Standard S2.1[2021]

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The profession of audiology is committed to providing auditory and vestibular care through ethical and evidence-based clinical practices that lead to optimal patient outcomes. Standard of practice documents outline basic services that audiologists are expected to include in the provision of quality healthcare. They reflect the values and priorities of the profession, providing direction for professional practice and a framework for the evaluation of practice. Standards of practice are prepared by subject matter experts, based on available evidence, peer-reviewed and subject to periodic updating.

HEARING AID FITTING STANDARD FOR ADULT & GERIATRIC PATIENTS

1. The hearing aid selection and fitting process is based on a comprehensive, valid audiological assessment. Each step of the selection and fitting process and the rationale is documented, where appropriate. [1, 2, 3]

2. Patient communication is conducted in a clear, empathetic manner consistent with the patient's communication mode, comprehension, and their health literacy level. Patient-centered and family-centered care is provided. The patient is encouraged to include communication partners (e.g., family members, significant others, companions) throughout the selection, fitting, and follow-up process.[4, 5, 6, 7, 8]

3. A needs assessment is conducted in determining candidacy and in making individualized amplification recommendations. A needs assessment includes audiologic, physical, communication, listening, self-assessment, and other pertinent factors affecting patient outcomes.[9, 10]

4. Pre-fitting testing includes assessment of speech recognition in noise, unless clinically inappropriate, and frequency-specific loudness discomfort levels. Other validated measures of auditory and non-auditory abilities are considered, as appropriate for the individual patient.[11, 12, 13, 14, 15, 16, 17, 18, 19]

5. Fitting of bilateral hearing aids is the recommended protocol if the patient is a candidate for hearing aids in both ears and it is supported by the needs assessment.[20, 21, 22]

6. The hearing aid style and the ear coupling are chosen to be appropriate for the degree and configuration of the hearing loss. Style and coupling should reflect any physical limitations of the patient. Patient input regarding acceptable styles is taken into account.[23, 24, 25, 26, 27, 28, 29, 30, 31, 32]

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7. The recommended hearing aids include signal processing and features that support the patient's listening needs. They have the appropriate gain and output, including reserve gain, to meet frequency-specific fitting targets as defined by a validated prescriptive method. [23, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43]

8. Assistive technology and accessories are considered to facilitate accessibility to other devices and to satisfy the patient's listening and communication needs.[23, 44, 45, 46, 47, 48]

9. An assessment of initial product quality is completed, using standard electroacoustic measures to verify either manufacturer or published specifications. [34, 49]

10. Hearing aids are fitted so that various input levels of speech result in verified ear canal output that meets the frequency-specific targets provided by a validated prescriptive method. The frequency-specific maximum power output is adjusted to optimize the patient's residual dynamic range and ensure that the output does not exceed the patient's loudness discomfort levels. [50, 51, 52, 53, 54, 55, 56, 57]

11. Following individualized verification of hearing aid gain and output, if the fitting is not acceptable to the patient, minor deviations in gain and output may be necessary.[58, 59]

12. Orientation is device- and patient-centered and includes use, care, and maintenance of the hearing aid(s) and accessories. [60, 61, 62, 63]

13. Counseling is conducted to ensure appropriate adjustment to amplification and to address other concerns regarding communication. Additional rehabilitative audiology is recommended if deemed appropriate. [64,65,66,67,68,69]

14. Hearing aid outcome measures are conducted. These may include validated self-assessment or communication inventories and aided speech recognition assessment. [70, 71]

15. Short- and long-term follow-up is conducted to ensure that post-fitting needs are addressed. This includes updated audiological assessment, hearing aid adjustments and routine maintenance as needed to ensure the devices are functioning properly and appropriately for the patient. [23, 33, 72, 73, 74, 75]

REFERENCES

1. Kleindienst, S. J., Zapala, D. A., Nielsen, D. W., Griffith, J. W., Rishiq, D., Lundy, L., & Dhar, S. (2017). Development and initial validation of a consumer questionnaire to predict the presence of ear disease. *JAMA Otolaryngology–Head & Neck Surgery*, *143*(10), 983-989.
2. Klyn, N. A., Robler, S. K., Alfakir, R., Nielsen, D., Griffith, J., Carlson, D., ... & Zapala, D. (2018). A Retrospective Estimate of Ear Disease Detection Using the "Red Flags" in a Clinical Sample. *Ear and Hearing*, *39*(5), 1035-1038.
3. Zapala, D. A., Shaughnessy, K., Buckingham, J., & Hawkins, D. B. (2008). The importance of audiologic red flags in patient management decisions. *Journal of the American Academy of Audiology*, *19*(7), 564-570.
4. Ekberg, K., Grenness, C., & Hickson, L. (2014). Addressing patients' psychosocial concerns regarding hearing aids within audiology appointments for older adults. American Journal of Audiology, 23, 337-350.
5. Ekberg, K., Meyer, C., Scarinci, N., Grenness, C., & Hickson, L. (2015). Family member involvement in audiology appointments with older people with hearing impairment. International Journal of Audiology, 54, 70-76.
6. Preminger, J. E., Oxenbøll, M., Barnett, M. B., Jensen, L. D., & Laplante-Lévesque, A. (2015). Perceptions of adults with hearing impairment regarding the promotion of trust in hearing healthcare service delivery. International Journal of Audiology, 54, 20-28.
7. Sciacca, A., Meyer, C., Ekberg, K., Barr, C., & Hickson, L. (2017). Exploring audiologists' language and hearing aid uptake in initial rehabilitation appointments. American Journal of Audiology, 26, 110-118.
8. Singh, G., & Launer, S. (2016). Social context and hearing aid adoption. Trends in hearing, 20, 1 - 10.
9. McCullough, J. A., Mormer, E. (2002). Matching hearing technology to the needs, goals, and preferences of individual listeners. *Contemporary Issues In Communication Science and Disorders,* 29, 101-110. doi: 1092-5171/02/2901-0101.
10. Schum, D.J. (1999). Perceived hearing aid benefit in relation to perceived needs. *Journal of American Academy of Audiology*, 10, 40-45.
11. Amos, N. E., & Humes, L. E. (2007). Contribution of High Frequencies to Speech Recognition in Quiet and Noise in Listeners With Varying Degrees of High-Frequency Sensorineural Hearing Loss. *Journal of Speech, Language, and Hearing Research*, *50*, 819-834.
12. Bentler, R. A. (2006, November). Audiometric Considerations for Hearing Aid Fitting (and Success). In *Hearing Care for Adults 2006: Proceedings of the First International Adult Conference,* 89-95.
13. Bentler R, Cooley L. (2001) An examination of several characteristics that affect the prediction of OSPL90. *Ear Hear* 22:3–20.
14. Humes, L. E. (2001). Issues in evaluating the effectiveness of hearing aids in the elderly: What to measure and when. In *Seminars in hearing* 22(3), 303-316.
15. Mueller HG, & Bentler RA (2005) Fitting Hearing Aids Using Clinical Measures of Loudness Discomfort Levels: An Evidence-Based Review of Effectiveness. *J Am Acad Audiol* 16:461–472.
16. Naylor, G., Öberg, M., Wänström, G., & Lunner, T. (2015). Exploring the effects of the narrative embodied in the hearing aid fitting process on treatment outcomes. *Ear and hearing*, *36*(5), 517-526.
17. Shi L, Doherty KA, Kordas TM, Pellegrino JT. (2007) Short-Term and Long-Term Hearing Aid Benefit and User Satisfaction: A Comparison between Two Fitting Protocols. *J Am Acad Audiol* 18:482–495.
18. Storey, L., Dillon, H., Yeend, I., & Wigney, D. (1998). The National Acoustic Laboratories' procedure for selecting the saturation sound pressure level of hearing aids: experimental validation. *Ear and Hearing, 19*(4), 267-279.
19. Wilson RH. (2011) Clinical experience with the Words-in-Noise test on 3430 veterans: Comparison with pure-tone thresholds and word recognition in quiet. *J Am Acad Audiol*. 22(7):405-423.

20. Ahlstrom, J. B., Horwitz, A. R., & Dubno, J. R. (2009). Spatial Benefit of Bilateral Hearing Aids. *Ear and Hearing*, *30*(2), 203-218.
21. Boymans, M., Goverts, S. T., Kramer, S. E., Festen, J. M., & Dreschler, W. A. (2008). A prospective multi-centre study of the benefits of bilateral hearing aids. *Ear and Hearing*, *29*(6), 930-941.
22. Köbler, S., Rosenhall, U., & Hansson, H. (2001). Bilateral hearing aids-effects and consequences from a user perspective. *Scandinavian audiology*, *30*(4), 223-235.
23. American Academy of Audiology. 2006. Guidelines for the Audiologic Management of Adult Hearing Impairment. Audiology Today, Vol 18(5).
24. Bennett, R. J., Kosovich, E. M., Stegeman, I., Ebrahimi-Madiseh, A., Tegg-Quinn, S., & Eikelboom, R. H. (2020). Investigating the prevalence and impact of device-related problems associated with hearing aid use. International journal of audiology, 59(8), 615–623.
25. Bennett, R. J., Taljaard, D. S., Brennan-Jones, C. G., Tegg-Quinn, S., & Eikelboom, R. H. (2015). Evaluating hearing aid handling skills: A systematic and descriptive review. International journal of audiology, 54(11), 765–776.
26. Chung, K. (2004). Challenges and Recent Developments in Hearing Aids: Part II. Feedback and Occlusion Effect Reduction Strategies, Laser Shell Manufacturing Processes, and Other Signal Processing Technologies. Trends in Amplification, 8(4), 125–164.
27. Curran, J.R., & Van Vliet, D. (2018). Hearing aid coupling: Theory and application. In J.A. Galster (Ed.), Audiology Treatment (3rd ed., pp. 40-78). Thieme.
28. Dillon, H. (2012). Hearing aid earmolds, earshells, and coupling systems. In H. Dillon (Ed.), Hearing Aids (2nd ed., pp 127-169). Boomerang Press.
29. Kuk F. K. (1994). Maximum usable real-ear insertion gain with ten earmold designs. Journal of the American Academy of Audiology, 5(1), 44–51.
30. Kuk, F., Keenan, D., & Lau, C. C. (2005). Vent configurations on subjective and objective occlusion effect. Journal of the American Academy of Audiology, 16(9), 747–762.
31. Meyer, C., Hickson, L., & Fletcher, A. (2014). Identifying the barriers and facilitators to optimal hearing aid self-efficacy. International journal of audiology, 53 Suppl 1, S28–S37.
32. Mueller, H.G., & Ricketts, T.A. (2006). Open canal fittings: ten take home tips. Hearing Journal, 59(11), 24-39.
33. American Academy of Audiology. (2000). Audiology Clinical Practice Algorithms and Statements. Audiology Today, Special Issue, 32-49.
34. American National Standards Institute. (2007). Testing hearing aids with a broad-band noise signal [ANSI S3.42-1992 (R2007)]. New York: Acoustical Society of America.
35. American National Standards Institute. (2004). Specifications for hearing aid characteristics (ANSI S3.22-2004). New York: Acoustical Society of America.
36. American Speech-Language-hearing Association. Ad Hoc Committee on Hearing Aid Selection and Fitting. (1998). Guidelines for hearing aid fitting for adults. American Journal of Audiology, 7(1), 5-13.
37. Ching, T.Y.C., Johnson, E.E., Hou, S., Dillon, H., Zhang, V., Burns, L., vanBuynder, P., Angela Wong, A., and Flynn, C. (2013) A comparison of NAL and DSL prescriptive methods for paediatric hearing-aid fitting: Predicted speech intelligibility and loudness. Int J Audiol, S29-38.
38. Hawkins D. (1992) Prescriptive approaches to selection of gain and frequency response, In : Mueller HG, Hawkins DB, Northern JL, editors. Probe microphone measurements: hearing aid selection and assessment. San Diego, CA: Singular Publishing; 145-158.
39. Hawkins, D. (1986) Selection of hearing aid characteristics in Hodgson, W.R. editor. Hearing aid assessment and use in audiologic habilitation, Baltimore, MD: Williams & Wilkins; 128-151.
40. Lakshmi, M., Rout, A., O'Donoghue, C. (2019) A systematic review and meta-analysis of digital noise reduction hearing aids in adults. J Disability and Rehabilitation: Assistive Technology, Published online: 10 Sep 2019.

41. McCreery, R., Brennan, M., Walker, E., Spratford, M. (2017) Perceptual implications of level-and frequency-specific deviations from hearing aid prescription in children. J Am Acad Audiol. 28: 861–875.
42. Northern, J. (2011) Strategies of adult hearing aid selection. Audio Res. Published online: 10 May 2011. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4627145/.
43. Staab, W.J. (2000) Hearing aid selection: An overview in Sandlin, R.E. Textbook of hearing aid amplification and technical and clinical considerations. San Diego, CA: Singular, 55-135.
44. American Academy of Audiology. (2011). Clinical Practice Guidelines. Remote microphone hearing assistance technologies for children and youth from birth to twenty-one years (includes supplement A). Retrieved from http://www.audiology.org/ publications-resources/document-library/hearing-assistance-technologies.
45. Atcherson, S.R., Franklin, C.A., Smith-Olinde, L. (2018). Hearing assistive and access technology. Plural Publishing, Inc.
46. Chisolm, T. H., Noe, C. M., McArdle, R., & Abrams, H. (2007). Evidence for the Use of Hearing Assistive Technology by Adults: The Role of the FM System. Trends in Amplification, 11(2), 73–89.
47. Rodemerk, K. S., & Galster, J. A. (2015). The Benefit of Remote Microphones Using Four Wireless Protocols. Journal of the American Academy of Audiology, 26(8), 724–731.
48. Thibodeau L. (2014). Comparison of speech recognition with adaptive digital and FM remote microphone hearing assistance technology by listeners who use hearing aids. American journal of audiology, 23(2), 201–210.
49. Holder, J., Picou, E., Gruenwald, J., Ricketts, T. (2016) Do modern hearing aids meet ANSI standards? J Am Acad Audiol, 27(8): 619-27.
50. Abrams, H. B., Chisolm, T. H., McManus, M., & McArdle, R. (2012). Initial-fit approach versus verified prescription: Comparing self-perceived hearing aid benefit. *Journal of the American Academy of Audiology*, *23*(10), 768-778.
51. Amlani AM, Pumford J, Gessling E. (2016). Improving Patient Perception Towards Clinical Services through the Provision of Real-Ear Measures. Hearing Review. 23(12):12.
52. Bratt GW, Rosenfeld MAL, Poek BF, Kang J, Williams DW, Larson V. (2002) Coupler and real-ear measurement of hearing aid gain and output in the NIDCD/VA hearing aid clinical trial. Ear Hear 23:308–324.
53. Kochkin, S., Beck, D. L., Christensen, L. A., Compton-Conley, C., Fligor, B. J., Kricos, P. B., & Turner, R. et al. (2010). MarkeTrak VIII: The impact of the hearing healthcare professional on hearing aid user success. *Hearing Review*, *17*(4), 12-34.
54. Mueller HG. (2005) Fitting hearing aids to adults using prescriptive methods: an evidence-based review of effectiveness. J Am Acad Audiol. 16 (7):448-60.
55. Munro K, Patel R. (1998) Are clinical measurements of uncomfortable loudness levels a valid indicator of real-world auditory discomfort? Br J Audiol 32:287–293.
56. Sanders, J., Stoody, T. M., Weber, J. E., & Mueller, H. G. (2015). Manufacturer's NAL-NL2 fittings fail real-ear verification. *The Hearing Review, 21*(3), 24.
57. Valente, M., Oeding K, Brockmeyer A, Smith, S., Kallogieri D. (2018) Differences in Word Recognition in Quiet, Sentence Recognition in Noise, and Subjective Preference between Manufacturer First-Fit and Hearing Aids Programmed to NAL-NL2 using Real-Ear Measures. *Journal American Academy Audiology* 29 (8): 706-721.
58. Keidser, G., & Dillon, H. (2006). What's new in prescriptive fittings down under. *Hearing care for adults*, 133-142.
59. Polonenko MJ, Scollie SD, Moodie S, Seewald RC, Laurnagaray D, Shantz J, Richards A. (2010) Fit to targets, preferred listening levels, and self-reported outcomes for the DSL v5.0 a hearing aid prescription for adults. Int J Audiol, 49 (8): 550-560.
60. Caposecco, A., Hickson, L., Meyer, C., & Khan, A. (2016). Evaluation of a modified user guide for hearing aid management. Ear and Hearing, 37, 27-37.

61. Convery, E., Keidser, G., Hickson, L., & Meyer, C. (2019). The relationship between hearing loss self-management and hearing aid benefit and satisfaction. American Journal of Audiology, 28, 274-284.
62. Desjardins, J., & Doherty, K. (2009). Do experienced hearing aid users know how to use their hearing aids correctly? American Journal of Audiology, 18, 69-77.
63. Kemker, B. E., & Holmes, A. E. (2004). Analysis of prefitting versus postfitting hearing aid orientation using the glasgow hearing aid benefit profile (ghabp). Journal of the American Academy of Audiology, 15, 311-323.
64. Abrams, H. B., Hnath-Chisolm, T., Guerreiro, S. M., & Ritterman, S. I. (1992). The effects of intervention strategy on self-perception of hearing handicap. Ear and Hearing, 13, 371-377.
65. Abrams, H., Chisolm, T. H., & McArdle, R. (2002). A cost-utility analysis of adult group audiologic rehabilitation: Are the benefits worth the cost? Journal of Rehabilitation Research and Development, 39, 549-558.
66. Beynon, G. J., Thornton, F. L., & Poole, C. (1997). A randomized, controlled trial of the efficacy of a communication course for first time hearing aid users. British Journal of Audiology, 31, 345-351.
67. Hickson, L., Worrall, L., & Scarinci, N. (2007). A randomized controlled trial evaluating the active communication education program for older people with hearing impairment. Ear and Hearing, 28, 212-230.
68. Picou, E. M. (2020). Marketrak 10 (mt10) survey results demonstrate high satisfaction with and benefits from hearing aids. Seminars in Hearing, 41, 021-036.
69. Rao, A., Rishiq, D., Yu, L., Zhang, Y., & Abrams, H. (2017). Neural correlates of selective attention with hearing aid use followed by ReadMyQuips auditory training program. Ear and Hearing, 38, 28-41.
70. Cox, R. M. (2005b). Choosing a self-report measure for hearing aid fitting outcomes. Seminars in Hearing, 26(3), 149-156.
71. Kochkin, S. (2010). MarkeTrak VII: Consumer satisfaction with hearing aids is slowly increasing. *Hearing Journal,* 63(1), 10-12.
72. Allen, P., Eddins, D. (2010) Presbycusis phenotypes form a heterogeneous continuum when ordered by degree and configuration of hearing loss. Hear Res, 264: 10-20.
73. Hearing loss in adults: assessment and management (2018) National Institute for Health and Care Excellence (UK). NICE Guideline, No 98. London (section 17: monitoring and follow-up). https://www.ncbi.nlm.nih.gov/books/NBK536536/.
74. Humes L, & Krull V. (2012) Hearing Aids for Adults. In Evidence Based Practice in Audiology - Evaluating Interventions for Children and Adults With Hearing Impairment. Eds. Wong and Hickson. Pages 61-92.
75. Yueh, B., Shapiro, N., MacLean, C., Shekelle, P. (2003) Screening and management of adult hearing loss in primary care. JAMA, 289: 1976-1985.