

**1999 CONFERENCE ON IMPLANTABLE AUDITORY PROSTHESIS  
ABSTRACTS FOR POSTER PRESENTATIONS**

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*SESSION 1*

*POSTER 22*

**INSERTION STUDY USING NEW PERI-MODIOLAR ELECTRODE ARRAY DESIGNS**

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Intracochlear multi-channel cochlear implants have been shown to successfully provide auditory information for profoundly deaf patients by electrically stimulating discrete populations of auditory nerve fibers via a scala tympani (ST) electrode array. Histological and radiological examination of implanted human temporal bones showed that the current straight Nucleus® array is usually positioned against the outer wall of the ST. An electrode array close to the modiolum could be expected to reduce stimulation thresholds and result in a more localized neural excitation pattern.

In the present study, we investigated various peri-modiolar array designs for both their surgical insertion properties and their potential of insertion-induced damage. The electrode arrays were implanted into formalin-fixed human temporal bones, which had been prepared as for cochlear implant surgery. Following insertion the temporal bones were radiographed using a "cochlear view" orientation and image analysis performed using those radiographs to establish the insertion depth and exact lateral position of the array within the cochlea. Most of the implanted temporal bones were then histologically processed with the electrode array in place and subsequently assessed for the position of the array as well as intracochlear damage related to the insertion. However, a subgroup was assessed differently. Following insertion a surface preparation of the cochlea was performed and the scala vestibuli carefully exposed. Following the removal of the endostium the underlying basilar membrane was inspected under the microscope for damage from the electrode array implanted into the scala tympani. The temporal bones were then radiographed and image analysis performed.

The performance of the various array designs in regard to insertion-induced damage, their coil or re-coil properties as well as surgical issues, like the required insertion techniques, are discussed. The performance of the array designs trialed in this study is compared to safety data for insertion of the standard Nucleus® array.



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