

# PREDICTING SEQUENTIAL BILATERAL COCHLEAR IMPLANTATION PERFORMANCE IN POSTLINGUALLY DEAFENED ADULTS: RETROSPECTIVE COHORT STUDY + PREDICTION MODEL

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**Objective:** Bilateral cochlear implantation is becoming a standard procedure to enhance hearing in noise and quality of life. 1-2 Our aim is to identify which preoperative factors influence sequential bilateral cochlear implantation performance outcomes and to create a model that predicts benefit.

**Design:** A literature review was performed followed by analysis of our own database of over 90 sequentially implanted adult patients to identify which preoperative factors and patient characteristics had an effect on hearing in 50% of this population. A multiple regression analyses was performed and a prediction model formulated which was then validated by applying it to the other 50% of our population.

**Participants:** 92 post lingualllydeafened adult patients participated and the main outcome measure was effect of preoperative factors on the maximum consonant-nucleus-consonant (CNC) phoneme score in quiet with the second cochlear implant (CI2) one year after implantation.

**Results:** Three factors were positively correlated to speech understanding with CI2: Wearing a hearing aid (HA) before receiving CI2 ( $r=0.45$ ,  $p=0.00$ ), the maximum CNC phoneme score with the first CI (CI1) ( $r=0.23$ ,  $p=0.04$ ) and the use of a HA before CI1 in the first implanted ear ( $r=0.25$ ,  $p=0.02$ ). Two factors were negatively correlated: The total duration of hearing loss before CI2 ( $r=-0.25$ ,  $p=0.02$ ) and preoperative pure tone audiometry (0.5, 1, 2kHz) before CI2 in the second implanted ear ( $r=-0.27$ ,  $p=0.01$ ). The following model was created: Predicted CNC phoneme score with CI2 (%) =  $25 + (39 * \text{hearing aid use before CI2 (yes)}) - (0.25 * \text{length of hearing loss before CI2 (yrs)}) + (0.20 * \text{maximum CNC phoneme score with CI1} (%)$ .

**Conclusion:** Using a hearing aid before receiving a second CI and a high level of speech understanding with the first CI predict a positive outcome for sequential cochlear implantation. A long duration of hearing loss before receiving a second CI predicts a negative outcome.

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### Biography

Dr Thomas Hendriks is a surgical resident medical officer from Western Australia. He has a passion for research and a specific interest in Ear, Nose and Throat Surgery. He has previously worked on several oral cancer projects based in Perth and is in the process of assessing Eustachian tube dilatation in patient suffering from Eustachian tube dysfunction.

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