Tech4POD

TECHNOLOGIES FOR PEDIATRIC ORTHOPAEDIC DISABILITIES

Marquette University Rehabilitation Engineering Research Center

R4: Advanced Mobility Modeling to Improve Function and Longer Term Transitional Care of Children with Orthopedic Disabilities

A Look Forward: RERC Plans for Year 2

Brooke Slavens & Gerald Harris

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MARQUETTE UNIVERSITY Be The Difference.
MEDICAL COLLEGE OF WISCONSIN
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R4: Advanced Mobility Modeling

Hypothesis: Proximal upper extremity joint demands are significantly greater than distal joint demands during assisted mobility in children using walkers, crutches and wheelchairs

Activity	YR 1	YR 2
Technical system setup and implementation		
Inverse dynamics model development, testing, and integration		
Patient recruitment, screening and baseline assessment		
Subject testing of 48 children using assistive mobility devices and 20 children with pes planovalgus	6/48 (2 CP, 2 SCI, 2 OI) 3 walker, 2 crutch, 1 wheelchair	12/48
Administration and assessment of outcomes tools		
Musculoskeletal model development, testing, and integration		
Mechanical testing of cadaveric specimens		
Quantitative data review, ongoing power analysis, and statistical analysis		
Research dissemination		

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R4: Advanced Mobility Modeling

- Test 12 subjects, 3 per pathology
  - Cerebral Palsy
  - Spinal Cord Injury
  - Myelomeningocele
  - Osteogenesis Imperfecta
- Test 4 subjects per assistive device
  - Wheelchair
  - Walker
  - Crutches

SmartWheel, Three Rivers LLC

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R4: Advanced Mobility Modeling

- 3D motion analysis with Vicon system
- Upper extremity inverse dynamics model
- Kinetic data for shoulder, elbow and wrist joints
  - Instrumented mobility devices
  - Models
- UE musculoskeletal model to investigate repetitive strain injuries and overuse syndromes