

MSDII Testing – Slow Motion Deflection Test

Team: P15001: Active Ankle Foot Orthotic

Engineer: Noah Schadt – Mechanical Engineer, Tyler Leichtenberger- Mechanical Engineer

Related System: ABBBBB- Raise Foot

This test is designed to determine how much deflection is needed from the air muscle in order to facilitate normal walking patterns. This test is optional at the team/customer's discretion.

Engineering Requirements:

ER4: Torque to life foot by McKibben air muscle (Ft-lbs)

Ideal Value: 3.7

Marginal Value: 2.2

ER5: Dorisflexion mobility with McKibben air muscle (°)

Ideal Value: 90°

Marginal Value: 80°

Testing Plan

The plan is to use a slow motion camera to determine how much deflection is needed for normal walking strides.

- 1.) Obtain access to a camera capable of taking slow motion videos
- 2.) Obtain some form of elastic material (rubber band, elastic strap, or bungee cord) and affix it to the calf of a volunteer.
- 3.) Attach fishing line to the volunteer's foot in such a way that it mimics the AFO's attachment point and line of travel. (alternatively the actual AFO could be used with a strap and elastic support)
- 4.) Attach the fishing line to the elastic strap. There should be enough tension such that the elastic strap takes all the slack from the fishing line during natural foot lift.
- 5.) Affix a marker (masking tape) with known dimensions to the fishing line in a visible spot.
- 6.) Record 3 slow motion videos of the volunteer walking at a natural gait. (A treadmill in the fitness center may be a good location)
- 7.) Analyze the videos using Tracker if available, otherwise, visually detect the distance that the marker travels.
- 8.) Test on stairs if necessary

Start Date: February 16 2015

End Date: February 27 2015

Potential Location

Treadmill in fitness center, Engineering building, campus wide

Budget

Equipment	Price	Quantity
Slow motion video camera (See team member)	-	1
Elastic material (rubber band, elastic strap, bungee cord)		1
Tape		A/R
Fishing line (green)		1-2'
Tracker software (See faculty member)		1
Total:	-	