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A COMPARATIVE STUDY OF PHASE-CONTRAST AND CONVENTIONAL X-RAY IMAGING IN HUMAN TEMPORAL BONE SAMPLES.

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This study compared a new x-ray modality, phase-contrast radiography, with conventional radiography for imaging in human temporal bones and also investigated its potential application in the development of electrode arrays for advanced cochlear implants. Nucleus standard electrode arrays and peri-modiolar Contour™ electrode arrays were implanted into the cochleae of 10 human temporal bones. Both conventional and phase-contrast radiographs were taken of each temporal bone. The phase-contrast radiographs showed significant improvements over conventional radiographs in the detail of temporal bone images. These improvements included enhanced contrast at the edge of canal type features, inherent image magnification, higher spatial resolution, and ability to use detectors such as Imaging Plates. The results demonstrate that phase-contrast imaging can have important advantages in visualisation of anatomical details of both the inner ear structures and the microelectrode. It can provide a clearer definition of electrode location in relation to cochlear walls. This study demonstrates the feasibility of applying phase-contrast radiography to studies of the human temporal bone. However, its usefulness in the imaging of larger objects or perhaps even with patients in a clinical setting will require further investigation.



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