Cochlear implantation via the round window membrane minimizes trauma to cochlear structures: a histologically controlled insertion study.

OBJECTIVE: To evaluate cochlear implant trauma to intracochlear structures when inserting the electrode via the round window membrane. MATERIAL AND METHODS: Eight fresh human temporal bones were evaluated histologically after insertion using two types of cochlear implant array. Bones underwent a special fixation and embedding procedure that allowed sectioning of undecalcified bone with the electrode in situ. Insertions depths were evaluated radiologically and histologically. RESULTS: All arrays were found in the scala tympani of the cochlea. Basal trauma could be avoided in all but one specimen. The mean depth of insertion was 382.5 degrees. Apically, only one implanted bone showed cochlear trauma exceeding lifting of the basilar membrane. CONCLUSION: Insertions through the round window membrane were shown to be atraumatic, even in basal cochlear regions. This route of insertion might be very effective for combined electric and acoustic stimulation of the auditory system.