A Model for Cochlear Implant Electrode Insertion and Force Evaluation: Results with a New Electrode Design and Insertion Technique


> Objective of the study
To evaluate the insertion characteristics of the Contour Advance™ electrode in temporal bones.

> Study design
A variety of techniques were used in the study:

- Contour Advance electrodes were inserted using Advance Off-Stylet™ (AOS) technique into 5 cadaveric temporal bones while being viewed using fluoroscopy (video x-rays).
- Histologic evaluation was then conducted on the 5 bones by a process involving embedding in acrylic, sectioning and inspection for trauma and electrode position.
- Hydraulic pressure within the cochlea during insertion of the Contour Advance was measured in another bone.
- Mechanical insertion forces were measured for Contour™ with Standard Insertion Technique (SIT) and Contour Advance with AOS technique. The forces were then compared.

> Key findings in the paper include
- Fluoroscopy and histology show that Contour Advance with AOS technique achieves its design goals of consistent perimodiolar positioning in the Scala Tympani and an atraumatic insertion with limited outer wall forces through a smooth insertion without contact with the outer wall of the cochlea.
- Hydraulic pressure analysis shows that the electrode size and shape allows egress of perilymph around the array, resulting in no detectable hydraulic forces in the cochlea.
- Insertions of Contour Advance electrode with AOS technique are less traumatic and result in a more reliable placement than the Contour electrode inserted with Standard Insertion Technique thus the Contour Advance with AOS technique is a significant improvement over the Contour electrode with Standard Insertion Technique.