The effect of tympanic membrane perforation on real-ear to coupler difference acoustic transform function

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Abstract

Real-Ear-to Coupler Difference (RECD) is the difference in decibels as a function of frequency, between the SPL at a specified measurement point in the ear canal and the SPL in a 2cc coupler for a specified input signal. OBJECTIVE: we investigated the effects of tympanic membrane perforation on the RECD. METHODS: RECD was obtained using an insertion gain analyzer for 24 adult patients with dry tympanic membrane perforation (group 1: 31 ears) and 20 healthy adult control subjects (group 2: 40 ears). RESULTS: Cases showed moderate conductive hearing loss. There was no statistically significant difference between both anterior-posterior locations as regards the degree of hearing loss or as regards the RECD. There was a statistically significant difference of RECD at frequencies 250 Hz, 500 Hz, and 750 Hz, between both groups. The RECD was 3 to 6 dB lower in group 1 than in group 2. There was a statistically significant difference on comparing RECD at frequencies 250 Hz, 500 Hz, 750 Hz, and 1000 Hz in right ears, and at frequencies: 250 Hz and 500 Hz and 750 Hz in the left ears of both groups. In group 1, there was no statistically significant difference of RECD values at different frequencies between right and left sided perforations and there was no statistically significant difference of RECD values at different frequencies between both genders except at 1500 Hz. There was no statistically significant correlation between the RECD and the age of the patients or their air-bone gap. CONCLUSION: RECD in patients with tympanic membrane perforation is lower than normal at frequencies (250 Hz - 750 Hz). We recommend that this discrepancy should be compensated for if average normal RECD are used in the pre-selection of target and gain to avoid under-amplification at lower frequencies. However, the large inter-subject variation strongly suggests the need for individual RECD measurements whenever possible in fitting aids for patients having tympanic membrane perforations.

Keywords

Real-Ear-to Coupler Difference, tympanic membrane perforation,