**Robotic Cochlear Implantation –**

**Feasibility Study for a Retrofacial Approach**

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**Introduction**

The first keyhole access, minimally invasive robotic cochlear implantation has recently been performed. It utilizes image guidance to create a tunnel to the round window via the facial recess. Based on the currently published data, this approach could only be used in patients with a wide facial recess. In some cases, the procedure was converted to the conventional open approach intraoperatively when the tunnel was an insufficient distance from the facial nerve (<0.3mm) and the tympanic membrane (<0.1mm). The aim of this study is to evaluate the feasibility of utilitising instead a retrofacial approach to create a straight-line tunnel to the round window. This could provide an alternative in robotic cochlear implantation where the facial recess approach is not favourable.

**Methodology**

51 normal CT temporal bone scans performed between 2014 and 2015 were reviewed. A few distances were measured:

1. the straight line distance between the mastoid cortex and the round window via a retrofacial route
2. the perpendicular distance between line in i) and the facial nerve
3. the perpendicular distance between the line in i) and the posterior semicircular canal

**Results**

A total of 51 patients (102 ears) were evaluated. The mean age was 47.5 years. 59.6% of patients were male and 40.4% were female. In 13 ears (12.7% of patients), the straight-line retrofacial approach was not possible due to the anterolateral position of the sigmoid sinus. The average distance from the mastoid cortex to the round window via a retrofacial approach was 37.2mm. The distance of this tunnel to the facial nerve was a mean of 1.2mm (range 0.4mm -2.5mm), and to the posterior semicircular canal was a mean of 1.9mm (range 0.9mm - 2.9mm).

**Conclusion**

The retrofacial route may be a feasible alternative for keyhole access robotic cochlear implantation in patients for whom the conventional facial recess approach is not favourable.