



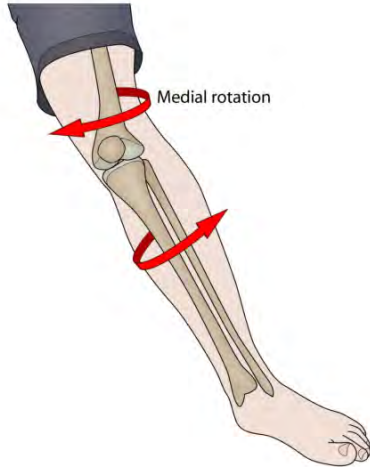
B

SmartBrace

responsive knee brace

200,000 people injure their ACL every year ^[1]

Customers: Athletes, Trainers

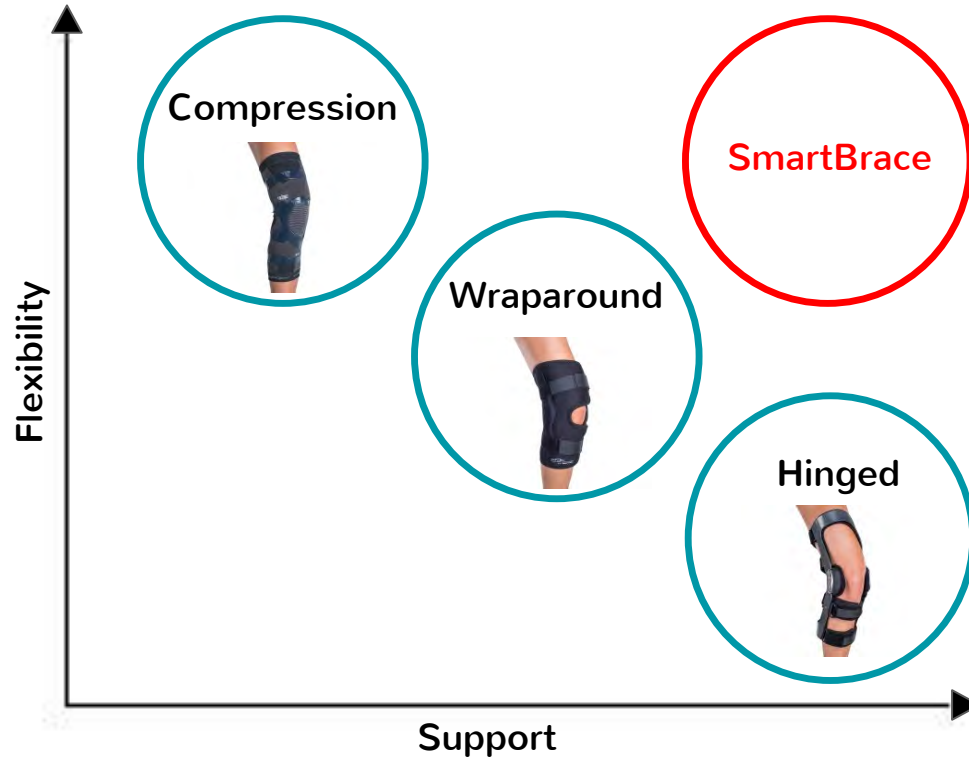


Overuse of braces can ^[2]:

- Increase compensation load
- Weaken knee
- Encourage long-term reliance



\$4.9 Billion Dollar Orthopedic Knee Brace Market ^[3]

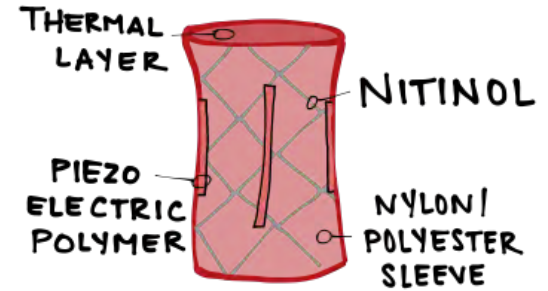
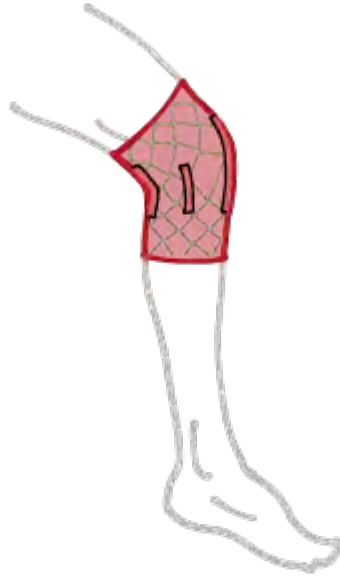


SmartBrace

a responsive brace offering flexibility when you want it, and support when you need it

Features:

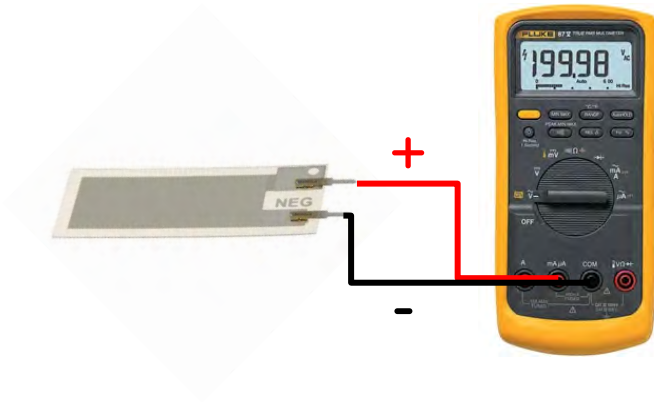
- Piezoelectric material
- Nitinol wire



Sketch Model

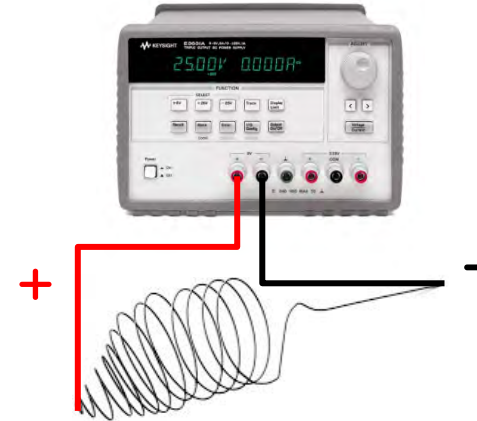
1) Piezoelectric sensor voltage

- voltage output

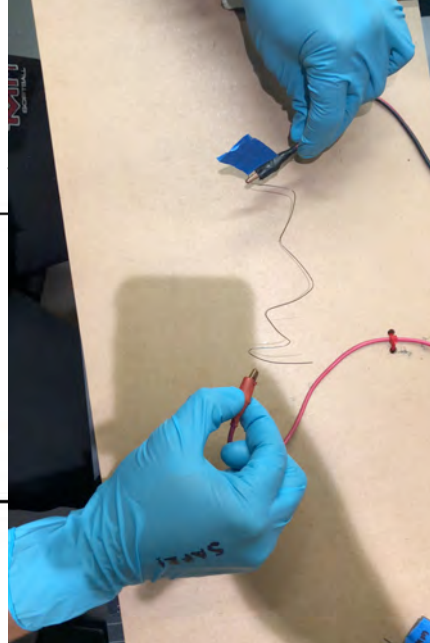
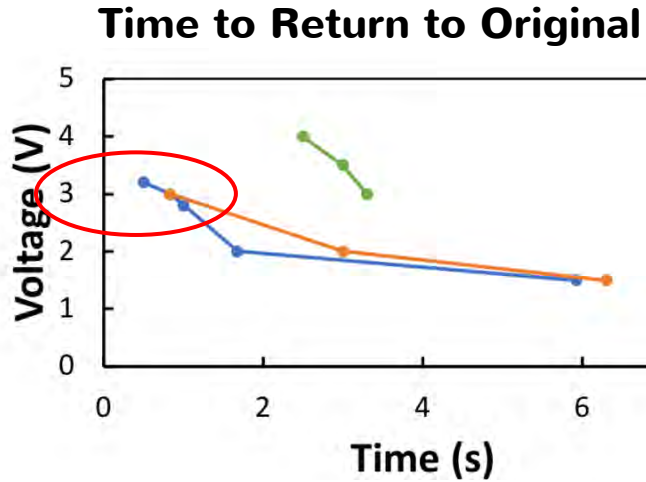


2) Nitinol wire response time

- time to return to original shape



Results



Optimal nitinol response at **3V**

Piezoelectric testing
Maximum voltage @ 8 mm:
390 V



Next Steps

- Explore other methods to activate nitinol
- Explore lattice options to produce needed force



SmartBrace Sources

- [1] Beaumont.org. (2019). *Beaumont Health | ACL Tears Signs, Diagnostics, and Treatments | Beaumont Orthopedics*. [online] Available at: <https://www.beaumont.org/conditions/acl-tears> [Accessed 3 Oct. 2019].
- [2] Athletico. (2019). *Pros and Cons of Wearing a Brace During Sports - Athletico*. [online] Available at: <https://www.athletico.com/2019/02/11/pros-and-cons-of-wearing-a-brace-during-sports/> [Accessed 3 Oct. 2019].
- [3] Grandviewresearch.com. (2019). *Global Orthopedic Braces And Supports Market | Industry Report, 2026*. [online] Available at: <https://www.grandviewresearch.com/industry-analysis/orthopedic-braces-support-systems-market> [Accessed 3 Oct. 2019].

