

### Motivation, Goal, Impact

Problem:

- ✗ Current wraps are difficult to adjust
- ⚠ Pressure applied is inconsistent



Design a wrap that:

- ✓ Is easy to use
- ⚡ Allows quick adjustment
- ⚖ Maintains consistent pressure

### Requirements

🏻 Provide **even pressure** of 0.39 to 0.58 psi evenly across the abdomen

👕 **Fit** under clothing

👐 **Easier adjustment** than current designs

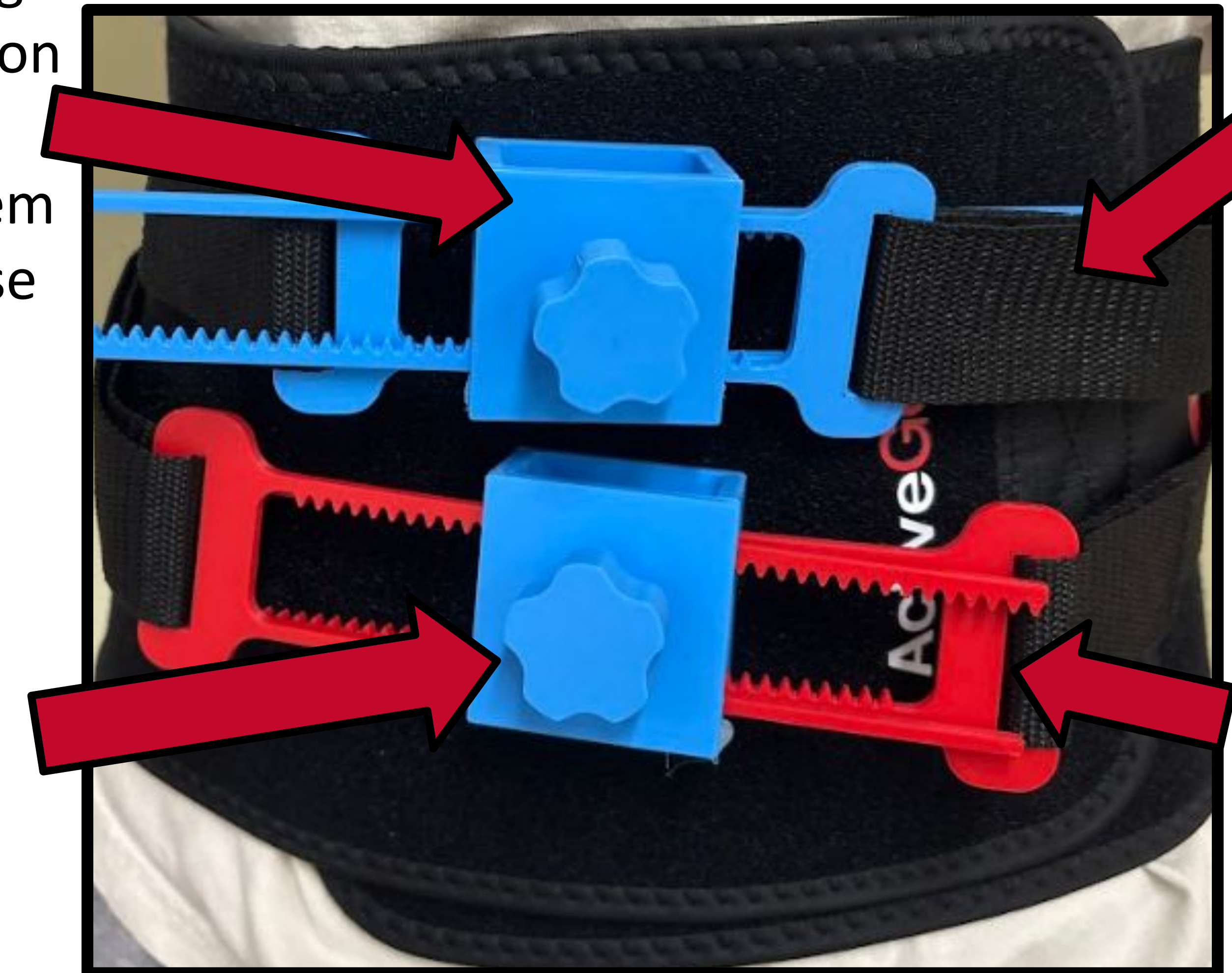
💰 **Affordable**

Within Housing:

- Rack and Pinion System
- Ratchet System
- Quick Release System

Ergonomic Handle

### Final Design



Bands to Deliver Pressure

Tracks that Interact with Central Gears

### Design Calculations & Decisions

$$\sigma_h = \frac{Pr}{t}$$

$P = 0.39 - 0.58 \text{ psi}$   
 $r = 7.64 \text{ in}$   
 $t = 0.125 \text{ in}$

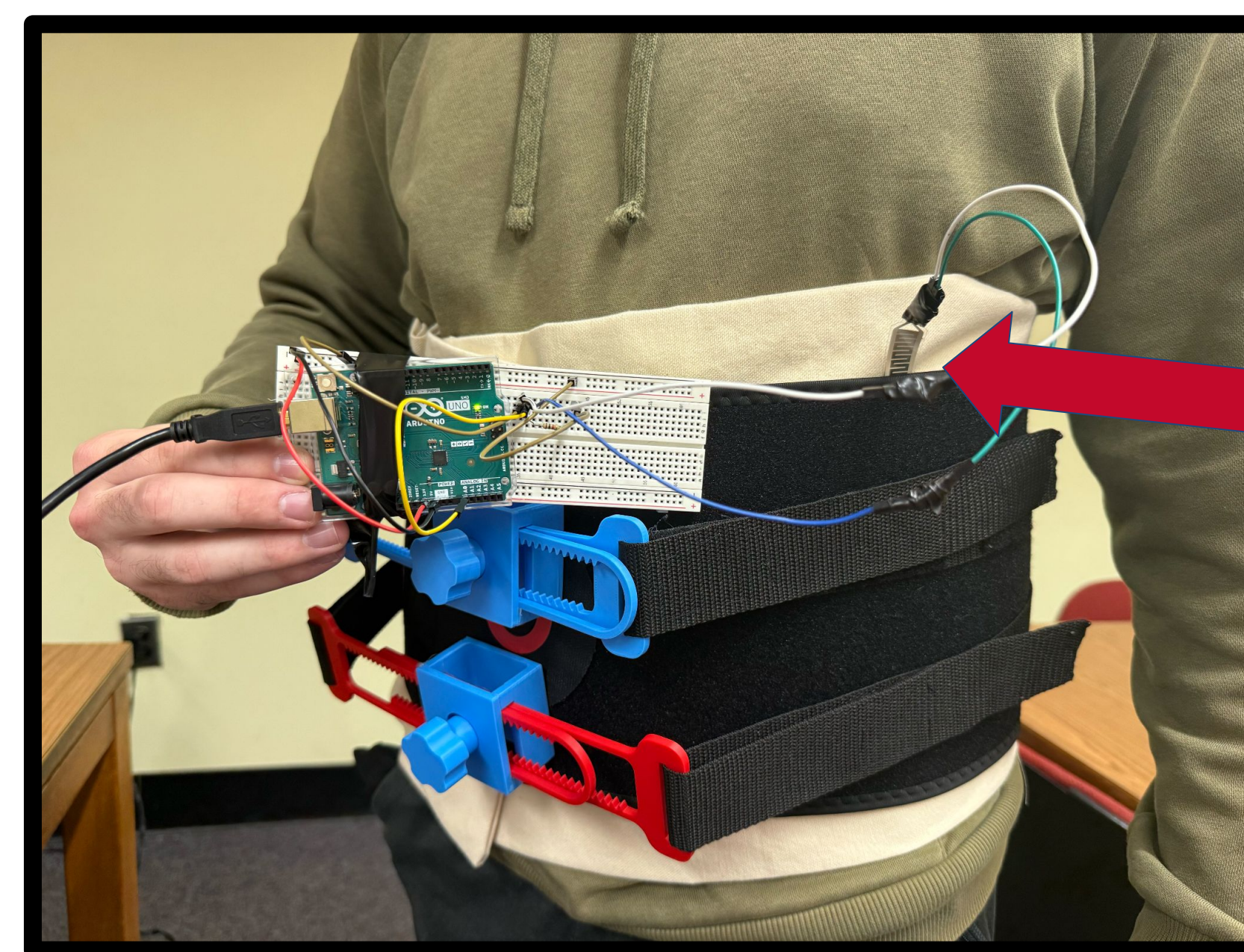
$$\sigma_h = 23.64 - 35.46 \text{ psi}$$

This defines the stress range on the wrap to achieve the target abdominal pressure of **0.39–0.58 psi**.

### Prototype & Test Results

Method:

- Using a **force sensitive resistor** we confirmed the mechanism was able to uphold industry standards
- Multiple dial systems allow the user to **vary the pressure** across the abdomen



Results:

- Able to vary the pressure from **0.31-0.60 psi**
- Average comfortable pressure of **0.47 psi**

