## Influence of Auditory Visual Information in Speech Perception in Children with Normal Hearing and Cochlear Implant

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Abstract: The cross-modal influence of visual information on speech perception can be illustrated by the McGurk effect which is an illusion of hearing of syllable /ta/ when a listener listens one syllable, e.g.: /pa/ while watching a synchronized video recording of syllable, /ka/. The McGurk effect is an excellent tool to investigate multisensory integration in speech perception in both normal hearing and hearing impaired populations. As the visual cue is unaffected by noise, individuals with hearing impairment rely more than normal listeners on the visual cues. However, when non congruent visual and auditory cues are processed together, audiovisual interaction seems to occur differently in normal and persons with hearing impairment. Therefore, this study aims to observe the audiovisual interaction in speech perception in Cochlear Implant users compares the same with normal hearing children. Auditory stimuli was routed through calibrated Clinical audiometer in sound field condition, and visual stimuli were presented on laptop screen placed at a distance of 1m at 0 degree azimuth. Out of 4 presentations, if 3 responses were a fusion, then McGurk effect was considered to be present. The congruent audiovisual stimuli /pa/ /pa/ and /ka/ /ka/ were perceived correctly as "pa" and "ka," respectively by both the groups. For the noncongruent stimuli /da/ /pa/, 23 children out of 35 with normal hearing and 9 children out of 35 with cochlear implant had a fusion of sounds i.e. McGurk effect was present. For the non-congruent stimulus /pa/ /ka/, 25 children out of 35 with normal hearing and 8 children out of 35 with cochlear implant had fusion of sounds. The children who used cochlear implants for less than three years did not exhibit fusion of sound i.e. McGurk effect was absent in this group of children. To conclude, the results demonstrate that consistent fusion of visual with auditory information for speech perception is shaped by experience with bimodal spoken language during early life. When auditory experience with speech is mediated by cochlear implant, the likelihood of acquiring bimodal fusion is increased and it greatly depends on the age of implantation. All the above results strongly support the need for screening children for hearing capabilities and providing cochlear implants and aural rehabilitation as early as possible.

**Keywords :** cochlear implant, congruent stimuli, mcgurk effect, non-congruent stimuli **Conference Title :** ICSHS 2016 : International Conference on Speech and Hearing Sciences **Conference Location :** Venice, Italy **Conference Dates :** November 07-08, 2016

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