



Master thesis

Development of a force and torque measuring tooth implant.

The loads applied to teeth by oral functions are of great interest for dentists and orthodontists. In particular the knowledge of the peak loading is important for the design and dimensioning of implants and their support. Collaborating with the university medical center we are investigating the feasibility of a novel implant with the ability of long term measurements of the acting loads.

In the framework of a master thesis we aim to develop a novel concept to measure loads acting on implants. This concept will be based on the measurement of the induced mechanical stress in the implant with a CMOS sensor chip. Each load component induces an individual stress profile into the implant. Hereby the different stress components are proportional to the applied load, so that by measuring the stress profile at appropriate positions, the load can be calculated.

The master thesis comprises FEM simulations and the assembly of a prototype. In addition a calibration and characterization setup has to be build up. Finally, the function should be demonstrated.

The main tasks of the thesis are

- Mechanical FEM-simulations using COMSOL Multiphysics.
- Technical implementation / packaging of a CMOS sensor chip.
- Programming LabView.
- Experimental validation.

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