Society for Audiology Professionals (Singapore)

Management of Adult Hearing Loss with Hearing Amplifications

Best Practice Guidelines

February 2019

BEST PRACTICE GUIDELINES FOR THE MANAGEMENT OF ADULT HEARING LOSS WITH HEARING AMPLIFICATIONS

Objective:

The purpose of this document is to formalize and standardize the delivery of adult hearing loss management services in Singapore to decrease variability in service delivery and increase the probability for patient satisfaction. It is not meant as a strict dictation of how services must be delivered, but rather a set of guidelines and recommended clinical practices for the management of hearing loss and its related disability in the adult population.

This document has been assembled by the Society of Audiology Professionals Singapore (SAPS) Committee for Management of Adult Hearing Loss and will be reviewed by the SAPS body and modified accordingly. The information in this document is heavily influenced by previous best practices guidelines from other countries (Audiology Australia, 2013; College of Audiologists and Speech-Language Pathologists of Ontario, 2008; Ferguson et al., 2016; Valente et al., 2006), primarily the Guidelines for the Audiologic Management of Adult Hearing Impairment (Valente et al., 2006). Because Audiologists are the qualified providers of audiologic management services, this document has been crafted to set the standard for the delivery of those services by Audiologists.

It is important to note that this document applies to management of hearing loss only; it does not include a thorough description of best practices for audiologic assessment. A future SAPS committee will be working on Best Practice Guidelines for Adult Audiologic Assessment. Therefore, it can be assumed in this document that all appropriate patient histories, diagnostic results and medical issues have been completed and reviewed and the patient has been cleared by a physician for audiologic management.

Table of Contents

HEARING AID EVALUATION (HAE)

1) Otoscopy:

The external ear and external auditory canal should be inspected visually using an otoscope in order to determine the following:

- Presence of any active disease process that warrants a medical referral.
- Presence of adequate wax to prevent the taking of an ear impression or insertion of an ear mould or ear tip.
- Presence of mastoid cavity or other ear canal abnormality that requires special care in the taking of an ear impression or insertion of an ear mould or ear tip.

2) Informal auditory needs assessment (patient interview):

It is important to note the difference between a patient interview for the purpose of intervention for hearing loss and a case history for the purpose of diagnosing hearing loss. As the diagnosis has already been established and medical clearance obtained by ENT doctor, the patient should now be interviewed for the purpose of establishing patient-specific communication needs and realistic expectations. Information to be obtained should include, but is not limited to how the hearing loss affects every-day life, how accepting the patient is of the hearing loss, how open the patient is to considering amplification devices and what specific concerns s/he has regarding the rehabilitative process. It is helpful to include the patient and family member(s)/caregiver(s) in this process, as the impact of hearing loss is far reaching.

3) Formal auditory needs assessment (questionnaires):

Questionnaires can be used to determine the extent of disability caused by the hearing loss, the effect on quality of life, patient efficacy in managing the hearing loss and patient expectations for use of amplification. Questionnaires vary in format and length, as well as information obtained. Some can be used pre and post-fitting to both establish amplification needs as well as document patient outcomes. Some questionnaires are more patient-specific and some are more generalized across populations. The questionnaire used should be chosen by the Audiologist based on the overall needs of the clinic and/or the needs of each individual patient.

Information discovered during auditory needs assessment can be used to determine hearing aid candidacy, select appropriate amplification devices, select appropriate amplification features and determine the need for additional support such as hearing assistive technology (HAT) and directive aural rehabilitation. This information can also be used to devise a list of patient-

specific management goals and/or listening needs, which can be used in the creation of a management plan.

Some commonly used examples:

- Client Oriented Scale Of Improvement (COSI)
- Hearing Handicap Inventory for Adults Screening Version (HHIA-S)
- Hearing Handicap Inventory for the Elderly Screening Version (HHIE-S)
- Abbreviated Profile Of Hearing Aid Benefit (APHAB)

4) Non-auditory needs assessment:

Non-auditory factors can impact a patient's communication deficits and prognosis with amplification. These factors may include cognitive decline, personality characteristics (expectations, motivation, risk aversion, assertiveness), additional sensory impairment (manual dexterity, visual acuity), prior experience with amplification, general health, other otologic conditions (tinnitus), environmental characteristics (occupational demands and recreational habits); patient support systems and financial conditions. Questions asked during the patient interview should be tailored to address these issues. The Audiologist should have a list of professionals trained to deal with the above-mentioned issues to whom patients might be referred.

5) Hearing aid selection:

Based on the patient's auditory and non-auditory needs assessments, Audiologists should prescribe appropriate hearing aid(s) and HAT. This includes matching appropriate hearing aid style and features with the patient's needs. Electroacoustic and non-electroacoustic characteristics will need to be considered.

- Electroacoustic Characteristics
  - Frequency-gain shaping
  - Compression type and settings
  - Number of channels/bands
  - Receiver bandwidth (frequency range)
  - Maximum output sound pressure level
  - Directional/omnidirectional microphones
  - Multiple programmes
  - Tinnitus signals
  - Digital noise reduction
  - Digital feedback suppression/cancellation
  - Telecoil/Direct audio input (DAI)
  - Other special technologies/applications, such as frequency compression/transposition
- Non-electroacoustic Characteristics
  - Style
    - Receiver-in-canal (RIC)/Receiver-in-the-ear (RITE)

        - Behind-the-ear (BTE)
        - In-the-ear (ITE)
        - In-the-canal (ITC)
        - Completely-in-canal (CIC)
        - Invisible-in-canal (IIC)
        - Contralateral routing of signals (CROS)
        - Bilateral CROS (BICROS)
        - Bone conduction (BC) hearing aids
        - Bone anchored hearing aids (BAHA) and cochlear implants (CI) will not be specifically addressed in this document, as they require specific collaboration between the Audiologist, otolaryngologist/otologist and aural rehabilitation specialist.
    - Bilateral versus unilateral fitting
    - Volume control preference
    - Ear mould/shell/dome selection
    - Number, size and function of user controls
    - Compatibility with HAT, direct audio input and wireless accessories/compatibility of these features with the patient's mobile phone

6) Hearing aid trial:

It is important for the patient and family member/caregiver to gain a realistic understanding of all aspects of hearing aid use. A live trial with a hearing aid or hearing aids that have been deemed appropriate based on the individual patient's needs is recommended. This trial can be conducted in the office during the hearing aid evaluation appointment and does not need to include sending the hearing aid(s) home with the patient; however the Audiologist can choose to do so when deemed appropriate. The trial should include, but is not limited to the following considerations:

- A trial should include at least one make/model of hearing aid. Any device, regardless of manufacturer or technology level can be chosen for the trial, as long as it has been deemed appropriate for the patient based on the auditory and non-auditory needs assessments, as mentioned above.
- A trial can consist of informal or formal listening tasks through the devices in environments that are quiet and/or exhibit background noise. It is recommended that the patient have the opportunity to experience more than one listening environment during the course of the trial.
- The features of the hearing aid(s) should also be in alignment with needs assessment results. Functionality of these features can be demonstrated during the trial.
- Hearing aid accessories and HAT that are appropriate for the patient and the hearing aid(s) may also be demonstrated.
- The patient and family member/caregiver should be educated regarding realistic expectations for amplification and projected adjustment periods and considerations.

- The patient and family member/caregiver should be educated regarding the cost of the hearing aid and what is included in the cost (such as accessories, follow up visits and warranty periods)
- The Audiologist should review the outcome of the trial with the patient and family member/caregiver and document subjective benefits and concerns. These concerns should be discussed with the patient and family member/caregiver and possible strategies for improvement presented prior to the patient making any purchasing decisions.
- If the patient is unable to make a decision or is unsatisfied with the hearing aid, the Audiologist should proceed with another hearing aid trial and/or provide evidence to support the choice offered. This second trial may be performed during the same appointment if time permits or at the subsequent visit.
- The Audiologist should offer professional guidance in recommending the appropriate hearing aid technology and compatible accessories; however the patient and family member/caregiver should have an active role in selecting specific hearing aid(s) and features, as is consistent with person-centred care.

7) Hearing aid acquisition:

Following appropriate selection of hearing aids and hearing aid trial based on the outcomes of the patient's individual needs assessment, the patient and Audiologist will come to a decision regarding the purchase of hearing aids(s) and/or HAT. Should the decision be made to proceed with the purchase of devices, the following procedures are recommended:

- Documentation of order particulars, including, but not limited to:
  - make and model of hearing aid(s) selected, including colour
  - suitable coupling device (ear mould specifications, ear tip size, tubing size, receiver size/strength)
  - any special requests or urgent timing needs
  - any accessories or HAT included in the order
- Submission of order form (hard copy or online) for hearing aid and any appropriate accessories and HAT
- Submission of order form (hard copy or online) for hearing aid coupling device
- Impression of ear canal(s) taken if needed to order an ear mould or custom hearing aid product
  - it is critical to perform otoscopy before and after each ear impression
- Review of terms and conditions of the hearing aid purchase and related costs with the patient and family member/caregiver. A purchase agreement may need to be signed at the time of purchase.

HEARING AID FITTING (HAF):

1) Quality Control:

In order to ensure that the hearing aid(s) being fitted to the patient are in proper working order and were not damaged in transit from the manufacturer, it is recommended that one or both of the following quality control methods be used prior to fitting.

- Listening check: a hearing aid stethoscope should be used to listen to the hearing aid to rule out sound quality issues such as excessive circuit noise and intermittency. Features, such as volume control and program button, should also be checked for functionality during the listening check.
- Electroacoustic evaluation: the hearing aid should be tested in a hearing instrument test box using ISO standards to compare against the manufacturer's specification sheet to verify proper functionality of the hearing aid components.

2) Preparation for validation of hearing aid fitting:

If a questionnaire of communication needs/hearing aid benefit was not administered in the HAE session, one should be administered prior to the HAF. This questionnaire will then be re-administered post-fitting as a validation measure to determine hearing aid benefit/performance/satisfaction. Some questionnaires do not require a pre-fitting administration and therefore can be used after the patient has worn the hearing aids for a specific period of time.

3) Non-auditory factors:

If non-auditory factors were identified during the HAE process, it should be determined at the HAF session how the patient is following up on these issues with other medical professionals.

4) Hearing aid fitting:

The actual act of fitting the hearing aid(s) to the patient's ear(s) should include an assessment of the quality of the acoustic and physical fits, as well as instruction regarding proper use and care of the devices.

- Acoustic fit: A validated hearing aid fitting rationale should be used for the initial programming of the hearing aid. The rationale chosen should be based on, but is not limited to patient age, gender, hearing thresholds (degree and type of loss), type of fitting (bilateral vs unilateral), type of hearing aid, language spoken and previous hearing aid experience. This same fitting rationale will be used as a target for gain and output in the verification process

- Physical fit: The hearing aid/ear mould should be assessed in the patient's ear to ensure: ease of insertion and removal; retention; patient comfort; appearance; access to external controls; the absence of audible acoustic feedback; correct vent size and acceptability of occlusion effect; correct directional microphone positioning. In-office modifications should be made as needed and/or hearing aid(s)/ear mould(s) sent back to the manufacturer if the fit is not appropriate.
- Use and care instruction: The following information should be reviewed with at least the patient and ideally in the presence of at least one family member or caregiver. Whenever possible, the patient and family member/caregiver should demonstrate their knowledge of managing the hearing aid(s). Management of the hearing aids should include, but is not limited to the following:
    - turning hearing aid on/off
    - using external controls (volume control/programme button)
    - changing batteries (size, lifespan, where to purchase, proper disposal)
    - features (programmes, telecoil, directional microphones, direct audio input)
    - insertion/removal
    - audible feedback
    - care/cleaning/dehumidification
    - telephone use
    - terms of warranty
    - insurance coverage
    - general trouble-shooting
    - who to contact if there is a problem with the hearing aid
    - use of accessories/connectivity devices
    - wearing schedule
    - hearing aid goals and realistic expectations
    - process of adjusting to amplification
    - listening strategies
    - importance of post-fitting follow-up care

5) Verification:

It is strongly recommended that at least one method of verification be employed to verify the hearing aid fitting. Verification can include probe microphone measurements or functional gain measurements. Results of verification measures should be used to make programming adjustments to the hearing aid(s) as needed.

- Probe microphone measurements (PMM): PMM can be used to measure occlusion effect, gain at multiple input levels (to determine audibility and comfort), maximum output levels-OSPL90 (to determine

tolerance) and functionality of special features. Minimally, verification of gain levels across frequencies at multiple input levels should be obtained. It would also be recommended that OSPL90 levels be obtained to ensure that the maximum output of the hearing aid does not exceed the patient's loudness tolerance level. Occlusion effect and special feature functionality can be assessed as deemed appropriate.

- Functional Gain (FG): As an alternative to PMM, FG testing can be used to measure gain values across frequencies by obtaining unaided hearing thresholds and aided hearing thresholds in a sound field (SF) environment. The unaided thresholds can then be subtracted from the aided thresholds to obtain gain values at each frequency. This information, like PMM, will take into account the changes in ear canal resonance caused by the insertion of a hearing aid or coupling device and will determine if adequate hearing aid gain is being obtained across frequencies. SF testing can also be used to measure aided thresholds of discomfort to determine if the hearing aid is violating the patient's levels of comfort. If FG testing is chosen as the preferred method of verification, it is important to remember to use effective masking in the non-test ear to prevent its involvement in the patient response.
- Please note that the committee recommends the use of PMM as the preferred method for hearing aid verification whenever possible due to the limitations of FG with non-linear hearing aids. However, if the Audiologist is unable to perform PMM due to equipment or patient-related constraints, FG is an acceptable alternative.

6) Follow-up/Management plan:

A hearing aid management plan should be established, including wearing schedule, goals and expectations. Follow-up timing and frequency should be determined based on the patient's individual needs. The follow-up schedule should be confirmed with and communicated to the patient and family member/caregiver. The patient should have a simple way of contacting his/her service provider should s/he encounter problems prior to the next scheduled appointment.

7) Documentation:

Documentation regarding the hearing aid fitting should include, but is not limited to, the following information:

- date of appointment
- make/model of device(s) fitted
- type of amplification strategy used
- tasks completed during the appointment
- patient questions/concerns and how they were addressed

- results of pre-validation measures if performed
- results of verification measures if performed including justification for deliberate departures from fitting targets
- summary of information relayed to patient and family member/caregiver
- summary of management plan/follow-up schedule
- any relevant documentation/receipts from the purchase of devices

HEARING AID FOLLOW-UP (F/U)

1) Re-evaluation of hearing aid fitting:

The physical fit of the hearing aid(s) should be re-checked to ensure continued comfort, retention, ease of insertion/removal and the absence of audible feedback. In-office modifications should be made as needed or the hearing aid(s)/ear mould(s) sent back to the manufacturer for alterations/remake to ensure proper fit.

2) Re-evaluation of hearing aid and assistive technology management:

The ability of the patient and family member/caregiver to handle the hearing aid(s) and assistive technology should be re-assessed. Hearing aid management may include insertion/removal of hearing aid(s), battery change, cleaning, maintenance, programme button usage and volume control usage. If the patient or family member/caregiver is found to be inept in any aspect of hearing aid, accessory or HAT management, the Audiologist should instruct them again until they can demonstrate competence. The Audiologist should also check with patient and caregivers regarding utilisation of accessories and hearing assistive technology.

3) Exploration of patient's hearing aid use and personal experience:

An interview with the patient and family member/caregiver should be used to ascertain information regarding recent use of the hearing aid. This should include, but is not limited to:

- hours of use per day (can be verified with data-logging)
- program and volume preferences (can be verified with data-logging)
- areas of success with the hearing aids
- areas of concern with the hearing aids
- overall perception of hearing aid benefit

4) Hearing aid verification and adjustment:

If hearing aid verification via PMM or FG testing has not been completed at the HAF appointment, verification should be carried out during the F/U appointment. Appropriate adjustments in hearing aid gain should be made using the results of these verification measures. If verification was performed during the HAF appointment but the gain was purposely set lower than the prescription targets recommendations in order to achieve patient comfort, adjustments to bring the gain closer to target may be carried out as part of the acclimatization process. Adjustments may also be made to other hearing aid features based on the patient's feedback, including but not limited to: addition/removal of programs or changes in configuration of hearing aid controls.

5) Outcomes assessment:

If a questionnaire of communication needs or hearing aid benefit was administered prior to hearing aid fitting, the questionnaire should be re-administered during the F/U appointment as a validation measure to determine hearing aid benefit/satisfaction. Questionnaires that do not require a pre-fitting administration can also be administered during the follow-up appointment. Other, non-questionnaire-based outcomes measures, such as aided speech audiometry, can also be performed; however they should not be used in place of, but rather in addition to, questionnaire-based validation. Some commonly used examples:

- Satisfaction with Amplification in Daily Life scale (SADL)
- Client Oriented Scale of Improvement (COSI)
- Hearing Aid Performance Inventory (HAPI)
- Shortened Hearing Aid Performance Inventory for the Elderly (SHAPIE)
- Spatial Hearing Questionnaire (SHQ)
- Hearing Handicap Inventory Screening Questionnaire for Adults (HHIA-S)
- Hearing Handicap Inventory for the Elderly Screening (HHIE-S)
- Abbreviated Profile Of Hearing Aid Benefit (APHAB)
- International Outcome Inventory For Hearing Aids (IOI-HA)

6) Counselling and auditory rehabilitation:

Hearing aid F/U should always include counselling for the patient and family member/caregiver in order to determine what other aural rehabilitation services and devices are needed to increase the probability of patient satisfaction. The following components should be included:

- Reviewing goals and setting realistic expectations
- Developing appropriate strategies to augment the benefit received from the hearing aids, such as:
    - appropriate listening behaviours
    - communication repair strategies
    - control of environment
    - assertiveness
- Reviewing the need for further accessories or HAT
- Recommending aural rehabilitation exercises or self-directed computer-based auditory training programs
- Advising on noise-induced hearing loss prevention where applicable

7) Recommendations for further management:

The individual hearing amplification management plan established during the HAF appointment should be reviewed and modified as needed. Long-term patients should return for annual audiological assessment to monitor the degree of hearing loss, document any significant threshold change and optimize hearing aid settings accordingly. Individual needs should also be

reviewed to determine if any changes to the long-term management plan are needed. Where appropriate, unaided and aided speech testing in quiet and noise should be performed especially to assess if current hearing aid technology may not suffice and or to refer for cochlear implantation should patient fulfils the cochlear implant criteria Individual needs should also be reviewed to determine if any changes to the long-term management plan are needed, such as (but not limited to) the acquisition of more powerful hearing aids, additional HAT, or the consideration of implantable hearing devices. Appropriate referrals to other healthcare professionals should be made as needed. These referrals may include, but are not limited to:

- Otolaryngologist/Otologist
- Speech Language Therapist/Auditory Verbal Therapist
- Neuroscience (Neurology/Psychiatry/Psychology)
- Medical Social Worker
- Primary care physician/Geriatrician

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