

# Feasibility Testing Report – Foot Lift

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*Team: P15001 Active Ankle Foot Orthotic*

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## Overview: Raise Foot

In order to understand how much force is needed to lift the foot, a series of four force tests were conducted on September 26, 2014. These tests quantified how much force was required to lift the foot and provided significant information concerning tension location and foot attachment methods.

## Testing Plan

### Setup Procedure:

1. Volunteer sat on table top with his foot hanging freely
2. A strap was firmly wrapped around volunteer's foot
3. Fishing line was attached to the foot strap
4. A Velcro strap was wrapped around the volunteer's leg and the table to keep the leg steady

### **Note: Four foot setups were used**

- Bare foot, 90 degree perpendicular force
- Bare foot, 60 degree resolved force
- Foot with sock, 60 degree resolved force
- Foot with sock & shoe, 60 degree resolved force

### Test Procedure:

1. Using a spring force gage, a second volunteer lifted the volunteer's foot
2. A third volunteer read off the force measurements
3. The foot volunteer recorded the force measurements
4. A measurement was taken from the tension attachment to the user's ankle
5. Videos and pictures were taken corresponding to document the setups visually

## Testing Results

Force Lift Data 9/26/2014				
Case 1 90 degree, bare foot	Case 2 ~60 degrees, bare foot	Case 3 ~60 degrees, with sock	Case 4 ~60 degrees, with shoe	
Force Needed to Lift Foot (lbs)	Force Needed to Lift Foot (lbs)	Force Needed to Lift Foot (lbs)	Force Needed to Lift Foot (lbs)	Distance from ankle to point of attachment: <u>3.80 in.</u>  Shoe Mass: <u>1.25 lb</u>
4.00	5.70	5.00	6.00	
4.50	4.50	5.50	7.50	
4.00	5.50	4.40	6.50	
3.75	5.00	5.00	8.00	
2.75	5.00	4.50	6.50	
3.00	4.20	4.50	8.50	
3.75	4.50	5.50	8.00	
4.25	5.50	5.00	8.00	
	6.00	4.50	7.75	
	5.50	6.00	7.75	
		5.00		
Average	Average	Average	Average	
3.8	5.1	5.0	7.5	

This section of the report is to be continued at a later time



**Figure 1: Setup 3 Foot Configuration**

Overall, this test took approximately 2.5 hours to complete. With the collected data, the team has a quantitative understanding of the amount of force it takes to lift a foot up as well as the ideal angle for muscle attachment.

*Start Date: 09/26/2014*

*End Date: 09/26/2014*

Budget

Equipment	Price	Quantity
Fishing line	-	10ft
20lb Spring Force Gage	-	1
Velcro strap	-	1
Foot strap / shoe lace	-	1
<b>Total:</b>	\$0.00	