



*The following is a brief letter of explanation distributed to variety of people involved in WV workers compensation hearing loss claims in 1990. Its purpose was to describe why the wide spread use of bone conduction thresholds by “experts”, for determining hearing loss disability, was not valid unless there was actually a conductive hearing loss. Gary Harris*

## **Use of Bone Conduction Thresholds in Hearing Loss Claims**

Two related misunderstandings about bone conduction thresholds and their use in sensorineural hearing loss claims have been noted. One has to do with bone conduction thresholds that are worse than air conduction thresholds, and the other has to do with bone conduction thresholds that, in the absence of conductive hearing loss, are better than air conduction.

Quoting from G. Studebaker’s “Intertest Variability and the Air-Bone Gap” (1967) *Journal of Speech & Hearing Disorders*, 32, pp 82-86:

“... there is widespread belief that bone-conduction thresholds cannot be worse than air-conduction thresholds. Although an unqualified statement to this effect is rarely seen in the literature it is often ...given by “experts” to various medical and paramedical groups.”

“... when both air- and bone-conduction thresholds are obtained on the same individuals, the difference between air- and bone-conduction thresholds for each subject may be plotted as a ...distribution ...[and] the mean of the distribution of differences is 0 [zero]. Approximately one-half of the differences then are positive and one-half negative. In other words, approximately one-half of the air-bone relationships obtained on patients without middle ear disease should have bone conduction thresholds worse than air-conduction.”

This means that in the absence of conductive hearing loss it is normal, and expected, that sometimes the bone conduction results will be poorer than the air conduction results, and sometimes they will be better. To be more specific, in a population with no conductive hearing loss: 38% will have no difference in their air- and bone-conduction thresholds, 24% will have bone conduction 5 dB better than air conduction and 24% will have bone conduction 5 dB worse than air conduction, 6% will have bone conduction 10 dB better than air and 6% will have bone conduction 10 dB worse. *The bone conduction variation around air conduction forms a normal bell-shaped curve.*

In summary, bone conduction thresholds can be worse or better –by 10 dB and rarely 15 dB- than air conduction in the absence of conductive impairment. Bone conduction thresholds should not be used for determining disability unless there is conductive hearing loss. The air conduction results are more accurate, having greater reliability and validity, than bone conduction results in these cases of sensorineural hearing loss.

--- Gary Harris, 1990