AudiologyOnline

Guideline for Audiologic Management of the Adult Patient

Michael Valente, PhD

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Introduction and Background

Task Force Members

In 2003, Angela Loavenbruck, then President of the American Academy of Audiology (AAA), asked the author to consider chairing a new Task Force whose goal was to develop a national guideline for fitting hearing aids to adults. At that time, AAA would soon release a guideline for fitting hearing aids to children, and AAA felt a separate guideline was needed for adults. For the adult population, the American Speech-Language-Hearing Association (ASHA) maintained the most recent national guideline that was released in 1998, and Angela felt a new guideline was necessary because a) the AAA guideline for children was about to be published; b) as the national organization for audiologists, AAA needed to formulate its own guideline; and c) numerous advances have been made in technology since the ASHA guideline was published. Angela informed the author that the current Task Force members included Harvey Abrams, Dennis Hampton, Todd Ricketts, and Robert Sweetow. Soon after assuming the chair, I asked Theresa Hnath-Chisolm, Darcy Benson, David Citron, and Helena Solodar to join. Please see Appendix A for a list of the members of the Task Force. It is important to note that of the ten members of the Task Force, five are in private practice (Darcy, David, Dennis, Angela, and Helena), one is involved in full-time research and teaching (Todd) and the others (Harvey, Theresa, Robert, and I) have combined administrative, patient care, research, and teaching responsibilities. As chair, I felt it was imperative to have a significant presence of clinicians as members of the Task Force so the content of the guideline would have relevance to the clinicians who would be asked to implement its contents. What followed was a three-year journey to develop the guideline. During that journey, there were numerous hurricanes, several crashed hard drives, lost files, thousands of e-mails and phone calls, some illnesses, and two face-to-face meetings (Tampa Bay and Washington, D.C.).

Why a New Guideline?

The reader might ask, "Why a new guideline?" There are several answers to this important question. **First**, as mentioned earlier, the last guideline was published by ASHA (Valente et al., 1998). Since 1998, there have been numerous advances in hearing aid technology as well as the methods used to verify and validate hearing aid fittings. Thus, the current standard needed to be updated to accommodate these advances. **Second**, there is increased interest in other professions in using evidence-based principles (EBP) when developing a new guideline. It was felt that in order for this guideline to have relevance, it too must use EBP to reinforce its recommendations. **Third**, AAA published a pediatric guideline (2004) and felt an adult guideline was also necessary. *Fourth*, there is considerable concern regarding the manner in which hearing aids are dispensed by audiologists (Mueller, 2003; Kochkin, 2002). That is, current clinical practices implemented "in the field" may do little to differentiate how hearing aids are dispensed by audiologists and others and therefore would not be in line with AAA's goal for professional autonomy.

Goals for Developing the Guideline

After recruiting the members, it was decided that a primary goal would be to use EBP to support whatever recommendations were developed. Initially, the decision to incorporate EBP into the guideline was not unanimously supported by the Chair and several members of the committee. Initially, the Chair felt the Task Force would make a major contribution by taking the current guideline and updating its contents. Harvey and Theresa, however, very diplomatically argued that using EBP to support guideline recommendations would be even a greater contribution to our profession. Because using EBP to support guideline recommendations had never been done in past or current Audiology-related guidelines, Harvey and Theresa persisted that the final guideline must be supported using EBP. Also, other than Harvey and Theresa, few members of the Task Force were exposed or knowledgeable about implementing EBP. To become more knowledgeable, each member was provided Law's (2002) textbook on EBP. For several weeks, little was accomplished until the members became more comfortable and knowledgeable about EBP. The author believes it fair to state that if Harvey and Theresa were not members of the Task Force, then the final version of the guideline would bear little resemblance to the version currently available on www.audiology.org and approved by the Executive Board of AAA.

A second goal was that the guideline must be **patient-centered** by incorporating a section on **auditory and non-auditory needs-assessment**. Finally, it was felt that if the **"spirit"** of the guideline (i.e., not every recommendation needs to be implemented; recommendations do not need to be implemented precisely as stated within the guideline) were followed then its implementation by audiologists would:

- Promote uniformity of care,
- Decrease variability of outcomes,
- Promote better fitting practices,
- Elevate the clinical care to our patients as well as elevate our profession,
- Provide greater patient satisfaction, and,
- Reduce the hearing aid return rate.

How does this Guideline Differ from Previous Guidelines?

include a section specifically on auditory and non-auditory needs assessment. **Second**, it is the first to use EBP to support its recommendations. Within the guideline, EPB is also used to point out areas where the evidence may not be sufficient to support implementing some recommendations of the guideline. **Finally**, it is emphasized that a guideline is not static and needs to be re-evaluated every five years to assess the need for revisions as technology and the evidence changes.

How Did the Members Organize the Guideline and Review the Evidence?

First, the group divided the guideline into five major divisions **(Introduction; Assessment; Technical Aspects of Intervention; Instruction, Orientation, Counseling and Follow-Up Audiologic Rehabilitation; Assessing Outcomes)**. These divisions follow the sequence patients typically follow when pursuing amplification. The five divisions were divided into nine sections. The numbers appearing below in parentheses indicate the number of specific recommendations for each section:

- **Assessment:** auditory assessment (0), auditory-needs assessment (3), and non-auditory needs assessment (6).
- **Technical Aspects of Intervention:** hearing aid evaluation (13), quality control (2), fitting and verification (7), and hearing assistive technology (4).
- **Instruction, Orientation, Counseling and Follow-Up Audiologic Rehabilitation:** hearing aid orientation (2), and counseling and follow-up audiologic rehabilitation (6).
- Assessing Outcomes (0)

Once the divisions and sections were identified, members within the Task Force volunteered to work on the nine sections of the guideline. Some sections may have had one member, while other sections may have had several members working on developing their material for their section. Through their work, specific recommendations were developed for most sections. The specific number of recommendations for each section ranged from zero to thirteen. **Overall, the guideline contains 43 specific recommendations.**

Then a systematic search of the literature was conducted using EBP to support each of the 43 recommendations. The search focused on seeking the best available evidence to address each recommendation and ensure maximum coverage of studies at the top of the hierarchy of study types (Levels 1-2, see Table 1). Once definitive studies providing relevant information were identified at this level, the search stopped. The search extended to studies or reports of lower quality (Levels 3-6) only if higher quality studies (Levels 1 or 2) could not be found.

Table 1. Levels of Evidence

1. Systematic reviews and meta-analysis of randomized controlled trials (RCT) or other high-quality studies
2. Well designed RCT
3. Non-randomized intervention studies
4. Cohort studies, case-control studies, cross-sectional surveys or uncontrolled experiment
5. Case report
6. Expert opinion

Table 2. Grade of Recommendation

A. Level 1- 2 with consistent conclusions.

B. Level 3- 4 studies; extrapolated evidence (generalized to a situation where it is not fully relevant from Level 1 - 2).

C. Level 5 studies of extrapolated evidence from Level 3 - 4.

D. Level 6 evidence; inconsistent or inconclusive studies of any level; any study having a high risk of bias.

After retrieving the evidence using a wide variety of methods, the members reviewed and graded the evidence using Quality of Evidence Ratings (Levels 1-6; Table 1) and Grade of the Recommendation (A-D; Table 2). In addition, it was determined if the evidence was Effective (EV) or Efficacy (EF) - based where EV is evidence measured in the "real world" and EF is evidence measured under "laboratory or ideal" conditions.

Table 3 provides an example of a **Table of Evidence** taken from the guideline. In this example, the first column shows guideline recommendation number(s). The second column states the evidence to support the recommendation. On several occasions, more than one statement was presented to support a recommendation. Also, several recommendations could be presented to support one statement. Overall, the combined Tables of Evidence contained **108 statements** to support the 43 recommendations. The third column cites the reference(s) used to support the statement of a recommendation (the number is the number of the reference cited to support the statement from the Reference section for that section of the guideline). The fourth column is the Level of the Evidence (1-6) and Grade (A-D). When reading the entire guideline, the reader will note that of the 108 statements supporting the key recommendations, 4.6%, 25.9%, 14.8%, 35.2%, 4.6%, and 14.8% were judged to have evidence at Level 1 through 6, respectively. It is clear that for most recommendations within the guideline, less than 1/3 were judged as Level 1-2. **This finding should be a major concern because this suggests there may not be strong evidence to support many of the procedures audiologists typically complete**

Table 3. Example of Evidence Table

Rec.	Evidence	Source	Level	Grade	EF/EV
1	A formal self-assessment inventory/instrument test battery determines patient-specific communication needs/function and detailed hearing aid features (e.g., directional microphones).	1,2,3,4	3	B	EV
1	Test battery addresses user expectations of hearing aid use.	1,4	3	B	EV
1,2	Both cognitive and affective patient needs/goals can be assessed with the test battery.	1,2,3,4	3	B	EV
3	Test battery is proven useful in validating the patient's goals and expectations following the use of amplification.	1,2,3,4	3	B	EV

Note. See text for explanation of acronyms and numeric codes.

Organization of Each Section

Each section begins with an **Objective** that states the purpose for that particular section. This is followed by a **Background** detailing how the section fits within the guideline. The specific **Recommendations** then follow. Each section then ends with the **Table of Evidence** and **References**.

Specific Divisions and Sections of the Guideline

Introduction

Within the "Introduction," the guideline provides several statements outlining some of the essential components. **First**, services must be provided by a licensed audiologist. **Second**, the combined efforts of the audiologist, patient, significant others, and/or caregivers are essential. **Third**, assessment must be viewed as a multi-faceted process that includes assessment of auditory function to determine the extent of impairment and assessment of activity limitations, as well as participation restrictions through self-report of communication needs and performance. **Fourth**, consideration should be given to assess the typical listening environments using tools such as datalogging or self-assessment. This assessment could be useful in helping make decisions regarding hearing aid style and features. A recent example of such a self-assessment tool is the **"Characteristics of Amplification Tool (COAT)"** that was recently introduced by Cleveland Clinic and published on *Audiology Online* (Sandridge & Newman, 2006). Washington University audiologists use this two-page questionnaire daily and have found it to be very beneficial in focusing upon the perceived listening environments of the patient, level of motivation for success with amplification, expectations, style, and cost of amplification. I urge readers to pursue this very helpful tool.

Also, consideration needs to be given to how these levels of assessment interact and reinforce each other to improve quality of life (QOL) of the patient. It was felt that as a result of the multi-faceted assessment, clear and realistic individualized goals for intervention could be set.

Assessment

Auditory Assessment

This section details the various components of the auditory assessment of the patient. Some of the specific components include:

- Comprehensive case history,
- Identifying type and magnitude of hearing loss via pure-tone and speech audiometry as well as immittance audiometry (tympanometry and acoustic reflexes),
- Measuring loudness discomfort levels (LDLs)
- Otoscopic inspection and cerumen management,
- Determine need for treatment/referral to physician or need for further tests (ABR; vestibular, etc),
- Counsel patient, family, caregiver on the results and recommendations,
- Assess candidacy and motivation toward amplification,
- Determine medical clearance as determined by FDA (1977).

Auditory Needs Assessment

This section details procedures to develop patient-specific communication needs. This includes providing **realistic expectations** and creating **patient-specific fitting goals** as the **initial stage** of the "validation" process. The importance of providing realistic expectations becomes increasingly more important as one reads the advertisements appearing in the local media. For example, the author lives in a major city where one major newspaper contains advertisements for hearing aids on a daily basis. One advertisement suggested an available hearing aid could "control the noise of 65,000 screaming football fans." Another advertisement used an excellent article on dead hair cells published in the *Journal of the American Academy of Audiology (JAAA)* as support that their hearing aid had the ability to "bypass dead cells" to improve speech understanding. It should be easy for the reader to see how advertisements such as these, and others, will create an atmosphere of unrealistic expectations and force a dispensing audiologist to dismiss these claims and provide his/her patient with more realistic expectations.

- Directional microphones
- Direct auditory input (DAI)
- Noise management
- Frequency Modulation (FM) devices

As part of the needs assessment, the patient may respond to a variety of questionnaires. Examples of such validation questionnaires may include:

- **Abbreviated Profile of Hearing Aid Benefit (APHAB)** (Cox and Alexander, 1995).
- **Client Oriented Scale of Improvement (COSI)** (Dillon et al., 1997).
- **Hearing Handicap Inventory for the Elderly (HHIE)** (Ventry and Weinstein, 1982).
- **Expected Consequence of Hearing Aid Ownership (ECHO)** (Cox and Alexander, 2000)
- **Glasgow Hearing aid Benefit Profile (GHABP)** (Gatehouse, 2000)
- **International Outcome Inventory-Hearing** (Cox et al., 2003)

Non-Auditory Needs Assessment

This section deals with the non-auditory aspects of the patient that may interact to determine success with amplification. These aspects may include cognition, patient expectations, motivation, willingness to take risks, assertiveness, manual dexterity, visual acuity, prior experience with amplification, general health, tinnitus, occupational demands, and the presence of support systems.

Technical Aspects of Intervention

Hearing Aid Selection

This section relates to the decisions needed to select the appropriate hearing aid(s) and hearing assistive technology (HAT) based on the results of the hearing assessment and the auditory and non-auditory needs assessment. The outcome of this process is an attempt to match the appropriate style and features to the patient. These decisions may include:

- Style (CIC ; ITE ; ITC ; BTE)
- Occlusion management
- Volume control
- Bilateral versus monaural
- Direct auditory input (DAI); telecoil (programmable)
- Type of signal processing
- Capacity for frequency shaping (number of bands)
- Selection of output and SSPL90
- Number of memories
- Number of channels of compression and feedback management
- Digital noise reduction
- Switchable or adaptive directional/omnidirectional microphones
- Frequency compression or transposition
- Bone anchored devices
- CROS/BICROS/Transcranial CROS

Quality Control

The objective of this section is to ensure that hearing aids meet reasonable and expected quality standards prior to scheduling for hearing aid fitting and verification. A small percentage of instruments and earmolds may be defective upon receipt. In addition, hearing aids and earmolds may arrive in good working order, but with the incorrect configuration/features. Quality control (QC) measures are necessary to limit patient and clinician frustration and inconvenience. Examples of QC may be:

- Verification of directional microphone performance using either coupler or real-ear measurement

- Electroacoustic analysis of new and repaired aids to ensure compliance to national standards and clinician satisfaction
- Electroacoustic analysis at final fit to provide base for measures at semi-annual or annual checks
- Verification of features to include confirmation of earmold/shell style, vent, color, type, processing (memories, automatic switches, etc.) and mechanical (directional microphones, t-coil, integrated FM, etc) features,
- Listening check for features not verifiable through physical examination or electroacoustic analysis. These may include operation of the volume control, directional microphones, FM, t-coil, etc.

Fitting and Verification

The objective of this section is to assure the fitting and verification procedure is viewed as a process that culminates in the optimal fitting. Verification procedures also serve as a benchmark against which future hearing aid changes can be compared.

Verification procedures should be based on validated hearing aid fitting rationales and are expected to yield a comfortable fit of hearing aids including all desired features. In the fitting and verification process a signal must be presented to the hearing aid whether in the test chamber or with a probe microphone in the real ear. The clinician must select signals ensuring accurate verification of prescriptive methods to target, which are based on speech inputs and therefore a speech-like signal should be used. Examples of aspects of the fitting requiring verification may include:

- A comfortable physical fit
- Gain/output using validated fitting rationales.
- Correction for monaural/bilateral conditions
- Correction for type of HL
- RESR90 measurement below the individually measured LDL using pure-tone signal, when possible.
- Aided sound-field thresholds for audibility of soft sounds.
- Function of features such as telecoil and directional microphone
- Absent or minimal occlusion effect

Hearing Assistive Technology (HAT)

The objective of this section is to promote the use of Hearing Assistive Technology (HAT) to ensure communication needs are met as hearing aids alone may not address all the needs of the patient. HATs can either be used alone or combined with hearing aids to supplement performance in difficult listening conditions. HATs can address four communication needs:

1. Face-to-face communication.
2. Broadcast and other electronic media.
3. Telephone conversation.
4. Sensitivity to alerting signals and environmental stimuli.

HAT is available as personal systems or large area listening systems. The most common HATs are:

a. Personal FM system

b. Infrared

c. Induction loop

d. Hardwired systems

e. Telephone amplifier, telecoil, TDD (telecommunication device for the deaf)

f. Situation specific devices (e.g., television)

g. Alerting devices

Instruction, Orientation, Counseling and Follow-Up Audiologic Rehabilitation

Hearing Aid Orientation

The objective of this section is to ensure patients obtain the desired benefits from amplification as easily and efficiently as possible. The hearing aid orientation process begins with the initial hearing aid fitting and may continue over several visits. Hearing aid orientation is complete only when all appropriate information has been provided and the patient (or family member/caregiver) is competent to handle the instruments or declines further post-fitting care.

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