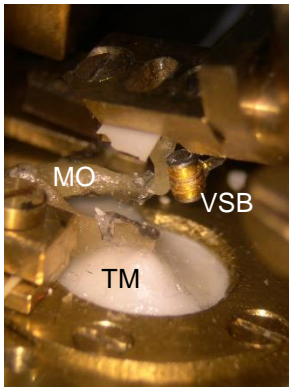


Master of Science – Biomedical Engineering
Thesis Proposal

Implantable Hearing Systems: Pre-operative Testing Device to simulate post-operative Hearing

Some hearing disabled patients cannot profit from a conventional hearing device because of persistent irritations of the external auditory canal. An alternative provides a middle ear hearing implant (Vibrant Soundbridge VSB). However, the patients are often scarred about surgery and would like to experience their hearing after implantation. An existing simulation device, so called DDS, allows a qualitative impression. But it cannot provide a realistic simulation of the postoperative hearing as quantitative data is missing.

This master thesis aims to quantify the DDS which include experimental work on a life size mechanical ear. This functional model allows to simulate pre-operative DDS and post-operative VSB. Within the thesis you will learn to design and execute an experimental study:



- 1.) Determination of the parameters of mayor influence
- 2.) Setup a measurement protocol
- 3.) Adaptation of the existing measurement system to the study design
- 4.) Measurements using Laser Doppler Velocimetry
- 5.) Data analysis
- 6.) Quantification of the transfer function(s) from “DDS to VSB”
- 7.) Design a “DDS to VSB” amplifier.

Figure: Life size mechanical ear with an implanted VSB (TM: tympanic membrane, MO: middle ear ossicles, VSB: implanted hearing system)

Nature of the Thesis

Experimental: 60 %
Programming: 20 %
Documentation: 20 %

Specific Requirements

Motivated

Supervisor

PD Dr. ès sc. Christof Stieger

Collaborators

Lukas Graf (ENT resident), Dr. sc. med. Flurin Honegger

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