

# Team 23 - Lower Limbs' Stabilization Structure for Children with Cerebral Palsy

Members: Blake Daniel, Nicolas Corrado, Daniel Alksnis, Bohdan Tkachov

Advisor(s): Dr. Valentina Graci, Dr. Laura Prosser

- NEED:**
- CHOP NMPL conducting SMC study for pediatric CP patients
  - Recurring issues with test setup involving lower limb stabilization
  - Existing solution has lengthy setup time and inadequate ankle stability

**FUTURE:**

*Revisions:* Connection to existing car seat with support beams and minor reprinting of new design components

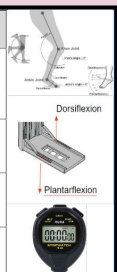
*Impact:* Decreasing testing setup time, ensure lower limb stabilization, and adjustability

**DESIGN INPUTS:**


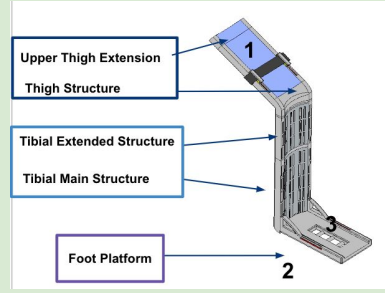
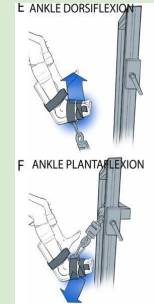
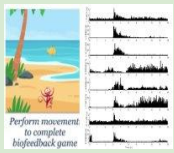
Constraint	Description	Requirement	Description
C#05	SMC Testing Setup	R#02	Ankle DOF
C#06	Boot Size	R#04	Load-Bearing Strength
C#09	Compatibility	R#05	Setup Time

**TESTING RESULTS**

Verification Test	Description	Criteria	Pass? (Y/N)
Knee Flexion Angle	Ensure knee flexion angle is within range using goniometer during movements	Knee flexion angle must be kept between 50-70 degrees during use to pass	N/A
Ankle DOF of Movement	Ensure ankle displacement does not exceed 15 degrees during movements	Maximum ankle displacement < 15 degrees to pass	Y
Load-Bearing Strength	Ensure device remains compliant during periods of maximum applied force	Device stays compliant under 20lbs (upwards) and 12lbs (downwards) of force	N
Setup Time	Ensure setup time of device < setup time of previous solution	Dorsiflexion: < 7 min 15 s Plantarflexion: < 8 min 40 s	N



**SOLUTION - DESIGN**

E ANKLE DORSIFLEXION

F ANKLE PLANTARFLEXION

Perform movement to complete biofeedback game

**SOLUTION - BUILD**

