is suspected. Many health organizations recommend screening newborns for hearing loss, ideally before they leave the hospital, although the type of testing differs from adults. Pediatric screening should continue for school-aged children up to adolescence. The January 25, 2006, issue of *JAMA* includes an article about screening for hearing loss in the elderly.

PURE-TONE AUDIOMETRY

Pure-tone audiometry measures how well someone can hear sounds of a different pitch and volume. Pitch or **frequency** is measured in cycles per second or Hertz (Hz). Most speech sounds are in the 500- to 4000-Hz range. People with hearing loss usually have the most difficulty with high-frequency sounds and consonants, such as S, F, SH, CH, or H. Volume or **intensity** is measured in decibels (dB). Usual conversation ranges between 45 and 60 dB.

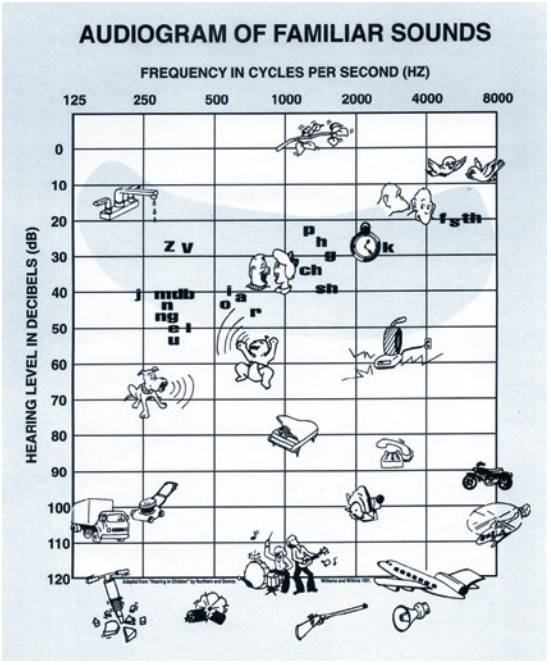
Audiometry testing is performed in a soundproof area. Earphones are placed, and the audiologist uses an **audiometer** to produce sounds of different frequencies and intensities. The person taking the test is asked to indicate if he or she can hear the sounds being generated. The test can be repeated using a small vibrator that is attached behind the ear. This device emits vibratory sounds conducted through the bones of the skull to the inner ear. This is called a **pure-tone bone conduction hearing test**, which detects hearing loss from a structural or an obstructive cause, such as earwax. Results of the testing are recorded and printed on a graph called an **audiogram**.

AUDIOGRAM

An audiogram illustrates a range of hearing across different frequencies and volumes. Frequency is listed from left to right, low to high pitch, much like the keys on a piano. Intensity or volume ranges from top to bottom, quiet to loud. Starting from the top to the bottom of the audiogram is like increasing the volume bars displayed on a cellular phone. The right and the left ear are plotted separately on the graph. At each frequency level tested, an "o" signifies the hearing threshold, or least intense sound heard in the right ear while an "x" signifies the softest sound heard in the left ear. Hearing is considered to be normal if sounds from 250 through 8000 Hz can be heard at volumes of 25 dB or less.

Consult your doctor if you are having problems with your hearing or with understanding others, such as difficulty listening in background noise or needing to increase the volume on the telephone. Protect your hearing by wearing properly fitted earplugs or earmuffs when in a noisy environment.

Sources: American Academy of Audiology, American Academy of Otolaryngology–Head and Neck Surgery, American Speech-Language-Hearing Association



Source: American Academy of Audiology

FOR MORE INFORMATION

- American Academy of Audiology
  www.audiology.org/consumer
- American Academy of Otolaryngology—Head and Neck Surgery
  www.entnet.org
- American Speech-Language-Hearing Association
  www.asha.org

INFORM YOURSELF

To find this and previous JAMA Patient Pages, go to the Patient Page link on *JAMA*'s Web site at www.jama.com. A Patient page on adult hearing loss was published in the April 16, 2003, issue; and one on cochlear implants in the May 19, 2004, issue.

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