Comparison of Cochlear Implants and a Transcutaneous Bone-Conduction Hearing Implant in Single-Sided Deafness

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Introduction

• Single-sided deafness (SSD) negatively influences speech perception, especially in difficult listening situations.

• Therapeutic options:
  CROS hearing aids
  (Implantable) bone-conduction devices
  Cochlear implantation
Objective

- In SSD: Compare cochlear implant to active transcutaneous bone conduction implant
- Outcomes: perception in noise & subjective benefits
Methods

- 10 SSD patients with cochlear implants
- 5 SSD patients with transcutaneous bone-conduction implants.
- Adaptive speech recognition test (Oldenburg Sentence Test, OLSA).
- Main outcome parameter: speech-reception thresholds (SRT)
Methods

MSNF

Rader et al., Ear Hear (2013)
Results - MSNF

- With CI significantly reduced SRTs.
- With active transcutaneous bone-conduction implant no benefit.
Results - $S_{CI(BB)}N_{NH}$

- With CI significantly reduced SRTs when speech signals from the implanted side.
- With active transcutaneous bone-conduction implant: tendency towards improved SRTs
Results – BBSD

“Bern Benefit in Single Sided Deafness“ Questionnaire:

- CI and Bone conduction implants beneficial in difficult hearing conditions.

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Results – Localization & overall

9. To localize a sound source, such as a honking car

10. Over all, for me hearing is:

Please rate your perceived benefit from your aid in the following situations by a vertical line. Example:

-5 -4 -3 -2 -1 0 1 2 3 4 5
Much easier without the aid... somewhat easier Similar with and without... somewhat easier Much easier with the aid
Discussion

• Limited power
• Cochlear implantation beneficial in difficult listening situation
• Important: patient selection (expectation, motivation, long rehabilitation)
• Bone-conduction implants no benefit in Multi source noise field. But subjective benefits for SSD-patients -> viable alternative.
Conclusions

In SSD:
- Cochlear implant offers improved speech perception in difficult listening situation
- both (Ci and bone conduction implant) show benefit in subjective hearing experience