IMPEDANCE AUDIOMETRIC RESULTS FOR THE DIFFERENT PROBE TONES*

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Impedance Audiometry yields information quickly and it does not require judgements by the patient. Low frequency probe tones are insensititive to identify .and differentially diagnose few pathological conditions. High-frequency probe-tones provide additional information and help us to indentify those pathological conditions which do not always yield pathognomonic patterns with conventional tympanometry (which use low-frequency probe-tones). Hence diagnostic findings for the different probe-tones need to be compared. Present study is carried out to compare the results obtained using the high frequency probe tones and low frequency probe-tones.

Aim of the study was to establish normative data for the different probe-tone frequencies (i.e. 226Hz, 660Hz and 1KHz). Study was carried out on normals as well as on few pathological subjects also. Hence, comparison between normals and clinical population was possible.

Totally 15 normal hearing subjects (20 dBHL, ANSI 1969) were selected .(8 females and 7 males) with age ranging from 16 years to 24 years (Mean age 20 years). None of them had any middle ear pathology. Further, 6 pathological -subjects were selected. Two of them had moderate sensori-neural hearing loss, three had mixed hearing loss (Otosclerosis) and one had conductive hearing loss (Otosclerosis).

ZO 174 Immittance Audiometer was calibrated and used for testing the subjects. The testing was done in a sound treated room.

Data were obtained and analyzed using appropriate statistical procedures. Means and Standard Deviations were obtained. Significant difference between the mean values for the different probe-tone frequencies were found out. The following results were obtained in normal subjects.

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* An excerpt from the Master's Thesis. University of Mysore, 1986.

1) There was significant difference between static compliance values obtained-using 226 Hz and 660 Hz (P<0-01) and 226 Hz and 1 KHz (P<0-05) probe-tone-frequencies (when the probe was in right ear).

There was significant difference between Static Compliance values obtained using 226 Hz and 660 Hz (P<0-01) and 226 Hz and 1 KHz (P<0-01) probe-tone frequencies (when the probe was in the left ear).

2) There was significant difference between compliance (PVT) values obtained using 226 Hz and 660 Hz (P<0-01) 660 Hz and 1 KHz (P<0-01) and 226 Hz and 1 KHz (P<0.01) probe tone frequencies

3) There was significant difference between middle ear pressure values obtained using 226 Hz and 660 Hz (P<0-02) and 226 Hz and 1 KHz (P<0-01) probe tone frequencies (when the probe was in the right ear).

There was significant difference between middle ear pressure values obtained using 226 Hz and 660 Hz (P<0-01) and 226 Hz and 1 KHz (P< 0-01) probe tone frequencies (when the probe was in the left ear).

4) There was significant difference between Gradient values obtained using 660 Hz and 1 KHz (P<:0-01) probe tone frequencies.

5) There was significant difference between contra reflex threshold values obtained using 226 Hz and 660 Hz (P<0-01) 660 Hz and 1 KHz (P<0-01) and 226 Hz and 1 KHz (P<0-01) probe tone frequencies.

In case of subjects with moderate sensori-neural hearing loss, there was significant difference between compliance (PVT) values obtained using 226 Hz and 660 Hz (P<0-01) 660 Hz and 1 KHz (P<0-01) and 226 Hz and 1 KHz and 1 KHz (P<0-0l) probe tone frequencies. Also there was significant difference between - contra reflex threshold values obtained using 226 Hz and 660 Hz (P<001) 660 Hz and 1 KHz (P<0-0l) and 226 Hz and 1 KHz (P<0-01) probe tone frequencies.

In case of subjects with Otosclerosis, there was significant difference between compliance (PVT) values obtained using 226 Hz and 660 Hz (P<0-01), 660 Hz and 1KHz (P<0-01) and 226Hz and 1 KHz (P<0-01) probe tone frequencies, Also static compliance values increased progressively from low frequency probe tone (i. e. 226 Hz) to high frequency probe tone (i. e. 1 KHz).

In other words, the type of tympanogram obtained using 226 Hz probe-tone frequency was different from the type of tympanogram obtained using 1 KHz probe tone frequency. For example, 2 subjects with Otosclerosis exhibited, As type tympanogram when tested using 226 Hz probe tone frequency. The same-

subjects showed B type tympanogram when tested using 660 Hz and 1 KHz probe tone frequencies.

Further, other two subjects with Otosclerosis exhibited As type tympanogram when tested 226 Hz and 660 Hz probe tone frequencies. The same subjects showed, A type tympanogram when tested using 1 KHz probe tone frequency.

From the above results, the following conclusion can be drawn.

1) Static Compliance, Middle Ear Pressure, Gradient, Compliance (PVT) and Contra Reflex Threshold Values are influenced by the different probe-tone frequencies (i. e. 226 Hz, 660 Hz and 1 KHz).

2) Probe tone frequency has an effect on Impedance Audiometric Measurement in normals as well as Clinical population.

3) Low frequency probe-tone (226 Hz) provides useful clinical information in terms of diagnosis of many pathological conditions of the middle ear. However, high frequency probe-tone are more sensitive to a few specific lesions that affect ossicular chain and ear-drum pathology.