Members: Mohammed Almakrami, Pierson Davis, Thomas McGovern, Krishna Patel, Lyuba Sas

Advisor(s): Dr. Barbee, Dr. Vu, Dr. Sarver

**NEED:**

10 million people Worldwide suffer from Parkinson’s Disease (PD)
- 4-6 million people suffer from Neurogenic Orthostatic Hypotension (nOH)
- Increases the risk of falls by 2x due to sudden drops in blood pressure from position changes (supine to upright)

**Objective:**

Design an active abdominal binder with user controls to increase compliance, comfortability and effectiveness.

**DESIGN INPUTS:**

**Requirements**
- R.1. Must compress the abdominal wall within 1.3-5.3 kPa
- R.2. Weight must be ≤ 1lb
- R.3. Response time must be ≤ 10s

**Constraints**
- C.1. The battery life cannot be under 24 hrs
- C.2. Limited to size range of 68 - 114 cm

**SOLUTION - DESIGN**

Motor tightens binder to apply pressure 1.3-5.3 kPa

User sets specific pressure prescribed to them by their physician

Feedback Loop Setting
Feedback Loop Pressure
Feedback Loop Set Pressure

Pressure Sensor Calibration

**SOLUTION - BUILD**

Arduino Uno

Motor

Housing Unit

Software

**SOLUTION - TEST RESULTS**

The linear relationship between the pressure and measured voltages will be used to control the close loop

**FUTURE**

Possible Revisions
- iOS app
- Decrease binder size

Impact
- Increased patient compliance and effectiveness
- Potentially decrease medication usage

**POTENTIAL IMPACT**

Increased patient compliance and effectiveness

**POSSIBLE REVISIONS**

- iOS app
- Decrease binder size

**Impact**

- Increased patient compliance and effectiveness
- Potentially decrease medication usage