



ORIGINAL ARTICLE

Open fitting: performance verification of receiver in the ear and receiver in the aid^{☆,☆☆}



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Abstract

Objective: To verify the receiver in the ear and receiver in the aid adaptations by measuring *in situ* the speech perception and users' level of satisfaction.

Methods: The study was approved by the research ethics committee (Process: 027/2011). Twenty subjects older than 18 years with audiological diagnosis of mild and moderate bilateral descending sensorineural hearing loss were evaluated. The subjects were divided into two groups, where G1 (group 1) was fitted with open-fit hearing aids with the built-in receiver unit (receiver in the ear) and G2 (group 2) was fitted with open-fit hearing aids with RITE. A probe microphone measurement was performed to check the gain and output provided by the amplification and for assessment of speech perception with Hearing in Noise Test with and without hearing aids. After a period of six weeks of use without interruption, the subjects returned for follow-up and answered the Satisfaction with Amplification in Daily Life questionnaire, and were again subjected to Hearing in Noise Test.

Results: Both groups presented better test results for speech recognition in the presence of noise.

Conclusion: Groups 1 and 2 were satisfied with the use of hearing aids and improved speech recognition in silent and noisy situations with hearing aids.

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PALAVRAS-CHAVE

Auxiliares de audição;
Perda auditiva;
Percepção da fala;
Ruído

Adaptação aberta: verificação do desempenho RITE e RITA**Resumo**

Objetivo: Estudo clínico prospectivo para verificar as adaptações RITE e RITA por meio da mensuração *in situ* da percepção da fala e satisfação dos usuários.

Método: Estudo aprovado pelo CEP (Processo nº 027/2011). Foram avaliados 20 indivíduos maiores de 18 anos com diagnóstico audiológico de perda auditiva sensorioneural descendente bilateral de grau leve e moderado. Os indivíduos foram divididos em dois grupos, onde o G1 (grupo 1) foi adaptado com AASI *open-fit* com receptor no próprio aparelho (RITA) e o G2 (grupo 2) foi adaptado com AASI *open-fit* com receptor no canal (RITE). Foi realizada a medida com microfone-sonda para verificação do ganho e saída do AASI e avaliação da percepção da fala com *Hearing in Noise Test* (HINT), sem e com AASI. Após um período de seis semanas de uso sem interrupções, o indivíduo retornou para acompanhamento e respondeu ao questionário SADL (*Satisfaction with Amplification in Daily Life Scale*) e realizou o HINT.

Resultados: Os grupos apresentaram melhores resultados no teste de reconhecimento da fala com presença de ruído.

Conclusão: Os grupos 1 e 2 apresentaram satisfação com o uso do AASI e melhora no reconhecimento de fala nas situações de silêncio e ruído com o uso de AASI.

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Introduction

Much has been discussed regarding the hearing aid (HA) adaptation in subjects with sloping hearing loss.¹ The occlusion effect is one of their major complaints as due to the configuration of the loss, which is reported as autophonia.

Considering the technological evolution in the development of HA and the particular configuration of the hearing loss in these cases, open fit-specific mini behind-the-ear (BTE) devices provide benefits to these individuals. This model uses a shaft and a flexible adapter, and has a unique characteristic of amplification in medium and high frequencies.^{2,3}

These devices are known as receiver in the ear (RITE) when the receiver is used into the ear canal and connected to the HA through a thin tube. Since the receiver is not located within the retroauricular device (BTE), this type of HA is particularly small and may have advantages regarding sound quality and comfort. Receiver in the aid (RITA) devices feature the receiver in the HA itself.

Both fitting and verification should be perceived as a process with a main objective: the optimum adaptation of the individual to the amplification characteristics. Researchers⁴ have developed a guide whereby the verification process by probe microphone measurement is part of the procedures for a proper HA fitting. The probe microphone measurement is the preferred method for verification of HA *in situ*.⁵

Probe microphone measurements can be used for checking adjustments made in the HA and to assess the efficacy of special circuits such as noise reducers, feedback reducers, directional microphones, and open-fitting HA.⁶⁻⁸

The main aim of the adaptation of HA is to improve speech intelligibility, thus facilitating the communication process; hence the importance of testing the individual's speech perception.⁹ With this investigation, it is possible to

obtain the threshold of speech recognition with and without competitive noise through the Hearing in Noise Test (HINT),¹⁰ which consists of a series of 12 lists of 20 sentences with the same extension, phonetic distribution, and degree of difficulty, which were normalized so as to present a natural aspect and reliability.

During the process of counseling hearing-impaired patients, the three processes of motivation related to the use of HA should be considered: acceptance, benefit, and satisfaction.¹¹ The success of the adaptation process of amplification depends, among other factors, on the individual's satisfaction with the results of the use of HA.¹²

Satisfaction is the outcome measure of auditory rehabilitation that represents the most comprehensive combination of factors needed for the final result, since the variable of interest is the point of view of the individual, and it is not related only to the performance of HA,¹³ but rather depends exclusively on the perceptions and attitudes of the individual.¹⁴

The measurement of satisfaction with the use of HA in daily life has also been studied using the Satisfaction With Amplification in Daily Life (SADL) questionnaire.¹³ This tool was designed to assess the satisfaction of HA users, quantifying it through a scoring process of four subscales: positive effects, costs and services, negative factors, and self-image.^{15,16}

In the field of phonoaudiology, studies that critically contribute to the process of HA fitting in centers accredited by the national politics of hearing healthcare are lacking.¹⁷ The present study prioritized the evaluation of open-fitting devices using objective and subjective tools and favoring the options of RITE or RITA.

This study aimed to verify the performance of RITE and RITA adaptations by measurements *in situ*, speech perception, and users' satisfaction.

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