Braz J Otorhinolaryngol. 2016;82(3):289–296

Brazilian Journal of
OTORHINOLARYNGOLOGY
www.bjorl.org

ORIGINAL ARTICLE

Effects of sound amplification in self-perception of tinnitus and hearing loss in the elderly☆,☆☆

Tiago de Melo Araujo[a,*], **Maria Cecília Martinelli Iório**[b]

[a] *Post-graduate in Human Communication Disorders, Department of Phonoaudiology, Escola Paulista de Medicina, Universidade Federal de São Paulo (UNIFESP), São Paulo, SP, Brazil*
[b] *Department of Phonoaudiology, Escola Paulista de Medicina, Universidade Federal de São Paulo (UNIFESP), São Paulo, SP, Brazil*

Received 14 April 2015; accepted 12 May 2015
Available online 16 October 2015

KEYWORDS
Questionnaires;
Scales;
Elderly;
Tinnitus;
Hearing aids

Abstract
Objective: To determine the effect of the use of hearing aids in self-perception of tinnitus and hearing loss in the elderly.
Methods: A total of 24 elderly patients between 60 and 70 years of age with moderate-grade sensorineural hearing loss were evaluated and divided into two groups according to the presence or absence of tinnitus. All volunteers were fitted with binaural micro-channel hearing aids of the same brand and model and submitted to tests, scales, and questionnaires relevant to this topic. The evaluations were performed before and after one and three months of effective use of these hearing aids.
Results: Acoustic stimulation through the effective use of hearing aids caused a reduction in the perception of tinnitus sound intensity (especially in evaluations with the prosthesis on) and in nuisance associated with this symptom and with hearing loss. In addition, all participants were satisfied with the use of hearing aids.
Conclusion: The continuous use of hearing aids is beneficial for the treatment of tinnitus and hearing loss, bringing satisfaction to users.

☆ Please cite this article as: Araujo TM, Iório MCM. Effects of sound amplification in self-perception of tinnitus and hearing loss in the elderly. Braz J Otorhinolaryngol. 2016;82:289–96.
☆☆ Study conducted in the *Núcleo Integrado de Assistência, Pesquisa e Ensino da Audição* (NIAPEA), Department of Phonoaudiology, Escola Paulista de Medicina, Universidade Federal de São Paulo (UNIFESP), São Paulo, SP, Brazil.
* Corresponding author.
E-mail: tiagoaraujofono@yahoo.com.br (T.M. Araujo).

http://dx.doi.org/10.1016/j.bjorl.2015.05.010

PALAVRAS-CHAVE
Questionários;
Escalas;
Idoso;
Zumbido;
Auxiliares de audição

Efeitos da amplificação sonora na autopercepção do zumbido e da perda auditiva em idosos

Resumo
Objetivo: Verificar o efeito do uso de próteses auditivas na autopercepção do zumbido e da perda auditiva em idosos.
Método: Foram avaliados 24 idosos com perda auditiva neurossensorial de grau moderado e idades entre 60 e 70 anos divididos em dois grupos conforme a presença ou não de zumbido. Todos os voluntários foram adaptados binauralmente com próteses auditivas micro canais de mesmo fabricante e modelo e submetidos a testes, escalas e questionários pertinentes ao tema. As avaliações ocorreram pré, e após um e três meses de uso efetivo das próteses auditivas.
Resultados: A estimulação acústica por meio do uso efetivo de próteses auditivas propiciou redução na autopercepção da intensidade sonora do zumbido (principalmente nas avaliações com as próteses) e no desconforto com este sintoma e com a perda auditiva. Além disso, todos os participantes mostraram-se satisfeitos com o uso dos dispositivos de amplificação.
Conclusão: O uso contínuo das próteses auditivas é benéfico ao tratamento do zumbido e da perda auditiva, além de implicar na satisfação dos usuários.

Introduction

According to the World Health Organization, tinnitus, *i.e.*, sound perception by a person in the absence of an external generating source,[1] is a symptom that affects about 278 million people worldwide, and about 28 million in Brazil.[2] International data indicate that the prevalence of tinnitus in the general population increased from 15% to 25.3% in only 15 years, and these numbers grow with the increasing age of the population.[3]

Approximately 20% of patients with chronic tinnitus (tinnitus present for over three months) experience a significant nuisance effect,[4] and among other complaints describe flaws in reasoning, memory, and concentration; impairment of speech discrimination and ability to maintain selective attention; and decreased pleasure derived from leisure activities, resting, and conviviality in their social environment.[5–7]

A temporary or permanent decrease in auditory stimuli (sensory deficit) increases the sensitivity of subcortical neurons, resulting in the plastic reorganization of the auditory cortex, with subsequent sustained awareness of tinnitus.[8,9]

The literature suggests that feelings of intensity with respect to tinnitus may be related to the nuisance caused by this condition,[10,11] and that there are several tools[12–15] which can be used to assess and monitor the treatment of patients suffering from this symptom, among which the authors emphasize the acuphenometry test, the visual-analogue scale (VAS), and the Tinnitus Handicap Inventory (THI) questionnaire. In patients with tinnitus associated with hearing loss, the IOI-HA (International Outcome Inventory for Hearing Aids) is also of value when rehabilitation is through the use of hearing aids.

Studies of plasticity have suggested that an increase of the auditory stimulus provided by sound amplification through the use of hearing aids can induce secondary plasticity, helping to decrease the nuisance associated with tinnitus.[16,17]

From this perspective, the hypotheses that guided us to initiate this research were that the use of sound amplification would reduce the sensation of intensity of tinnitus in the elderly with hearing impairment and decrease the nuisance associated with both symptoms (tinnitus and hearing loss), determining the success of patient's adaptation to hearing aids.

Considering that the presence of tinnitus also interferes in health self-perception in the elderly,[18] the present study aimed to verify the effect of the use of hearing aids in self-perception of tinnitus in the elderly with hearing impairment.

Methods

This research was conducted in the Integrated Center for Assistance, Research, and Education in Hearing (Núcleo Integrado de Assistência, Pesquisa e Ensino em Audição [NIAPEA]), Department of Phonoaudiology, Escola Paulista de Medicina/Universidade Federal de São Paulo (EPM/UNIFESP) during the years 2013 and 2014, after approval by the Ethics Committee in Research, UNIFESP, under Presentation Certificate for Ethics Assessment (CAAE) No. 09876112.1.0000.5505.

This study consisted of an interventional prospective study and of a non-probabilistic sample, which monitored and evaluated 24 elderly patients aged 60–70 years, divided into two groups according to the presence or absence of tinnitus symptoms. The subjects' participation was voluntary and confirmed by signing the informed consent.

Initially, a survey was conducted with a medical record analysis of all patients who were seen in the service between the years 2010 and 2013 in order to ascertain the occurrence of tinnitus in the population attended to in NIAPEA. There