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Hearing Aid Fitting Considerations for the Teenage Patient

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Objectives

At the end of this presentation, the learner will be able to:

• Describe the variables which impact the selection of hearing aid styles, advanced hearing aid features, and accessories for the teenage patient
• Explain the prescribed Real-gain differences for child and adult generic non-proprietary prescriptive hearing aid formulas
• Identify different hearing aid validation measures for the teenage population
Course Outline

- Hearing Aid Selection and Coupling Considerations
- Verification: Selecting Prescriptive Formulas
- Validation: Aided Measures
- Case Studies
- Questions and Answers
A quick vocabulary refresh

RITE vs. RITA

- **RITE (receiver in the ear)** - Receiver is in the ear canal and not in the case of the hearing aid. Coupled to a custom or non-custom earpiece via a thin wire.

- **RITA (receiver in the aid)** - Similar to a traditional BTE with a thin tube coupled to a custom or non-custom earpiece.
Open vs. Closed

- Any RITE or RITA hearing aid coupled to a non-custom dome (power, tulip, double, etc.) is considered an open fit.
- Any RITE or RITA hearing aid coupled to a custom earmold is considered a closed fit.

Considerations

<table>
<thead>
<tr>
<th>RITE (receiver in the ear device)</th>
<th>RITA (receiver in the aid device)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides greater high frequency gain; can be limited by receiver size</td>
<td>Provides less high frequency gain</td>
</tr>
<tr>
<td>Better suited for a more severe or progressive hearing loss</td>
<td>Better suited for a more mild hearing loss (gain limited by tubing diameter)</td>
</tr>
<tr>
<td>Clear ear canal and healthy middle ear; at risk for more manufacturer repairs.</td>
<td>Can better tolerate moisture/cerumen in the ear canal; less repairs.</td>
</tr>
<tr>
<td>Larger ear canal volume needed, especially when fitting a power receiver</td>
<td>Accommodates any size ear canal volume</td>
</tr>
<tr>
<td></td>
<td>Convertible and can be fitted with a standard tube/earmold as needed</td>
</tr>
</tbody>
</table>
Considerations

<table>
<thead>
<tr>
<th>Open (non-custom)</th>
<th>Closed (custom)</th>
</tr>
</thead>
<tbody>
<tr>
<td>More concerns re: feedback; may be better suited for milder hearing losses</td>
<td>More max stable gain before feedback; better suited for more severe hearing losses</td>
</tr>
<tr>
<td>Comfort</td>
<td>Comfort</td>
</tr>
<tr>
<td>May be more cosmetically appealing</td>
<td>Better retention</td>
</tr>
<tr>
<td>Reduce the feeling of occlusion</td>
<td></td>
</tr>
</tbody>
</table>

Earmold Acoustics/Occlusion Effect (OE)

- If the severity of the hearing loss requires an earmold for adequate gain and feedback control consider:
  - Altering your vent size
    - Be sure your vent diameter corresponds well to their threshold at 500 Hz
    - Widening the vent results in less acoustic mass and reduces the feeling of the OE
      - Acoustic mass is directly proportional to the length of the vent
  - Lengthening the canal of the earmold (beyond the second bend)
Earmold acoustics

<table>
<thead>
<tr>
<th>Degree of HL at 500 Hz (dB HL)</th>
<th>Recommended vent diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20 dB</td>
<td>open</td>
</tr>
<tr>
<td>20-29 dB</td>
<td>3-4 mm</td>
</tr>
<tr>
<td>30-39 dB</td>
<td>2-3 mm</td>
</tr>
<tr>
<td>40-49 dB</td>
<td>1-2 mm</td>
</tr>
<tr>
<td>50-60 dB</td>
<td>0.5-1 mm</td>
</tr>
</tbody>
</table>

Advanced hearing aid features

- **Directional Microphones (DM)**
  - Appropriate counseling on the use and benefit of DMs\(^1\)
    - Teenagers should be able to position themselves to best use their directional microphones
  - Adaptive vs. fixed\(^2\)
    - True benefit is noticed in discrete noise environments
  - Degree of HL considerations\(^3\)
    - Patients with moderate-severe HL prefer omnidirectional
    - Patients with a milder HL prefer DMs

---
\(^1\) Ricketts & Mueller 2000
\(^2\) Kuk et al 2005
\(^3\) Gwenikow 2009
Advanced hearing aid features

• **Noise Reduction (NR)**
  • Provides no speech intelligibility benefit, but has no detrimental effect either
  • Eases comfort for listeners
    • Less noise annoyance and higher tolerance of noisy situations
  • Decreases listening effort

Accessory Considerations

• **Bluetooth compatibility**
  • Technology is a huge part of a teenager’s every day world
  • Don’t forget to talk about streaming accessories during your selection/fitting process

• **Plans for higher education?**
  • Most college settings don’t support the use of an FM systems
    • Telecoil
    • Mini-mic/Roger pen may be more appropriate
      • Requires patient advocacy
Verification: Selecting Prescriptive Formulas

Why use hearing aid prescriptions?

• Threshold based procedures use information from the audiogram to assist in configuration of hearing aid settings

• Appropriate gain and output can be selected for the average patient based upon audiometric characteristics (Mueller, 2005)

• Prescriptions focus on frequency responses and compression levels that are optimal for the typical patient (Mueller, 2005)
Why use hearing aid prescriptions? (cont’d)

• Evidence based guidelines recommend the initial selection of target gain for multiple input levels (soft, moderate, loud inputs) and MPO for children (AAA Clinical Practice Guidelines Pediatric Amplification, 2013)

• Professional organizations (AAA, 2013 & ASHA, 1998) state that probe microphone (Real-ear) measures are the primary method for verifying the performance of hearing aids

What are the goals of hearing aid prescriptive formulas?

• These formulas are designed to optimize the perception of speech based upon a theoretically driven rationale

• Find parameter values that optimize the speech intelligibility index (SII)

• Prescribed gain values are constrained to a loudness growth model in which individuals with hearing loss do not perceive loudness greater than that of an individual with normal hearing given the same input
What’s the Speech Intelligibility Index (SII)?

- It is a metric that reflects the audibility of the long-term speech spectrum, such that frequency ranges that are more critical for speech are weighted more heavily than ranges that are less important (French and Steinberg, 1947; Kryter, 1962)
- The frequency spectrum between 100-9500 Hz is divided into speech bands by octaves, 1/3 octaves, or critical bands (ANSI, 2007)

SII (cont’d)

- The SII ranges from zero (no audibility of the speech spectrum) to one (full audibility of the speech spectrum)
- It can also be expressed as a percentage from 0-100%
- The value is calculated based upon the audibility function and the frequency band importance function
SII cont’d

• It can be used to predict the proportion of correct items on a Word Recognition task when used with a correct transfer function
• In children greater SII was associated with more accurate Word Recognition, non-word repetition, and larger receptive vocabulary
• It can be difficult to predict Word Recognition scores based upon SII scores as hearing loss and development status impact word recognition ability (Stiles, Bentler, & McGregor, 2012)

SII (cont’d)

• Children with an aided SII of 0.65 or higher had better receptive vocabulary outcomes than children with less audibility (Stiles, Bentler, & McGregor, 2012)
• In most cases the matching of DSL targets should result in an aided SII of 0.65 or higher for children (Stiles, Bentler, & McGregor, 2012)
• Matching of DSL targets should provide reasonable audibility
SII (cont’d)

Aided Speech Intelligibility Index (SII) Normative Values v.1.0

AudiologyOnline

11/11/2016
Verifit Real-Ear (SII)

Hearing Aid Prescriptive Formulas

• DSL m (i/o)
  • DSL Child and Adult v. 5.0
• NAL NL-2
  • NAL NL-2 Child and Adult
• CAMEQ2-HF
  • No child recommendations
The stated goals of DSL v. 5.0 (Scollie et al., 2005) include:

- Avoiding loudness discomfort
- Selecting a frequency response that meets audibility requirements
- Choosing compression targets that appropriately match technology to the user’s needs
- Accommodating the overall prescription to meet individual needs for use in various listening environments (quiet and noise)

Accommodating the different hearing requirements for listeners with congenital and acquired hearing loss (Scollie et al., 2005)

Widely used in pediatric audiology and known to significantly improve child’s speech recognition scores over unaided performance (Jenstad et al., 1999; Jenstad et al., 2000)

Clinical trials demonstrate that adults typically like less gain than prescribed by DSL and reported higher loudness ratings (Scollie et al., 2005)
NAL-NL

• Prescribed amplification is based upon (Byrne, 2001)---
  • Pure tone hearing loss such that predicted speech intelligibility (effective audibility) is maximized while minimizing contributions to loudness.
  • Overall loudness is constrained to less than that of an individual with normal hearing
  • Specific loudness is approximately equalized across the frequencies of 500-4000 Hz
  • Will not vary gain based upon on UCLs

NAL-NL 2 (cont’d)

• Less gain than NAL-NL 1 for adults but maintained comparable speech intelligibility (Johnson and Dillon, 2011)
• Larger compression ratios for children and adults with mild and moderate hearing losses (Gitte, K., Dillon, H., Carter, L, & O’Brien, 2012)
• Patient specific gain adaptations
  • Age
  • Hearing aid experience
  • Gender
  • Tonality of language
Hearing Aid Prescriptions Children

- Developmental psychoacoustics studies have demonstrated that the auditory and phonologic system do not mature until approximately 12 years of age (Wightman and Allen, 1992; Allen and Wightman, 1994; Allen and Bond, 1997; Allen et al., 1998)

- Children hearing aid users preferred listening levels (PLL) were 7 dB higher than adult hearing aid users (Scollie et al., 2005)

- The study found children with lower language scores needed a higher signal-to-noise ratio to correctly repeat sentences in noise than did children with higher (more mature) language scores (Gravel et al. 1999)

Analysis of Gain Differences Across Frequencies for Different Hearing Aid Prescriptions
Variations in gain across frequencies

- Selected six SNHL of differing configurations along with a mixed and conductive hearing loss (Byrne, 2001; Johnson & Dillon, 2011)
- Placed thresholds into the Audioscan and charted input levels for soft, medium, and loud inputs
- Examined gain differences between DSL C, DSL A, and NAL NL-2 Adult for the various hearing loss configurations

Configuration of Audiograms

Sensorineural HL
- Flat (f) 45 dB
- Sloping (s) 15-80 dB
- Rising (r) 50-15 dB
- Cookie Bite (cb) 15-45-15 dB
- Precipitously Sloping (ps) 5-105 dB
- Moderate to severe (ms) 40-70 dB

Conductive/Mixed HL
- Conductive (co) rising (Air 50-15 dB) with normal bone conduction
  - Average Air/Bone Gap of 25 dB
- Mixed (mi) sloping (Air 40-85 dB) with bone conduction (20-60 dB)
  - Average Air/Bone Gap of 25 dB
Sensorineural Audiograms

Sensorineural Hearing Losses

Frequency (Hz)

Sensorineural Hearing Losses

Medium Inputs 65 dB (sensorineural)

Avg Target Differences (SpeechMap 65 dB)
Sensorineural hl (medium inputs)

- The average of six sensorineural hearing losses revealed DSL C was 9 dB greater than DSL A across frequencies at 65 dB inputs. (re: DSL C NAL +12 dB)

- DSL A and NAL were in general agreement at 65 dB inputs (3.5 dB more gain for DSL A)
Soft Inputs 55 dB (sensorineural hl)

Avg Target Differences (SpeechMap 55 dB)

Flat

Flat 45 dB HL (SpeechMap 55 dB)
Sloping

Sloping HL (SpeechMap 55 dB)

Precipitously Sloping

Prec Sloping (SpeechMap 55 dB)
Sensorineural HL (soft inputs 55 dB)

- DSL C averages **10-11 dB greater** than DSL A and NAL
- DSL A and NAL in agreement (average difference 1 dB)
- NAL prescribed more gain than DSL A for 3 SNHL configurations (sloping, rising, and cookie bite)

Loud Inputs 75 dB (sensorineural hl)
Sensorineural HL (Loud inputs 75 dB)

- DSL C average was 7 dB greater than DSL A and 13 dB greater than NAL.

- DSL A and NAL averages had the largest disagreement among inputs.
  - DSL A 7dB greater than NAL at loud inputs.
Summary of SNHL findings

- DSL C prescribed **greater gain** than DSL A and NAL for all inputs (soft, medium, loud)
- DSL C prescribes 6-10 dB greater average gain across frequencies and input levels than DSL A
- DSL A and NAL are in very close agreement for soft and medium input levels (re: DSL A NAL 1-3 dB more gain)
- DSL A provides much more high frequency gain in precipitously sloping configurations than NAL at all input levels

Medium Inputs (mixed/conductive hl)

![Graph showing Avg Target Differences (SpeechMap 65 dB)]
Conductive

Conductive (SpeechMap 65 dB)

Mixed

Mixed (SpeechMap 65 dB)
Summary of Conductive HL findings

• DSL C prescribes 7-13 dB more gain across frequencies and input levels than DSL A
• DSL C and NAL gain in very close agreement for loud and medium inputs (Difference of 1 and 2 dB respectively greater gain for DSL C)
  • Re: DSL C NAL +5 dB average gain for soft inputs
• DSL A provides the least gain for purely conductive hearing losses

Summary of Mixed HL findings

• DSL C prescribes 5-9 dB greater gain across frequencies and input levels than DSL A (7-9 dB greater gain than NAL)

• DSL A and NAL in very close agreement for all input levels (difference 0-3 dB across input levels)
Current Research on Hearing Aid Prescriptions

Scollie et al. (a/b)/Ching et al. (a/b) (2010)

- DSL 4.1 v. NAL NL-1 paired comparison
- 48 Children age 6-19 (avg. age 11.6 yrs)
- Mild to moderately severe SNHL (avg. PTA 47 dB HL)
- Trial 1/2- Assigned NAL or DSL for 8 weeks
- Trial 3/4- NAL and DSL in a program slots (4 weeks)
Scollie et al. (2010a) Speech perception and loudness ratings

• The use of fitting methods, Real-Ear verification, wide range compression resulted in good speech audibility and speech sound recognition regardless of prescription.

• Speech-in-noise testing did not reveal a significant difference in prescriptions.

• Both prescriptions received a rating of much too loud for speech @ 80 dB SPL.

• Children reported more perceived comfort in noise with NAL.

Scollie et al. (2010b) Real-World Preference of DSL/NAL

• Stronger evidence for an environment specific outcome
  • Preferences vary based upon the loudness of both the signal (soft v. loud) and the environment (quiet v. noisy).

• DSL was chosen for speech in quiet or when individuals were whispering while NAL was selected for speech-in-noise and comfort in noise.
Ching et al. (2010 a)  
Mild/Moderately Severe SNHL

- DSL on average provided 10 dB higher gain than NAL (500-4000 Hz)
- Speech perception in quiet and noise was equally good for both prescriptions
- Children rated NAL better in real-world noisy situations
- More positive comments about softly spoken speech and speech from a distance for DSL
- Children needed more gain to achieve optimal audibility of soft speech than is prescribed by NAL.

Ching et al. (2010b) Intelligibility and Functional Performance

- The choice of prescriptions did not have a significant impact on performance in quiet.
- PEACH and SELF scores were 3% higher for the Noise Subscale with NAL
- DSL was more often reported as too loud or excessive for noisy situations
- Children with less significant hearing losses at 2000 Hz preferred NAL
Quar et al. (2013) Prescriptions Moderately Severe to Profound

- Sentence recognition was significantly better for DSL in quiet
- Children preferred DSL over NAL in terms of speech intelligibility
- Functional outcomes scales revealed significantly better real-world performance with DSL
- Children expressed loudness discomfort more frequently with DSL

Johnson and Dillon (2011)

- Compared gain of the major generic adult hearing prescriptions
  - NAL-NL 1
  - NAL-NL 2
  - DSL m (i/o) v. 5.0
  - CAMEQ2-HF
- Selected five SNHL of varying configurations along with a mixed and conductive hearing loss
Johnson and Dillon (2011) cont’d

- DSL and NAL-NL 2 had comparable overall loudness for average inputs for the five SNHL configurations
- NAL NL-2 and DSL v.5.0 provided comparable predicted speech intelligibility in quiet and noise
- CAMEQ2-HF and NAL NL-1 provided the most overall loudness
- CAMEQ2-HF provided the most high frequency audibility, but this audibility became less effective at improving speech intelligibility as severity of hearing loss increased

Summary of Studies (children)

- Children tended to prefer DSL for quiet situations and when attempting to understand low-level inputs (e.g. whispering, hearing from a distance)
- NAL was preferred for speech-in-noise and comfort in noise situations
- More severe hearing losses overwhelming preferred DSL
Summary of Studies (adults)

- Gain approximating NAL NL-1 formula is most preferred by adults with mild to moderately severe SNHL
- DSL v.5.0 and NAL NL-2 have comparable overall loudness and speech intelligibility for moderate level inputs
- DSL Adult gain targets tend to be louder than most adults preferred listening levels especially in the high frequencies

Clinical Implications

- Children want to understand soft speech as well as be provided solutions that work when in noisy environments
- Neither prescription prescribed sufficient compression to achieve gain reduction in noise that children prefer
- NAL could be used as an additional speech-in-noise program
- Use of digital noise reduction/directional microphones
Clinical Implications (cont’d)

• Individuals with more severe hearing losses may continue to prefer DSL Child
• DSL Child a good option for mixed/conductive hearing losses for individuals that want more gain (NAL has greater gain than DSL A)

Verification Summary

• There is no current research which addresses the selection of prescriptive strategies for adolescents and young adults
• Instead inferences must be made from current literature on prescriptive strategies for children and adults, loudness models, speech audibility studies, and normal speech/language development
Verification Summary (cont’d)

• No definitive answer on selection of prescriptive strategies
• Consider patient’s self-reporting, SII measures, aided speech scores, speech-in-noise testing, and functional outcomes measures
• Multiple programs can allow users to select the prescription that works best for them in a particular environment
Validation Battery (aided measures)

- Speech Recognition Threshold (SRT)
- Word Recognition testing (50 and 35 dB HL)
- Speech-in-noise testing
- Ling 6 sounds
- UWO Plurals Test
- Functional outcome measures (e.g. questionnaires)
Hierarchy Word Recognition Testing
(monosyllabic words)

- NU-6 (6+yrs/literature 12 yrs+)
- CID W-22 (6+yrs/literature 12 yrs+)
- PBK (5-7 yrs)
- WIPI (4-6 yrs)
- NU-CHIPS (3-5 yrs)

How many words to present?

- Variability increases when shorten lists are utilized.
  - The NU-6 list is not ordered by Word Difficulty. List 1 has 8 of the 10 most difficult words as the first 25 words.
  - If the patient missed the ten most difficult words of the entire list they would score 68%(first 25 words) and 92% (second 25 words) for their two ears or two test conditions.
NU-6 List 1– Ten Most Difficult Words

1. band
2. boat
3. pool
4. rag
5. limit
6. shout
7. sub
8. vine
9. dime
10. goose
11. whip
12. tough
13. puff
14. knee
15. sail
16. take
17. fall
18. rais
19. third
20. boss
21. gap
22. fat
23. meet
24. jar
25. door

How many words (cont’d)?

• Variability increases as number of test items decreases (Thornton and Rafin 1978)
• Largest variability for scores near 50%
• Using half-lists (25 words) reduces reliability and validity on Word Recognition testing
• Hurley and Sells (2003) developed a protocol to determine which individuals should receive a full list
NU-6 Most Difficult Word List Protocol

- Present the first ten words if the patient misses one or zero stop testing (very unlikely score is poorer than 96%)
- If the patient misses >1 word present the next 15 words
- If the patient misses three or less words after 25 words presented score is 88-100%
- If 4 or more words are missed test all 50 words

Monitored Live Voice (MLV) v. Recorded

- Most assume that MLV is quicker, easier, and more flexible
- Reliability of Word Recognition scores using MLV is reduced and can call into question interpretation between different test sessions
- Mendel and Owens (2011) found using recorded material only increased presentation level by about one minute per ear. This did not take into a consideration using ordered by difficulty list
Did this chart give you nightmares in grad school?

**SPRINT CHART for 25-WORD LISTS**

Updated Chart (Carney et al. 2007)

AudiologyOnline

Cincinnati Children's
Sentence in Noise testing

- **Quick SIN**
  - A list of sentences is presented in four talker babble @ 25, 20, 15, 10, 5, and 0 dB SNR
  - Sentences are at a high school level
  - Two lists of sentences should be presented to improve reliability

- **Hearing-in-Noise-Test (HINT/HINT-C)**
  - 13 Lists of 10 phonemically balanced sentences and noise is varied adaptively to find the listener’s threshold
  - Speech shaped noise not as challenging as other noise types (e.g. multi-talker babble)

Speech in Noise testing (cont’d)

- **BKB-SIN**
  - Sentences are on a grade one reading level and developed for children with hearing loss
  - 18 list pairs- 10 sentences starting at +21 dB SNR and decreasing by 3 dB with each presentation
  - First sentence has four key words and each of the final nine sentences has 3 key words
  - Determine listener’s SNR loss (SNR- 50 expressed in dB)
**BKB-SIN Norms**

<table>
<thead>
<tr>
<th>Age</th>
<th>Adult (normal)</th>
<th>5-6</th>
<th>7-10</th>
<th>11-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean SNR-50</td>
<td>-2.5</td>
<td>3.5</td>
<td>0.8</td>
<td>-0.9</td>
</tr>
<tr>
<td>SD</td>
<td>0.8</td>
<td>2.0</td>
<td>1.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

**BKB-SIN Scoring**

<table>
<thead>
<tr>
<th>SNR Loss</th>
<th>Degree of SNR Loss</th>
<th>Expected improvement with directional microphone</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-3 dB</td>
<td>Normal/near normal</td>
<td>May hear better than normals in noise</td>
</tr>
<tr>
<td>3-7 dB</td>
<td>Mild SNR Loss</td>
<td>May hear almost as well as normals in noise</td>
</tr>
<tr>
<td>7-15 dB</td>
<td>Moderate SNR Loss</td>
<td>Directional microphones help</td>
</tr>
<tr>
<td>&gt;15 dB</td>
<td>Severe SNR Loss</td>
<td>Maximum SNR improvement is needed. Consider FM System</td>
</tr>
</tbody>
</table>
Validation Summary

• Utilize a variety of measures to validate the fitting including detection, identification, and speech-in-noise measures
• Recorded speech is the most valid and allows comparison of scores while limiting variability
• Use full lists or most difficult word lists to lessen variability of scores
• Multi-talker babble best represents real-word speech-in-noise situations
Case Example #1 (LB)

- LB was a 17 y/o with a moderate/mild rising primarily conductive hearing loss
- Otosclerosis
- No history of amplification/no speech language concerns
- Unaided SII- 49% (left ear)
- Unaided soundfield testing
  - SRT- 30 dB
  - Word Recognition 50 dB- 96%
  - Word Recognition 35 dB- 48%
  - BKB-SIN-- +5.0 dB age corrected
  - /u/ Ling Sound missed @ 35 dB
Case Example #1 (LB cont’d)

- Fit with RITE and earmolds
- NAL-NL 2 prescriptive formula utilized
- Aided SII- 81% (left ear)
- Aided Testing
  - SRT- 15 dB
  - Word Recognition 50 dB- 100%
  - Word Recognition 35 dB- 92%
  - BKB-SIN- +2.0 dB age corrected
  - All Ling sounds identified @ 50 and 35 dB
Case Example #2 (NA)

• NA was a 13 y/o with normal hearing sloping to a moderate high-frequency hearing loss
• Pt had previously worn hearing aids but had not worn amplification for nearly five years
• Pt expressed hearing difficulty especially at school and concerns about her speech
• Unaided SII- 65 (left ear)
Case Example #2 (NA cont’d)

- Pt was fit with a RITA (thin-tube) with domes
- DSL child was selected for this patient as high-frequency audibility was the primary concern
- Custom earmolds were made if feedback impacted matching prescriptive targets
- A good match to prescriptive targets was achieved and no audible feedback with domes
- Aided SII (65 dB input)- 89 (left ear)
Case Example #3 (AB)

- AB was a 14 y/o with normal hearing through 2000 Hz precipitously sloping to a severe sensorineural hearing loss
- Pt was initially referred due to a failed hearing screening at school
- No academic/speech language concerns
- Unaided UWO Plurals– 60% (18/30)
- Unaided SII
  - Rt ear- 81
  - Lt ear- 77
Case Example #3 (AB cont’d)

• Pt was fit with RITE and domes
• DSL Adult was utilized because it likely an acquired hearing loss
• Aided SII- Rt ear- 87  Lt ear- 85
• Validation revealed good benefit with selected prescriptive formula
  • Aided SRT- 15 dB
  • Aided Word Recognition 50 dB- 100%
  • Aided Word Recognition 35 dB- 92%
  • **Aided UWO Plurals- 90% (27/30)**
  • BKB-SIN- -1.1 dB age corrected
  • All Ling sounds identified @ 50 and 35 dB

Summary

• Consider the teenage hearing aid user’s personality, maturity, and acoustic characteristics when selecting amplification
• DSL Child provides the most gain of the generic non-proprietary prescriptive hearing aid formulas
• NAL NL-2 and DSL Adult in relative agreement for average input levels
• A variety of measures are available to validate the hearing aid fitting
Questions?

References


References (cont’d)


