



Un été ensoleillé avec prévision de science

14 – Validation of a novel clinical method for assessing the effect of a brace on knee biomechanics

Accepted Academic Levels (in progress):

☐ College ☒ Bachelor's ☐ First-cycle PhD ☐ Master's

Research Team

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And

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Research Project Description

Background

Anterior cruciate ligament (ACL) tears are among the most common lower limb injuries in young athletes and often require reconstructive surgery. Despite rigorous rehabilitation protocols, a significant number of young individuals experience re-injury upon returning to play.

One potential strategy to reduce this risk is the use of a knee brace designed to control unwanted movements, particularly dynamic valgus. However, there is currently a lack of

simple and accurate tools to objectively assess the biomechanical effect of these braces in a clinical setting.

Objective

The main objective of this project is to test a new method for biomechanical assessment of the lower limb, which is easy to use in a clinical setting, in order to determine its potential to measure the effects of a knee brace on valgus control. This method combines innovative and accessible technologies to provide a practical alternative to complex and expensive motion analysis systems.

Methodology

Two cohorts will be recruited:

- 10 healthy subjects exhibiting dynamic valgus.
- 10 subjects who have undergone ACL reconstruction and wear a brace during sports activities.

Each participant will be assessed in the motion analysis laboratory using:

- Vicon cameras, serving as the reference for three-dimensional movement measurement.
- Chacuro technology, a simplified portable motion tracking method.
- The commercial Hurtblocker application, used to evaluate the risk of ACL rupture.

In healthy subjects, the agreement between the Chacuro method and Vicon measurements will validate the accuracy of this approach. In participants who have undergone ACL surgery, the use of this method will allow us to explore its ability to detect biomechanical changes induced by the brace.

Role of the candidate during the internship

The student will actively participate in:

- Recruiting participants and coordinating their laboratory visits;
- Collecting biomechanical data in the laboratory;
- The analysis and interpretation of results;
- Preparing and presenting the findings at the student conference at the end of the summer.

Academic Programs

Students enrolled in one of the following academic programs, or in a related field, are invited to apply:

- Kinesiology, Physiotherapy, Medicine, Biomedical or mechanical engineering



<https://event.fourwaves.com/fr/stagerecherchechusj2026>

Internship Details

Schedule

- ☒ Full-time (35 hrs/week)
- ☒ Part-time

Duration (approximative)

- ☒ 4 months
- ☒ 3 months
- ☐ 2 months
- ☐ 1 months

Funding

Funding will vary depending on the type of internship:

- Internship recognized by the academic institution: A minimum stipend of **CAD \$550 per week** (based on a 35-hour schedule) will be provided from the supervisor's research funds or in combination with other funding sources.
- Internship outside the academic curriculum: An hourly wage ranging from **CAD \$16.10 to \$18.72** will be provided from the supervisor's research funds.

This project is supported by a grant from the Canadian Institutes of Health Research.

Keywords

Knee, anterior cruciate ligament, biomechanics, orthopaedics

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