CHAPTER TWENTY-NINE

Guideline for Audiologic Management of the Adult Patient

Michael Valente

Introduction

In 2003, Angela Loavenbruck asked the author to consider chairing a new task force to develop a guideline for fitting hearing aids to adults. The American Academy of Audiology (AAA) would soon be releasing a guideline for children and felt a separate guideline was needed for adults. Loavenbruck informed me 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. Of the ten members, five are in private practice (Benson, Citron, Hampton, Loavenbruck, and Solodar), one is full-time research and teaching (Ricketts) and the others (Abrams, Hnath-Chisolm, Sweetow, and myself) have administrative, patient care, research, and teaching responsibilities. As chair, I felt it was imperative to have a significant presence of clinicians as members so the guideline would have relevance for 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 illness, and two face-to-face meetings.

Why a New Guideline?

The reader might ask, “Why a new guideline?” There are several answers. First, the last guideline was published by the American Speech-Language and Hearing Association (ASHA) (Valente, Bentler, Seewald, Trine and Van Vliet 1998). Since 1998 there have been significant advances in hearing aid technology and methods to verify and validate fittings. Second, there is increased interest in using evidence-based principles (EBP) when developing a new guideline (Cox 2004). Third, AAA published a pediatric guideline (AAA 2004) and AAA felt an adult guideline was necessary. Fourth, there is some concern regarding the manner in which hearing aids are dispensed (Mueller 2003; Kochkin 2003) and that current clinical practices may not be in line with AAA’s goal for professional autonomy because these current clinical practices may do little to differentiate how hearing aids are dispensed by audiologists and others.

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. It was felt that using EBP to support guideline recommendations would be a major contribution to our profession because its use was never present in past or current guidelines. Abrams and Hnath-Chisolm persisted that the final guideline must be supported using EBP. Besides Abrams and Hnath-Chisolm, few members were exposed to 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.

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 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?

The content and organization of this guideline differs significantly from previously published guidelines in several ways. First, it is the first to include a section specifically on auditory and non-auditory needs assessment. Second, it is the first to use EBP to support its recommendations. EBP also is used to point out areas where the evidence may not be sufficient to support implementing some recommendations of the guideline. Finally, it is pointed out 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 then divided into the nine sections and the numbers appearing below in parenthesis indicate the number of key 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 volunteered to work on sections of the guideline. Through their work, key recommendations were developed for each section. The specific recommendations for each section ranged from none to thirteen. **Overall, the guideline contains 43 specific recommendations.**

Then a systematic search of the literature was conducted using EBP for each of the 43 recommendations. The search focused on the best available evidence to address each recommendation and ensured 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, the search stopped. The search extended to studies or reports of lower quality (Levels 3–6) only if higher quality studies could not be found.

After retrieving the evidence, the members reviewed and graded the evidence using **Quality of Evi**

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**Table 1. Level of Evidence**

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
<td>Systematic reviews and meta-analysis of randomized controlled trials (RCT) or other high-quality studies</td>
</tr>
<tr>
<td>2</td>
<td>Well designed RCT</td>
</tr>
<tr>
<td>3</td>
<td>Non-randomized intervention studies</td>
</tr>
<tr>
<td>4</td>
<td>Cohort studies, case-control studies, cross-sectional surveys or uncontrolled experiment</td>
</tr>
<tr>
<td>5</td>
<td>Case report</td>
</tr>
<tr>
<td>6</td>
<td>Expert opinion</td>
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</tbody>
</table>
Evidence Ratings (Levels 1–6; 1) and Grade of the Recommendation (A–D; 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 the number of the recommendation (1 to 3). The second column states the evidence to support the recommendation. On occasion, more than one statement could be presented for a recommendation. Also, several recommendations could be presented to support one statement. Overall, the Tables of Evidence contained 108 statements to support the 43 recommendations. The third column cites the reference(s) used to support the statement of support for a recommendation. 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 evidence, 4.6%, 25.9%, 14.8%, 35.2%, 4.6%, and 14.8% were judged as Level 1 through 6, respectively. For most recommendations within the guideline, less than 1/3 were judged as Level 1–2. This finding should be of some concern to audiologists. It points to the need for research to

<table>
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<tr>
<th>Rec</th>
<th>Evidence</th>
<th>Source</th>
<th>Level</th>
<th>Grade</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Test battery addresses user expectations of hearing aid use.</td>
<td>Dillon et al. 1997, Cox and Alexander 2000</td>
<td>3</td>
<td>B</td>
<td>EV</td>
</tr>
<tr>
<td>1,2</td>
<td>Both cognitive and affective patient needs/goals can be assessed with the test battery.</td>
<td>Ventry and Weinstein 1982, Cox and Alexander 1995, Dillon et al. 1997, Cox and Alexander 2000</td>
<td>3</td>
<td>B</td>
<td>EV</td>
</tr>
<tr>
<td>3</td>
<td>Test battery is proven useful in validating the patient’s goals and expectations following the use of amplification.</td>
<td>Ventry and Weinstein 1982, Cox and Alexander 1995, Dillon et al. 1997, Cox and Alexander 2000</td>
<td>3</td>
<td>B</td>
<td>EV</td>
</tr>
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</table>
justifies how audiologists provide services relative to the sections covered in this guideline.

**Organization of Each Section**

Each section begins with an *Objective* stating the purpose for the section. This is followed by a *Background* detailing how the section fits within the guideline. The specific *Recommendations* then follow. Each section then ended 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 and participation restrictions through self-report of communication need and performance. Fourth, consideration should be given to assess the typical listening environments using such tools as datalogging. Also, there should be consideration of how these levels of assessment interact and reinforce each other to improve quality of life (QOL). 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 may include:

- Complete comprehensive case history,
- Identify type and magnitude of hearing loss via pure-tone and speech audiometry as well as immittance measures,
- Measuring loudness discomfort levels (LDLs)
- Inspect the ear canal and eardrum via otoscopy (including cerumen management),
- Determine the need for treatment/referral to physician or need for further tests (ABR; vestibular, etc),
- Counsel the 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. Also involved in this process is determining which hearing aid “features” may be appropriate for the patient. These features may include:

- 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, James, and Ginis 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, Alexander and Beyer 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, 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 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 on 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:

- Directional microphones performance verification,
- Electroacoustic analysis of new and repaired aids to assure compliance to standards and repairs are completed to clinician satisfaction,
- Electroacoustic analysis at final fit to provide a baseline comparison for measures at semi-annual or annual checks,
- Earmold/shell style, vent, color, type, processing (memories, automatic switches, etc.) and mechanical (directional microphones, t-coil, integrated FM, etc.) features verification,

**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 for which the targets are based on speech inputs and therefore a speech-like signal should be used. Examples of aspects of the fitting requiring verification may include:

- Verify that the physical fit is comfortable,
- Verify gain/output using validated fitting rationales,
- Correct for monaural/bilateral fitting,
- Correct for type of hearing loss,
- Verify that the measured RESR90 is below the individual LDL,
- Verify aided sound-field thresholds for audibility of soft sounds,
- Verify function of features such as telecoil and directional microphone,
- Verify that the occlusion effect is absent or minimal.

**Hearing Assistive Technology (HAT)**

The objective of this section is to promote the use Hearing Assistive Technology (HAT) to ensure communication needs are met because 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  
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.

Orientation information can be device or patient-related. Device-related is specifically about the care and use of hearing instruments. Patient-related includes helping the patient understand the nature of hearing loss, adjusting to amplification, having realistic expectations of the benefits and limitations of amplification, and taking advantage of other sources of help (such as better communication strategies, HATs and speechreading). Topics included in orientation may include:

- Use and care of the hearing aids such as instrument features; insertion/removal; battery use; care and cleaning; comfort; feedback, use with the telephone; and warranty.
- Wearing schedule; goals and expectations; adjustment to amplification; speechreading; and post-fitting.

**Counseling and Follow-Up Audiologic Rehabilitation**

The objective of this section is to provide patients who have received hearing aids a comprehensive understanding concerning the effects of hearing impairment and the implementation of strategies to mitigate those effects. The members view the fitting of hearing aids as the beginning of the treatment process. Successful management requires comprehensive counseling to help the patient adjust to his/her hearing aids and instruct the patient and the primary communication partners, and to develop appropriate communication strategies to maximize and augment the assistance received from the hearing aids. Counseling is often required to help the patient learn new strategies to help ensure success. In addition, emotional factors concerning hearing loss must be addressed in a comprehensive audiologic rehabilitation program. Counseling can be provided on an individual basis, but is often delivered in small group settings.

Topics addressed in these sessions should include:

- Anatomy and physiology of the hearing process
- Understanding the audiogram
- Problems associated with understanding speech in noise
- Appropriate/inappropriate communication behaviors
- Communication strategies
- Listening and repair strategies
- Ways in which to control the environment
- Assertiveness training
- Realistic expectations from amplification
- Stress management
- Speechreading skills
- HATs
- Community resources

**Assessing Outcomes**

This is the part of the patient management process that assesses how well intervention reduced activity limitations, decreased participation restrictions, and improved quality of life and is referred to as validation. Validating the choices made as part of the assessment, selection, and fitting processes, to the extent that the patient’s needs have been met, is accomplished through the administration of outcome measures. Many outcome measures, described in the auditory and non-auditory needs assessment section, have been developed to assess the impact of a hearing impairment on the individual in the areas of communication functioning, activity limitation and participation restrictions.

As critical as it is to measure the benefits of hearing aid intervention at the level of the patient, the measurement of treatment outcomes is assuming greater importance on the national health care stage. Through the routine use of
clinically applied outcome measures and carefully controlled clinical trials, audiologists can build a foundation for evidence-based clinical practice guidelines. Clinical practice guidelines, in turn, minimize variability in outcome, maximize treatment efficacy, reduce risks, decrease waste, improve patient satisfaction, and should elevate the profession of Audiology among third party payers, other health care providers, and, most importantly, current and future patients. As audiologists continue to compete in the health care marketplace, they must demonstrate that treatments reduce activity limitations, decrease participation restrictions, and improve health-related quality of life. Only by measuring the outcomes of treatment can audiologists be assured that interventions make a difference and patients have benefited from their care.

References