EXPANDABLE LEADWIRES FOR A PAEDIATRIC COCHLEAR IMPLANT

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Anatomic studies of skull growth have shown an increase (about 20 mm) in the distance between the round window and the asterion where the receiver-stimulator is usually located. In order to accommodate the skull growth of young patients, an expandable leadwire connecting the receiver-stimulator and the electrode array is necessary. Several expandable leadwires were evaluated in experimental animals, including helical leadwires protected by Silastic tubes and leadwires, with "V" or "W"-shaped levels in a single phase, and protected by thin Silastic or Teflon bags. The leadwires together with their controls were implanted on young animal's scapulae, temporal and parietal bones and in subcutaneous tissue. The in vivo expansion of the leadwire was monitored by periodic x-ray examination and the force to expand the leadwire was measured at the completion of implantation. The results showed that helical leadwires were surrounded by fibrous tissue and a large force was required to expand them. The V or W-shaped leadwires were able to expand up to 20 mm in vivo and only a moderate force was required to expand them. For most of the cases, there was none or little fibrous tissue in Silastic or Teflon bags. The results indicated that for a paediatric cochlear implant, leadwires with V or W-shaped levels could expand and biocompatible envelopes could effectively protect the leadwires from being bound by fibrous tissue.
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