

Project proposal for SSY226:

Knee extension measurement tool

Background

Full range of motion is critical for a fully functional joint in the human body. After an injury or an operation affecting a joint, the range of motion can be severely diminished. Another consequence can be a temporary decrease of muscle functionality in the vicinity of the affected joint.

As recovery progresses, most patients recover full functionality of the affected joint. However, in some cases, the joint functionality can be permanently affected. In these cases, it can be difficult to determine the reason behind the reduction of functionality, and tests need to be performed to determine the cause. One such test is related to the range of motion. It can therefore be a parameter of interest to measure and monitor during the rehabilitation.

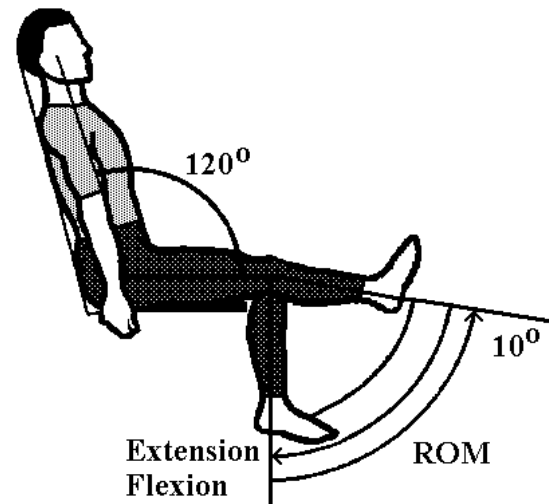


Illustration of knee extension, taken from Pontaga, Inese. (2004). Hip and knee flexors and extensors balance in dependence on the velocity of movements. Biology of Sport. 21.

Problem Description

This project aims to design and construct a system that can measure a patient's capability of flexing and extending their knee in a reliable and repeatable manner. The system should have the following features:

- Can be easily attached/mounted to a human knee and needs to stay in place throughout the assessment.
- Can be used by a multitude of individuals with varying body dimensions, preferably both children and adults.
- Capability of being used alongside gym equipment to allow the possibility of applying external load.

Prerequisites: Designing mechanical systems, designing and building electrical circuits, programming in C, C++ and Python

Number of students: 2-4

Contacts: Rikard Karlsson, rikard.karlsson@chalmers.se
Emmanuel Dean, deane@chalmers.se