Essential Links

Parent Links

Selecting Hearing Aids for Infants and Children

Adapted from Boys Town National Research Hospital

Hearing loss can affect communication. Understanding hearing loss and the role hearing instruments can play is helpful in making informed decisions.

The Importance of Evaluation

Because of improved technology, hearing loss can be identified soon after birth. Regardless of age, a child with a permanent hearing loss should be evaluated by an audiologist to determine which type of hearing instrument will be most beneficial.

The Importance of Hearing Instruments

Children who have normal hearing begin using single words at about one year of age. In reality, a great deal of language is learned before children utter their first word. Hearing loss can disrupt language development because learning spoken language depends on the ability to hear speech.

The earlier that finding and addressing any hearing loss begins, the greater the possibility of developing listening abilities and using spoken language. The use of hearing instruments is an integral part of this process.

Audiologists usually recommend hearing instruments as soon as possible after a loss is identified. Ideally, an audiology facility that specializes in serving young children will have a cost-saving loaner hearing-instrument program where a loaner hearing instrument can be selected immediately after a hearing loss is determined. As more complete information about a child's hearing loss is obtained, a hearing instrument evaluation can be completed to recommend hearing instruments for purchase.

Tests Necessary Before Receiving Hearing Instruments

Before hearing instruments can be purchased, an audiologist must determine the degree of a child's hearing loss. This can be done using special test methods for infants, toddlers and young children.

For very young infants, the auditory brainstem response test (ABR) may be used. Electrodes are placed on the child's scalp using an adhesive, then as the child sleeps, sounds are played through earphones. Responses to the sounds are used to determine the degree of hearing loss for each ear.

After six months of age, infants, toddlers and children may be tested with game-like activities called Visual Reinforcement Audiometry (VRA) and Conditioned Play Audiometry (CPA). In this kind of testing children respond to a number of different high and low pitch (frequency) sounds, as well as to speech. The softest levels at which a response is observed indicate how much hearing loss is present. An older child may press a button or raise a hand in response to sounds.

Although behavioral responses can provide more complete detail about hearing sensitivity across all frequencies, ABR responses may be the only hearing information available from very young children who cannot be tested with behavioral methods. As children mature, additional information about their hearing can be obtained.

Selection and Evaluation of Hearing Instruments

After determining the degree of hearing loss and receiving medical clearance to use hearing instruments, the audiologist begins the hearing instrument evaluation process. Audiologists may use one of several assessment methods when evaluating hearing instruments for children. Regardless of the technique used, the goal is to enable conversational speech to be heard at a comfortable level. These assessment methods may include:

- *Probe-Tube Microphone Testing* - During probe-tube microphone testing, a tiny, soft microphone is placed in the ear next to the earmold. The amplification provided by the hearing instrument is then measured while in place in the ear. The measured response is evaluated to estimate the instrumented benefit and adjustments to the hearing instrument are made as needed.

- *Real-Ear-to-Coupler-Difference (RECD) Measures* - In RECD testing a tiny, soft microphone is also placed in the ear next to the earmold. The effect of the child's ear and earmold are measured without the hearing instrument. The hearing instrument is evaluated separately and its response added to the RECD measurement. This allows different hearing instruments and settings to be compared without having to test each one on the child.

- *Behavioral Testing* - When probe-tube measures cannot be completed, behavioral testing methods can be used to assess a child's performance with hearing instruments. The softest level at which a child responds to sound while wearing the hearing instrument is compared to the softest level of response without the hearing instrument to estimate instrumented benefit. This type of evaluation does not require the placement of measuring equipment on the child, but provides less comprehensive information.

Probe-tube microphone or RECD measurements are usually the methods of choice for fitting hearing instruments for children for several reasons. First, they allow hearing instrument performance to be meas-

ured at typical speech levels so that performance in conversational situations can be predicted. Second, they allow direct measurement of the maximum level of sound provided by the hearing instrument to the child's ear. The hearing instrument then can be adjusted to a safe and comfortable level. Third, they provide more comprehensive information and can be completed quickly.

Characteristics Considered When Choosing Hearing Instruments

There are several technical terms you may hear when audiologists discuss the characteristics they consider when selecting hearing instruments for children. These terms include:

- *Gain* - The amount of amplification the hearing instrument provides. For example, a powerful hearing instrument would have high gain. Gain is usually expressed in decibels (dB).

- *Frequency response* - The amount of gain a hearing instrument provides across a range of frequencies. Gain is usually provided only in frequency regions where hearing loss is present.

- *Saturation sound pressure level (SSPL)* - The loudest sound the hearing instrument can produce, regardless of the incoming signal or the amount of gain. The hearing instrument should be set so that it never becomes uncomfortably loud or potentially damaging to the ear.

The audiologist will also discuss other important characteristics, including flexibility in adjusting frequency response, gain and saturation response. This flexibility is useful as additional information about the hearing loss is obtained or in cases where hearing changes.

The compatibility of a hearing instrument with assistive devices is also considered, because many children with hearing loss use additional amplification devices, such as Frequency Modulated (FM) Systems. Volume-control covers and tamper-resistant battery compartments should also be available when selecting hearing instruments for infants and toddlers.

Behind-The-Ear Hearing Instruments

Safety is the overriding concern for the choice of behind-the-ear (BTE) vs. in-the-ear (ITE) hearing instruments for children. BTE hearing instruments can be used with earmolds made of soft material as a safety precaution with physically active children.

In general, BTE hearing instruments also require fewer repairs than ITE hearing instruments, and they are more compatible with assistive devices such as FM systems. Although assistive devices are not typically used with infants and toddlers, many children with hearing loss use FM systems and other assistive devices when they begin school.

After the Hearing Instrument Evaluation

The Food and Drug Administration (FDA) recommends a thirty-day trial period with each new hearing instrument. During this time, the hearing instruments should be used as much as possible in everyday situations. The audiologist will monitor hearing instrument adjustment and benefit during the trial period to de-

termine if any adjustments or changes are necessary. Children's hearing and hearing instrument performance should be reevaluated frequently to monitor hearing sensitivity and hearing instrument function. These appointments should be scheduled as recommended by the audiologist.

Identifying hearing loss and finding appropriate hearing instruments for a child is a process that may take weeks or months. Parents play an important part in this process of evaluating and using hearing instrument amplification. They provide valuable information about a child's responses and are critical to their child's successful use of hearing instruments.

Benefits of Hearing Instruments

Ideally, hearing instruments will enable conversational speech to be heard at a comfortable level. The success of achieving this goal depends on the degree and configuration of a hearing loss. When severe-to-profound hearing loss is present, hearing instruments may not be able to amplify speech to levels where it can be understood clearly. However, hearing instruments may still improve awareness of speech and environmental sounds as well as provide helpful additions to visual and facial cues.

Hearing instruments do not restore hearing to normal and may not be effective in all listening situations such as noisy backgrounds or listening to speech at a distance. In more difficult listening situations, an FM system or a similar assistive device may be beneficial.

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