What Parents Should Know About Hearing Aids: What’s Inside, How They Work, & What’s Best for Kids

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Presentation available at: http://pedamp1.asu.edu/presentations/
Hearing Loss in children vs. adults

1 Million Children
30 Million Adults

3 Million Children
30 Million Adults
Degree of Hearing Loss

- **Mild** (15-40 dB HL)
- **Moderate** (41-60 dB HL)
- **Severe** (61-80 dB HL)
- **Profound** (>80 dB HL)

- 39% Mild
- 30% Moderate
- 21% Severe
- 10% Profound

Hearing Loss in Children and Adults: Audiometric Configuration, Asymmetry, and Progression

A. L. Pittman and P. G. Stelmaehowicz

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Why should children with hearing loss wear hearing aids?

(Pittman & Latto, JSLHR, in review)
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"Behavior problems are found more commonly in children with hearing loss and the level of behavior problems is highest amongst those children with hearing loss with the least developed language capabilities."

Behavior problems are not related to the degree of hearing loss but rather to the child’s ability to use language to communicate.
Interesting reading...

The deaf child—challenges in management: a parent’s perspective

Diana M. Glover*1


Counseling Adolescents with Hearing Loss with the Use of Self-Assessment/Significant Other Questionnaires

Judy Elkayam* Kris English†

Journal of the American Academy of Audiology/Volume 14, Number 9, 2003
How can hearing aids help?

Critical Accomplishments of Childhood

1. Perceive Speech
2. Aware of Sounds in the Environment
   
   Recognize events in the environment and adjust behavior appropriately
3. Manage Complex Environments
   
   Respond appropriately to information from multiple sources using multiple modalities
4. Learn
   
   Detect and configure new information (words, sounds)
Perceiving Speech

![Bar chart showing performance in quiet and noise conditions for NH Children, W/O Hearing Aids, and With Hearing Aids.]

Pittman et al, (in process)
Learning (identifying new words)

Pittman et al, (in process)
Learning new words

Pittman et al, (in process)
How do hearing aids work?
Styles

- Behind-the-Ear
- Receiver-in-Canal
- In-the-Ear
- In-the-Canal
- Completely-in-Canal
- Invisible-in-the-Canal

Frequency (kHz)

Hearing Level (dB)

Larger
Basic Features

Hardware
- Microphone
- Amplifier
- Receiver
- Battery
- Telecoil
- Direct Audio Input
How do hearing aids work?

- **Feedback**: The sound that reaches the ear is compared to the original sound picked up by the microphone. If the feedback matches, it is blocked to prevent any distortion.
- **Amplified sound**: The sound picked up by the microphone is amplified and sent to the speaker, which is located in the ear mold.

Components of a hearing aid:
- **Microphone**: Captures the sound.
- **Connecting tube**: Transfers the sound to the ear mold.
- **Ear mold**: Directs the amplified sound to the ear canal.
- **Ear hook**: Secures the hearing aid in place.
- **Volume control**: Adjusts the volume level.
- **On/off switch**: Turns the hearing aid on or off.
- **Battery compartment**: Stores the battery that powers the hearing aid.
Advanced Features

• Feedback Suppression
• Amplitude Compression
• Frequency Compression
• Noise Management
  Directional microphones
  Digital noise reduction
• Multiple Memories
• Remote Control

Black: features that are set by the audiologist
Blue: features that can be controlled by the child
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Hearing Aid Styles for Children

Behind-the-ear hearing aids
Stand up to wear and tear
Tougher than other styles.
They last years longer.

Accommodate Growth
Ear molds can be replaced inexpensively as the child grows.
3-4 in the first year
1-2 thereafter
Rule of thumb: when your child grows out of his shoes he’s ready for new earmolds too.
Hearing Aid Features for Children

Behind-the-ear hearing aids
  Allow for Connectivity
    Telephone
    FM system in the classroom
    Personal audio device

Lifetime: about 5 years
  When it’s time to replace aids you’ll want to ask yourself, “Will my child still like these aids 5 years from now?”
Hearing Aids for Infants and young children (0-7yrs)

Fun and colorful is great.
Children can choose the color of their earmolds.
Hearing aids for children (7-11yrs)

Become aware of the differences between themselves and others. Smaller devices and earmolds in neutral colors might be good.
Hearing Aids for Adolescents (12+ yrs)

Life becomes complicated
  Worry about losing expensive aids
  Tired of explaining hearing aids to strangers and friends
  At risk of discarding their hearing aids
May be ready to transition to adult products
Who’s the best person to provide hearing aids for my child?
A pediatric audiologist

Special training to work with children of all ages
  Know the hearing aid features appropriate for children
  Know how to fit and verify hearing aids
  Work with the school audiologists
A pediatric audiologist

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Hearing aid fitting –
A process of adjustment and measurement
Hearing aid fitting –
A process of adjustment and measurement
Thanks for listening!