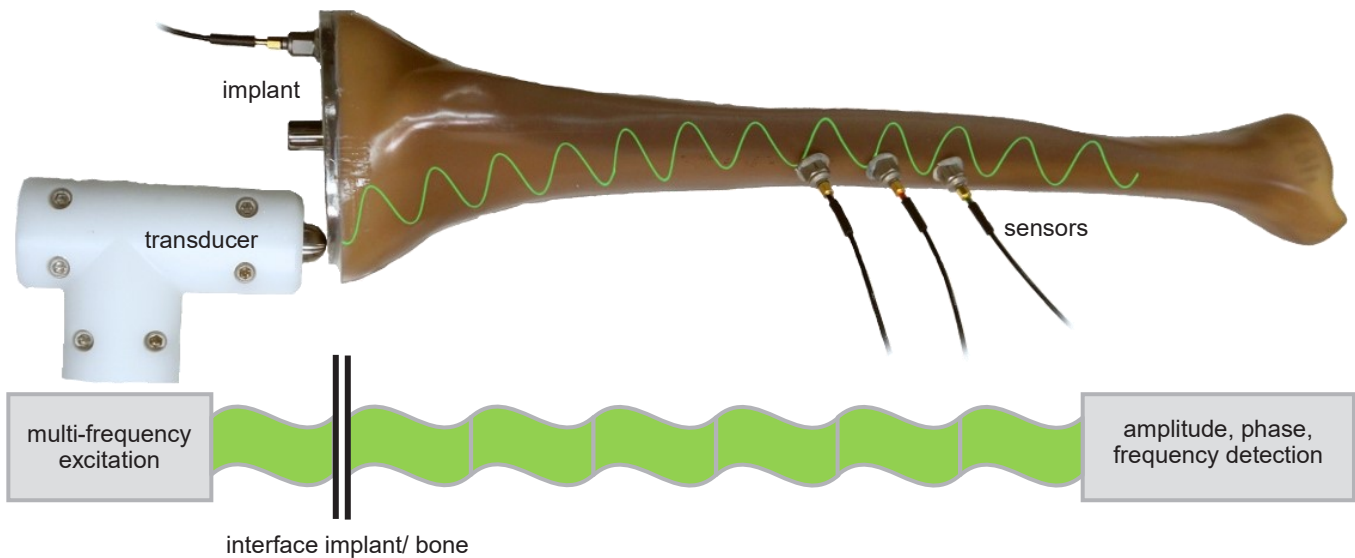


## Licensing Opportunity

### Acoustic detection of implant loosening



#### Summary

A pain-free, fast and cheap diagnostic method based on acoustic wave propagation detects reliably implant loosening.

#### Background

The loosening of bone implants without the occurrence of an infection is causing around 40 % of scheduled revisions. The detection of such aseptic loosening with current techniques (x-ray absorption, MRI) is not trivial. 1 out of 10 surgical revisions is unnecessarily performed because of a false-positive diagnosis.

#### Invention

The loosening of a bone implant can be well detected by an acoustic wave, which travels from the bone to the implant or vice versa. The contact interface alters the physical properties of the transmitted wave depending on the state of the interface (secure/loose). A transducer and a set of sensors are attached on the skin close to the implant and bone. The system is calibrated to each individual person by measuring the acoustic wave propagation in a relaxed and loaded state, that is for a knee implant a sitting and a standing position.

#### Features & Benefits

- Non-invasive, pain-free
- Portable device
- Cheap, easy to use, performed in a few minutes
- High sensitivity compared to x-ray images

#### Fields of Application

- Assessment of primary stability during implantation surgery
- Assessment of secondary stability during follow-up checks

#### Patent Status

- Patent pending

#### Publication

- *Paper under review*

#### Technology Readiness Level



#### ETH transfer

transfer@sl.ethz.ch  
www.transfer.ethz.ch  
+41 44 632 23 82

Reference: 2016-078  
Developed by: Laboratory for Movement Biomechanics  
Professor William Taylor, Florian Vogl