Conclusions: The robotic system allows the accurate and safe drilling of a minimally invasive tunnel to the inner ear for cochlear implantation procedures. The evaluation of the system in a first in man clinical trial will take place in the near future.

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Emerging Technologies (2) (R661)

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The Case for Cochlear implantation Robotics and an autonomous drilling robot

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Learning Objectives: Cochlear implantation leads to cochlear trauma, reducing this may help optimize implantation performance. An autonomous cochlea drilling robot may be one of the components in reducing this trauma.

Introduction: To detail the intra cochlear trauma caused during cochlear implantation and its effect on CI performance. To demonstrate a human trial of an autonomous robot capable of performing a bony cochleostomy whilst preserving the underlying endosteal membrane.

Methods: A review of the implantation literature assessing cochlear trauma and its impact on implant performance. An autonomous cochleostomy robot was used to create a cochleostomy in 3 live patients during a cochlear implantation procedure.

Results: Twenty one papers were identified which were relevant to our search. In total, 686 implants were inserted and 121 (17.6%) showed evidence of trauma.

The robotic cochleostomy drilling robot was able to perform a complete cochleostomy whilst preserving the underlying endosteal membrane.

Conclusions: Cochlea trauma is a common result of cochlear implantation. An autonomous robotic drill can perform a cochleostomy whilst preserving the underlying endosteal membrane. This is one of the necessary steps in being able to perform a completely robotic cochlear implantation - with an intention to reduce the typical cochlear trauma.

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Free Papers (F662)

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Middle fossa approach for cochlear implantation

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Learning Objectives: To present indications, surgery and results of cochlear implantation via middle fossa approach.

Introduction: Classic approach to the cochlea through the mastoid and facial recess may not be suitable for patients after middle ear surgery for cholesteatoma. In 1998 Colletti presented a technique to bypass the middle ear, and insert the electrode through the middle cranial fossa approach.

Material and methods: In our department cochlear implant program started in 1994 and till now 1266 cochlear implantations were performed. In 4 patients middle fossa approach was used. Indications, surgical technique and results in this group were analyzed. Results: Initially 6 deaf patients after middle ear operation for cholesteatoma were qualified to cochlear implantation via middle fossa approach. A middle cranial fossa craniectomy was performed. Then a careful dissection of the dura was carried out to expose the arcuate eminence and the greater petrosal nerve. In two cases surgery was stopped because of strong adhesions and bleeding from the dura during preparation. In the rest 4 cases the basal turn of the cochlea was discovered, the cochleostomy was done and successful implantation was performed. The time of surgery was nearly two times longer than during standard implantation. In 3 cases there were no complications and in one case hematoma occurred 2 days after surgery and the patient was reoperated. Postoperative CT showed correct intracochlear position of the electrode in all cases. All 4 patients use their implants and have good hearing thresholds in sound free field, but they can't fully communicate using hearing only and require lip reading.

Conclusions: Middle fossa approach enables cochlear implantation in deaf patients after middle ear surgery where implantation through standard approach (antromastoidectomy and posterior tympanotomy) is not possible.

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Systematic Review of VSB in C/M Hearing Loss

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Pubmed, OvidSP (MEDLINE), EMBASE (DIMDI), the NHR Centre for Reviews and Dissemination (including NHS EED, DARE, and HTA), and the Cochrane Library were searched to identify papers published between January 2006 and December 2015 using the MeSH terms