

Evaluating the Efficacy of Phonemic Rehabilitations in Cochlear Implant Users: A Single Subject Study

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Abstract

Background: In many cochlear implant users, even after some time following cochlear implantation and adequate central auditory stimulation, certain hearing processing capabilities remain unresolved. These difficulties for cochlear implant users have a very similar manifestation to the decoding subcategory of the buffalo model of auditory processing which has a direct role in accurate phoneme processing. The present study was designed to investigate phoneme processing abilities in cochlear implant users and to evaluate the efficacy of phonemic rehabilitations in this population.

Methods: This was an interventional study with single subject design. Six prelingually deaf children aged between 8 and 11 years were recruited in the study. The performance of the cochlear implant users during three phases of baseline, intervention and follow-up was investigated. Phonemic Training and Phonemic Synthesis programs were administered and the outcomes were compared based on performance of the children in phoneme recognition test, phonemic synthesis test and the phoneme error analysis form.

Results: All findings demonstrated that test scores improved in all six cases after intervention in comparison to the baseline ($p < .00$).

Conclusions: This study suggests that phoneme-based rehabilitation strategies improve the performance of deaf children with cochlear implants and should be used in postoperative therapy batteries.

Key Words: Cochlear implant, Phoneme recognition, Phonemic Synthesis, Phonemic Synthesis Program, Phonemic training Program.

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analysis in the study and replacing PAND analysis.

5- CONCLUSIONS

To conclude, the present study provides strong evidence demonstrating that Persian CI users are suffering from phoneme processing difficulties. This study also demonstrates that phoneme-based rehabilitation strategies improve the performance of deaf children with CIs. The findings revealed that despite extensive rehabilitation programs after cochlear implantation, the phoneme processing difficulties remained unsolved. We believe that these issues are due to the inadequate phoneme processing in the auditory cortex, especially in the mid-posterior temporal area. However, with introducing the phonemic interventions and relabeling phoneme engrams the performance of all six subjects in phonemic tests of auditory processing improved significantly based on C-statistics ($p < .00$). Also, the findings of effect size revealed a proper to decisive intervention based on PAND analysis. These findings suggest the importance and necessity of auditory processing rehabilitation procedures after cochlear implantation.

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