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THE PHENOMENON OF "INCREASED" BONE CONDUCTION ¹

NOBLE H. KELLEY

THE PROBLEM AND TECHNIQUE

Previous experimentation has indicated that under the following two conditions one's sensitivity for bone-conducted sound is increased: (1) closure of the external auditory meatus; and (2) filling the meatus with water. There has been much discussion as to whether this "increased" sensitivity is apparent or real. This study attempted to investigate the phenomenon of "increased" bone conduction in the normal occluded ear. The experimentation was conducted in a sound proof room. The source of sound was a Western Electric 2-A audiometer, which permitted control of the intensity of eight octave frequencies, ranging from 64 to 8192 cycles. The bone conduction receiver was a vibrating button-type oscillator, part of a bone conduction hearing aid. Measurement was made with the receiver on the mastoid bones and on the forehead, and with the ears both open and occluded. Occlusion was affected with white vaseline.

EXPERIMENTAL RESULTS

Bilateral occlusion increased the auditory sensitivity for bone-conducted sound as follows:

Frequency Cycles	Threshold Lowered — db
64	25
128	26
256	24
512	20
1024	16
2048	2
4096	0
8192	0

The effect of occlusion was approximately the same with the bone conduction receiver on the forehead as when on the mastoids.

Forehead-mastoid decrement values were also obtained. This refers to the decrease in intensity of sound due to propagation through the cranial bones from the forehead to the mastoid. The

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decrement was practically the same with the ears open as when they were occluded. The values are as follows :

Frequency Cycles	Decrement db
64	13
128	14
256	14
512	13
1024	9
2048	7
4096	7
8192	10

A consideration of transcranial decrement values is very important in making auditory threshold measurements for bone-conducted sound. This may be illustrated in a case of complete unilateral deafness. With the bone conduction receiver on the mastoid adjacent to the deaf ear, the threshold values obtained will differ from those of the normal ear opposite only by the amount of transcranial decrement. This indicates that in making bone conduction measurements the better ear should be presented with a masking sound.

This study establishes the fact that there is increased sensitivity for bone-conducted sound in the normal occluded ear for frequencies up to 1024 cycles. It is therefore important in making these measurements to insure that the meati are not already occluded with cerumen.

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