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REVIEW ARTICLE

**Degree of tinnitus improvement with stapes surgery – a review**☆

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**KEYWORDS**

Otosclerosis;  
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**Abstract**

*Introduction:* Otospongiosis is temporal bone osteodystrophy, characterized by disordered bone resorption and neoformation in genetically predisposed individuals. Clinically, otospongiosis is characterized by progressive conductive and/or mixed hearing loss and by tinnitus.

*Objective:* A review of the last two decades of publications that report the degree of tinnitus improvement with stapes surgery.

*Methods:* 125 articles published in the last 20 years mentioning the relationship between otosclerosis and tinnitus. Literature has always shown that the hearing improvement after stapes surgery was the main result sought and found. However, recent articles has reinforced the need for surgery for the tinnitus improvement. The ideal time to assess tinnitus through different scales is in the sixth month post-operative. The estimated average hearing improvement is 93% and tinnitus is 85.52%.

*Results:* Summaries of 12 articles were reviewed which fulfilled the search criteria of the survey, and 8 studies were included in the study according the selection criteria. This studies

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investigating the degree of tinnitus improvement with stapes surgery, using different scales as: Tinnitus Functional Index, Visual Analog Scale, Tinnitus Functional Index and Visual Analog Scale, Visual Analog Scale and "questionnaire asking about tinnitus", Newman's method and Tinnitus Score Advocated by the Japan Audiological Society. The total of the samples of the evaluated articles was of 254 participants.

**Conclusion:** We conclude that stapes surgery is effective for the treatment of tinnitus (average improvement is 85.52%), and hearing loss (average improvement is 93%). When deciding about the surgical indication in patients with otosclerosis, the presence and level tinnitus should be considered as well as the level of hearing.

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## PALAVRAS-CHAVE

Otosclerose;  
Zumbido;  
Cirurgia do estapédio

## Grau de melhora do zumbido com cirurgia do estribo – uma revisão sistemática

### Resumo

**Introdução:** A otosclerose é uma osteodistrofia do osso temporal, caracterizada pela reabsorção e neoformação óssea desordenadas em indivíduos geneticamente predispostos. Clinicamente, a otosclerose é caracterizada por perda auditiva progressiva condutiva e/ou mista e por zumbido. **Objetivo:** Uma revisão das últimas duas décadas de publicações que relatam o grau de melhora do zumbido com a cirurgia do estapédio.

**Método:** 125 artigos publicados nos últimos 20 anos, mencionando a relação entre otosclerose e zumbido. A literatura sempre mostrou a melhora auditiva como principal objetivo e resultado da cirurgia do estapédio. No entanto, artigos recentes reforçaram a necessidade de cirurgia para a melhora do zumbido. O momento ideal para avaliar o zumbido através de diferentes escalas é no sexto mês pós-operatório. A melhora auditiva média estimada é de 93% e a do zumbido, de 85,52%.

**Resultados:** foram revisados resumos de 12 artigos que preencheram os critérios de pesquisa, sendo incluídos no estudo 8 artigos de acordo com os critérios de seleção. Este estudo investiga o grau de melhora do zumbido com a cirurgia do estribo, utilizando diferentes escalas: *Tinnitus Functional Index*, Escala Visual Analógica, *Tinnitus Functional Index* e Escala Visual Analógica, Escala Visual Analógica e "questionário sobre o zumbido", método de Newman e o *Tinnitus Score Advocated*, da Sociedade Audiológica do Japão (*Japan Audiological Society*). O total das amostras dos artigos avaliados foi de 254 participantes.

**Conclusão:** Concluímos que a cirurgia do estribo é bastante eficaz no tratamento do zumbido (melhora média de 85,52%) e perda auditiva (melhora média de 93%). Ao decidir sobre a indicação cirúrgica em pacientes com otosclerose, a presença e o nível de zumbido devem ser considerados, assim como o nível de audição.

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## Introduction

Otospongiosis is temporal bone osteodystrophy, characterized by disordered bone resorption and neoformation in genetically predisposed individuals. All the otic capsule may be involved, although the area close to the fissula ante fenestram (anterior to the oval window) is the most commonly affected site.

Clinically, otospongiosis is characterized by progressive conductive and/or mixed hearing loss and by tinnitus. Sensorineural hearing loss, aural fullness and vertigo may eventually occur.

Tinnitus is an abnormal sound sensation that some patients with hearing loss experience. Patients with

otosclerosis may experience variable degrees of tinnitus associated with their hearing loss. Gristwood et al.<sup>1</sup> reported that 65% of patients with hearing loss due to otosclerosis have tinnitus based on a review of 1014 consecutive cases of clinical otosclerosis.

Then Deuyer et al. reported that tinnitus prevalence is estimated to be 65–85%.<sup>2</sup> Previous studies have indicated that tinnitus does decrease when hearing improves after stapedectomy.<sup>2</sup> Several studies have been talking about the high prevalence of tinnitus and the degree of discomfort in patients with otosclerosis and improvement after surgery. However, only a few previous studies in general have delineated the time frame of tinnitus improvement or quantified the improvement using a validated tinnitus instrument in a

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