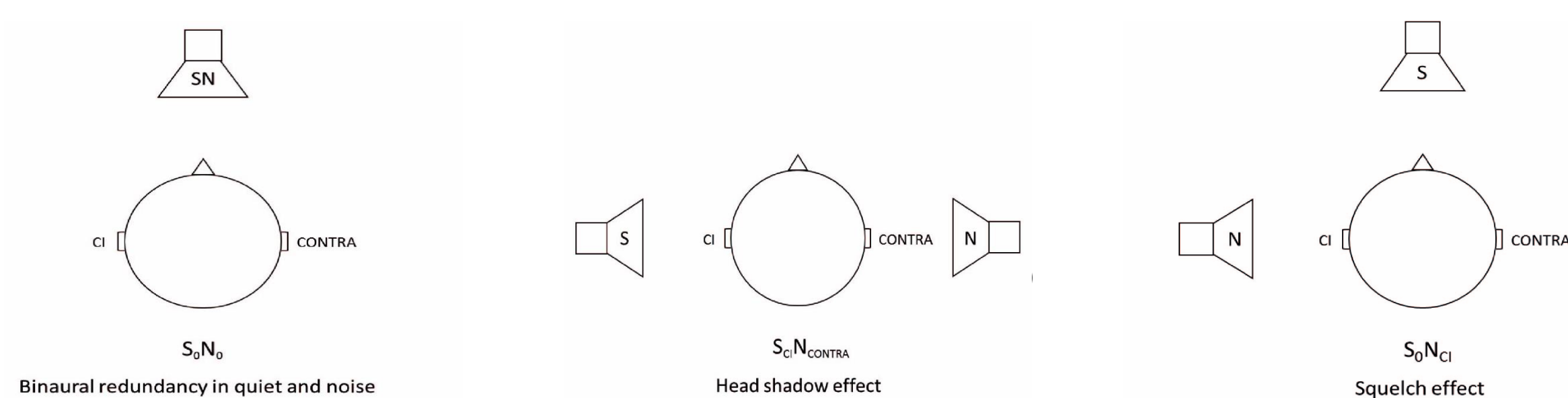


Background

Unilateral profound hearing loss also known as Single –Sided Deafness (SSD) has been demonstrated to impact speech and language development, cognitive abilities, and overall quality of life in children. This condition places affected individuals at a heightened risk for psychosocial and behavioral challenges and results in suboptimal performance in educational environments compared to peers with normal auditory function. In our previous studies we demonstrated binaural benefit after cochlear implantation in adults (Skarzynski, 2017), (Lorens, 2019; Lorens, 2021). The results from these studies strongly encourage the use of a CI for adults with SSD. For these persons, the addition of the CI enables binaural hearing with positive and highly significant effects of binaural summation, head shadow, and binaural squelch, as well as improved localisation ability.



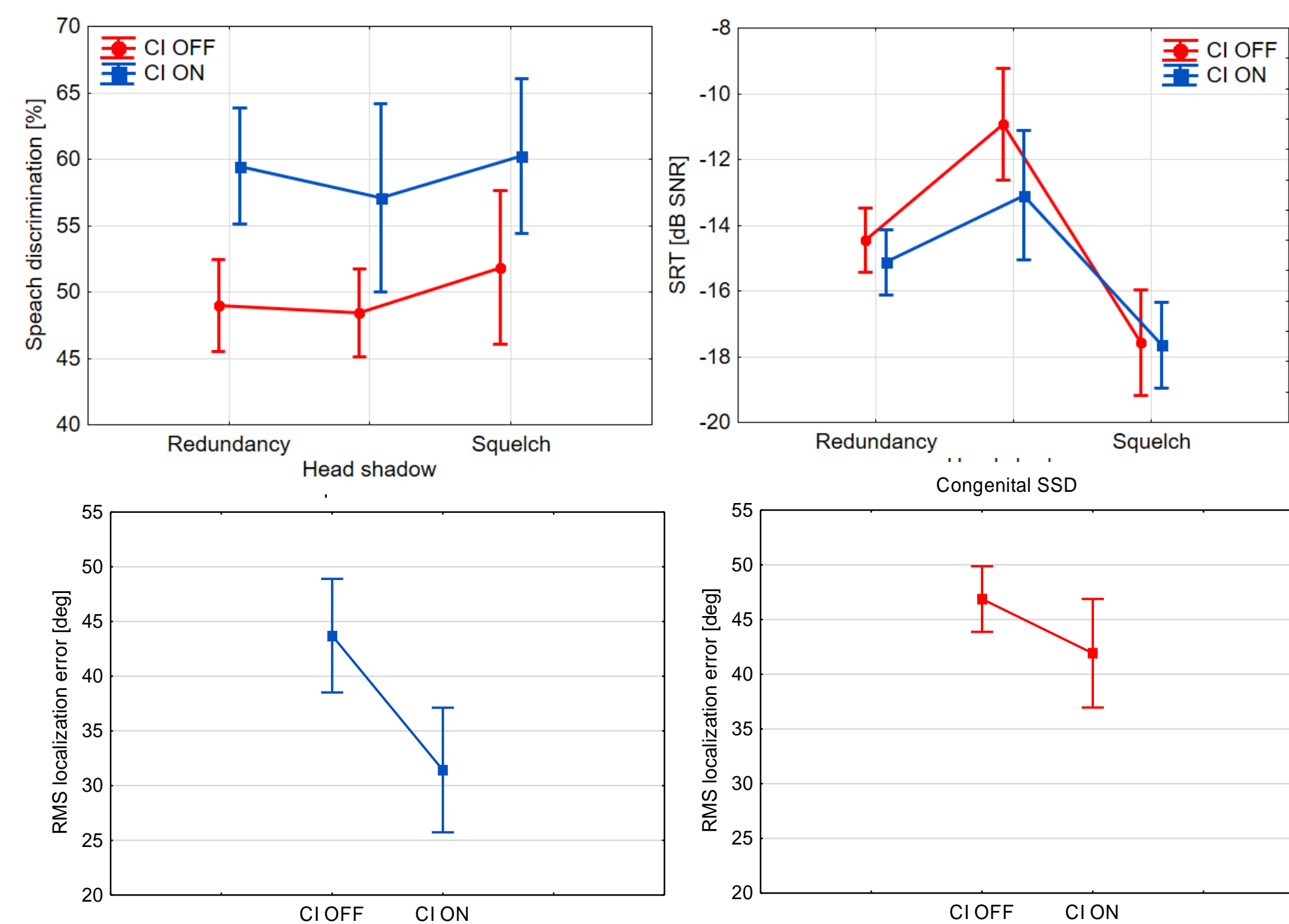
Objectives

To evaluate binaural effects after cochlear implantation (CI) in children with congenital single side deafness (SSD) and children with acquired SSD.

Materials and Methods

A prospective study has been conducted, and so far we have analyzed results of 25 children with congenital SSS (12 boys and 13 girls, mean age at CI was 6.3 yrs) and 19 children with acquired SSD (10 boys and 9 girls, mean age at CI was 13.3 yrs). In three different spatial arrangements of loudspeakers for presenting the words and competing noise, three binaural effects – redundancy, head shadow, and squelch – were evaluated with a monosyllabic word test (children with enquired SSD) and Adaptive Auditory Speech Test - AAST (children with congenital SSD) in conditions: speech processor off (CI off) and speech processor on (CI on). Additionally sound localization ability was tested in an anechoic chamber using a custom made system of 11 loudspeakers and RMS error was calculated.

Results



Monosyllabic word test was performed in 19 children with acquired hearing loss. Children showed significantly better word recognition scores in 'CI on' condition comparing to 'CI off' condition for all binaural effects.

The Adaptive Auditory Speech Test (AAST) was measured in 25 children with congenital hearing loss. Children showed significantly better speech perception in 'CI on' condition in relation to 'CI off' situation for head shadow.

Sound localization error was significantly smaller for CI on condition compared to CI off condition in both groups.

Conclusion

Children with both congenital/perinatal and acquired single-sided deafness (SSD) have been found to benefit from their cochlear implants (CIs) in terms of both speech recognition in noise and sound localization.

References

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