Title: A setup dedicated to measuring acoustic attenuation through artificial bone matching layers

Authors:
Eedit Koivukangas, Sofia Voimanen, Nonna Nurmi, Antonia Ressler, Michiel Postema

Keywords:
biomedical imaging, biomaterials, bone, transcranial ultrasound, matching layers

Abstract
Transcranial focused ultrasound finds uses in the treatment of Parkinson's disease and brain tumours. The skull is, however, a strong reflector of ultrasound. We propose to create artificial transducer matching layers to ameliorate sound transmission through the skull. For this purpose, multiple layered configurations were tested for their influence on the sound field, in an in-vitro setup comprising an aquarium filled with water, a transducer or probe, a needle hydrophone in the natural transducer focus, and one or more sample layers positioned in between. From this setup, the acoustic attenuation of these samples was determined. Preliminary results show promising configurations to reduce reflection on bone.