

## Feasibility Testing Report – Corrosion Test

---

*Team: P15001: Active Ankle Foot Orthotic*

*Engineers: Tyler Leichtenberger – Mechanical Engineer*

**Test Date:** 03/10/2015 & 03/12/2015

### **Related System:** ABBBB: Raise Foot

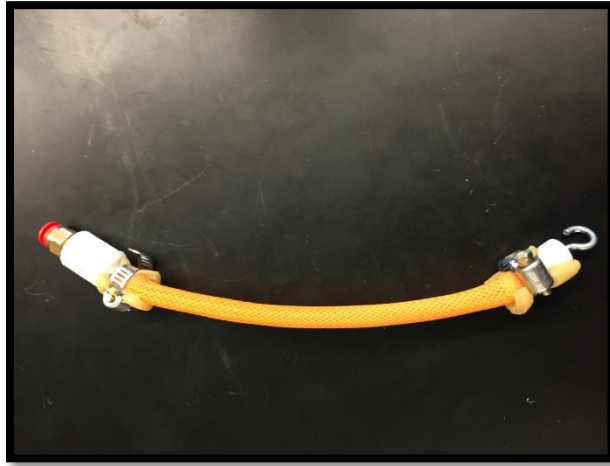
The test is being completed to determine if our McKibbon muscle can withstand environmental conditions that our AFO could potentially see throughout a day's use. Because our AFO needs to be used in a Rochester environment, we need to be sure our muscle will not corrode when exposed to the environment.

It was decided that, instead of submerging the muscle into salt water or putting it in a freezer, we would instead expose the muscle to actual environmental conditions for the Rochester climate. A sample muscle was constructed and was then taken on a "walk" around the RIT campus, exposing the muscle to 2 snow piles, as well as 5 salt water puddles. These are potential environmental conditions that the AFO would see throughout a day. The muscle components and performance was compared before and after the test.

### **Supplies:**

- 1.) Prototype McKibbon muscle
  - a. Plastic air port
  - b. Plastic plug
  - c. Silicon tubing
  - d. Sheathing
  - e. Air fill attachment
  - f. Silicon sealing material
  - g. Worm clamps
- 2.) RIT Campus

## Setup:



Muscle contraction

## Procedure(s):

### Test:

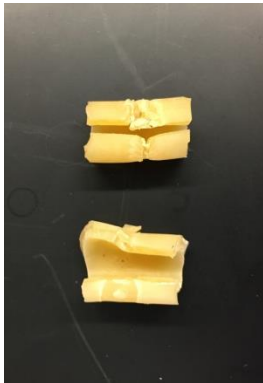
1. Construct sample McKibson muscle to complete test
  1. Use identical materials used in our McKibson muscle; i.e., silicon, sheathing, plastic plugs, etc.
2. Take pictures of muscle components before test
3. Test muscle performance before test
4. Expose muscle to environmental conditions around the RIT campus
  1. Expose muscle to 2 different cold snow piles
  2. Drag entire muscle through 5 salt water puddles left behind
5. Allow muscle to completely dry for 2 days
6. Test performance of muscle after corrosion testing
7. Disassemble muscle
8. Take pictures of components for comparison

Pictures of Testing:

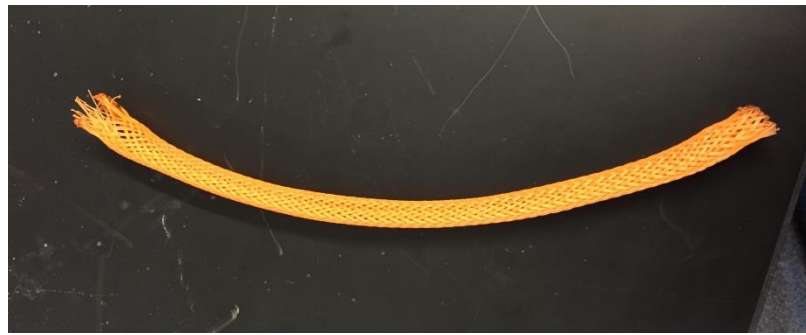
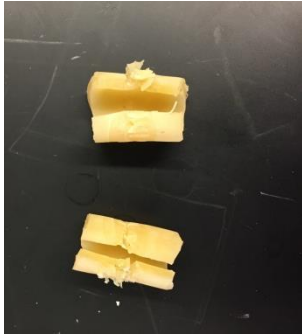
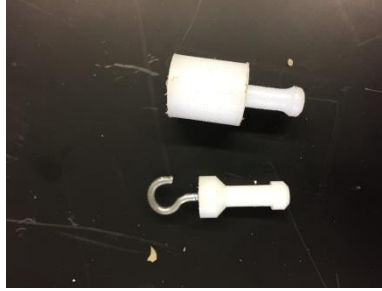
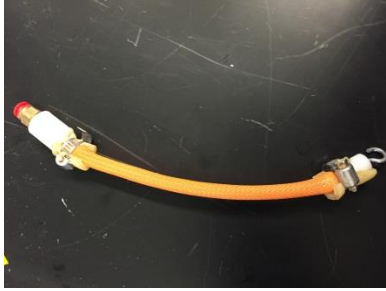


Comparison of Components Before and After:

Before:



After:



## Results:

When comparing the muscle and its components before and after testing, there were no noticeable defects that would affect the muscle performance. There was some dried salt on the muscle components, most notably the metal clamps and air port, but it was nothing that would seriously affect performance. Also, there was no rust present on the metal components.

Also, the muscle was inflated before and after the test, and the deflection and performance was identical for the muscle before and after the test. There was no noticeable drop in performance.

## Conclusion:

- a.) Our muscle, when exposed to Rochester environmental conditions, does not lose any noticeable performance metrics.