Since 1958, stapedotomy has been the method of choice for middle ear surgeons who operate on patients suffering from otosclerosis, especially stiffening of the interface between the stapes footplate of the middle ear and the oval window, which is a part of the cochlea of the inner ear. Later, many surgeons started to use the Schuknecht prosthesis, which consists of cartilage and is inserted into the complete opened oval window during stapedectomy. Our study shows that basilar membrane (BM) displacement is increased with an increasing stapes footplate area by a numerical simulation including the different geometries. An increase in the footplate area leads to an increase in BM displacement equivalent to 13 dB. Therefore, we recommend prostheses with areas as big as the normal stapes footplate area.
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