MASTER OF SCIENCES – BIOMEDICAL ENGINEERING

MASTER – THESIS PROPOSAL

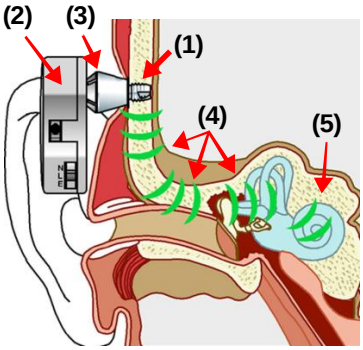
UNIVERSITÄT BERN

ARTORG CENTER
BIOMEDICAL ENGINEERING RESEARCH

Artificial Hearing Research Group

ACTUATOR OPTIMIZATION FOR BONE ANCHORED HEARING AIDS

Patients with hearing losses can benefit from **b**one **a**nchored **h**earing **a**ids. BAHAs consist on three parts; the osseointegrated screw inserted surgically behind the ear, the snap coupling and the BAHA actuator (**BAHA**, *fig. 1*). The BAHA actuator transforms sound into mechanical vibrations that are transmitted to the inner ear (**bone conduction**, (4) *fig. 1*). Our group investigates to improve bone anchored hearing aids by optimizing the BAHA actuator.



(1) Implant screw

(2) BAHA actuator

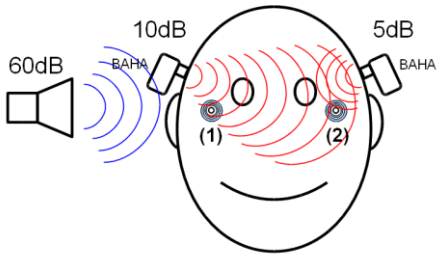
(3) Snap coupling

(4) Vibration propagation (bone conduction)

(5) Inner ear (cochlea)

Fig. 1: Bone conduction to inner ear.

In this study the sound propagation of different and or bilateral BAHA transducers or should be examined regarding the effect of interference with two BAHA actuators and different sound sources (*fig. 2*).



(1) Cochlea on loudspeaker side

(2) Cochlea away from loudspeaker

At points (1) and (2) in figure 2 some interference eventually occur in the cochlea. With the improved actuator the sound interference should be measured and quantified dependant on the source and the BAHA positioning. Also the vibration direction of the BAHA should be taken into account.

Fig. 2: Sound propagation and interference.

Nature of the Thesis

Conceptual work: 20%, Experimental: 30%, Analytical: 30%

Specific Requirements

Interest in conceptual work
Basic knowledge in force measurements

Examinator

Contact

Prof. Dr. Christof Stieger, Artificial Hearing Research, Department of ENT, Head and Neck Surgery, Inselspital, christof.stieger@artorg.unibe.ch, 031 632 87 89