Feasibility Testing Report – Lower Attachment Redesign

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Related System: ABBBB: Raise Foot, AAA: Secure Foot

The reason for this test is to find:

a) How much force does it take to lift the foot using the newly added A-shaped strap?
b) Does the lift remain comfortable when a force is applied?
c) Does the A-shaped strap allow users to apply and remove the device easier?

Supplies:

1.) Modified Ankle Brace
    a.) Mueller Adjustable Ankle Stabilizer
    b.) Thread
    c.) Ribbon
    d.) Thin Nylon strap with plastic clip
2.) Plastic Wrap
3.) 20lb spring force gage

Procedure:

1. Have volunteer sit on table top with their right foot hanging freely
2. Place modified ankle brace on volunteer's foot
3. Strap the volunteer's leg to the table using a Velcro strap, to ensure that the leg remains still when the force is applied.
4. Hook the spring force gage hook onto the thin strap
5. Using a spring force gage, a second volunteer will lift the volunteer's foot
6. Have another volunteer read off the force measurements and the test volunteer record the measured forces.

Results:

Observations:

a. Force was not distributed evenly at the base of the pull

b. User experienced slight pain near base of toe when force was applied
c. Strap sewing came undone and strap detached from brace at the end of the experiment

Table 1: Test Results- With Shoe

Trial	Force (lbs)
1	10.5
2	10
3	10.5
4	11
5	11
6	10.5
7	10.5
8	10.5
9	11
10	11
Average	10.7

Table 2 displays the results obtained in the previous lift test performed. The same procedure was followed; however, a different shoe was used.

Table 2: Test Results- With Shoe

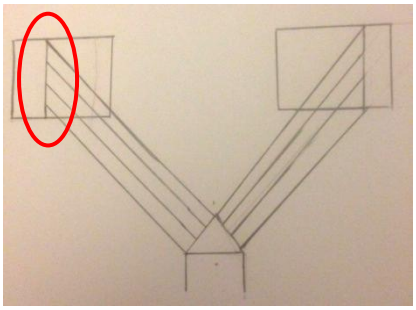
Trial	Force (lbs)
1	8.5
2	8.0
3	8.5
4	8.5
Average	8.4

Conclusion:

a) The new strap allows the user to apply/remove the AFO easily because the Velcro strap is more accessible
b) An additional 2lbs was required to lift the foot due to an uneven distribution of force at lift base. This will be addressed through brace modifications.

Next Steps:

1) Sew the A-shaped strap onto the brace at an angle (see design below)



2) Complete same test with modified design to determine whether or not the device is comfortable during lift and the amount of force to lift the foot is less than 10.6lbs.