

## **Cantonese tone perception ability of cochlear implant children in comparison with normal-hearing children**

\*Lee, Kathy Y.S., \*van Hasselt, C.A., #Chiu, S.N. & \*Cheung, Dilys M.C.

\*Division of Otorhinolaryngology, Department of Surgery, Chinese University of Hong Kong, Prince of Wales Hospital, Shatin, Hong Kong.

#Department of Mathematics, Hong Kong Baptist University, Kowloon Tong, Hong Kong.

### **Abstract**

*Background & Objective:* Cantonese is a tone language. A change in the fundamental frequency pattern within the same phonemic segment causes a change in the lexical meaning. The present study examined the Cantonese tone perception ability of cochlear implant children in comparison with normal-hearing children. It was hypothesized that cochlear implant children follow a similar pattern of tone perception development as do normal children.

*Method:* 225 normal-hearing and 15 hearing-impaired children with cochlear implants were recruited. The high level (tone 1), high rising (tone 2) and low falling (tone 4) were the target tones examined. The three tones were arranged into tone pairs for identification. Each pair shared exactly the same segmental information but differed only in tones (e.g. /sy/ in tone 1 and 2 meaning 'book' and 'mouse' respectively). Subjects were required to point to the corresponding pictures after monitored live voice presentations.

*Results:* For each tone pair, each subject was awarded a score representing the proportion of stimuli pairs that were correctly discriminated by the subject. The average scores in the normal-hearing and the hearing-impaired group were 0.92 and 0.64 respectively. The normal group had the lowest average score in tone 2 / tone 4 (0.87) while the hearing-impaired group performed the worst in tone 1 / tone 2 (0.53) perception between

the three tone contrasts.

*Conclusions:* The normal-hearing group performed significantly better than the hearing-impaired group in basic Cantonese tone perception. The pattern of tone perception development of cochlear implant children did not seem to follow that of normal children. Contributing factors on the tone perception performance of the cochlear implant children were subject's age, duration of special training, duration of wearing hearing aid and duration of wearing cochlear implant.

*Keywords:* Cantonese; tone perception; cochlear implant; hearing-impaired children; child language development