MSDII Design Modification- Upper Brace

Team: P15001: Active Ankle Foot Orthotic
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Motivation

After assembling our phase 2 prototype for our AFO, it became evident that the upper brace would need to be modified to reduce the additional strain that was being absorbed by the brace. During MSD I testing, the upper brace was tested and it was determined that the brace would not become detached from the leg when the muscle was articulated, but it was not clear until the prototype was assembled that the muscle stretched the brace. Because the brace is elastic, the material stretched when the muscle was articulated. Also, because the strap was not sewn on to the front of the brace, but rather the back, and the top of the brace was slipping downward when the muscle was articulated.

Possible Solutions

Three possible solutions were generated for the problem:

1. Add an inelastic material, spanning from the muscle base to the top of the brace, to prevent the elastic material from stretching as much as possible
2. Re-sew the strap at the top of the brace so that strap is sewn onto the front of the brace, above the muscle base
3. Add a belt loop to the current design to thread the strap through, substituting for sewing the strap to the front of the brace

Chosen Solution

The team decided to implement 2 different solutions into our design modification- the strap will be re-sewn onto the brace, with the sewing occurring in the front of the brace directly above the muscle brace. This will prevent the top of the brace from slipping downward.

Also, a small inelastic piece will be added to the brace, to try and prevent the elastic brace from stretching during muscle articulation as much as possible.

Test Plan

The design alterations will be made to the AFO, and the muscle will be articulated to see the reduction in slippage in the brace and the additional strain gained by the muscle.

Start Date: March 2015 (Phase 3)