University of Basel
Department of
Biomedical Engineering

UKBB Universitäts-Kinderspital beider Basel

Université de Strasbourg

University of Basel, Department of Biomedical Engineering, Hegenheimermattweg 167c, 4123 Allschwil

Master of Science – Biomedical Engineering
Thesis Proposal

Finite Element Validation of retropatellar contact pressure in AI generated trochleas

The University Children's Hospital Basel (UKBB) is a world leading hospital in the treatment of trochlea dysplasia (TD) – a malformation of the femur.
This thesis at the Center for medical Image Analysis and Navigation (CIAN) in collaboration with the UKBB and the University of Strasbourg aims to evaluate different trochlea shapes found by generative AI approaches. The project will involve working with open source Finite Element Model (FEM) software (sofa). The primary objective is to evaluate a stress-strain distribution on the backside of the patella. This evaluation would represent a significant step in validating generated trochlea shapes as potential solutions for improving outcomes in patients with trochlea dysplasia.

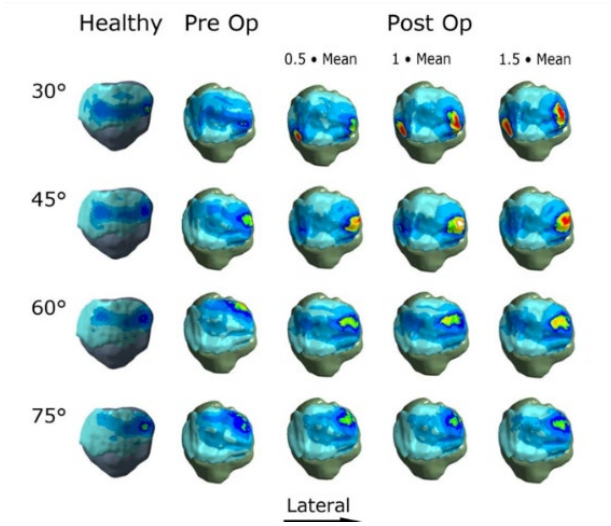

Figure 1: D. Kaiser, T. Götschi, E. Bachmann, J. G. Snedeker, P. M. Tscholl, and S. F. Fucentese, "Deepening trochleoplasty may dramatically increase retropatellar contact pressures- a pilot study establishing a finite element model," Journal of Experimental

Nature of the Thesis
Literature Research 20%
FEM/Programming: 60%
Documentation: 20%

Specific Requirements

- Basic knowledge of mechanics/biomechanics, including concepts such as stresses, strains, elasticity, plasticity, and failure criteria.
- Programming skills in Python. Experience with FEM tools such as ANSYS or open source software as SOFA is a plus.
- Strong organizational skills and a high level of motivation.

Group Leader / Supervisor: michaeljan.wehrli@unibas.ch
Group Leader: Prof. Dr. Philippe Cattin,
Supervisor: PhD Student Michael Wehrli, University of Basel
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Collaborators
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