Critical Review: In individuals with sensorineural hearing loss, are there benefits of open-canal hearing aid fittings relative to those of traditional fittings?

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This critical review examines the benefits of open-canal hearing aid fittings relative to those of traditional fittings. The relative benefits of open-canal fittings have been described using varying parameters; the occlusion effect, aided sound localization and subjective measures have all been used to demonstrate the advantages of open-canal fittings relative to traditional hearing instrument fittings. Overall, research suggests that fitting patients with open-canal hearing instruments, when appropriate, does decrease the occlusion effect, improve aided sound localization abilities, and leads to an overall increase in subjective patient satisfaction.

Introduction

Open fitting hearing aids have re-emerged in the hearing aid industry with resounding popularity. One survey conducted in January 2006 estimated that 17% of hearing aid fittings were open (Mueller, 2006), with the percentage of open-canal hearing instruments dispensed on the rise since then.

Traditionally, hearing aids have occluded the ear canal in order to increase the sound pressure level of the signal arriving to the tympanic membrane and reduce the risk of acoustic feedback. However, occlusion of the ear canal has several disadvantages, such as the occlusion effect, lost localization cues, poor sound quality and discomfort.

While open-canal hearing instruments have been available for decades, improved digital signal processing (DSP) technology has made open fittings possible for a larger portion of hearing loss configurations. In particular, advances in acoustic feedback reduction algorithms have made modern open-canal hearing instrument fittings feasible. Sophisticated feedback reduction algorithms are an integral part of open-canal hearing aids, allowing them to provide 8 to 15dB of additional gain before entering the audible oscillatory state (Parsa, 2006).

The many benefits of open-canal fittings that have lead to their rise in popularity have been described by Mueller (2006): improved comfort of fit, cosmetics, sound quality, localization, ease of repair/maintenance, intelligibility, high frequency gain and reduction of the occlusion effect. Many of these benefits are a result of the design of these products; leaving the ear canal open allows for air circulation as well as un-altered sound information to enter the ear canal.

However, while the numerous advantages of open-canal hearing aids over traditional fittings have been theorized, little research has been conducted to verify these benefits. The high dispensing rate must be validated by evidence supporting the advantages of open-canal hearing instrument fittings. Hence, clinicians need to be critically examining the validity of hearing instrument products before prescribing the technology.

Objectives

The primary objective of this review is to critically evaluate existing literature examining the benefits of open-canal hearing instruments relative to traditional fittings. A secondary objective is to critically evaluate the various measurement tools used to describe the advantages of open fittings.

Methods

Search Strategy

Computerized databases, including MEDLINE-OVID, CINAHL, and PubMed, were

traditional amplification. Additionally, on the Open-Canal Questionnaire, participants wearing open-canal hearing instruments scored better on the questions of occlusion than did the non-open canal group. All other areas failed to reach statistical significance, though the scores on every measure were better for the open-canal subjects when compared to the traditionally fit group.

Gnewikow and Moss (2006) collected information for their study largely through the use of mailed surveys. While the utilization of well designed surveys can provide vital information for future hearing aid fittings, bias may be seen in those that completed the surveys and those that chose not to. Moreover, the empirical questionnaire developed for this study has not been tested for validity or reliability. Finally, the group of participants was recruited from one centre only.

Discussion

The results of the aforementioned studies validate many of the theorized benefits of open-canal hearing instruments. Though various measurement tools were utilized in varying studies, all showed significant benefits of open-canal hearing aids not seen in traditional fittings.

All of the studies evaluated used valid and reliable measures of a portion of the benefits open-canal hearing aid fittings offer, excepting the empirically designed questionnaire utilized in the study by Gnewikow and Moss (2006). Both subjective