Stabilization Method for Selective Motor Control Testing in Children with Cerebral Palsy

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**Problem**  
CHOP researchers in Neuromotor Performance Lab (NMPL) conducting lower extremity selective motor control testing for children with Cerebral Palsy (CP)

**Current Testing Method at CHOP**

1. **Electrode**  
   Muscle activity  

2. **Load Cell**  
   Force from movements

3. **Angular displacement**  
   Perform movements to complete biofeedback game

   - No upper body stabilization
   - Movements not isolated
   - 3-4 hours of testing

**Objective**  
Develop an NMPL-compatible, adjustable device that provides upper body stabilization in children [ages 3-7] with CP to reduce test time, facilitating a smoother testing process

1. Counter the max expected moment (knee extension)
2. Adjustable for 3-7 yr. old subjects
3. 50% time decrease

**Verification Testing**

- Angular Displacement of Solution During Largest Child Knee Extension
  - AVG: $1.1° \pm 0.55°$
  - $< 15°$ displacement when $47$ N-m is applied
  - $\geq 29$ cm through entire weight range

**Impact**

- Quicker, cheaper, easier testing
- Standardized test procedure
- Increase consistency and reliability
- Inspire innovation for other clinicians

**Revisions**

- **Current**  
  Additional dampening support under chair
- **Future**  
  Continue gathering time & EMG data
  Add ankle stabilization methods

**Solution**

- High back booster seat  
  Weight tolerance: $\leq 50$kg  
  Height tolerance: $\leq 57"$
- 50 cm adjustable track system
- Table tightener
- Aluminum plates (+Dense Foam)
- Modular frame

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