

Original Article

Transient Evoked otoacoustic emissions otologically in normal adults

Mowafaq Al-Qhaiwi

King Hussein Medical Centre(KHMC)

Amman-Abu-alanda 11592 PO Box 746 Jordan

Request for reprints to Dr Mowafaq Al-Qhaiwi Amman-Abu-alanda 11592 PO Box 746 Jordan

Abstract

Objective: To examine the effects of aging on the existence of transient evoked otoacoustic emissions in normal adult.

Material and methods 40 subjects (30 males, 10 females) aged between 20-60 years were divided into 4 groups by representing. All patients were screened to insure otologically normal subjects based on history and otological examination and tympanometry. Examined was done in the KHMC between 1999-2000 using a manually Operated Madson Audiometer ,and the IL 088 otodynamic Analyser was used to record transient otoacoustic emission.

Results The age groups were 20-30,31-40, 41-50, 51-60 years .There was no significant difference in threshold as a function of age at $p < 0.05$.The TEOAE amplitude as function of audiometric threshold between (0-20db hl) was not significant.

Conclusion: Age appears to have no effect on TEOAE level when the degree at hearing is within normal.

Introduction

Transient Evoked acoustic emissions (TEOAEs) are generated by a series of short sound such as clicks or tone bursts, that can be measured with a low-noise sensitive microphone in the external ear canal, and these emissions are originated from the cochlear outer hair cells The existence of TEOAE provides clear evidence that the outer hair cell ,actively participate in the processing of acoustic signal , because otoacoustic emission OAEs are absent or diminished when outer hair cells are damaged, their measurement is used clinically as a non-invasive ,fast and objective test for evaluating cochlear status.

The objective of this study is to re-examine the effects of aging on TEOAEs in a group of otologically normal adults and to investigate the contribution of age on the existence of TEOAEs

Materials and methods

40 subjects were recruited into the study with age range 20-60 years. They were grouped into 4 groups of 10 each according to age:20-30,31-40, 41-50 and 51-60 years. All subjects were screened to ensure otological normality from history otological symptoms of ear disorder and noise exposure. They were all otologically examined and tympanometry was done. For all the subjects threshold did not exceed 20 dBHL for Pure tone at the frequency range (0.25-

4kHz).Hearing threshold were determined using a manually operated Madsen audiometer fitted with TDH-49 earphone calibrated according to IEC 318 coupler at each of the frequency range 0.25-4 KhZ).Testing was conducted in an acoustically isolated testing booth with background noise before those specified in (ISO 8253).Tyapometer (immitance analyzer) Type Madsen was used to the middle ear function for each subject. Transient evoked otoacoustic emissions were recorded using the IL 0889 Otodynamic analyzer.

Methods

All testing was conducted in an acoustically isolated testing booth with group noise below those specified in 150- 8253 at KHMC. All subjects first were examined otologically by ENT surgeon then tympanometry was carried out for each subject to ensure that there was no wax or any middle ear pathology which might affect the recording at TEOAEs. After that, hearing threshold measurements were conducted on each subjects for frequency range 0-25-4Hhz). Any subject who gave a hearing above 20 was excluded from the study. After screening for otological normality for each subject TEOAEs were recorded using

the IL 088 Analyser. The stimulus consisted of conventional non linear click delivered at 75 dB peak SPL . The ear canal was checked using a probe and adjusted to access any assembly faults. TEOAEs were done twice to ensure reliability of recording .Response was accepted when the replication was 75% Or greater. Data was analysed using analysis of variance (ANOVA) to compare thresholds for frequencies from 0-25 Khz

Results

Discussion

There has been considerable disagreement regards the effect of aging on OAEs It is not clear from several studies if changes in OAEs reported as a function of age are really the effects of aging or infact, if such changes are related to decreased hearing sensitivity and are independent of aging, Previous studies showing apparently age related decline in TEOAEs have been challenged on grounds that the degree of hearing sensitivity was not controlled .For example, Bonfils² reported that TEOAES were detected in all ears at subjects less than 60 years and there is an increase in the threshold of TEOAEs as a function of age but the interpretation findings is confounded by age related hearing loss. Previous studies in human s concluded there was a statistically significant affect of age on the amplitude of emissions .The results of this study does not

Audiometric thresholds and imittance were within normal range for all subjects. Analysis of Variance indicated that there was no significant differences in audiometric threshold as a function of age at $p,0<005$) in addition to that the TEOAEs amplitude as a function of audiometric threshold between 0-20 dB HI) was not significant, and there is no significant effect of age on TEOAEs amplitude

agree with previous findings. One explanation is that previous studies could be using some subjects with hearing loss and this will affect presence or absence of emissions. In previous studies it was not clear about the hearing sensitivity for subjects and the normal range not defined and this may bring about audiometric thresholds among age groups and the differences seen in the Otoaccoustic emission(OAE) levels. The results of the present study is in agreement with stove and Norton findings and Stover that advanced age ahs no direct effect on OAE measures⁶.

Conclusion:

It can be concluded that age has no effect on Transient-Evoked-Otoaccoustic- emission (TEOAE) level when the degree of hearing is within normal.

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