THREE-DIMENSIONAL RECONSTRUCTION OF THE COCHLEA AND TEMPORAL BONE


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In the preoperative evaluation of prospective cochlear implant patients high resolution computed tomography is routinely performed in our cochlear implant clinic. The sectional images provide the surgeon with essential information about cochlear and mastoid pathology, and are important for planning surgery. Three-dimensional reconstruction can help to visualize the complex anatomy in the temporal bone. We have examined the value of pre- and postoperative three-dimensional reconstruction on our own personal computer based image analysis system. The accuracy of this procedure has been demonstrated by reconstructing seven cadaver temporal bones (including one with an implanted cochlea), and making measurements that were compared with identical ones on the same bones when dissected. The comparison of the data showed good statistical correlation. We examined the CT-scan series of eight children prior to cochlear implantation and one of these postoperatively (a seven year old girl with a Mondini deformity). It showed in the intracochlear position of the electrode array following the basal turn of the rudimentary cochlea. By its ability to extract certain features from the existing CT-scans and selectively displaying them at any preferred angle and level, our three-dimensional reconstruction programme provides an important tool for the implanting surgeon, helping her/him conceptualize the patients anatomy and plan the operation.

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