Klinik für Orthopädie und Sportorthopädie
TUM Klinikum
Technische Universität München

Research internship (Experimental)

Preparing and designing a clinical study to characterize cruciate ligament tests

Background:

The Lachman test is an orthopedic diagnostic test used to assess the integrity of the anterior cruciate ligament (ACL). The test consists in applying a pulling force on the tibia while holding the femur in place. This evaluation is inherently subjective, and the test has a documented uncertainty between examiners.
Our goal is to describe this test using quantifiable metrics: the force pulling on the tibia, the counterforce holding the femur, and the resulting displacement of the tibia. Collecting these measurements requires a clinical study, which this project helps to prepare.
This research internship covers the technical and organizational side of the study. The technical part comprises the design of the adapters for the force sensors and the implementation of motion capture for the tibia and femur. The organizational part comprises the study design and the preparation of the ethics application. The follow-up master's thesis will then conduct the study and analyze the resulting data.

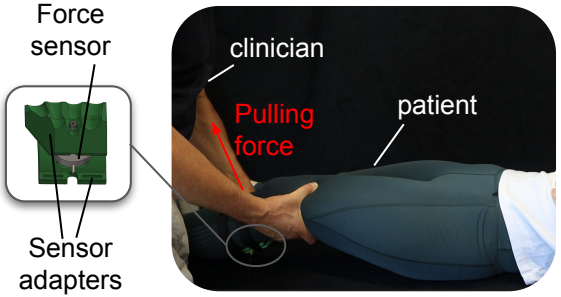
Prerequisites:

- Background in biomedical engineering or general engineering with an interest in medical applications
- Independent and structured working style
- Knowledge of CAD and motion capture is beneficial
- Interest in continuing with the follow-up master's thesis

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Work packages:

- Design of force sensor adapters for the tibia and femur
- Development of a motion capture solution to track the motion of the tibia relative to the femur, including the design of the trackers
- Integration of force and motion data into one time-synchronized recording and evaluation pipeline
- Development of the study protocol (participants, procedure, outcome measures) and preparation of the ethics application (in cooperation with the supervisor)



Setup for the instrumented Lachman test