**Problem statement**

Knee injuries account for 41% of all sports injuries\(^1\); is a quote from an article published in the British Journal of Sports Medicine written by Dr. Parag Sancheti and colleagues. Described in the article are important risk factors related to a knee injury and common methods of both prevention and treatment. These include surgery and rehabilitation of the mentioned common types of injury. We see that there are many people who could benefit from a design improvement in physical therapy techniques that offers a portable and effective option to existing technologies such as CPM machines.

**Abstract**

This project aims to design and develop a motorized knee brace that acts as a portable physical therapy device to improve mobility and physical therapy compliance for individuals with knee joint conditions. The research methodology involves conducting a literature review, user research, designing and prototyping the device, testing it on a sample population, and evaluating its effectiveness.

**Conclusion**

An automatic and portable physical therapy device, with range of motion therapy capabilities, has been created, that is more affordable than industry-standard Continuous passive motion devices. It also achieves the goal of an ergonomic design, which accounts for both engineering and customer requirements, allowing users to have custom and wireless control over their recovery.

**Bill of materials**

- **Thigh support**
- **Call Clamp**
- **Shaft piece**
- **Thigh Clamp**

**Design**

- **Motor Housing**
- **Shaft and plate piece**
- **Servo motors**
- **Infrared control**, allowing 0-135° of range of motion for users
- **Custom physical therapy with 1°, 5°, 10°, 30° increments and rotational speed control**
- **Future implications to add Bluetooth control, through a mobile app**