

A Study on Remote Masking*

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The phenomenon of Remote Masking was first described by Bilger and Hirsh (1956). Remote Masking is a low frequency phenomenon. It consists of a threshold rise for low-frequency tones when the ear is exposed to a high frequency noise band delivered at overall Spl of 80-100 dB.

There are two possible contributing factors to explain remote masking phenomenon studies done by several investigators and they attributed this phenomenon to mechanical nonlinear distortion of the cochlear partition as an effect of the envelope of a non-uniform signal.

Another possible contributing factor to Remote Masking given by Ward (1963) is the attenuation of low frequency stimuli by elicitation of acoustic reflex by the high frequency masker.

In recent years Remote Masking has been studied in patients with auditory impairments in the hope that it could serve as a test for topographic diagnosis of deafness.

Clinical studies using Remote Masking have revealed, reduced Remote Masking value in conductive hearing loss subjects and variable in SN hearing loss cases. They proposed this Remote Masking value can be used as test of cochlear partition stiffness.

As there was no study on Indian population on Remote Masking, this study was undertaken to determine the norms in normal hearing adult subjects.

A sample of 36 subjects with an age range of 17-36 years was selected for the present study.

The test frequencies selected for the study were 250 Hz, 500 Hz and 1000 Hz. Narrow band noise centered around 3 KHz at 98 dB Spl (72 dB HL) (300 Hz band width, as per the specification given by the OB70 Madson audiometer manufacturer) was used to mark the pulsed tone of 250 Hz, 500 Hz and 1000 Hz.

To establish the hearing threshold and Remote Masking threshold for pulsed tone, Vernier scale of 1 dB step was used. After establishing the hearing threshold for pulsed tone, the noise was presented 98 dB Spl in the same ear (Ipsilateral masking) and the masked thresholds for each frequency were determined. The Remote Masking value was computed by finding out the difference between the masked threshold and unmasked threshold. Remote Masking values were determined in the same manner for the other ear also.

Remote Masking value was obtained for 16 SN hearing cases, to verify whether Remote Masking value is related to degree of hearing loss or not in SN hearing loss cases.

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The data obtained were analyzed statistically.

Conclusions

The following are the conclusions of the present study :

- (1) Regarding "Remote Masking", there is no significance difference between right ear and left ear values in normal hearing subjects.
- (2) Males and females do not significantly differ with respect to "Remote Masking".
- (3) As per the present study "Remote Masking" values of normal hearing subjects are as follows : 20.9 dB at 250 Hz, 32.79 dB at 500 Hz and 47.08 dB at 1000 Hz.
- (4) The present study revealed that the Remote Masking value is not related to degree of hearing loss in SN loss subjects.

This is in agreement with the results reported by Cervellera *et al.* (1980).

Recommendations for Further Study

- (1) "Remote Masking" values are to be determined in Meniere's disease cases.
- (2) As the "Normative data" established in the present study differ at 1000 Hz from the data reported by other investigators, further studies are needed.

Limitations

Bandwidth of the narrow band noise used in this study was not actually verified due to non-functioning of the noise analyzing equipment. The specification given by the manufacturer of OB70 audiometer regarding bandwidth of narrow band noise is assumed as the bandwidth of the noise used in this study.