**Physical Therapy Device for Shoulder Rehabilitation**

Jordyn Folh, Raedah Alsayoud, Mirren Robison, Xanthica Carmona

Department of Biomedical Engineering – University of Houston

**Objective**

Create a physical therapy device for shoulder rehabilitation in order to help post-surgery or elderly patients with a limited range of motion.

**Background**

[Figure 1. Example of simple exercises used to increase shoulder strength using resistance bands]

To increase mobility and force ability of the shoulder in a safe and accessible manner, we designed a physical therapy (PT) device for specific shoulder rehabilitation. Improper PT of affected muscles can cause damage rather than recovery.

**Methods and Materials**

This PT device uses a linear actuator, motor control, Arduino control board, a liquid crystal display, and a handle attached to a force sensor to monitor patients. The PT procedure will be a linear push/pull by the patient on the device’s handle that will move back and forth across the linear track at a set speed.

[Figure 2. Top (top) view and side (bottom) view of the device]

**Results**

[Figure 3. Image of the device relative to the user. The top image indicates pulling the device, while the bottom image indicates pushing the device.]

[Figure 4. Outputs of the force sensor of the device. This information can be output to either a phone or laptop device for observation. These are demonstrations of the device working up to 25N, over the course of 5 seconds.]

**Conclusion**

Decreases the risk of injury and provides patients the opportunity for at-home physical therapy to graduate from dynamic exercises with no resistance to dynamic motions with resistance.