

Fully-implantable hearing aid

Susen Lailach, Nikoloz Lasurashvili, Hannes Seidler, Thomas Zahnert

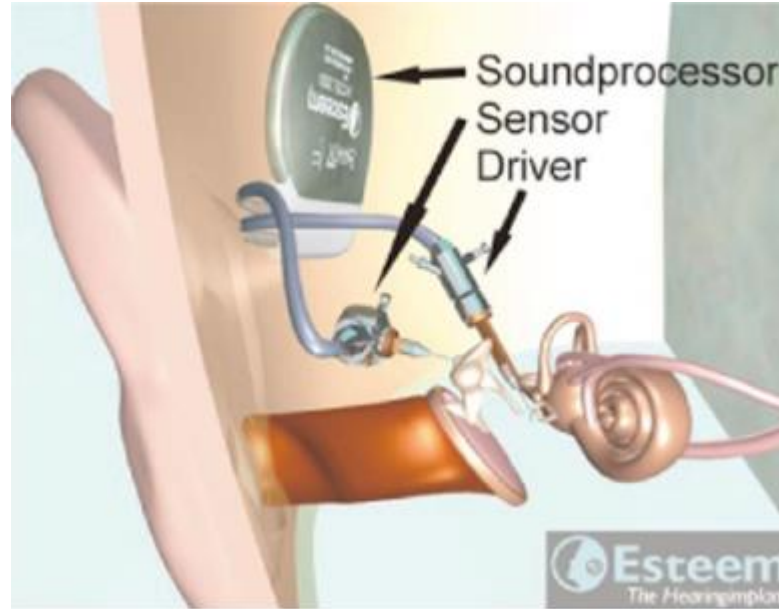
Hannover, 18.11.2019



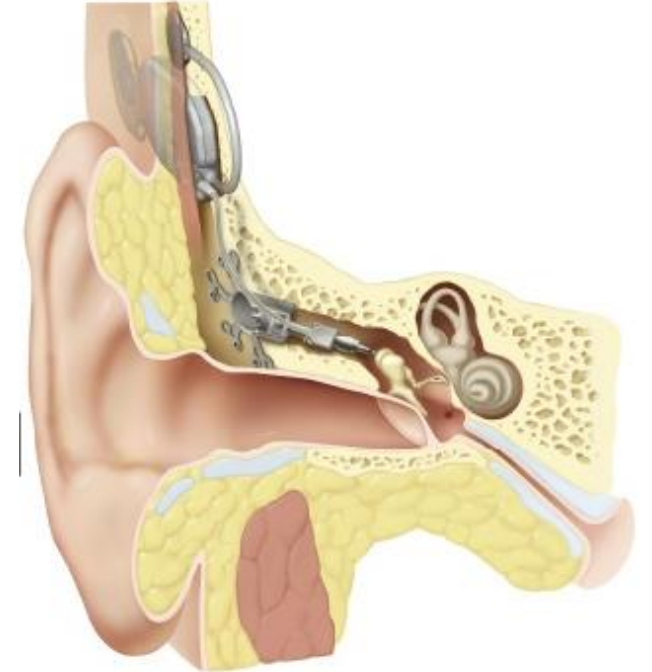
Fully-implantable hearing aids



TICA (Implex)

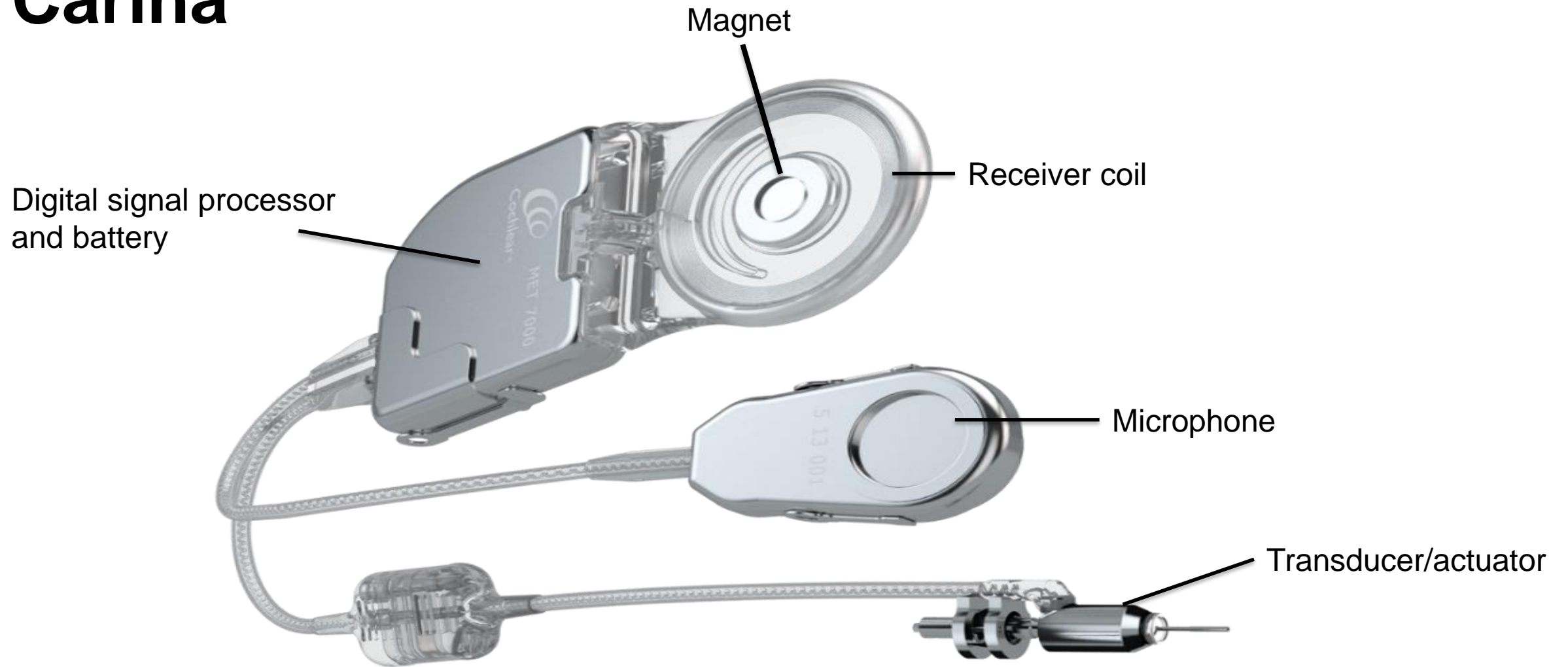


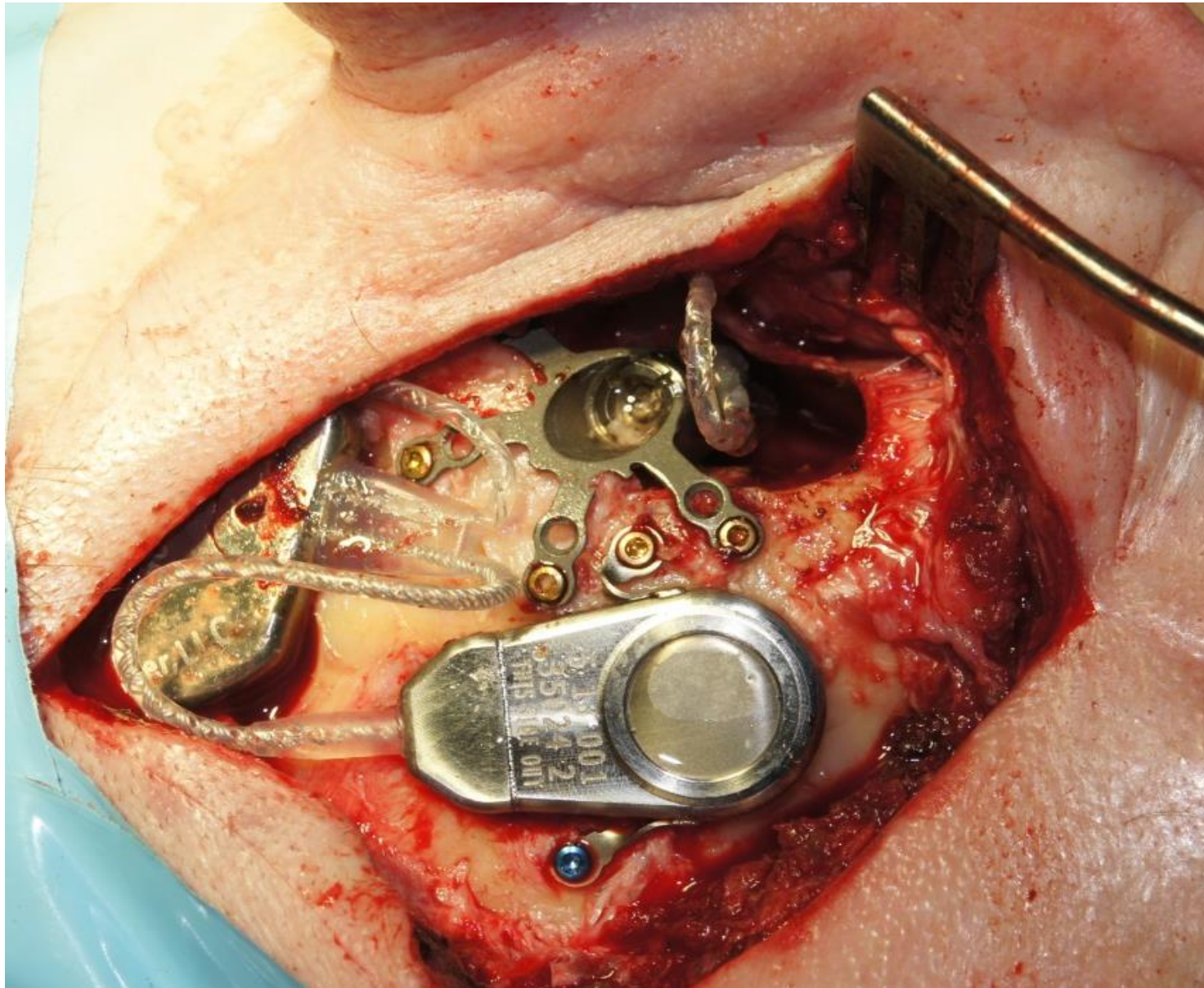
ESTEEM (Envoy)



CARINA (Cochlear)

Carina





Stapes head



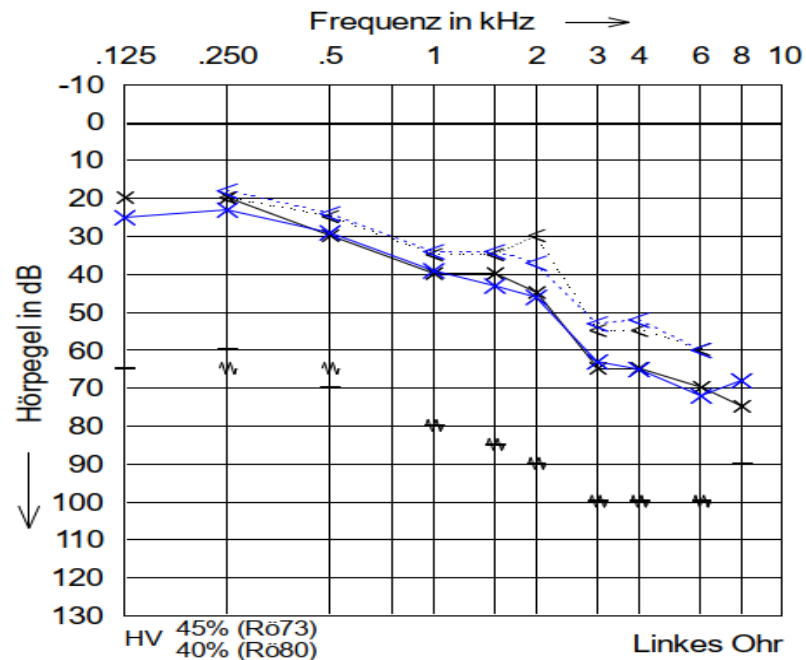
Stapes footplate



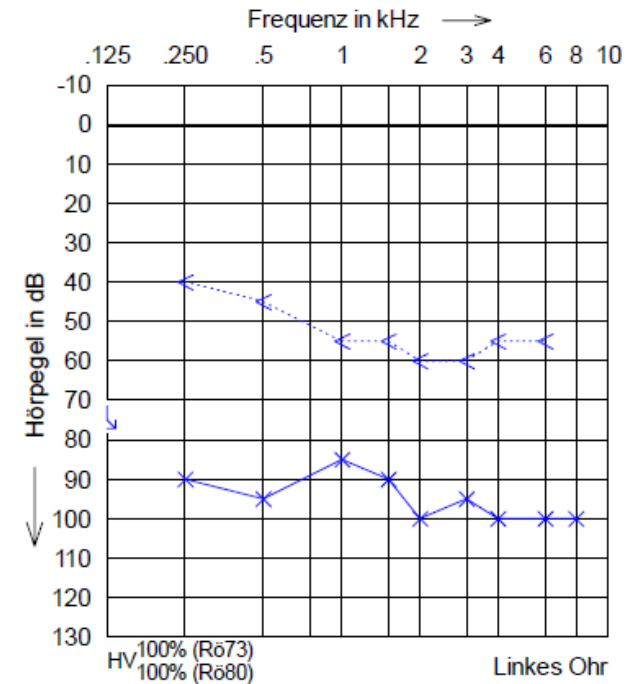
Round window membrane

Carina – indication range

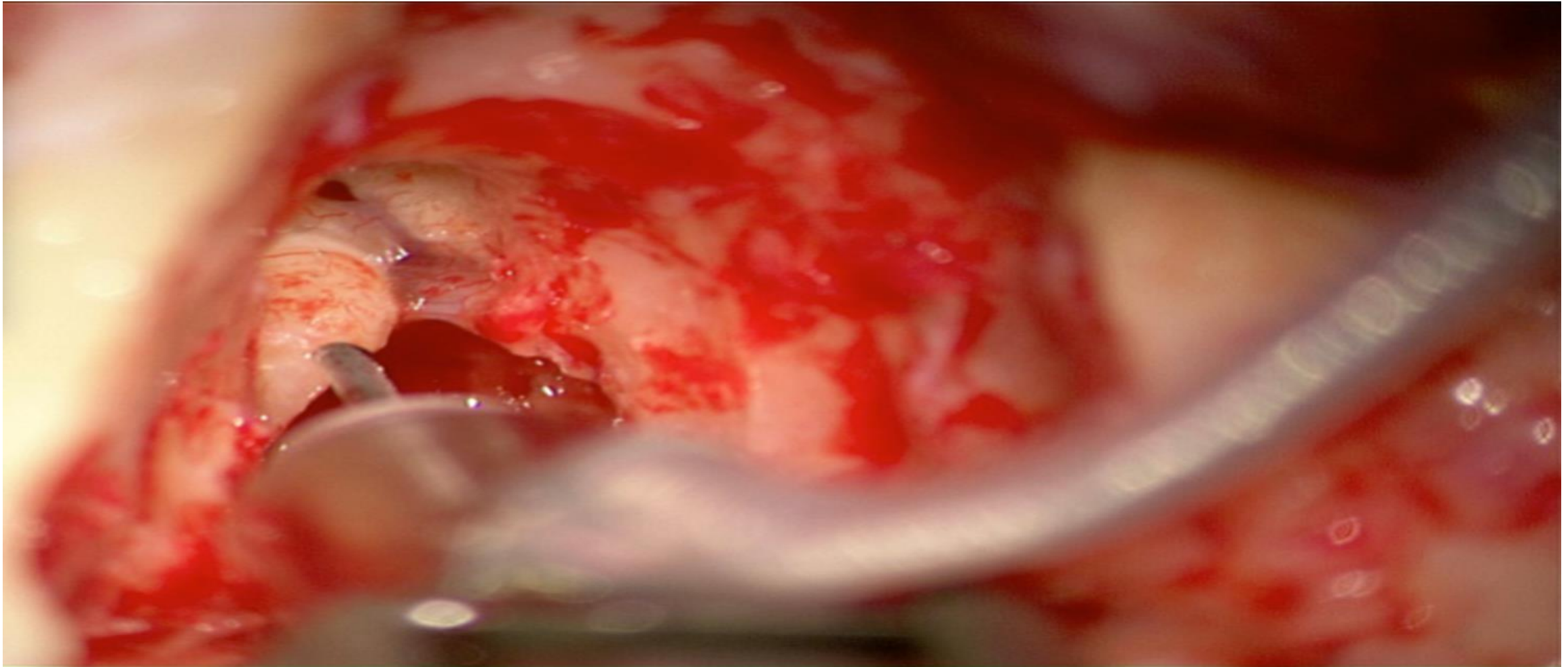
Middle- to high-grade sensorineural hearing loss



Mixed hearing loss with middle- to high-grade inner ear component

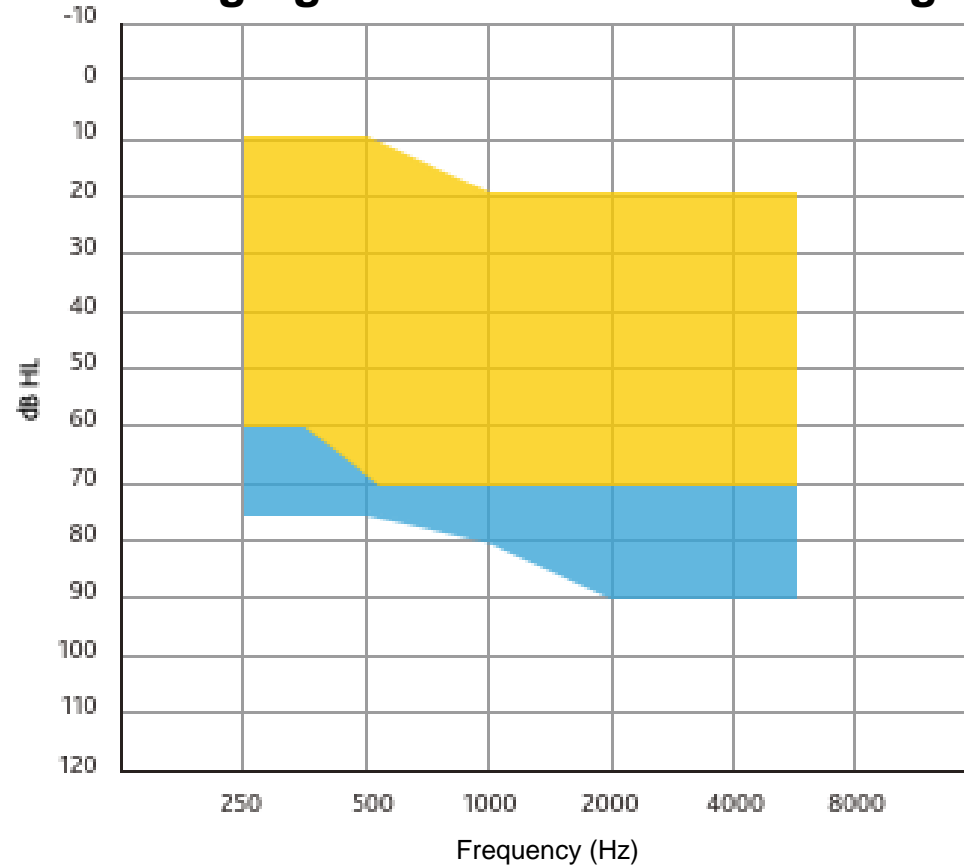


Sensorineural hearing loss



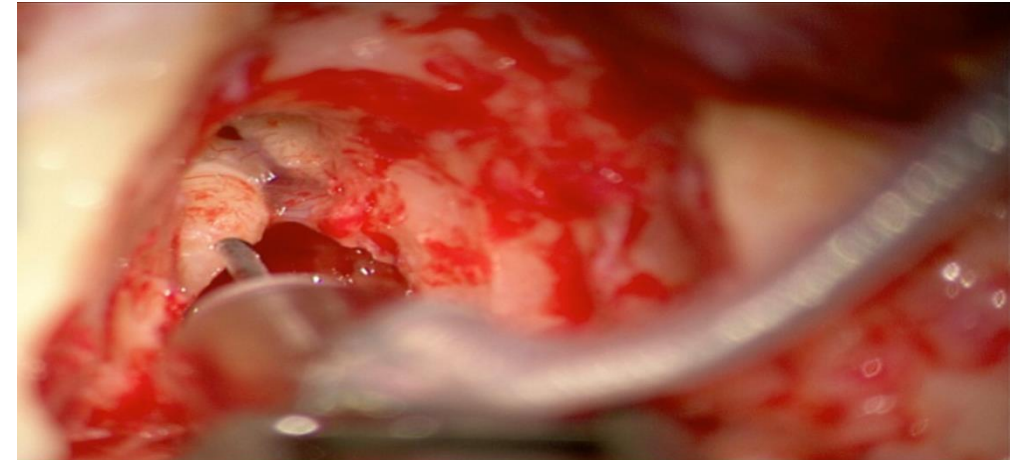
Sensorineural hearing loss

Middle- to high-grade sensorineural hearing loss



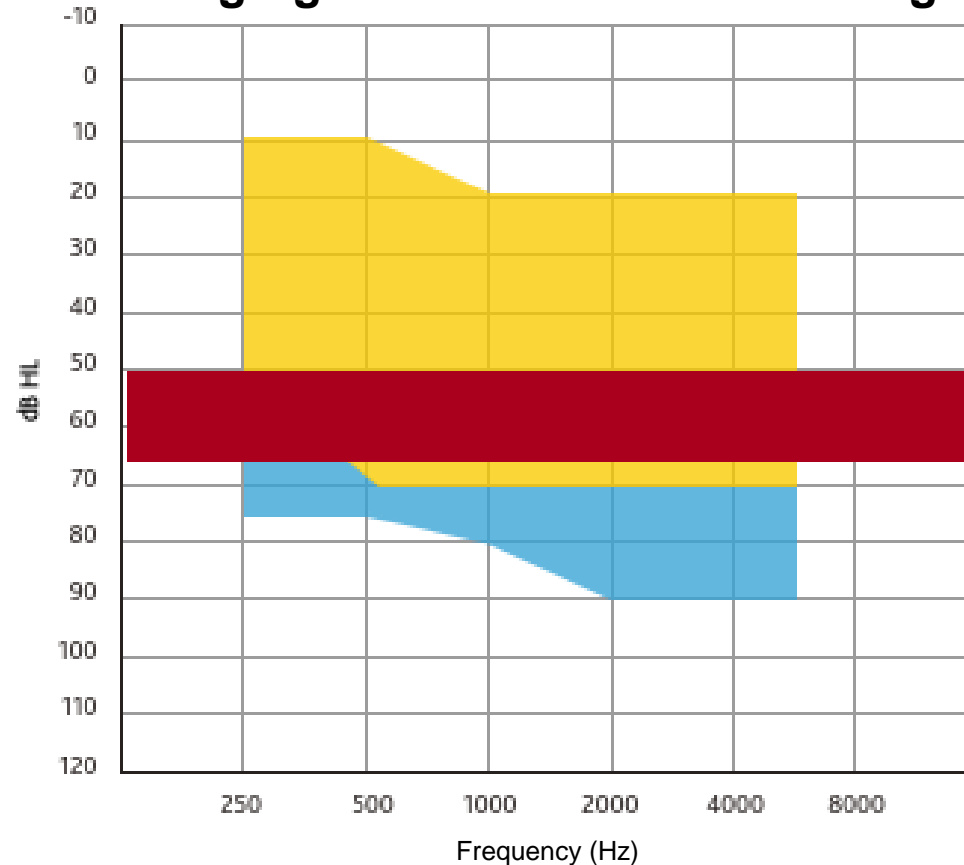
■ Air conduction threshold

■ Air conduction with external button soundprocessor



Sensorineural hearing loss

Middle- to high-grade sensorineural hearing loss



■ Air conduction threshold

■ Air conduction with external button soundprocessor

- Usage of conventional hearing aids is not possible (chronic otitis externa, eczema..)
- Work-related reasons: wet or dusty surroundings

Carina versus Cochlear Implant

- Air conduction threshold
- Speech recognition
 - WRS max

Sensorineural hearing loss

Lefebvre P et. AI 2016

“A Retrospective Multicentre Cohort Review of Patient Characteristics and Surgical Aspects versus the Long-Term Outcomes for Recipients of a Fully Implantable Active Middle Ear Implant”

Motivation	Patients (n=66)
Medical reasons	2 % (1)
Cosmetical reasons	27% (17)
Lifestyle	19% (12)
Work-related reasons	52% (32)

Sensorineural hearing loss

**Audiology &
Neurotology**

Original Paper

Audiol Neurotol 2016;21:105–112
DOI: 10.1159/000444243

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Long-Term Outcome Data in Patients following One Year's Use of a Fully Implantable Active Middle Ear Implant

Kristin Uhler^a Melinda C. Anderson^b Herman A. Jenkins^a

^aUniversity of Colorado School of Medicine, Aurora, Colo., and ^bUniversity of Colorado Boulder, Boulder, Colo., USA



Sensorineural hearing loss

- **Study design:**

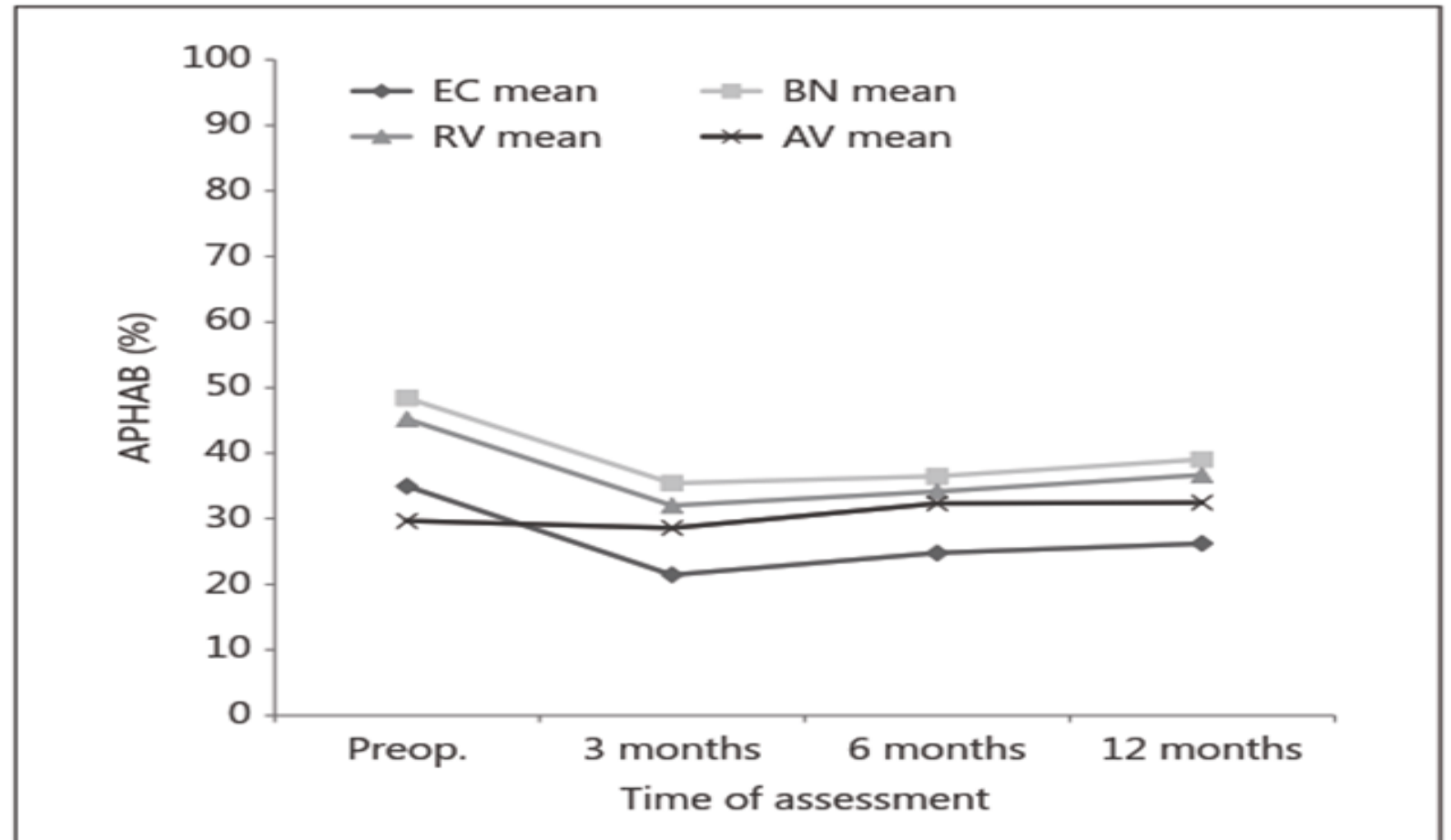
- prospective

- **Patients**

- 58 patients, Otologics
- Sensorineural hearing loss

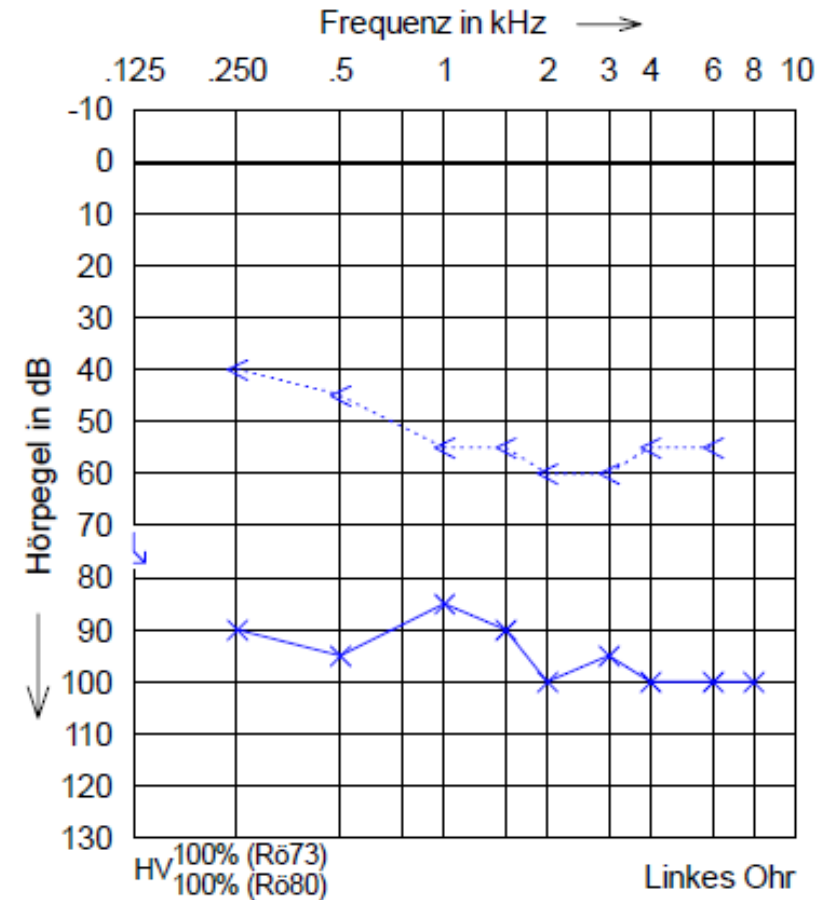
- **Outcome parameter**

- WRS in quiet at 65 dB SPL
- APHAB

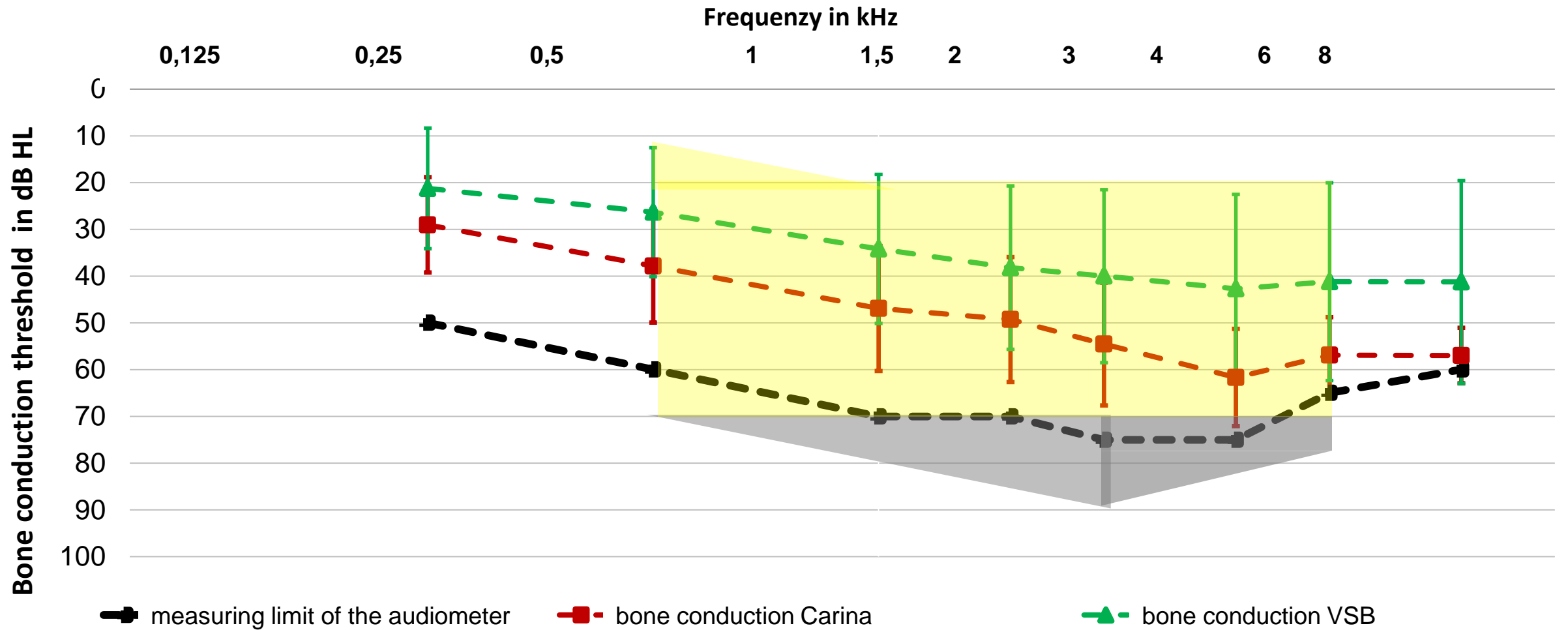


Mixed hearing loss

- Failed tympanoplasty/ossiculoplasty
 - Poor middle ear ventilation
 - Postinflammatory stapes fixation
- draining radical cavity

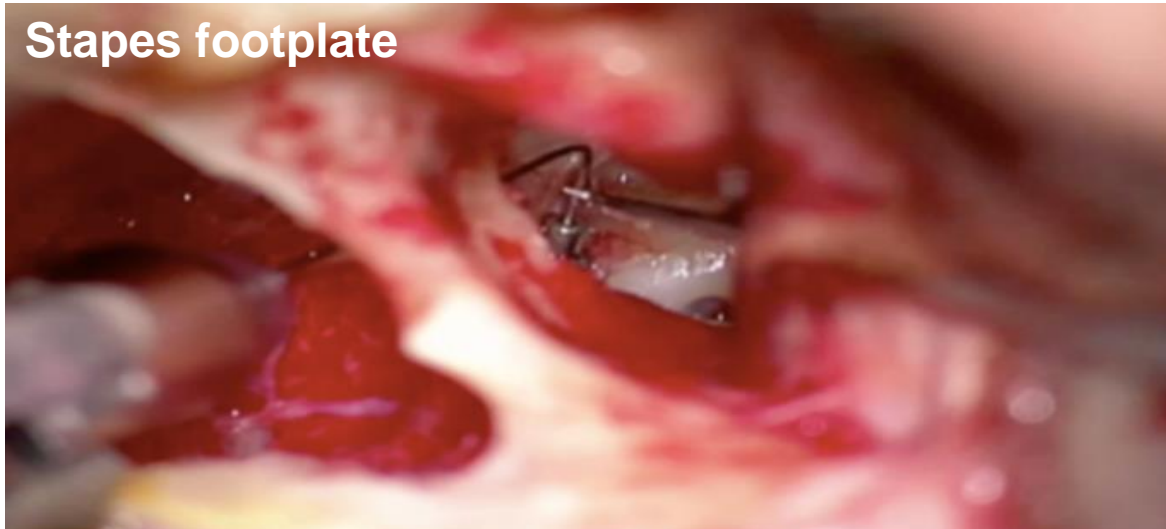


Mixed hearing loss



Mixed hearing loss

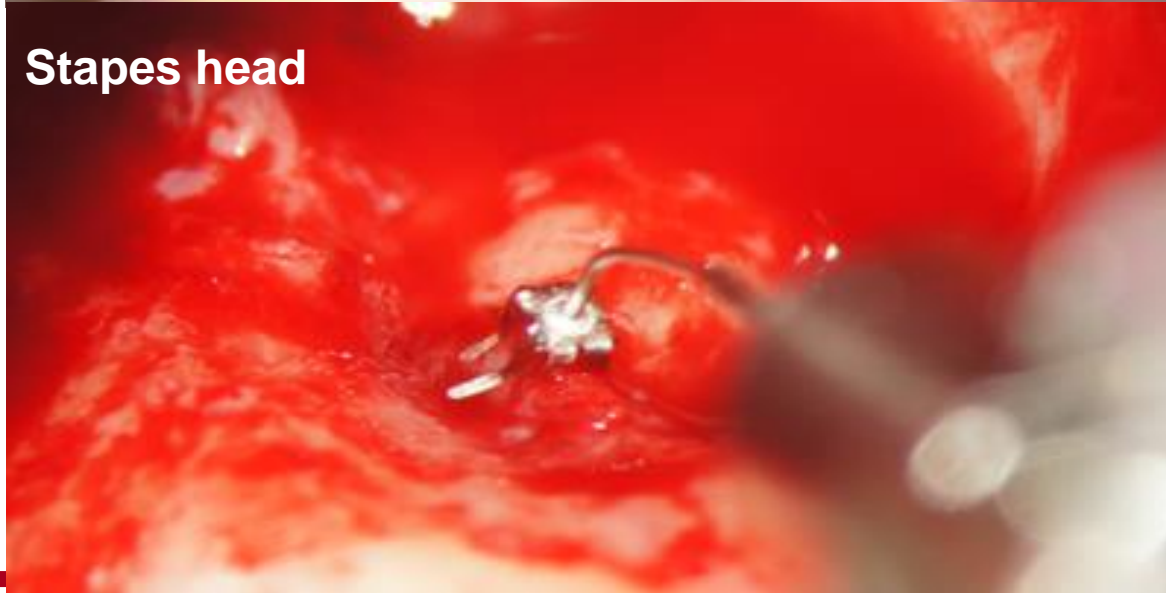
Stapes footplate



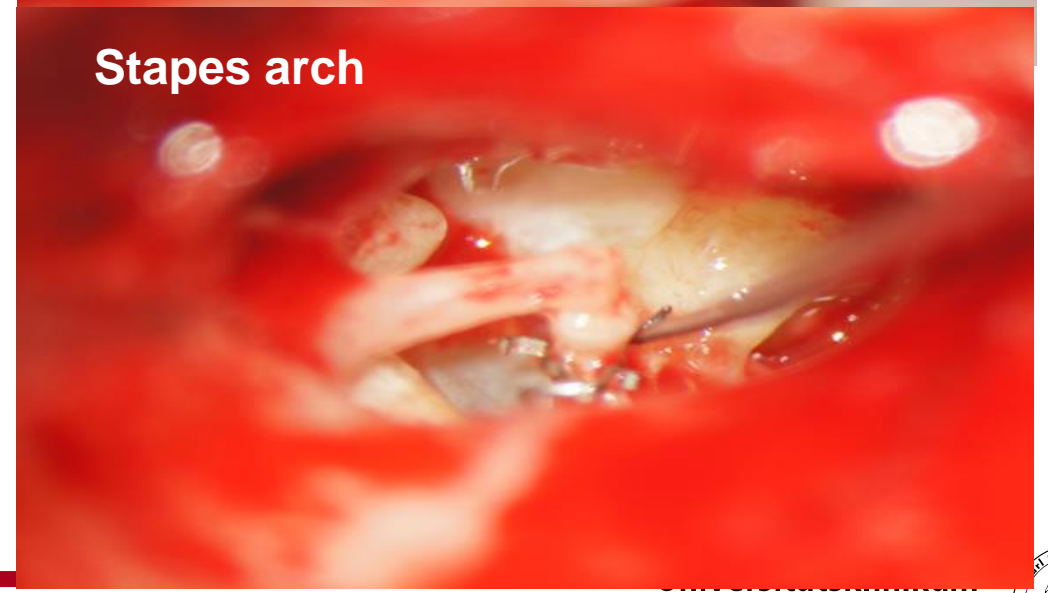
Round window



Stapes head



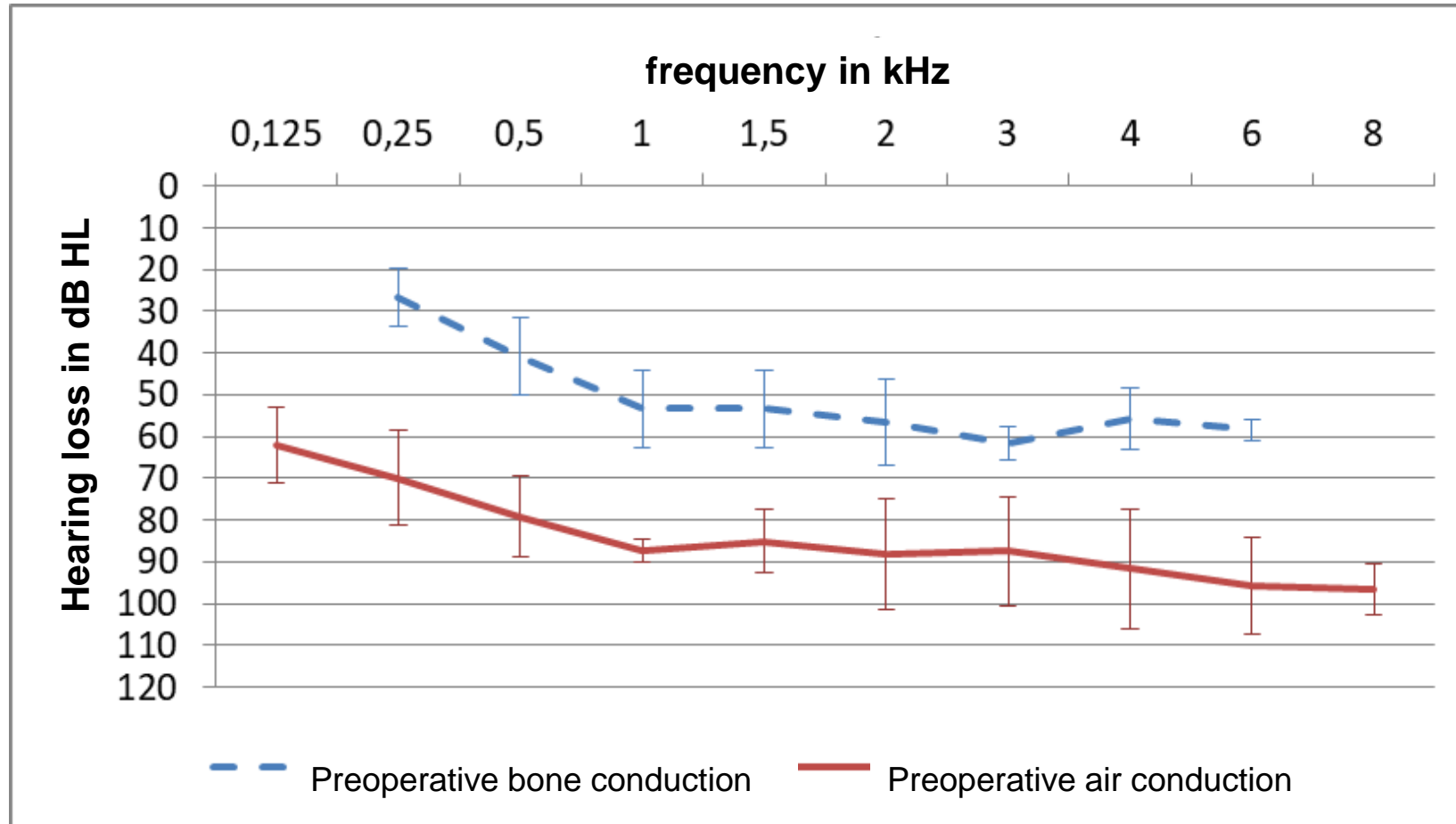
Stapes arch



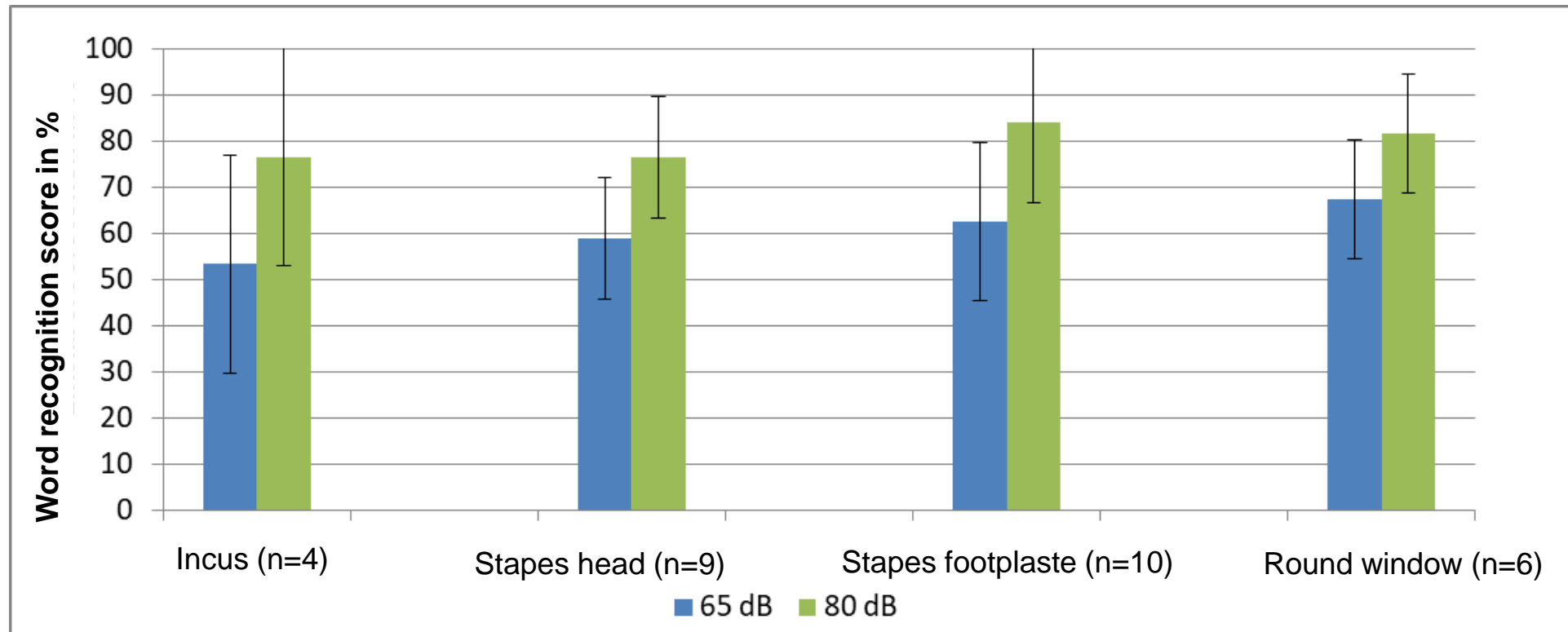
Outcome of Carina implantation in Dresden

- 38 Carina implantations in Dresden (2017 – 2019)
- 29 patients with a follow-up of 6 months
- Coupling site
 - Incus (n=4)
 - Stapes head (n=9)
 - Stapes footplate (n=10)
 - Round window membrane (n=6)

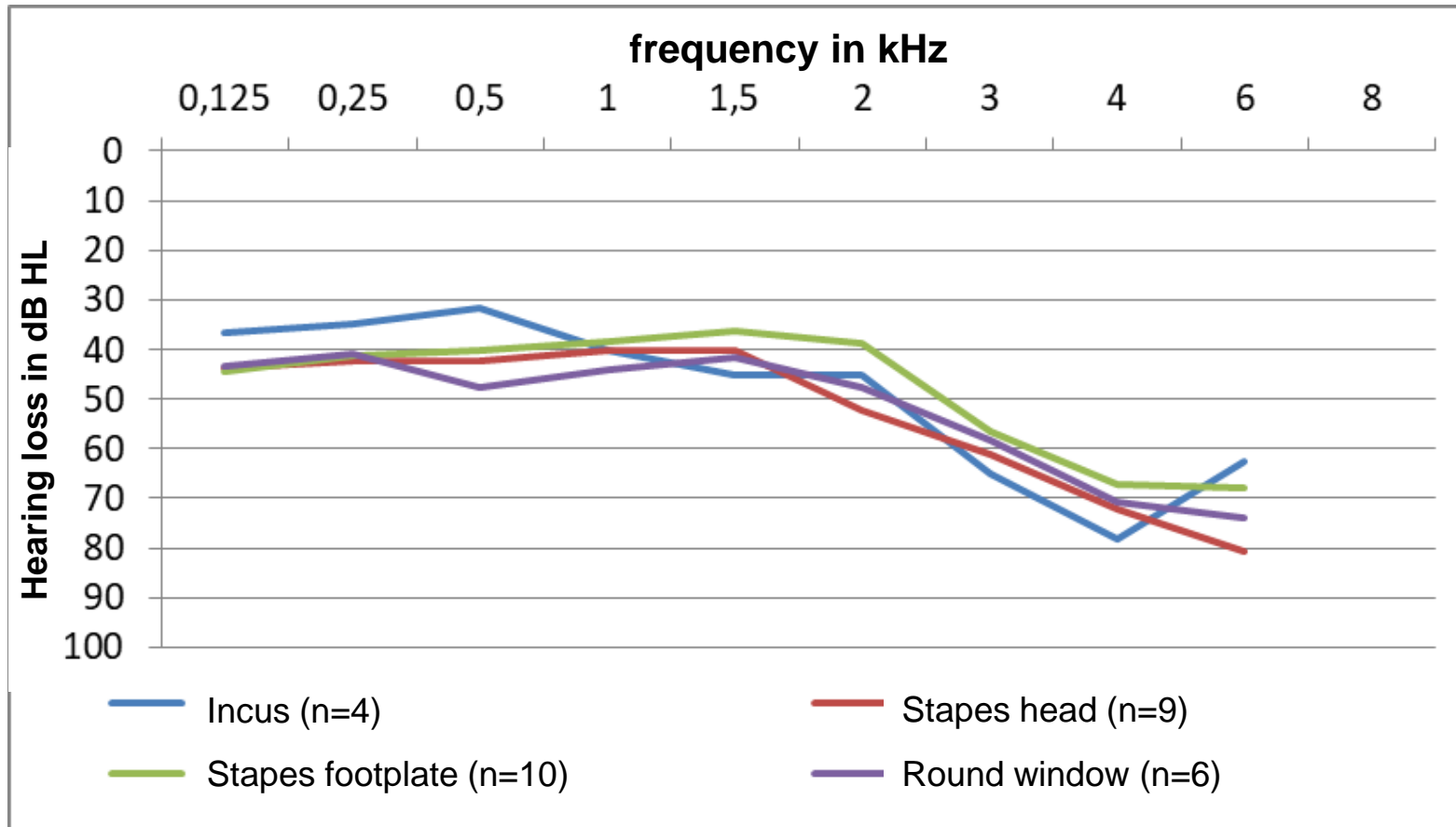
Preoperative audiometric data



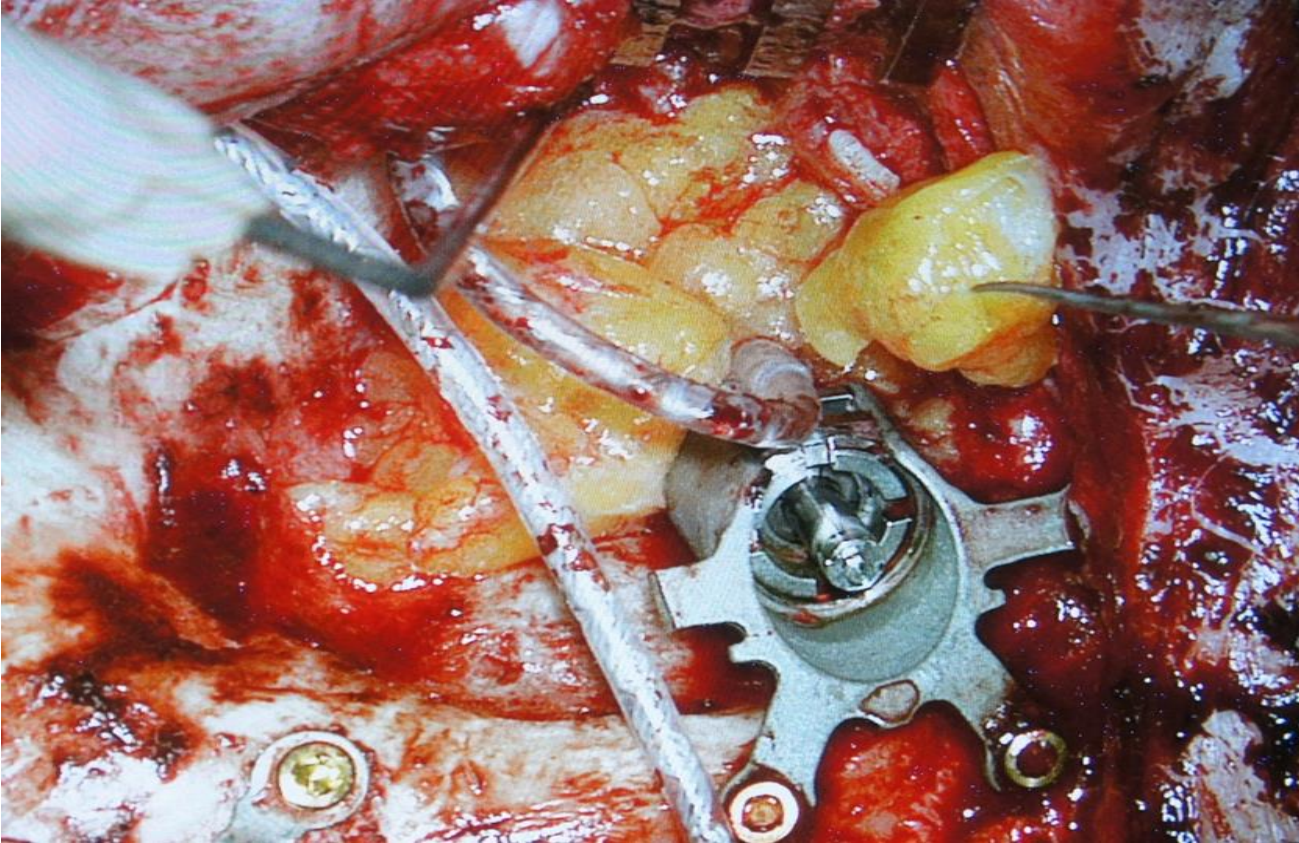
Coupling site – word recognition score



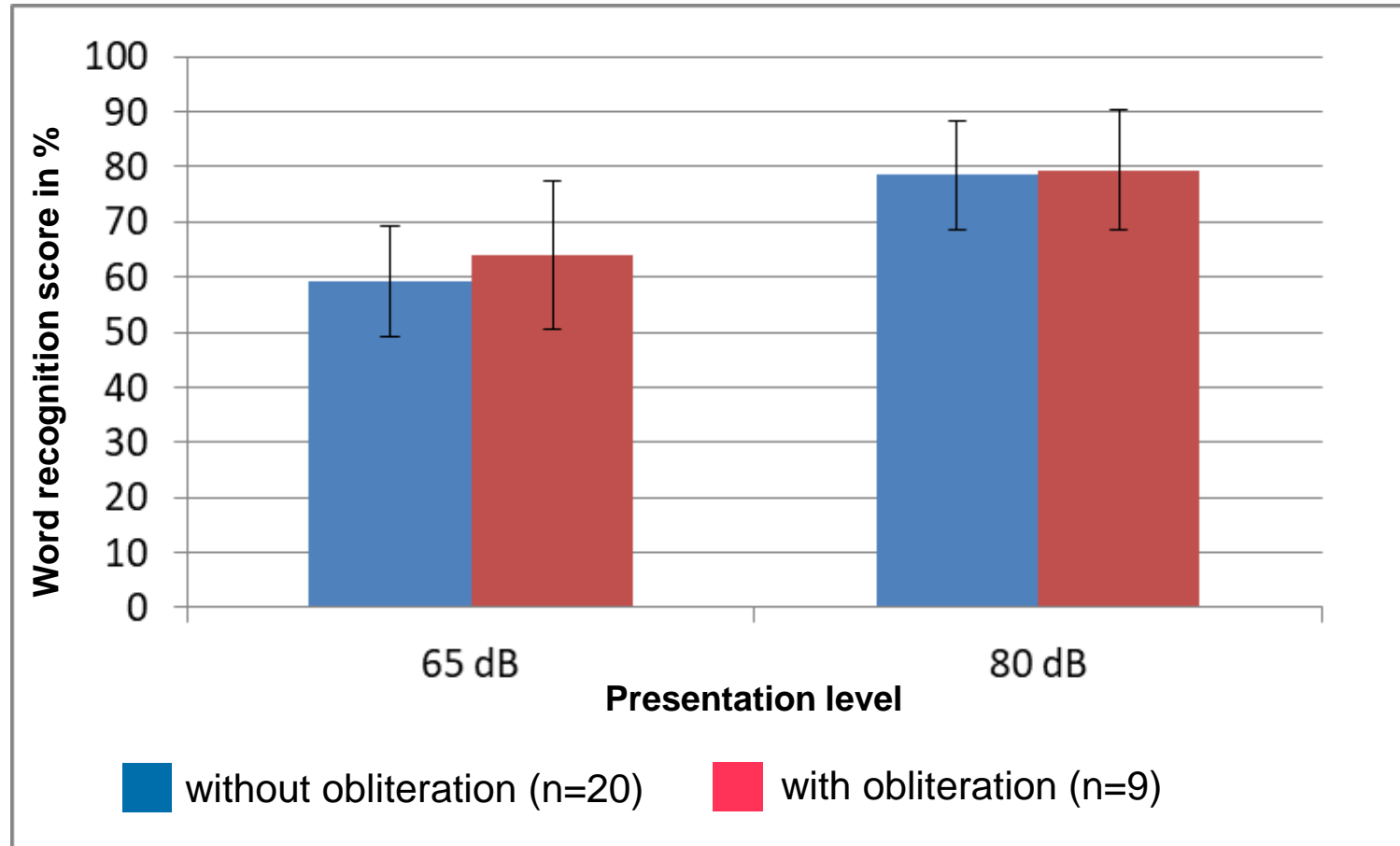
Coupling site: thresholds in free-field



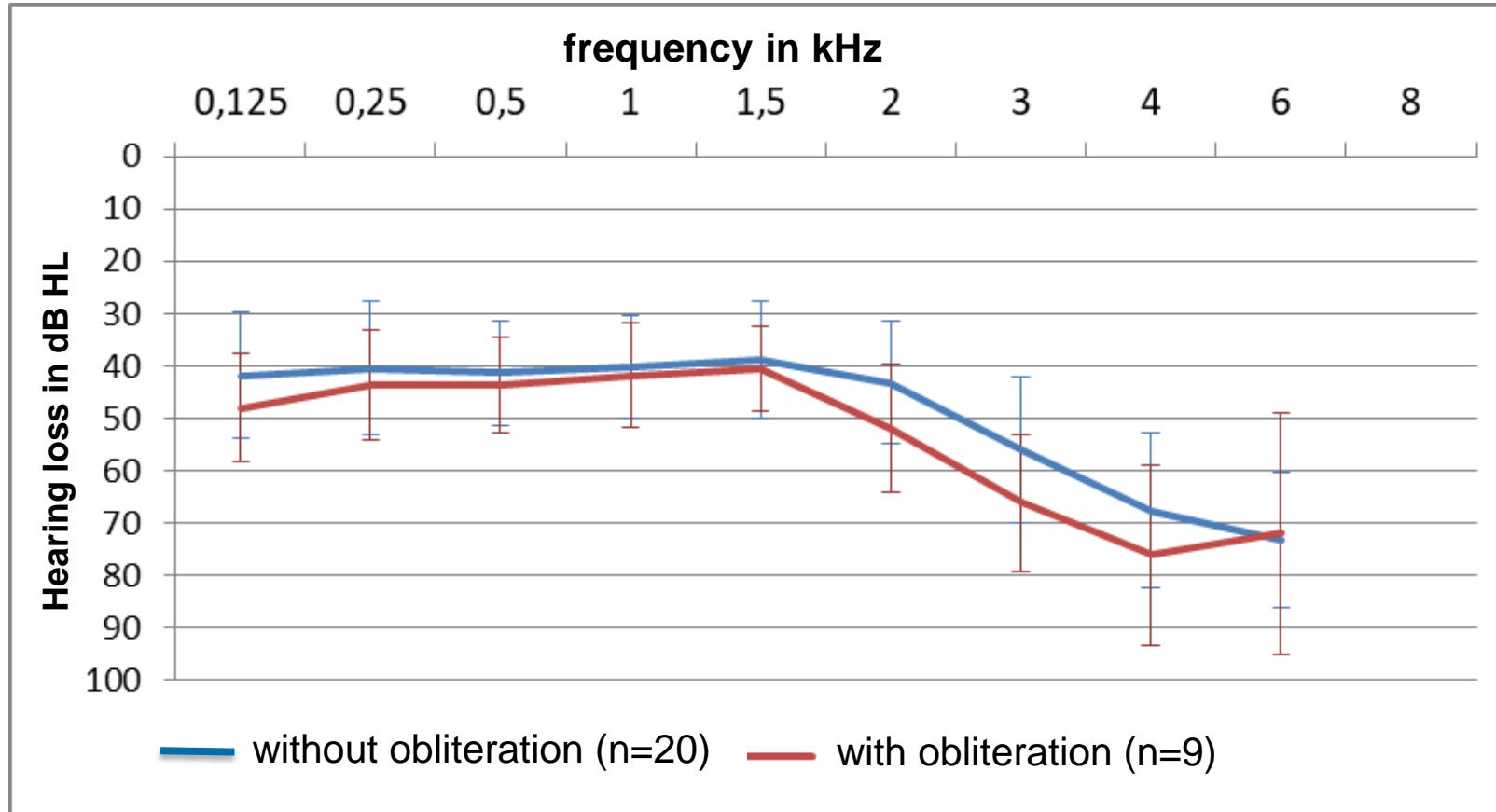
Carina implantation in radical cavities



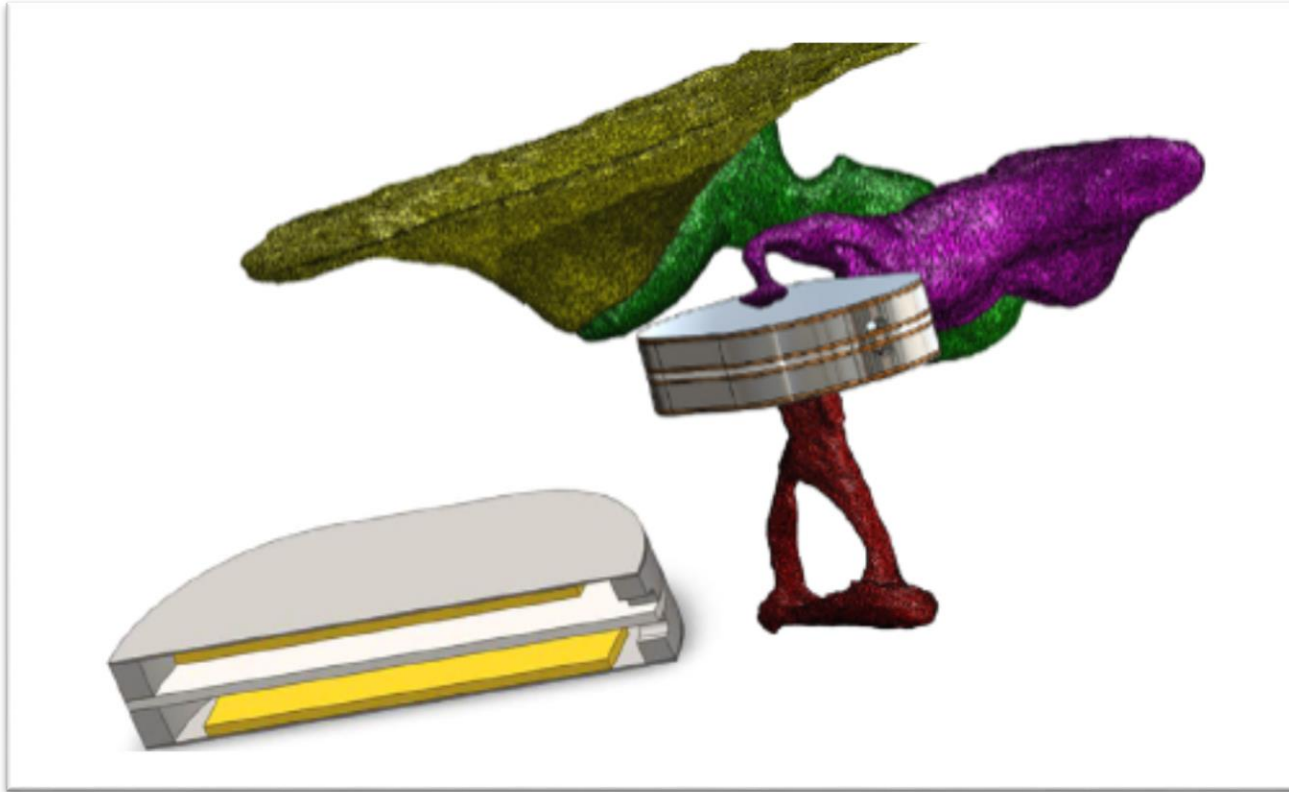
Fat obliteration and Carina implantation



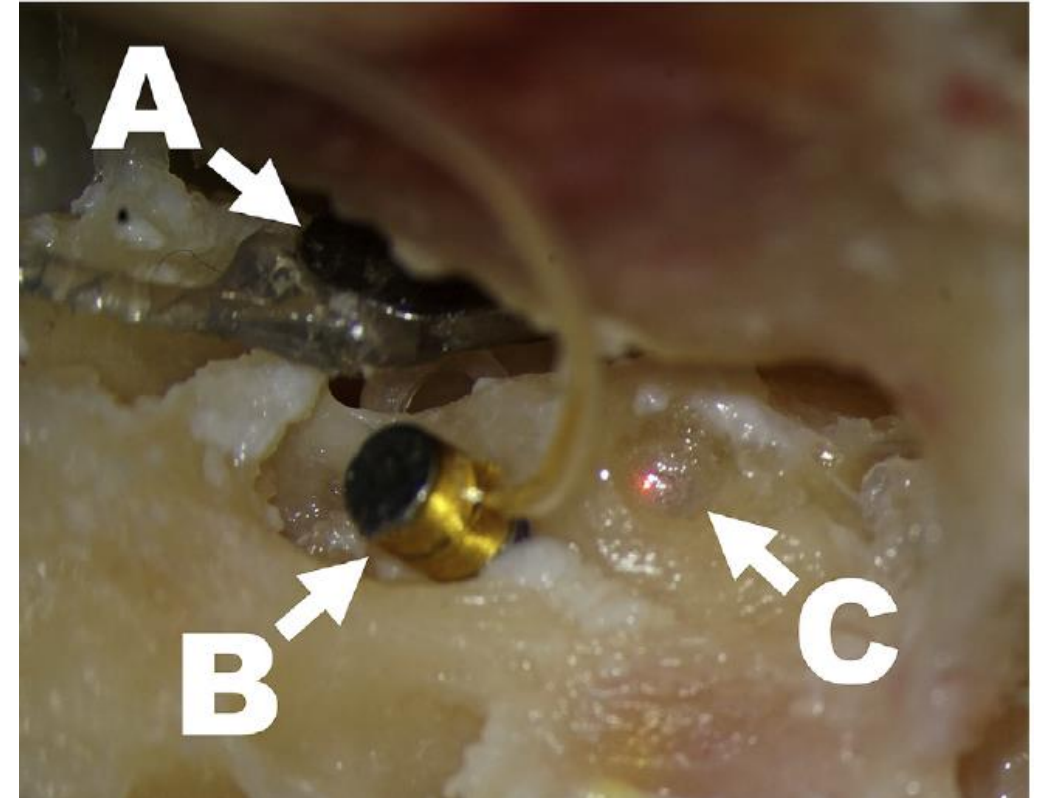
Fat obliteration and Carina implantation



Recent developments...



Koch M, Eßinger TM, et al. Hear Res. 2016 Oct;340:169-178.



Eßinger TM, Koch M et al. Hear Res. 2019 Jul;378:157-165.

Conclusion

- Carina implantation provides an alternative treatment option in patients with middle to high-grade sensorineural hearing loss.
- Different coupling elements allow for sufficient hearing rehabilitation in patients with mixed hearing loss.
- Fat obliteration does not affect the output of the actuator.

**Thank you for
your attention !**

