

Pre-Fitting Considerations in Receiver-in-the-Canal Hearing Aid Selection: A Clinical Case Series

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ABSTRACT

Receiver-in-the-Canal (RIC) hearing aids have become the most widely prescribed hearing aid style because of their cosmetic appeal, acoustic advantages, reduced feedback, and user comfort. Despite these benefits, hearing aid adoption and long-term satisfaction remain suboptimal. Patient-specific factors such as cerumen management, manual dexterity, anatomical variations, and pediatric considerations may significantly influence fitting success but are often underemphasized during routine pre-fitting assessments. To illustrate the importance of comprehensive pre-fitting assessments in the selection and successful fitting of RIC hearing aids through a series of clinically relevant cases. The four cases demonstrated that recurrent cerumen impaction, reduced manual dexterity, temporomandibular joint (TMJ)-related ear canal changes, and pediatric retention and loudness concerns significantly affected hearing aid performance and user satisfaction. Individualized interventions including cerumen management, alternative hearing aid styles, custom receiver shells, earmould modifications, and programming adjustments improved outcomes. Successful RIC fitting requires consideration of factors beyond audiometric thresholds.

Comprehensive pre-fitting evaluation incorporating otoscopic examination, dexterity assessment, anatomical evaluation, pediatric-specific considerations, and structured self-assessment measures may improve patient satisfaction, adherence, and long-term hearing aid outcomes.

Keywords: Receiver-in-the-Canal hearing aids, hearing aid fitting, pre-fitting assessment, hearing rehabilitation, dexterity, cerumen management, TMJ, pediatric amplification

INTRODUCTION

Hearing loss is among the most prevalent sensory impairments worldwide and is associated with significant communication difficulties, social isolation, reduced quality of life, and psychological distress. In India, approximately 6.3% of the population is affected by disabling hearing loss, with substantial prevalence across both pediatric and adult populations. Hearing aids remain the most accessible and commonly prescribed intervention for individuals with permanent hearing loss, with evidence demonstrating improvements in speech perception, communication ability, and health-related quality of life following amplification [1].

Advances in digital signal processing and miniaturization have transformed hearing aid technology over the past three decades. Among contemporary hearing aid styles, Receiver-in-the-Canal (RIC) devices have achieved widespread acceptance due to their cosmetic appeal, improved high-frequency amplification, reduced occlusion effect, lower feedback susceptibility, and fitting flexibility. Consequently, RIC devices have become the dominant hearing aid style globally [2].

Despite technological advancements, hearing aid uptake remains relatively low, and rejection rates continue to range between 20% and 30% [3]. While audiometric findings guide the selection of amplification, successful outcomes are influenced by numerous patient-specific variables. Factors such as recurrent cerumen accumulation, reduced manual dexterity, anatomical changes of the external auditory canal, and age-related considerations may directly affect device performance and user satisfaction.

Although contemporary fitting protocols emphasize audiological assessment and verification procedures, less attention is often given to these practical considerations during the pre-fitting phase. Failure to identify such factors may result in repeated troubleshooting, reduced adherence, and eventual device rejection.

The present case series highlights four clinical scenarios in which individualized pre-fitting considerations played a critical role in the success or failure of RIC hearing aid fittings. The cases aim to reinforce the importance of patient-centered assessment in optimizing hearing aid outcomes.

CASE PRESENTATION

Case 1: Cerumen Impaction Affecting Receiver Function

A 55-year-old male presented with bilateral sloping sensorineural hearing loss and was fitted with bilateral RIC hearing aids. Initial fitting outcomes were satisfactory; however, during follow-up he reported distorted sound quality and excessive noisiness.

Clinical examination revealed significant cerumen accumulation obstructing the receiver outlet and wax guard. The wax guard was replaced, resulting in immediate restoration of sound quality. The patient received counselling regarding ear hygiene, routine monitoring, and periodic maintenance.

This case demonstrates the susceptibility of RIC receivers to cerumen-related obstruction and highlights the importance of pre-fitting otoscopic assessment and patient education regarding receiver maintenance.

Case 2: Reduced Manual Dexterity in an Older Adult

A 75-year-old male with bilateral moderate-to-severe sensorineural hearing loss initially selected RIC hearing aids because of their cosmetic appeal. During follow-up visits, he reported repeated difficulty inserting the receiver, changing wax guards, and handling batteries.

Observation revealed reduced fine motor control and manual dexterity, which compromised routine device management. Despite repeated training and modifications, the patient remained dissatisfied. Subsequently, he was fitted with a conventional behind-the-ear (BTE) hearing aid, which he managed more successfully. This case underscores the importance of assessing physical handling abilities before recommending hearing aid styles, particularly in geriatric populations.

Case 3: TMJ-Related Ear Canal Dynamics

A 56-year-old female with mixed hearing loss reported persistent acoustic feedback despite multiple programming adjustments. Otoscopic and physical examination suggested substantial ear canal shape changes during jaw movement associated with temporomandibular joint activity.

The dynamic alteration of ear canal geometry resulted in inadequate sealing and intermittent acoustic leakage. Custom receiver shells were recommended to improve retention and maintain a stable acoustic seal.

This case highlights the influence of anatomical factors on hearing aid coupling and demonstrates the need to evaluate ear canal dynamics during pre-fitting assessment.

Case 4: Pediatric Considerations in RIC Fitting

A 9-year-old female with bilateral sloping sensorineural hearing loss was fitted with RIC hearing aids after discussion with caregivers regarding available amplification options.

During follow-up, she reported loudness discomfort and occasional retention difficulties. Verification measures and programming modifications were undertaken. Custom earmoulds were subsequently provided to improve retention and acoustic stability.

Following these interventions, hearing aid acceptance and comfort improved substantially. This case demonstrates that while RIC devices may be considered in selected pediatric patients, ongoing monitoring, verification, and individualized coupling solutions remain essential.

DISCUSSION

The present case series emphasizes that successful Receiver-in-the-Canal (RIC) hearing aid fitting depends not only on audiometric characteristics but also on a range of patient-related physical, anatomical, and functional factors that influence hearing aid management and long-term outcomes. Although RIC devices have become the most widely prescribed hearing aid style because of their cosmetic appeal, acoustic advantages, and fitting flexibility, real-world success is often determined by factors that are not routinely captured through standard audiological assessment alone.

The first case demonstrated the significant impact of cerumen accumulation on hearing aid performance. Because the receiver of RIC devices is positioned within the external auditory canal, these devices are particularly susceptible to wax-related obstruction. Even minor blockage of the receiver port or wax guard can reduce output, distort sound

quality, and increase the likelihood of device malfunction. Previous reports have identified cerumen as one of the most common causes of hearing aid repair and receiver replacement [4, 5, & 6]. The findings of the present case support these observations and reinforce the need for routine otoscopic examination, proactive cerumen management, patient education regarding hearing aid maintenance, and periodic follow-up assessments. Such preventive measures may reduce unnecessary service visits and improve long-term device reliability.

The second case highlighted the influence of manual dexterity on hearing aid selection and successful device use. While RIC hearing aids offer cosmetic advantages and technological sophistication, their small size, receiver placement, battery compartments, and maintenance requirements may present challenges for individuals with reduced fine motor skills. Older adults frequently experience age-related declines in dexterity due to musculoskeletal, neurological, or sensory changes. Studies have reported that better manual dexterity is associated with more successful hearing aid handling and use [7]. The present case further demonstrates that even when hearing aid performance is acoustically appropriate, difficulties in daily management may result in dissatisfaction and reduced adherence. Consequently, hearing aid style selection should incorporate assessment of handling skills alongside traditional audiological measures. Tools such as the Practical Hearing Aid Skills Test-Revised (PHAST-R) and the Hearing Aid Skills and Knowledge Inventory (HASKI) may provide objective measures of a patient's ability to manage hearing aids independently.

The third case illustrated the importance of anatomical and physiological considerations, particularly those associated with temporomandibular joint (TMJ) movement. The external auditory canal is not a static structure; its cartilaginous portion undergoes dynamic changes during speaking, chewing, yawning, and jaw movement. It is also

observed that ear canal dimensions can change substantially with mandibular motion [8]. Such changes may compromise the acoustic seal of RIC devices, resulting in intermittent feedback, poor retention, reduced amplification effectiveness, and patient frustration. This case emphasizes that assessment of ear canal morphology should extend beyond static otoscopy and include observation of canal changes during jaw movement. Recognition of dynamic ear canal behaviour may facilitate timely implementation of customized coupling strategies, including custom receiver shells or earmoulds, thereby improving acoustic stability and patient comfort.

The fourth case focused on pediatric hearing aid fitting considerations. Although RIC devices are increasingly available with pediatric-compatible features, they are not traditionally considered the primary amplification choice for children because of rapid ear growth, retention difficulties, safety concerns related to small components, and the need for frequent earmould replacement. Nevertheless, selected pediatric patients, particularly older children with sloping high-frequency hearing loss, may benefit from RIC technology when appropriate retention and verification procedures are implemented. Consistent with recommendations from pediatric amplification guidelines [9], the present case demonstrates that successful pediatric RIC fitting requires ongoing monitoring, real-ear verification, parental counselling, and individualized coupling solutions to accommodate growth-related anatomical changes.

Collectively, these cases support a broader patient-centered approach to hearing aid selection. Contemporary hearing aid fitting protocols often emphasize audiometric assessment, prescriptive targets, and electroacoustic verification. While these components remain essential, they may not fully predict long-term hearing aid success. Factors such as cerumen management, manual dexterity, ear canal anatomy, cognitive abilities, lifestyle demands, caregiver support, and patient expectations

should also be systematically evaluated during the pre-fitting stage. Failure to identify these variables may contribute to hearing aid dissatisfaction, reduced usage, increased follow-up burden, and eventual device rejection.

An additional observation emerging from this case series is the limited use of structured self-assessment measures during hearing aid selection. Recent evidence from India suggests that hearing aid selection frequently relies on informal interviews rather than standardized questionnaires assessing functional, physical, and psychosocial needs. Incorporating validated tools may facilitate a more comprehensive understanding of patient-specific challenges and improve alignment between hearing aid technology and individual requirements. Such an approach is consistent with modern principles of patient-centered hearing healthcare and shared decision-making [10]. Although the present report involves only four cases, the cases represent commonly encountered clinical scenarios that may substantially influence hearing aid outcomes. The findings therefore highlight areas that warrant greater attention during routine clinical practice and provide foundation for future investigations examining the relationship between pre-fitting variables and long-term hearing aid success.

CONCLUSION

Receiver-in-the-Canal hearing aids represent a highly effective amplification option because of their acoustic performance, flexibility, cosmetic acceptability, and technological capabilities. However, the findings from this case series demonstrate that successful fitting outcomes are influenced by considerably more than audiometric thresholds and prescriptive gain targets alone.

Patient-related factors such as cerumen accumulation, manual dexterity limitations, dynamic ear canal anatomy associated with temporomandibular joint movement, and pediatric-specific retention and fitting challenges can significantly affect hearing

aid performance, comfort, maintenance, and overall satisfaction. Failure to identify these factors during the pre-fitting stage may contribute to repeated troubleshooting, reduced device usage, increased service requirements, and eventual hearing aid rejection.

The present cases reinforce the importance of adopting a comprehensive and patient-centered pre-fitting assessment protocol that integrates otoscopic evaluation, anatomical examination, dexterity assessment, lifestyle analysis, counselling, and validated self-assessment measures in addition to conventional audiological testing. Such an approach may facilitate more informed hearing aid selection, improve adherence and user satisfaction, reduce maintenance-related complications, and ultimately enhance communication outcomes and quality of life for individuals with hearing loss.

Future prospective studies involving larger and more diverse populations are required to quantify the impact of specific pre-fitting variables on hearing aid acceptance, satisfaction, retention, and long-term rehabilitation outcomes. Establishing evidence-based pre-fitting assessment guidelines may further strengthen clinical decision-making and contribute to more individualized and effective hearing healthcare.

Declaration by Authors

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REFERENCES

1. Alrasheed AM, Junaid M, Ardi KT, Ebraheem FAM, Alaidaroos OZ. Quality of Life Among Adults with Hearing Loss Who Were Prescribed Hearing Aids in Aseer Province, Saudi Arabia: A Cross-Sectional Tertiary Center-Based Study. *Cureus*. 2023 Sep 25;15(9):e45922. doi: 10.7759/cureus.45922.
2. Bisgaard N, Ruf S. Findings From EuroTrak Surveys From 2009 to 2015: Hearing Loss Prevalence, Hearing Aid Adoption, and Benefits of Hearing Aid Use. *Am J Audiol*. 2017 Oct 12;26(3S):451-461. doi: 10.1044/2017_AJA-16-0135.
3. Marcos-Alonso S, Almeida-Ayerve CN, Monopoli-Roca C, Coronel-Touma GS, Pacheco-López S, Peña-Navarro P, Serradilla-López JM, Sánchez-Gómez H, Pardal-Refoyo JL, Batuecas-Caletrío Á. Factors Impacting the Use or Rejection of Hearing Aids-A Systematic Review and Meta-Analysis. *J Clin Med*. 2023 Jun 13;12(12):4030. doi: 10.3390/jcm12124030.
4. Roeser RJ, Ballachanda BB. Physiology, pathophysiology, and anthropology/epidemiology of human ear canal secretions. *J Am Acad Audiol*. 1997;8(6):391-400.
5. LoPresti J, Kochkin S. Improved hearing instrument reliability with ferrofluid damped receivers. *Hear Rev*. 2003;10(1):44,46,61.
6. Branda E, Chalupper J. A new system to protect hearing aids from cerumen and moisture. *Hear Rev*. 2007;14(4):56,89.
7. Kumar M, Hickey S, Shaw S. Manual dexterity and successful hearing aid use. *J Laryngol Otol*. 2000;114(8):593-7. doi:10.1258/0022215001906480.
8. Oliveira RJ, Hammer B, Stillman A, Holm J, Jons C, Margolis RH. A look at the ear canal changes with jaw motion. *Ear Hear*. 1992;13(6):464-6.
9. Muñoz K, Markle K, San Miguel GG, Twohig MP. Increasing Pediatric Hearing Aid Use: Considerations for Clinical Practice. *Am J Audiol*. 2023 Sep 6;32(3):665-670. doi: 10.1044/2023_AJA-23-00036.
10. Thomas P, Palani S, Shankar K. Hearing aid selection, fitting, verification, and validation: audiology practice in India and Australia. *Egypt J Otolaryngol*. 2025; 41:38. doi:10.1186/s43163-025-00789-4.

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