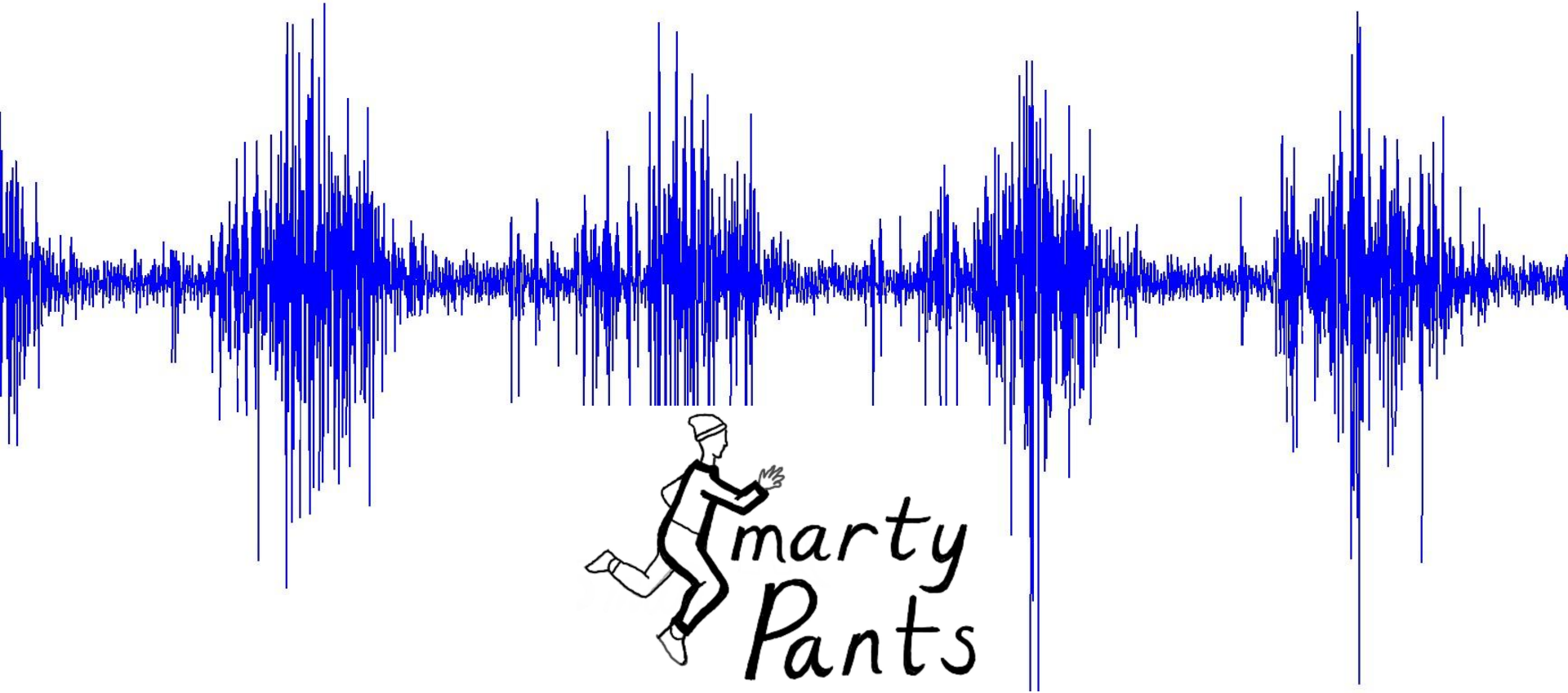


Better Biomechanics

Rebekah Bond, Annes El-Krewi, Laura Heinze, and Alli Ray

50-70% runners

Opportunity

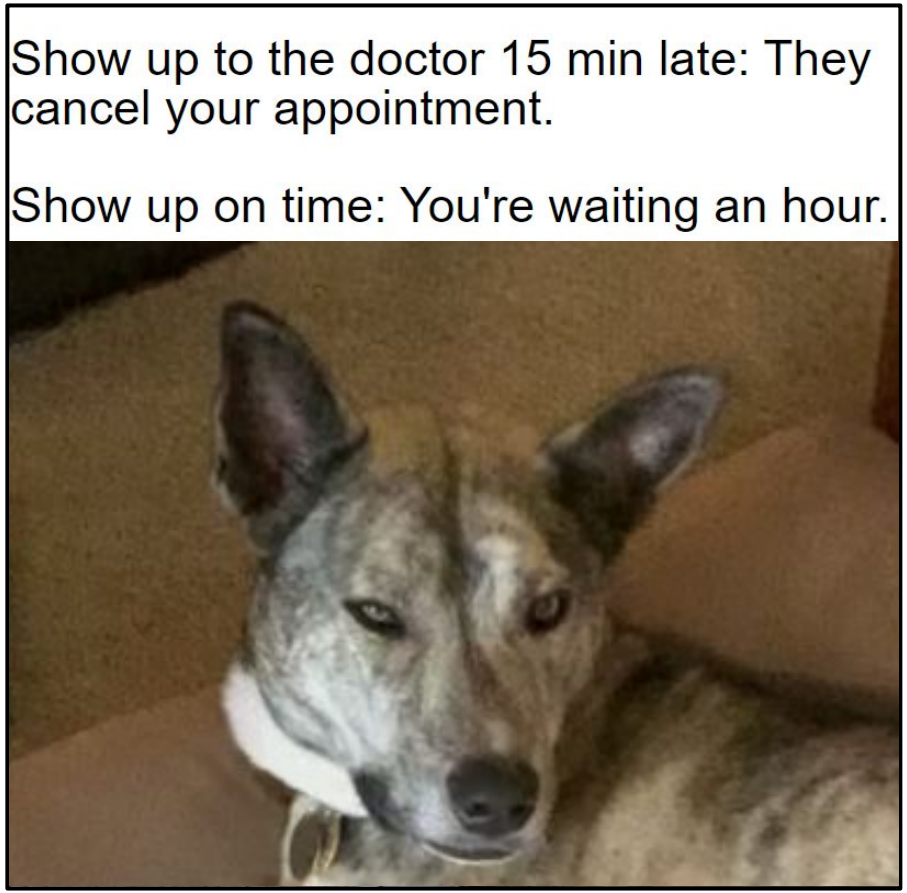
Sports Medicine Market:

2020: $5.5 BILLION

2025: $7.2 BILLION

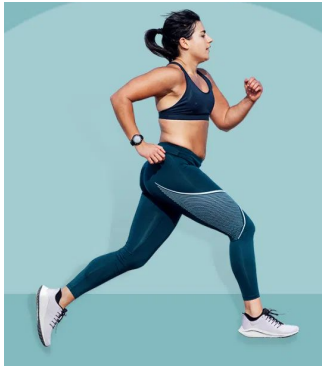
Current Methods

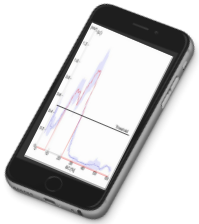
- Dr. appointments
- Physical Therapy
- KT tape
- Orthotics



Smarty Pants

Get ahead of the pain. Stay in the game.

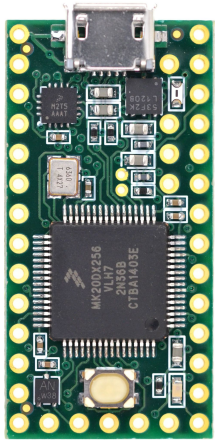




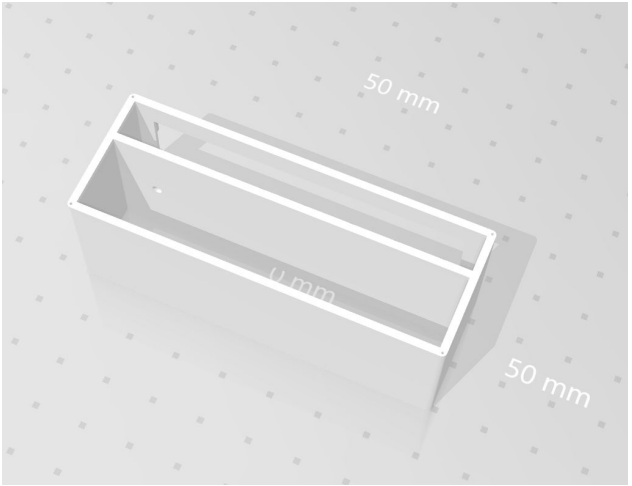
https://www.orthobethesda.com/blog/how-to-prevent-sports-injuries/

Prototypes

1. Silver-based electrodes



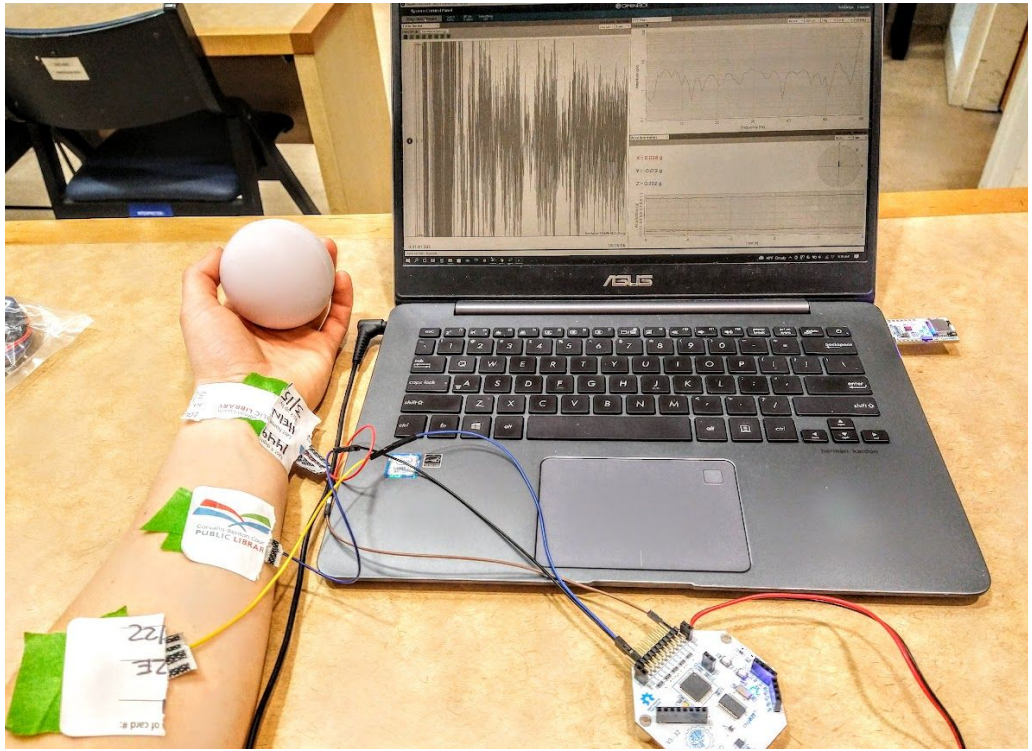
2. Teensy 3.2 (Arduino)



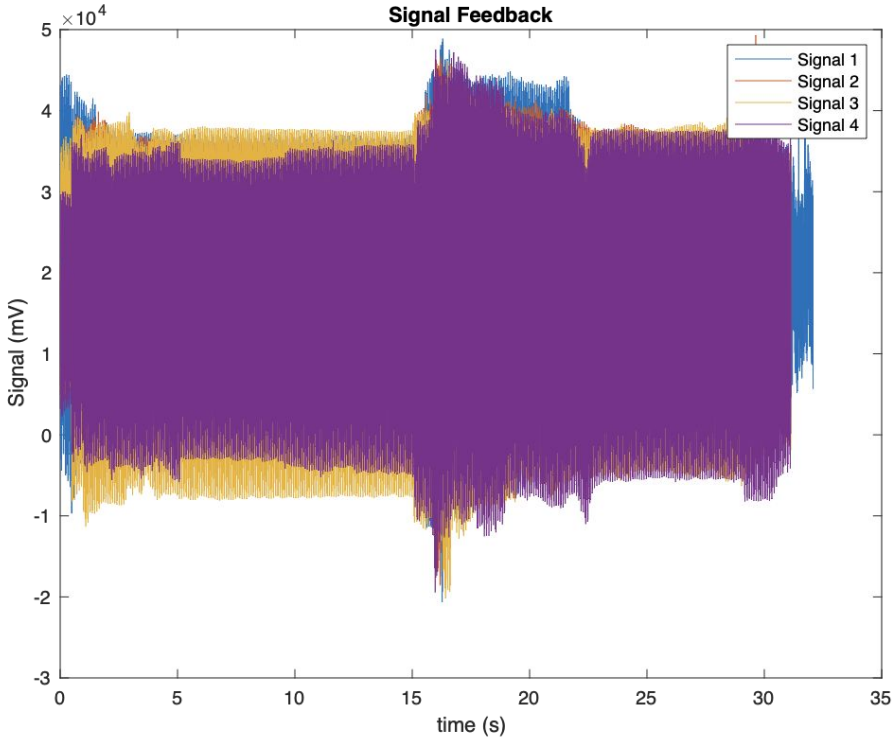
3. Power Pack

Smart Electrodes

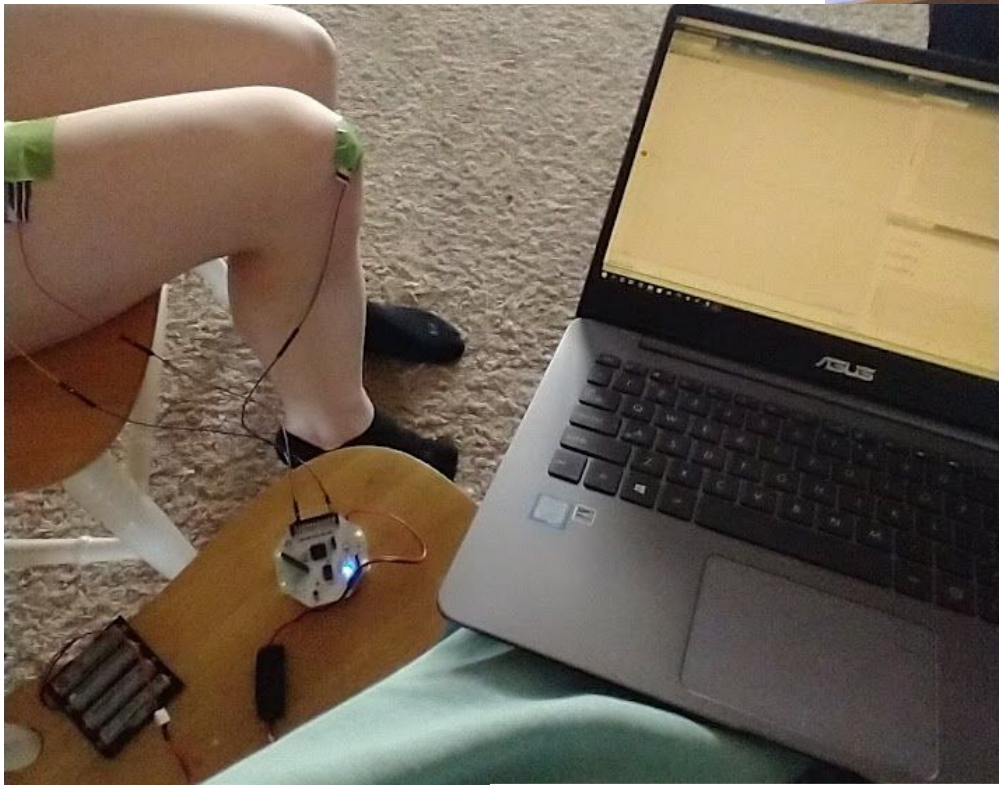
Smart Electrodes



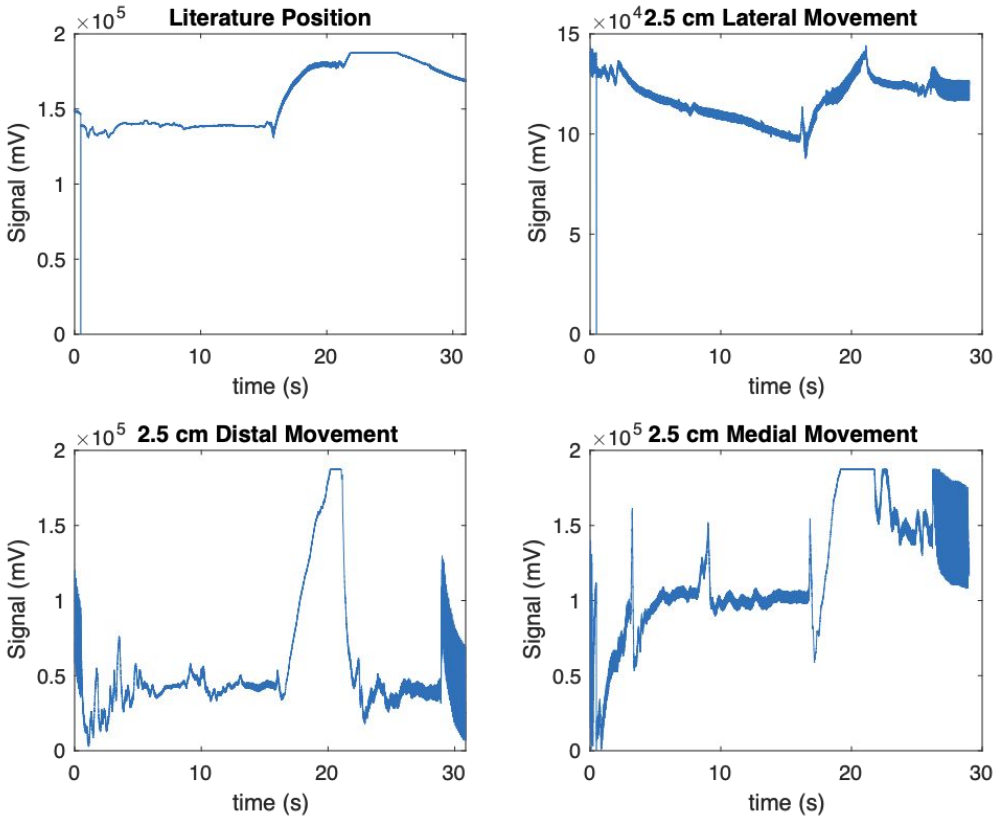
Smart Electrodes



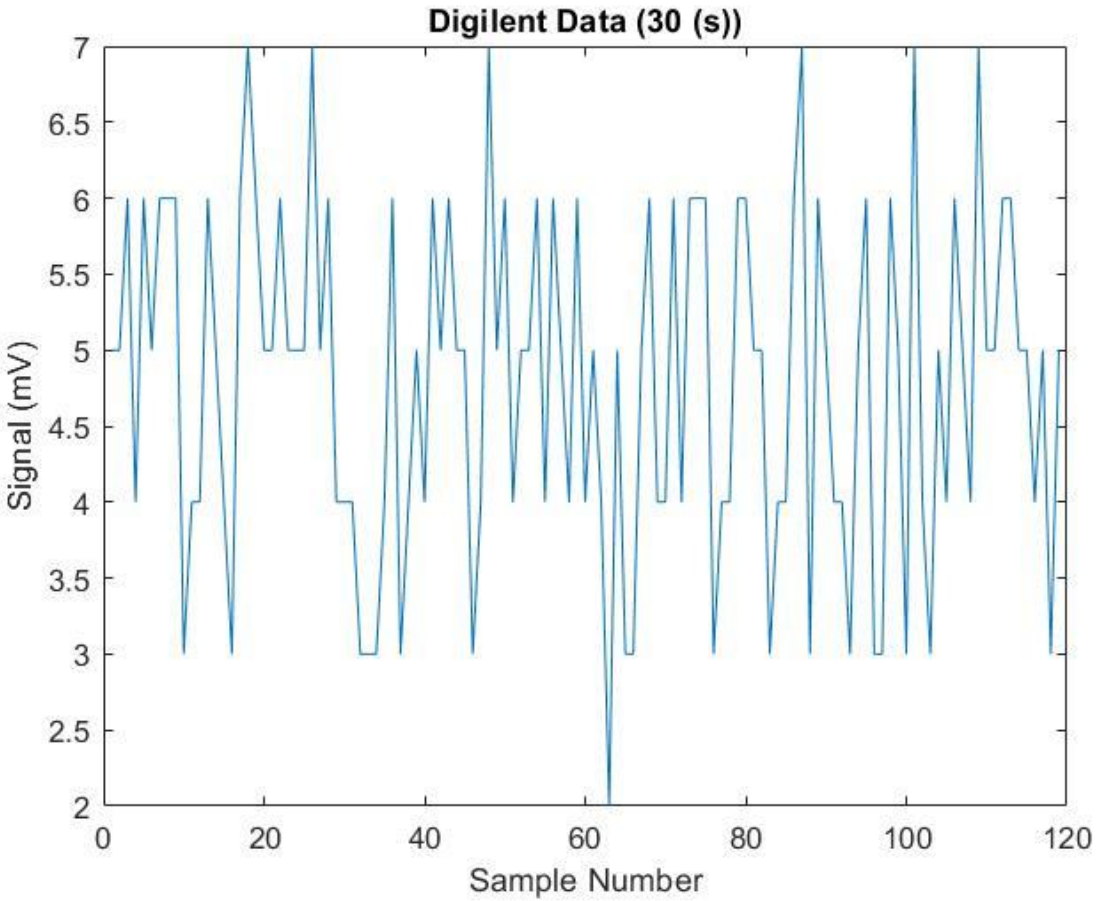
Smart Electrodes

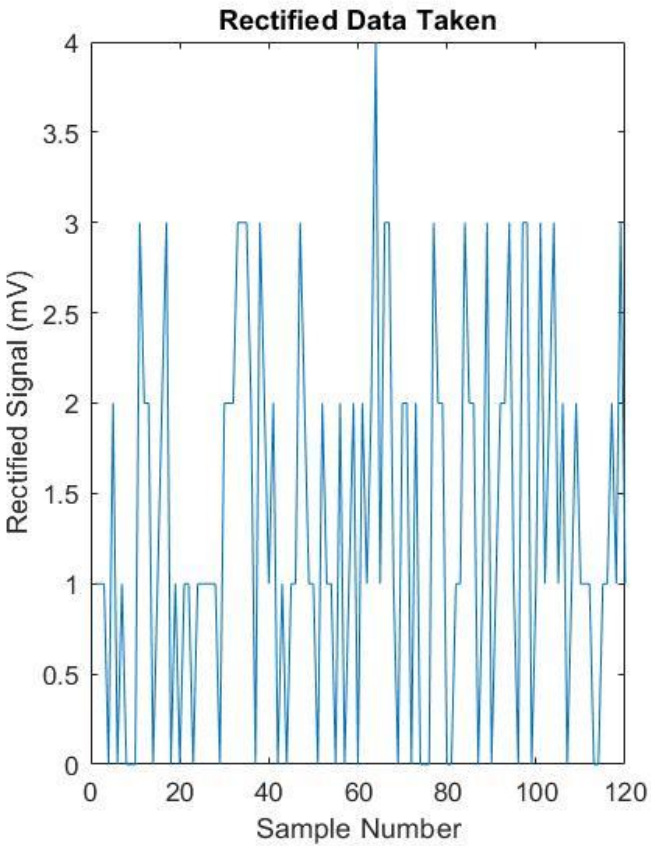


Smart Electrodes - Do they work if they move?

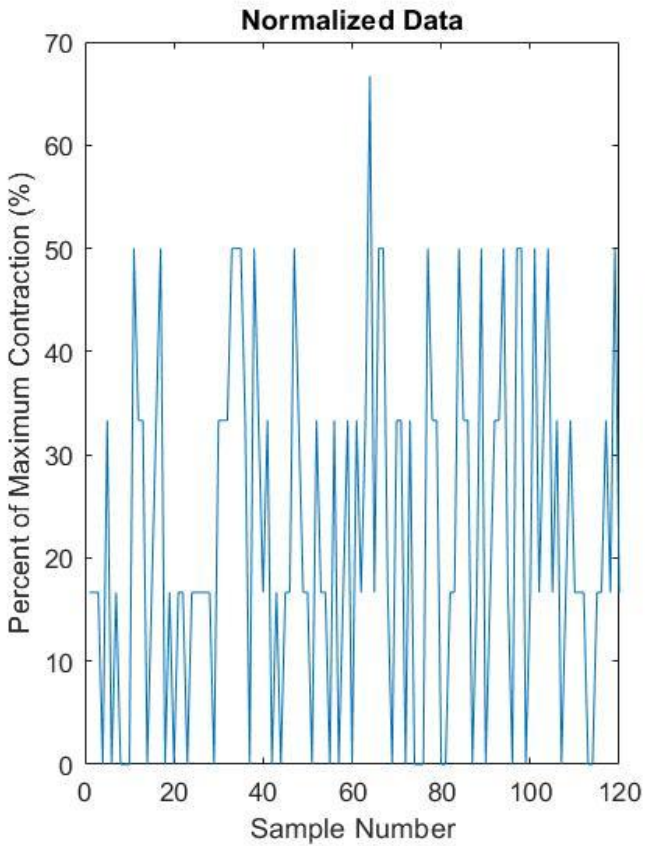


Digilent Waveform Results




Rectified Data Taken
Rectified Signal (mV)
Sample Number
0
0.5
1
1.5
2
2.5
3
3.5
4
0
20
40
60
80
100
120

(a)

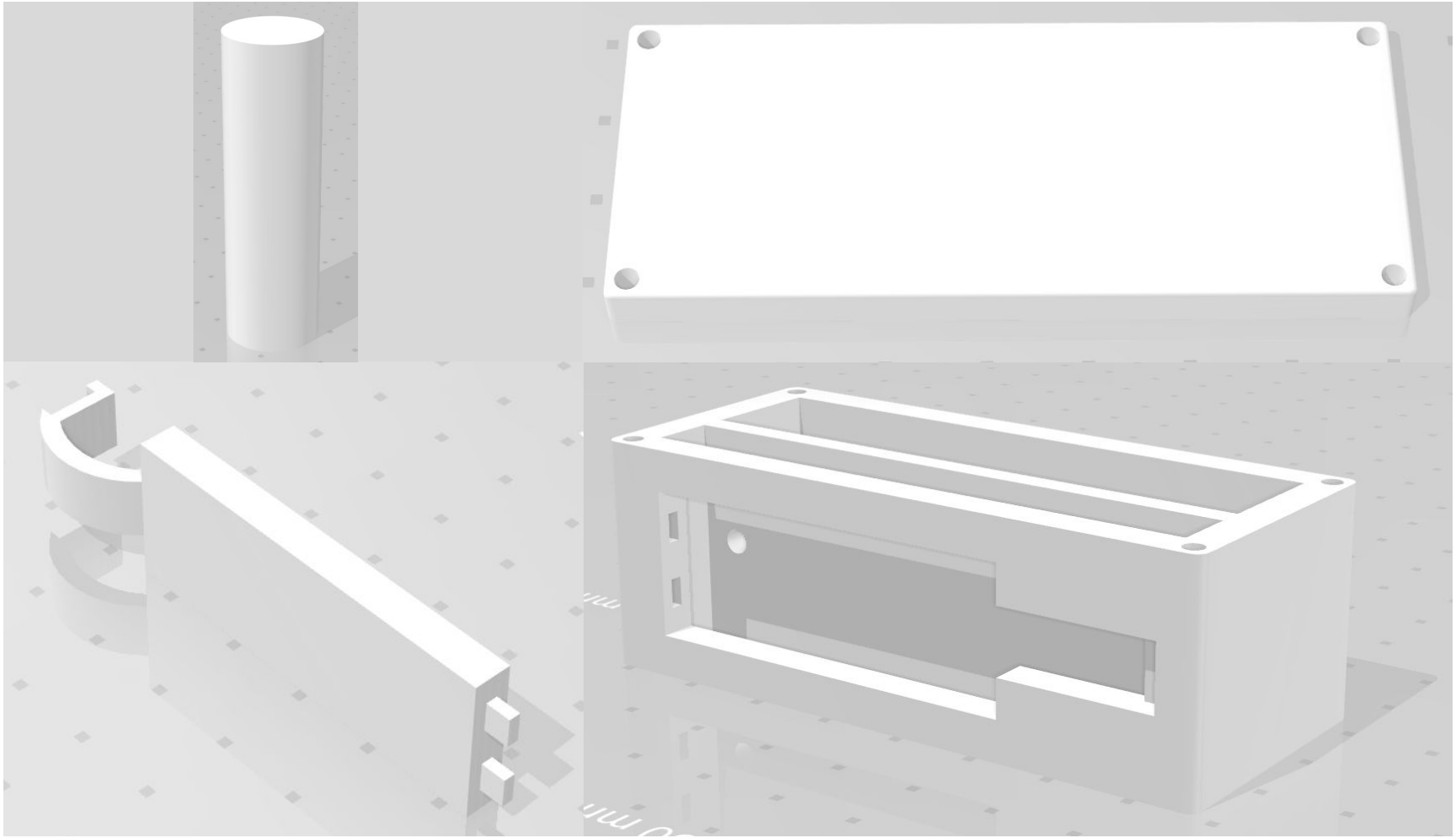

Normalized Data
Percent of Maximum Contraction (%)
Sample Number
0
10
20
30
40
50
60
70
0
20
40
60
80
100
120

(b)

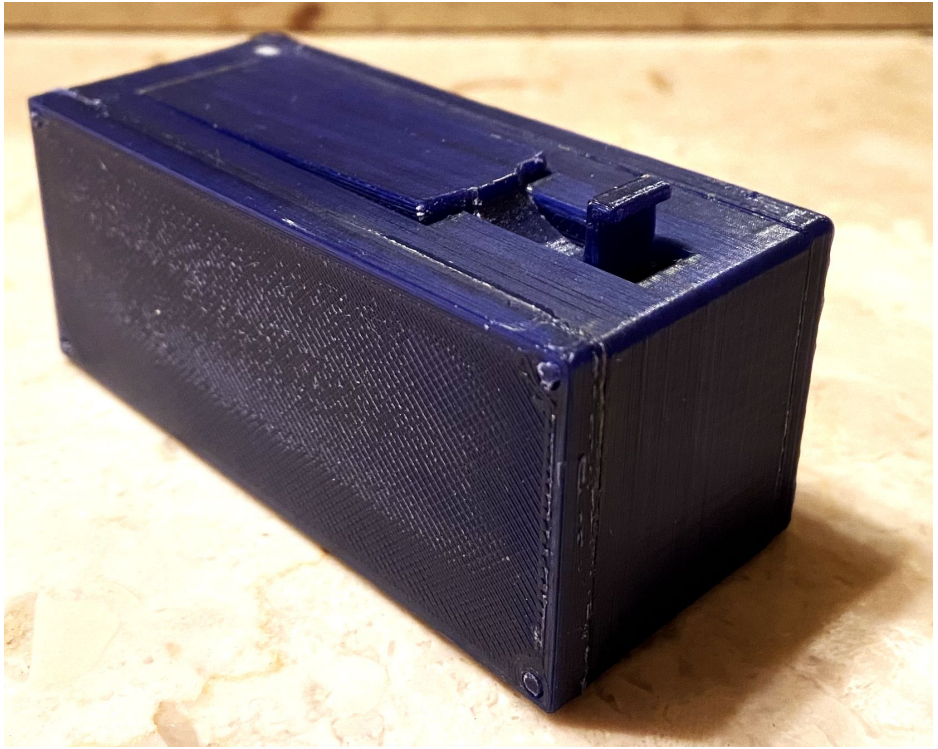
Feedback

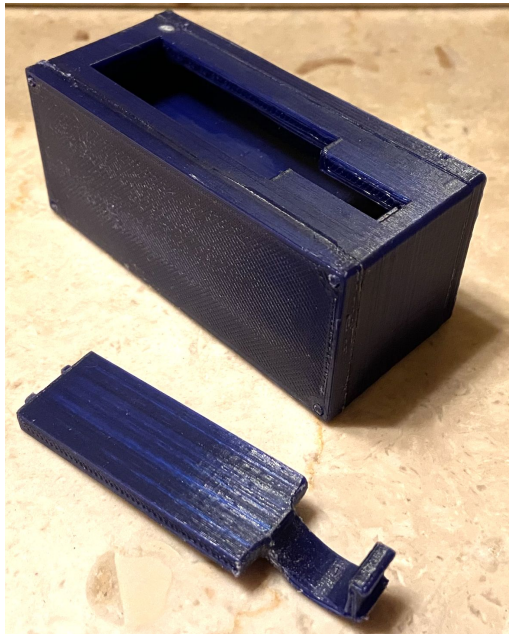
Command Window

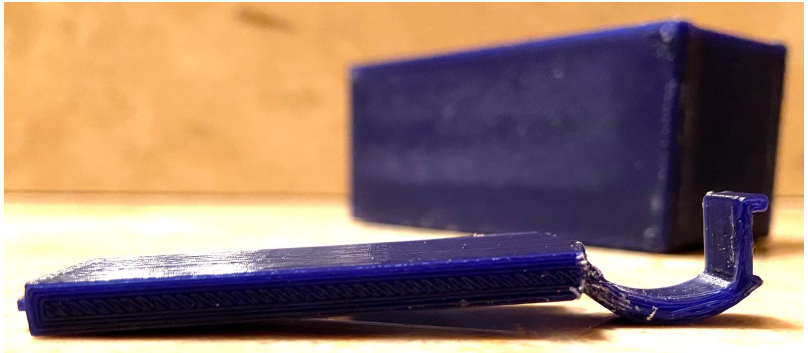
```
Run "readSerialData.m" after graph appears.
>> readSerialData
Enter the maximum right glute activation [mV]: 6
The maximum activation is 6.00 mV.
Good muscle activation right glute.
fx >>
```



Power Pack Model







Smarty Pants

Get ahead of the pain. Stay in the game.

Acknowledgements

Dr. Marc Norcross

Dr. Lindsay Biga

Dr. Matthew Johnston

Peter Bond

Jahnsam Richardson

Thomas Snyder

Michael Frazier

Questions?

References

https://www.mdpi.com/applsci/applsci-07-01050/article_deploy/html/images/applsci-07-01050-g003.png

https://cdn.ebaumsworld.com/mediaFiles/picture/2076647/83873878.gif

https://www.sparkfun.com

http://giphy.com/gifs/D6uUoxFgRL1GU

https://letstalkscience.ca/educational-resources/stem-in-context/how-does-a-lithium-ion-battery-work

https://aip.scitation.org/doi/full/10.1063/5.0058617

https://www.epectec.com/batteries/cell-comparison.html

https://surgefabricshop.com/blogs/surges-sewing-blog/guide-to-understanding-activewear-fabrics

https://www.nike.com/

https://www.underarmour.com/en-us/

https://www.medicalnewstoday.com/articles/319324