The Gellé Test, Quantitatively Performed, as a Measure for the Mobility of the Stapes

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Mobilisation of the stapes in otosclerosis has several advantages to the fenestration operation. It is very important that successful mobilisation can lower the threshold for air-conduction even under the pre-operative bone conduction level. In about half of the otosclerotic patients the stapes footplate is so firmly fixed that mobilisation has no chances of success. The original Gellé test being a supraliminal loudness balance test is a qualitative trial and not very accurate. The purpose of this study is to examine the degree of fixation and the possibility of mobilisation ante operationem. It proved to be possible to note exactly the effect of pressure variations in normal and pathological ears by performing the test in a quantitative manner, noting the threshold with and without pressure variations in the external auditory meatus.

Alterations in the air pressure cause increasing stiffness of the membrane and ossicular chain, resulting in a rise of the threshold for low tones, this having a greater effect on air-conduction than on bone conduction. A tone generator and an amplifier were used as the source of sound, feeding a pneumophone, and connected air-tight to the ear. The pneumophone was also used to apply air pressure. An intensity modulator was operated by the patient himself and the threshold recorded by means of a level recorder.

In air-conduction a threshold shift of 20–25 db was found at a pressure of 60 cm. water at 250 cps, in normal subjects; about the same as for inner ear deafness. The effect at 500 cps was somewhat smaller. Otosclerotic patients showed a threshold shift of only 0–10 db at 250 cps; this was also the case in non-oto-sclerotic middle ear deafness.

Operational findings showed that in nearly all cases with a low threshold shift an ankylotic stapes was present. After successful mobilisation this threshold shift proved to be almost normal again.