THE POSTNATAL GROWTH OF THE TEMPORAL BONE AND ITS IMPLICATIONS FOR COCHLEAR IMPLANTS IN CHILDREN

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An understanding of the postnatal growth of the temporal bone is an important prerequisite for the development of cochlear implantation in very young children. Such information will have an important bearing on both the design of the implant and the surgical procedure. We have measured the postnatal growth of the temporal bone by direct anatomical measurements on 60 cadaver specimens with ages ranging from 2 months to 84 years. Nineteen anatomical landmarks with implications for cochlear implant surgery were identified on each bone and the distance between these points measured. The inner and middle ears were adult size at birth. The external auditory canal and most parts of the temporal bone were subject to significant lateral growth. The size of the pneumatized mastoid increased with age in all directions. Significantly, no postnatal growth was observed in the facial recess. The fossa incudis showed no growth relative to the round window and was found to be a convenient fixation site for the electrode array close to the cochlea. However, with the electrode leadwire fixed at a cortical site such as the posterosuperior point of McEwan's triangle, the leadwire would be subject to approximately 20 mm of growth between this point and the cochlea.

These anatomical results indicate that a paediatric cochlear implant would require an expandable leadwire to accommodate these growth changes.
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