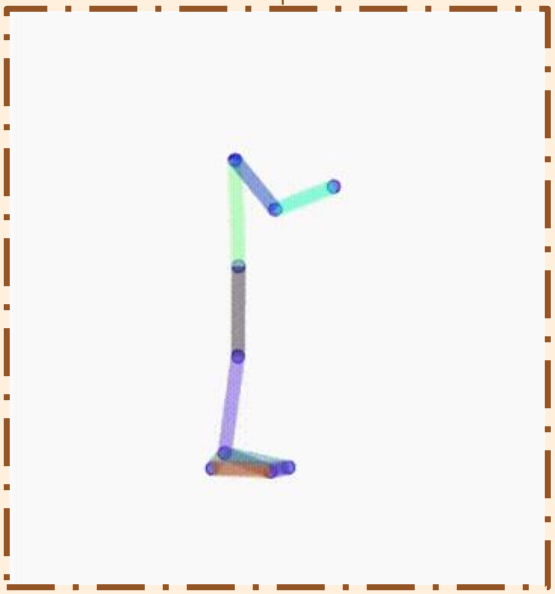


The Biomechanic Brainiacs

ASSISTIVE SQUAT JUMP DEVICE

Ellie Smith | Elin Lee | Stacey Sholter

The Squat Jump

Squat

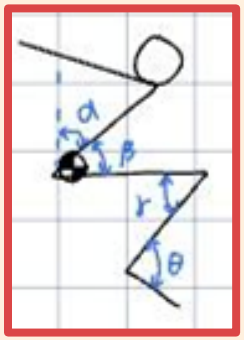
Flexing at torso, hip, and ankle. Legs and ankles are engaged for stability.

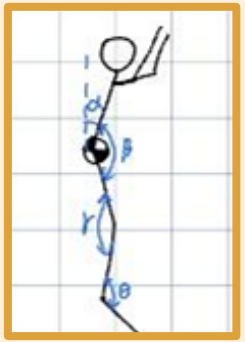
Take-Off

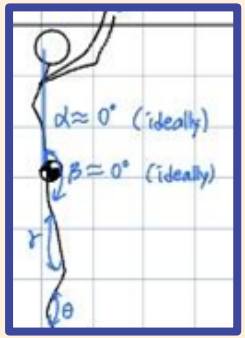
Initiated through a powerful push-off from the feet and ankles.

In Flight

Knees, hips, and elbows extend to help propel the movement upwards.





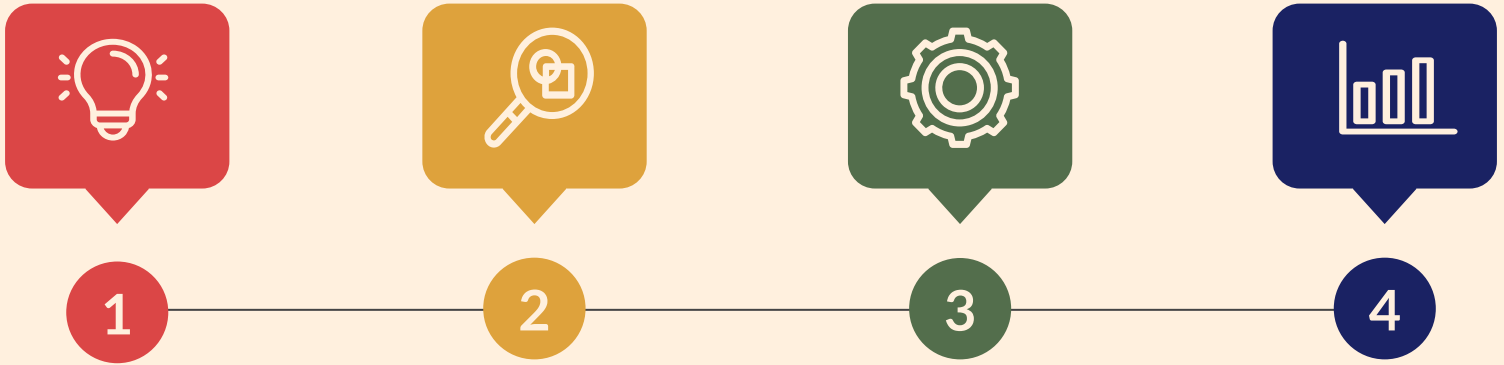


Patellofemoral Pain Syndrome

- Common in athletes doing running, squating, and jumping movements
- Can be caused by overuse of the knee joint, problems with kneecap alignment, and weak muscles surrounding the knee [2]
- Exercise is a favourable treatment for the issue, but exercising incorrectly could cause more pain [1]

So what is our solution???

Design Process



1

Conceptualize

Look at the squatting movement and determine what needs augmentation

2

Data Analysis

Analyze squat jump data in OpenPose and MatLab

3

Design

Create a device that suits our client's needs

4

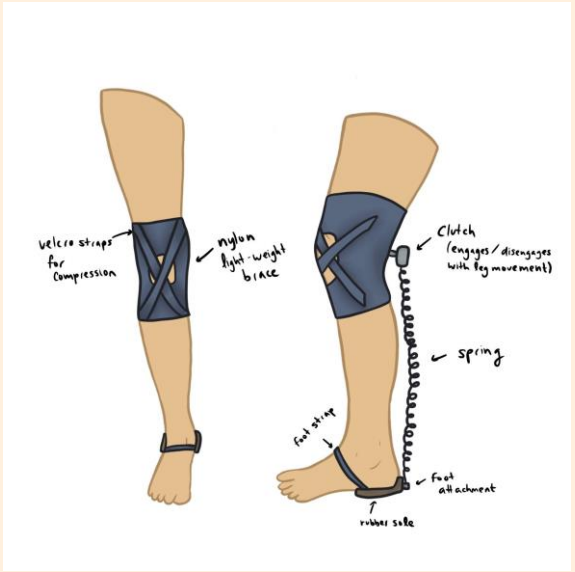
Build + Evaluate

Build and evaluate the device for future development

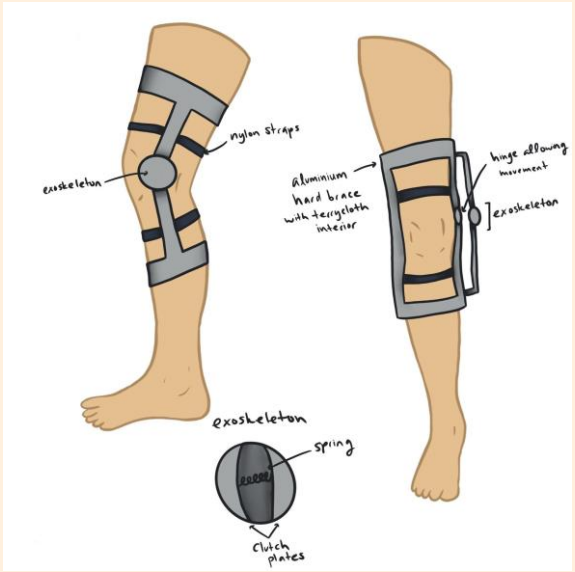
Design Generation

Patellar Strap

Soft Knee Brace

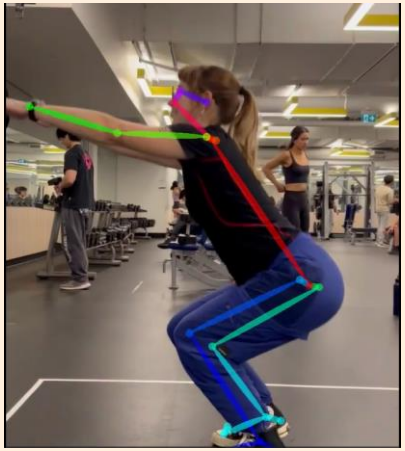


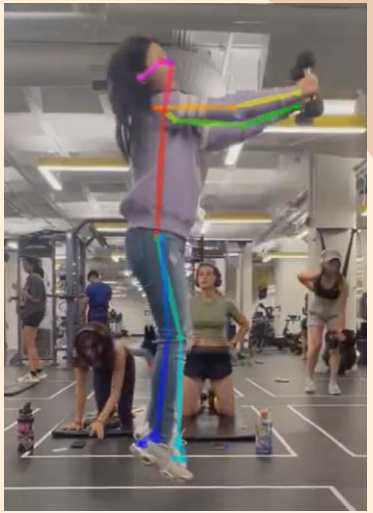
Hard Knee Brace



Thanks for Listening!

Any Questions?





References

[1] “Clinical biomechanics of patellofemoral pain syndrome,” Physiopedia, https://www.physio-pedia.com/Clinical_Biomechanics_of_Patellofemoral_Pain_Syndrome (accessed Dec. 2, 2023).

[2] “Patellofemoral pain syndrome (Runner’s knee): Symptoms & causes,” Cleveland Clinic, https://my.clevelandclinic.org/health/diseases/17914-patellofemoral-pain-syndrome-pfps (accessed Dec. 2, 2023).