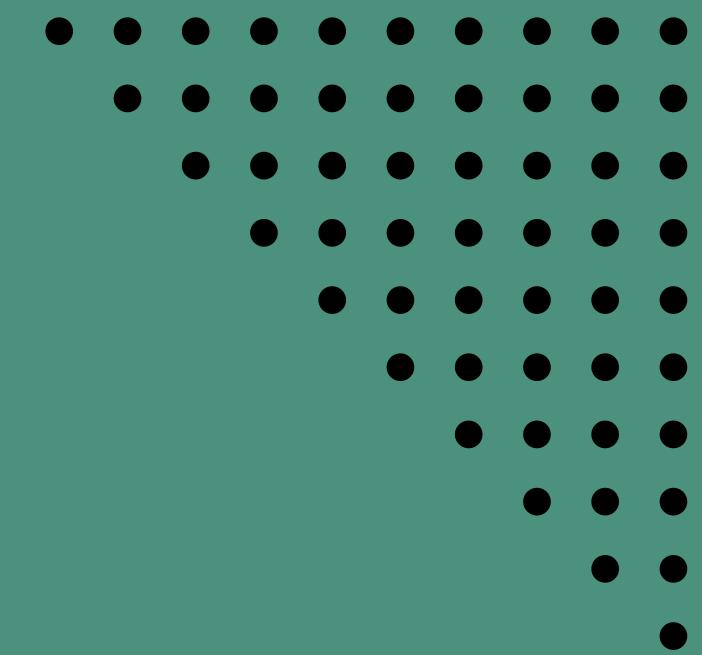
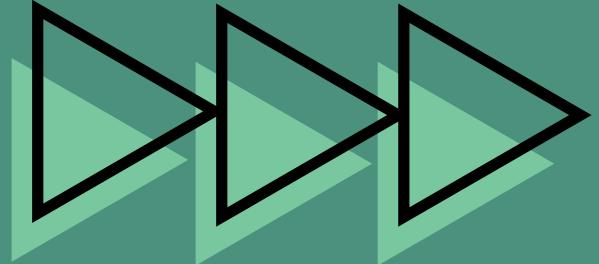
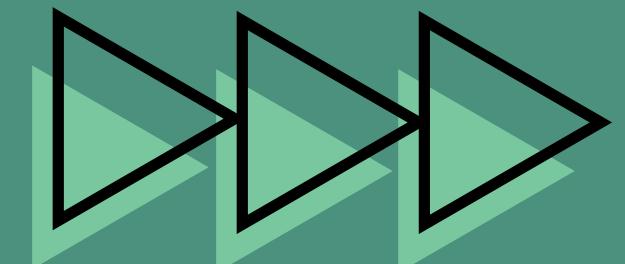
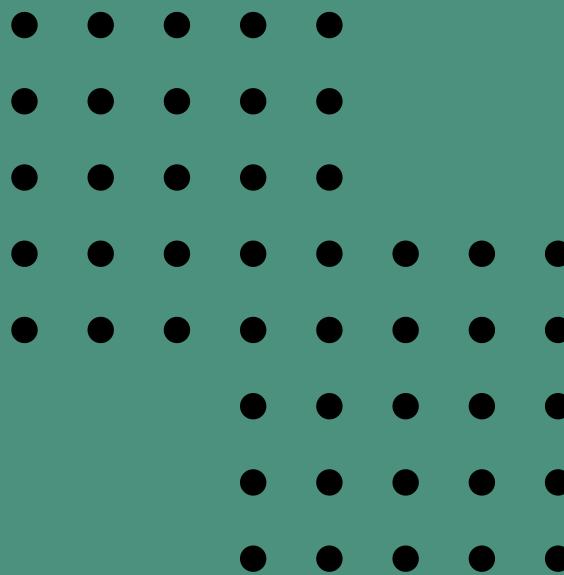


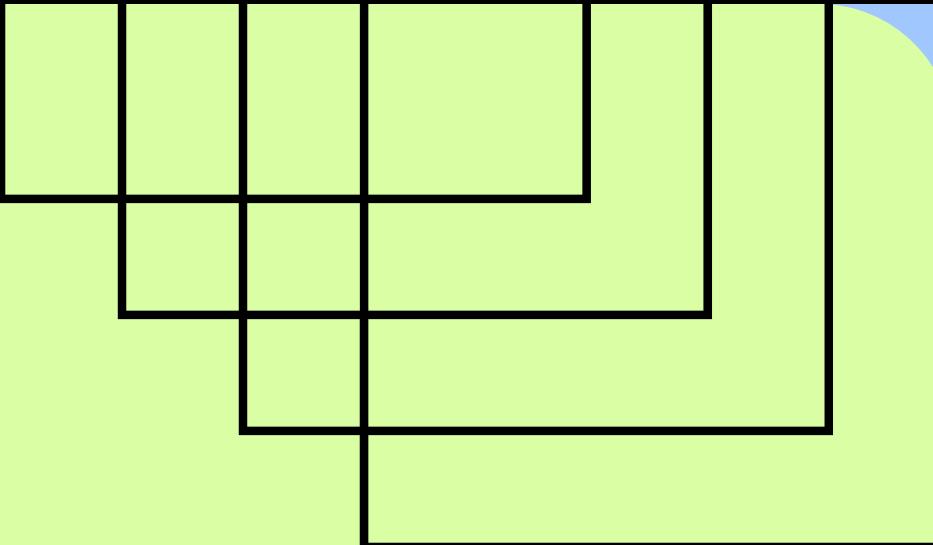
MAKE - A -THON 2025



KNEEless To Say



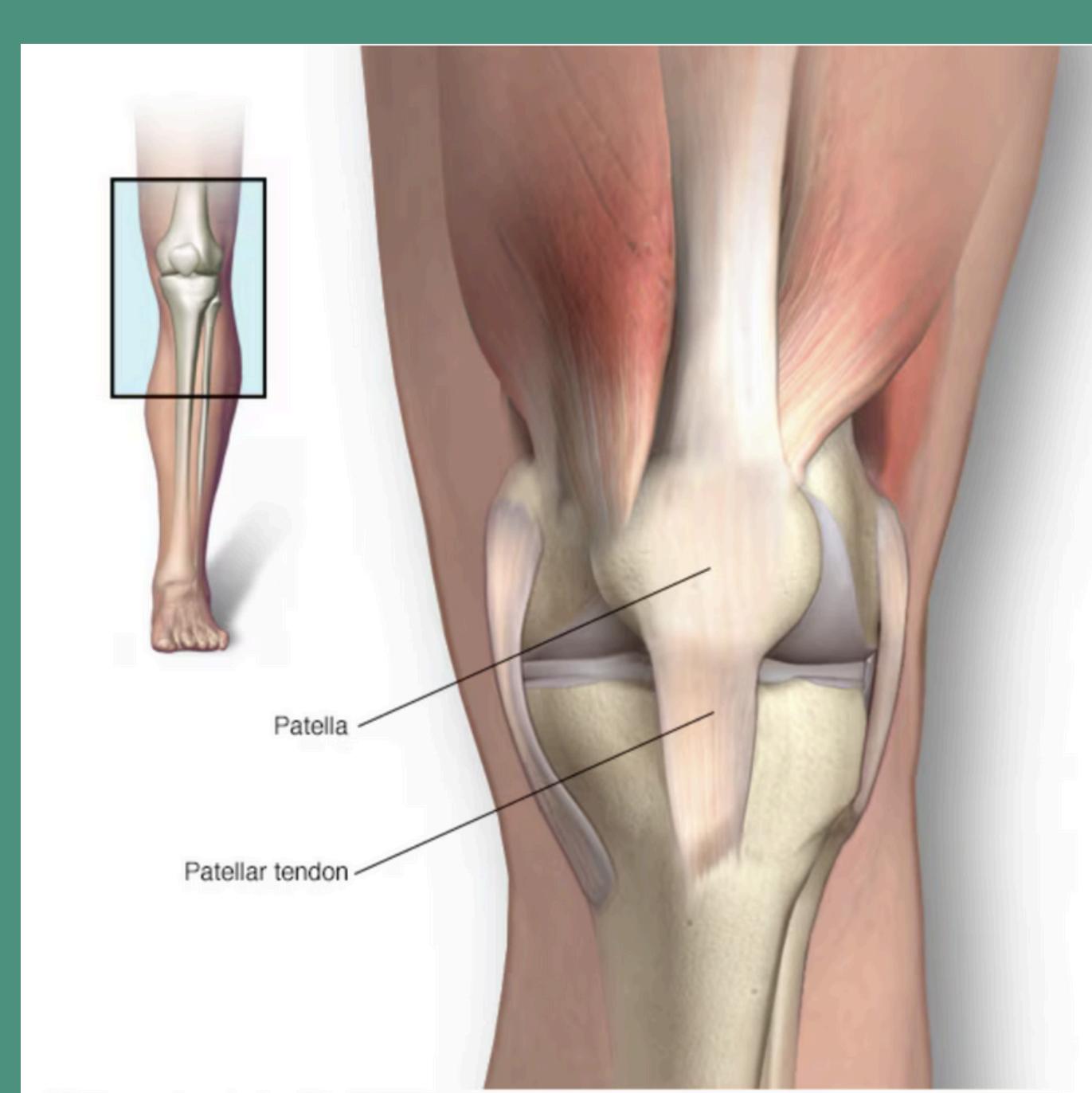
Abir Bhatt, Brenda Santeliz, Joel Etchri, Leo Crampé, Vrinda Gandhi, and Zach Eggleton



Our Problem



PATELLAR TENDONITIS



What is it?

An injury to the tendon connecting the kneecap to the shinbone.

What causes it?

Overuse from repeated stress on the patellar tendon.

Who's at risk?

Common in athletes who jump (basketball, volleyball), but anyone can get it.

Demographic?

15-30 years

Why is it important?

The patellar tendon helps with kicking, running, and jumping—hence the name "Jumper's Knee."

MEET OUR PATIENT



NAME: Joel Etchri

AGE: 16

CAUSE OF INJURY: Repeated
jumping in soccer

SYMPTOMS: Knee pain when
jumping, running, squatting

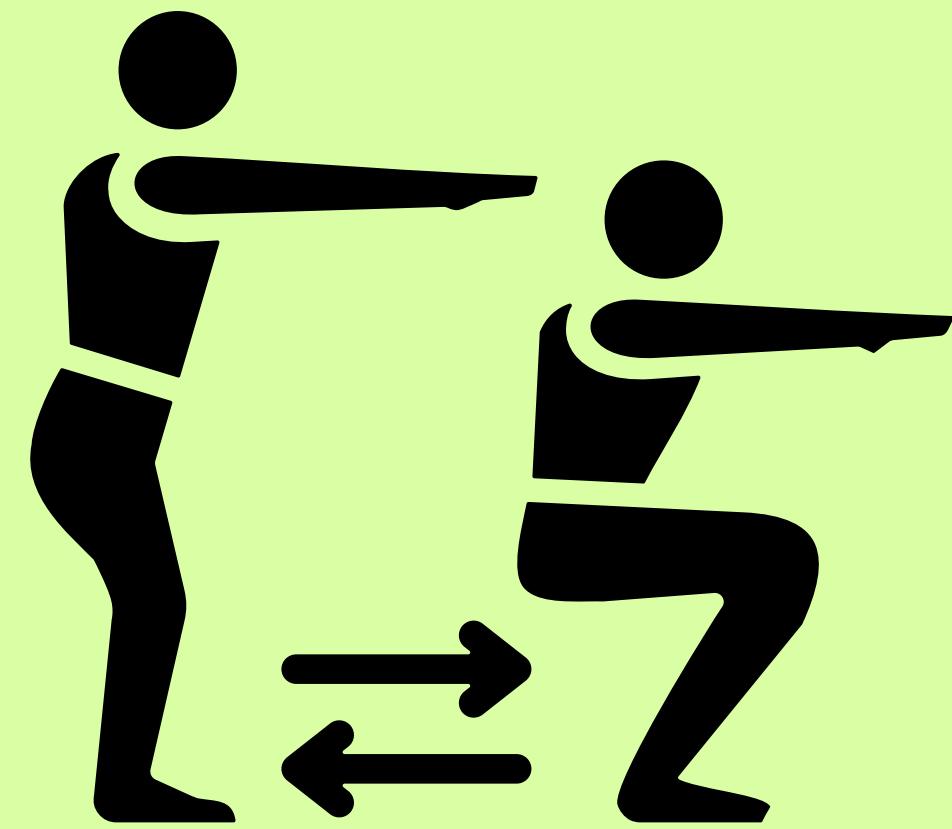
CURRENT TREATMENT IN PT:
Isometric Strength, Periodic
Electrotherapy, Ultrasound

OUR PRODUCT

THE PT²

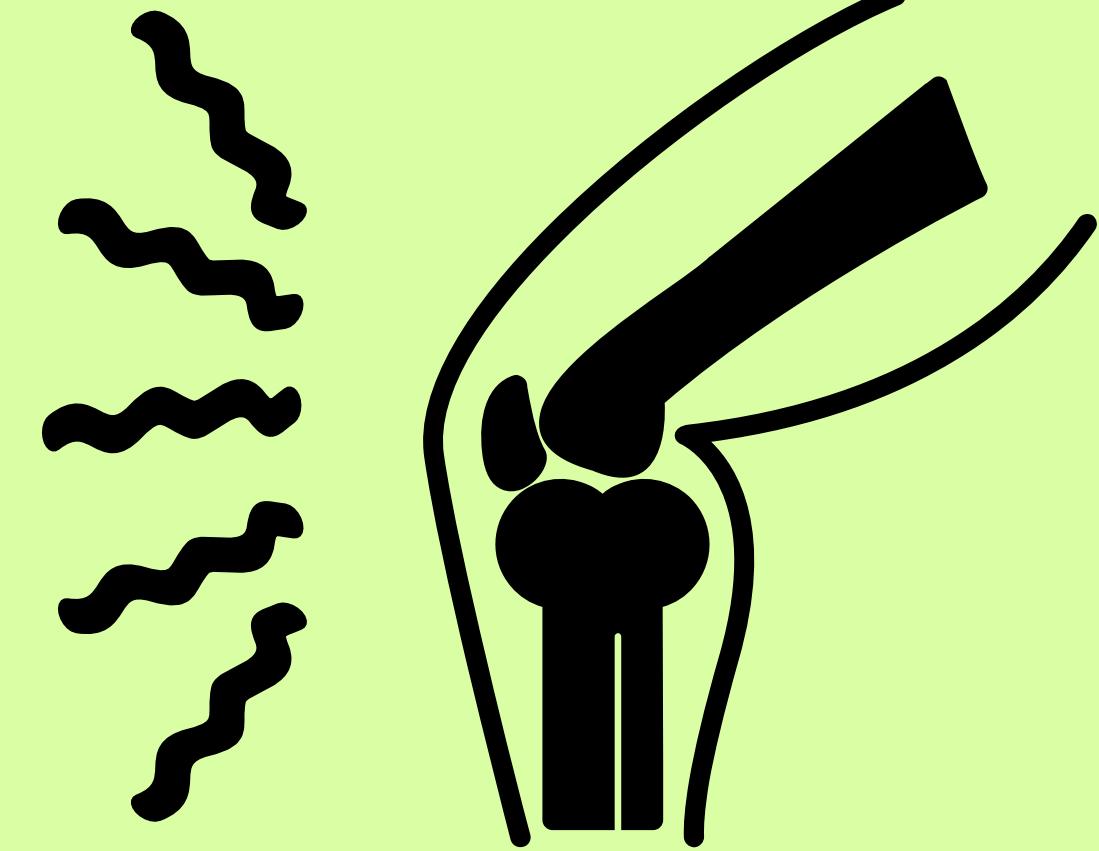
“PATELLAR TENDON PHYSICAL THERAPY”

Treatments



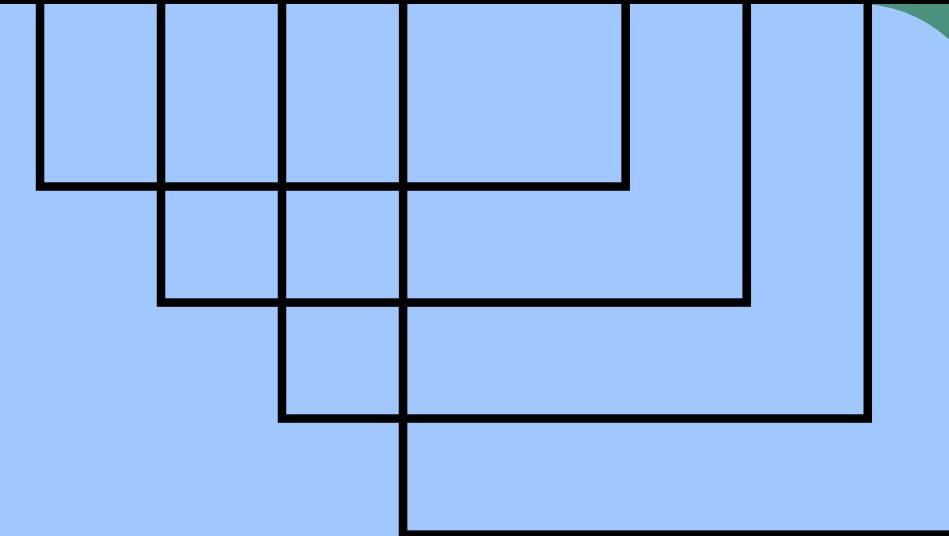
Isometrics & Strength Exercises

Slow, controlled leg lowers and steady isometrics help heal the patellar tendon.



Vibration Therapy

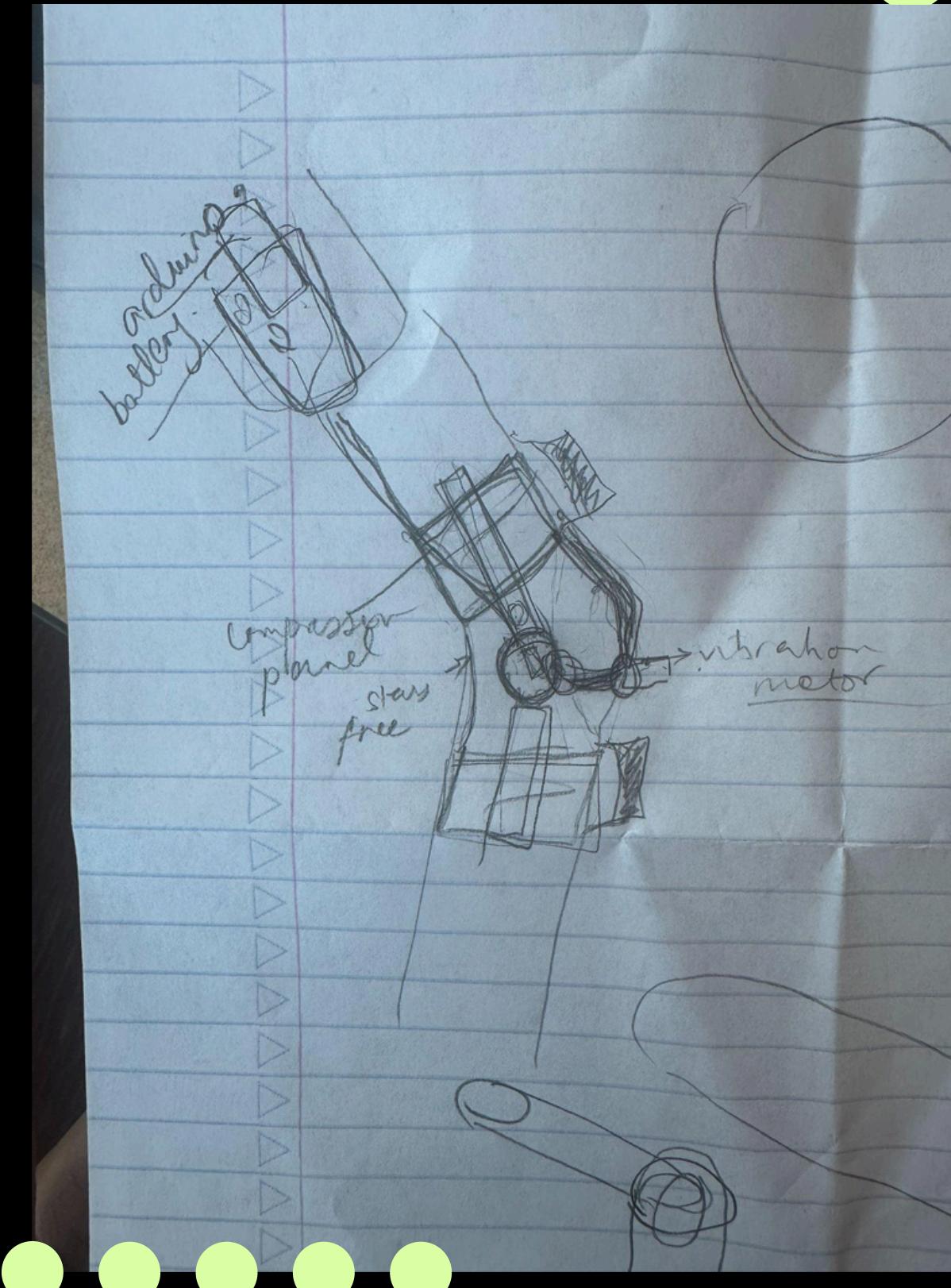
Massage guns relieve pain and break down scar tissue.



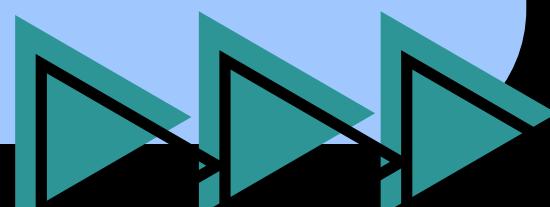
Our Solution & Design



Initial Design

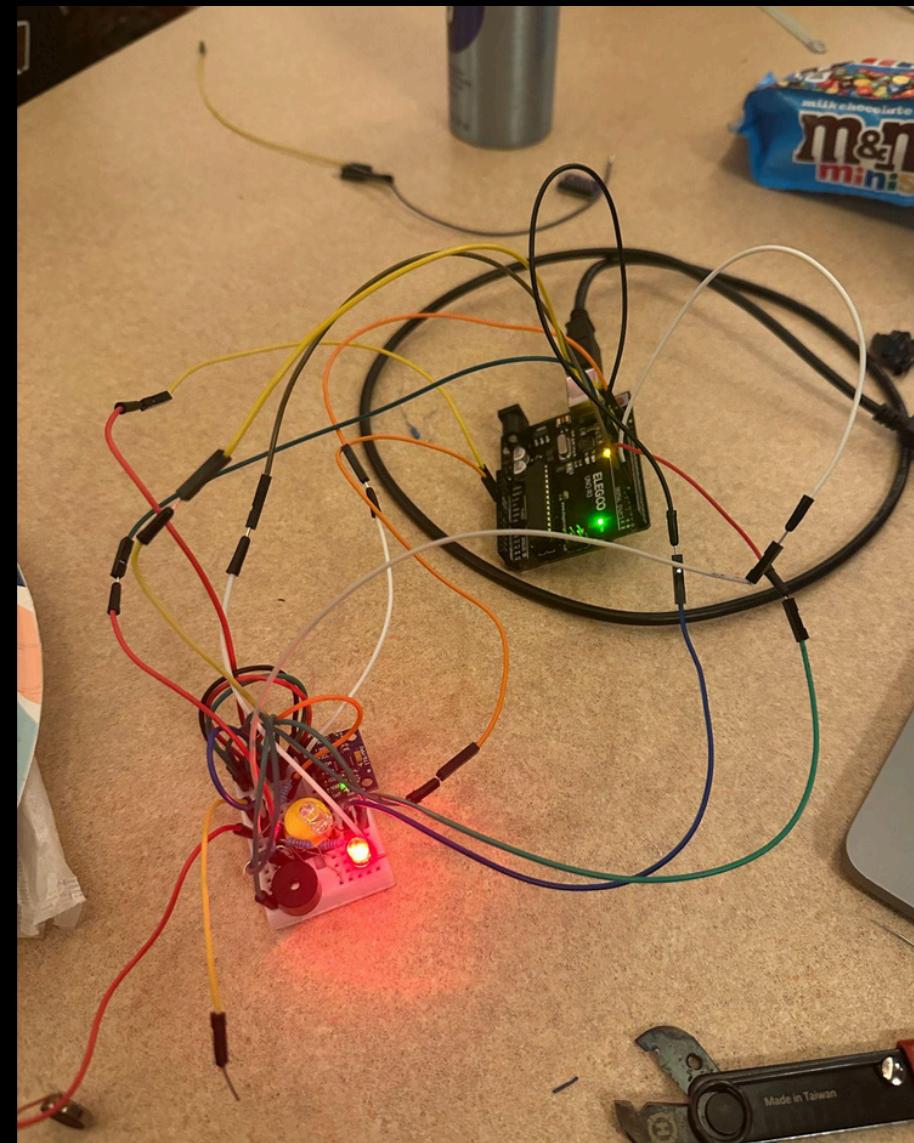


1. A corrective brace that alerts users of poor form during exercises.
2. Attachable vibrating module to break down scar tissue and relieve pain.
3. Comfortable for compression and support





How it Works





Acceleration X: 0.71 m/s², Y: 9.73 m,

Acceleration X: 1.34 m/s², Y: 9.15 m,

Acceleration X: 0.51 m/s², Y: 9.32 m,

Acceleration X: 0.65 m/s², Y: 9.37 m,

Knees Caving In!

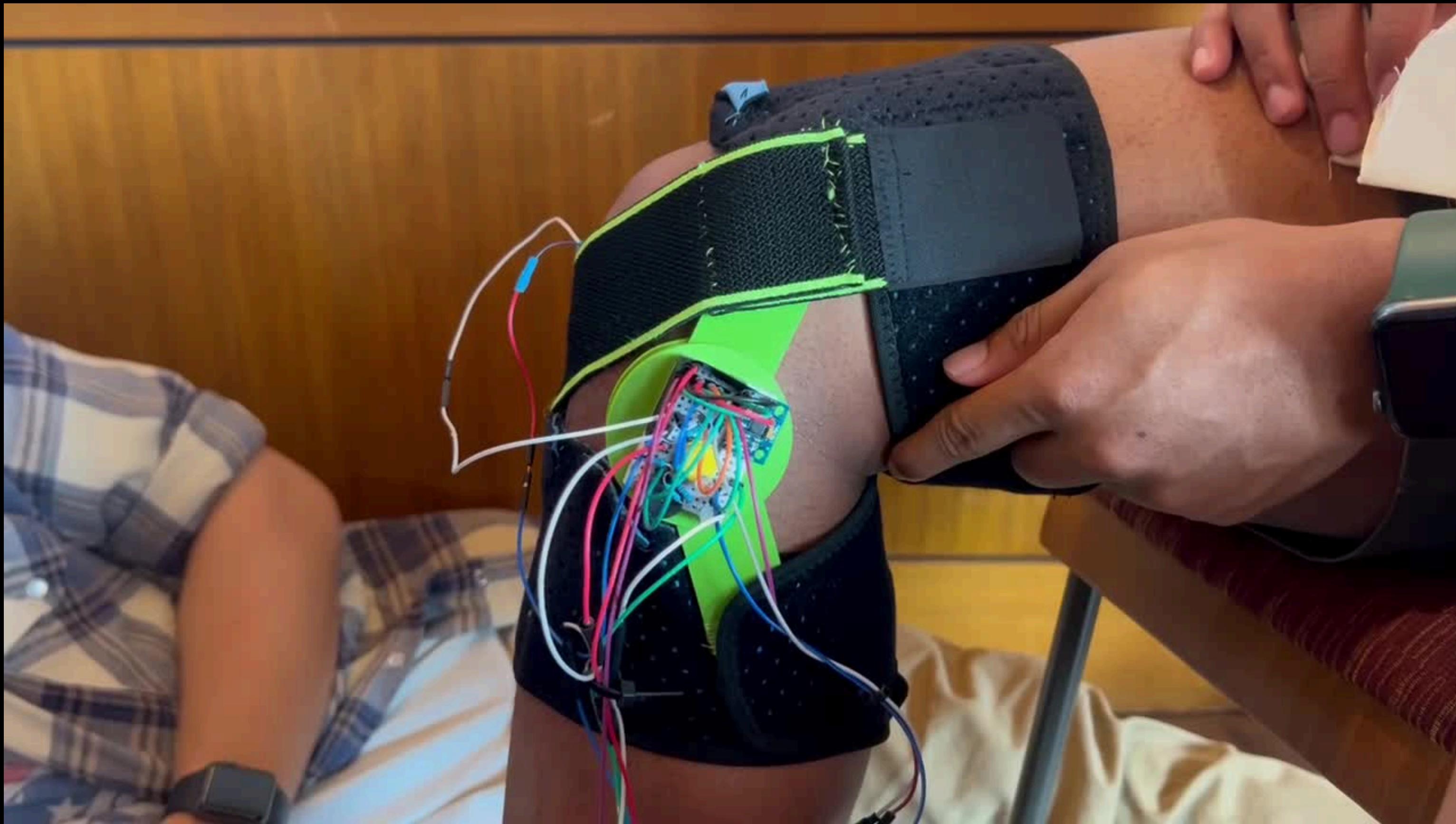
Acceleration X: 0.79 m/s², Y: 9.17 m,

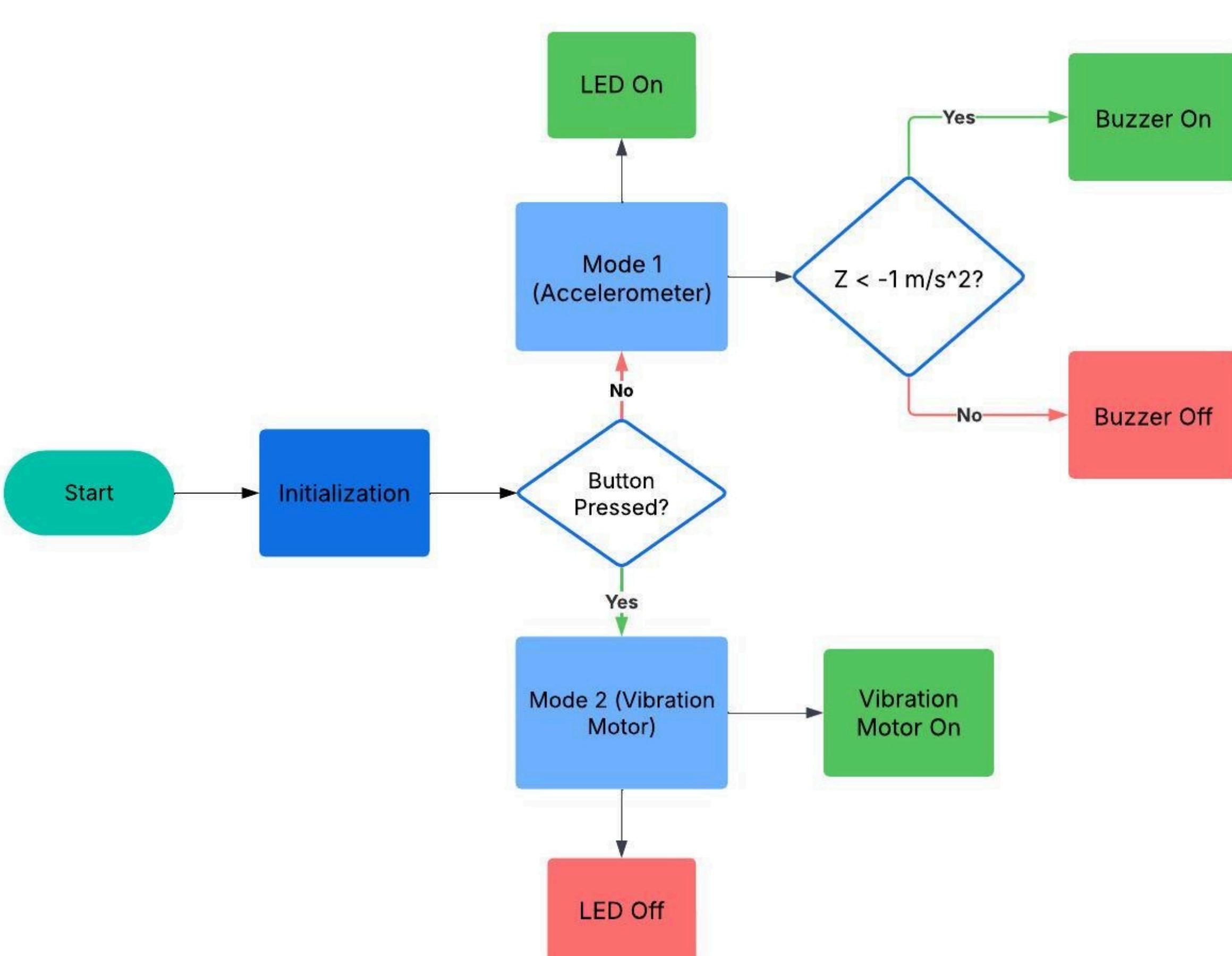
Acceleration X: 0.40 m/s², Y: 9.42 m,

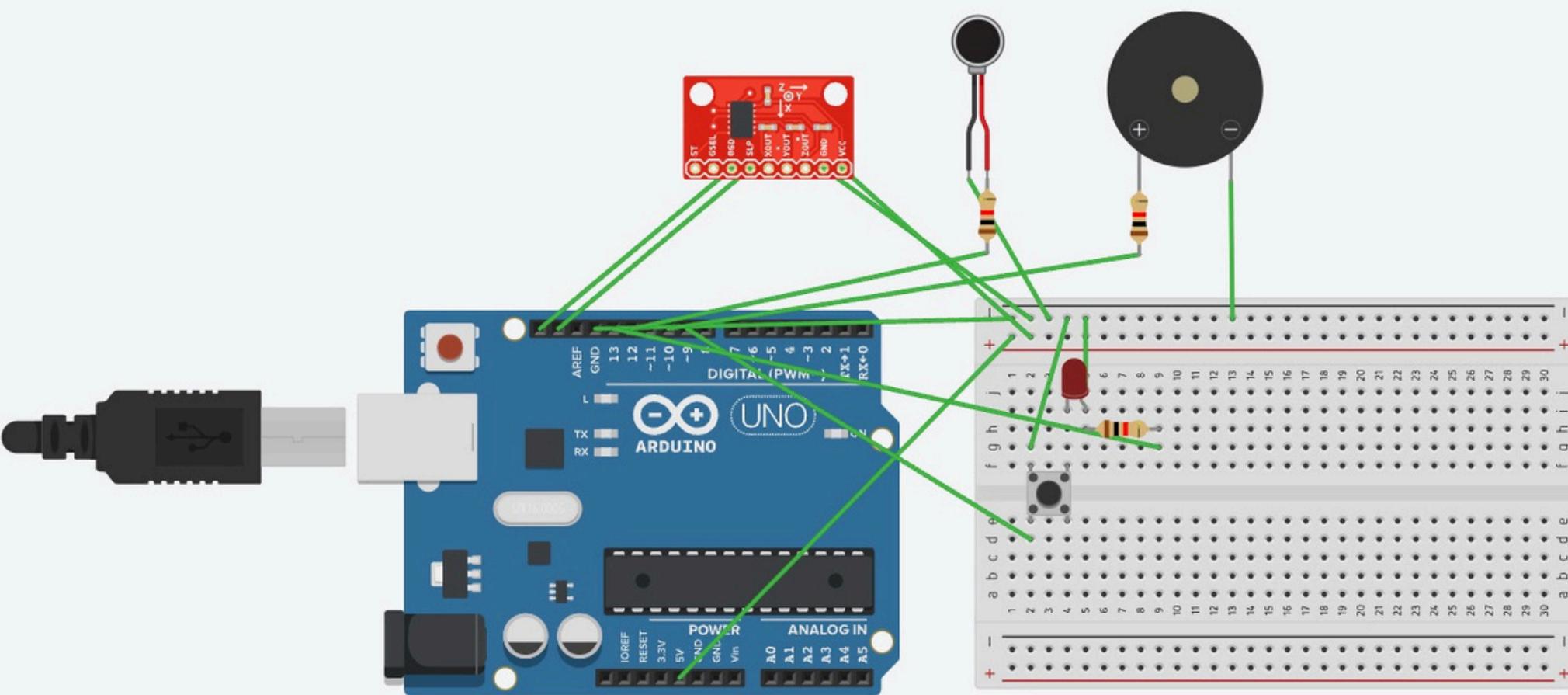
Acceleration X: 0.53 m/s², Y: 9.48 m,

Acceleration X: 0.27 m/s², Y: 9.32 m,

Acceleration X: 0.00 m/s², Y: 9.83 m







Product Instructions



3

straps



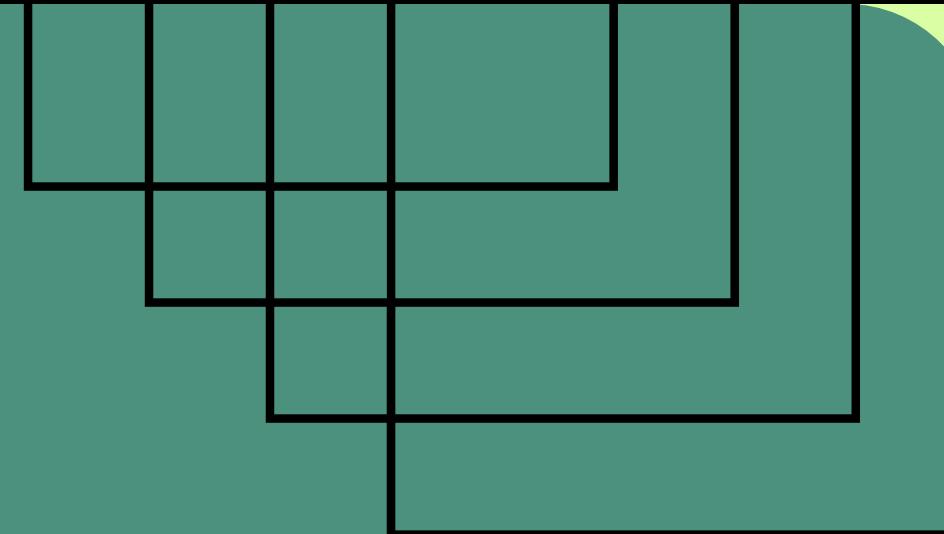
2

modes



1

brace

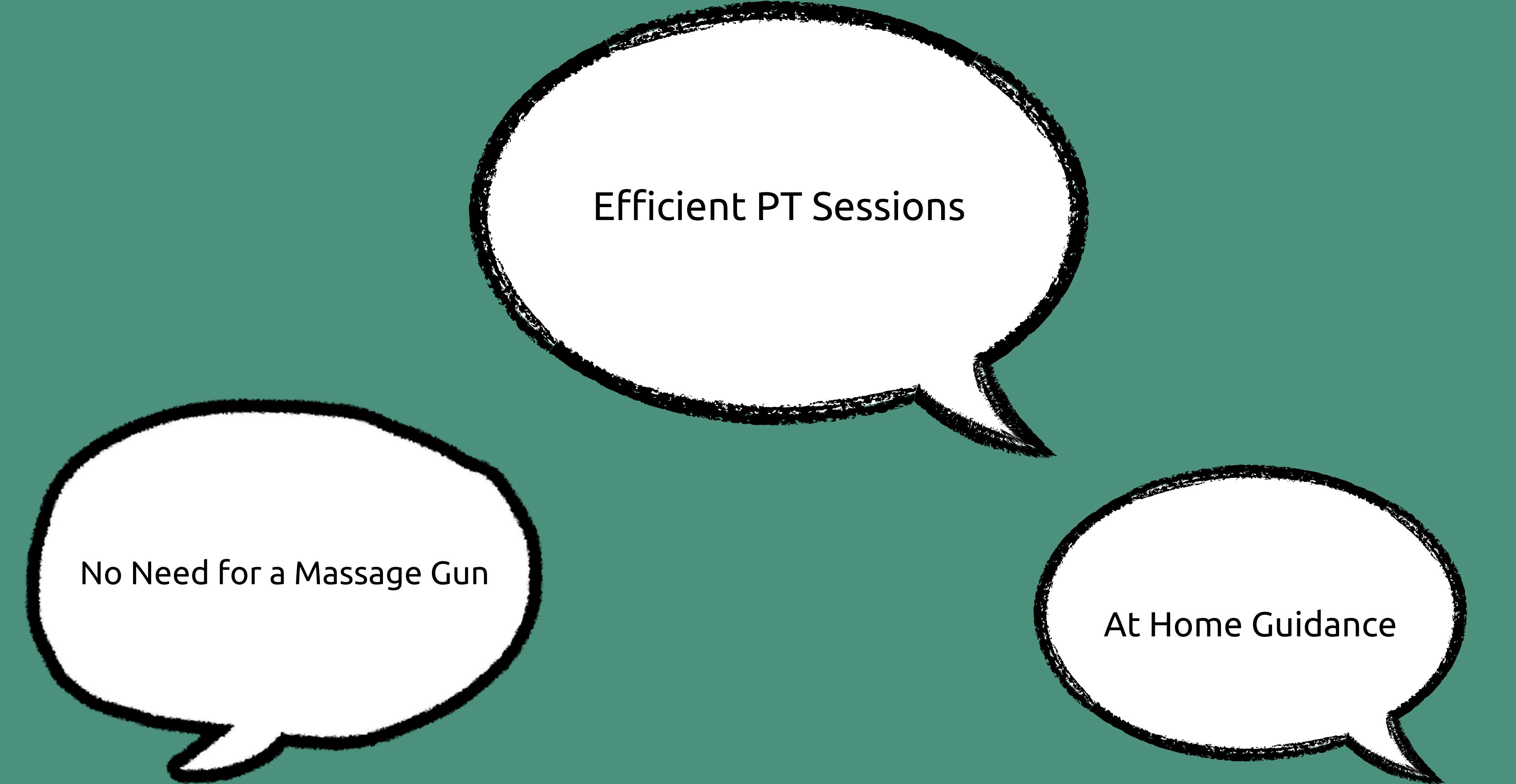


Why our Product?





CONVENIENCE.



Efficient PT Sessions

No Need for a Massage Gun

At Home Guidance

The Current Market



FEATURES	OUR DEVICE	REGULAR BRACE	MASSAGE GUN
REAL-TIME FEEDBACK	✓		
VIBRATIONAL THERAPY	✓		✓
SMART MOVEMENT TRACKING	✓		
AFFORDABLE	✓	✓	



Cordless Knee Massager with Heat and Vibration, Heating Pad for Knee Elbow Shoulder, Heated Kn...

★★★★★ 928
100+ bought in past month

\$39⁹⁹ (\$39.99/Count)



DonJoy Performance
Webtech Short Knee Brace



\$60.99

★★★★★ (40)

Manufacturing & Cost Breakdown

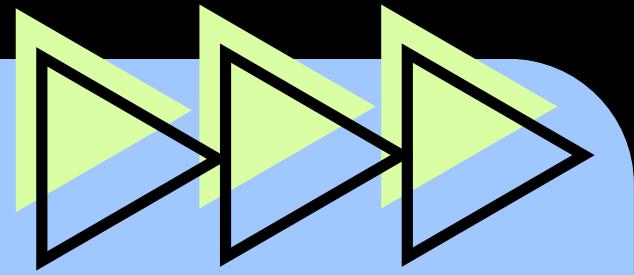
COMPONENT	COST P/U
▶ Arduino	\$22 ▶
▶ Accelerometer	\$6 ▶
▶ Vibration motor	\$3 ▶
▶ Knee brace	\$10 - \$15 ▶
▶ Total Cost (estimate)	\$40 - \$47 ▶

Future Additions

- Tracks patient progress to inform physical therapists.
- Data is uploaded to an app (with patient consent) for therapists to monitor at-home progress.
- Includes range of motion, squat depth, and exercise frequency.
- Boosts physical therapy productivity, especially for patients with limited insurance coverage.



References



- <https://www.mayoclinic.org/diseases-conditions/patellar-tendinitis/symptoms-causes/syc-20376113>
- <https://myhealth.alberta.ca/Health/aftercareinformation/pages/conditions.aspx?hwid=bo1598>
- <https://www.mayoclinic.org/diseases-conditions/patellar-tendinitis/diagnosis-treatment/drc-20376118>
- <https://www.donjoystore.com/knee-injuries/patellar-tendonitis-jumpers-knee>
- <https://www.nhslanarkshire.scot.nhs.uk/services/physiotherapy-msk/patellar-tendinopathy/#:~:text=Patellar%20tendinopathy%20can%20affect%20anyone,such%20as%20football%20and%20tennis.>
- ChatGPT helped with writing some of the code.

