WALKING ACTIVITY IN CHILDREN WITH MYELOMENINGOCELE

Pauline Yasmeh, Nicole Mueske, Siamak Yasmeh, Deirdre D. Ryan, Tishya Wren
WALKING ACTIVITY IN CHILDREN WITH MYELOMENINGOCELE

• Deirdre Ryan, MD
  – Director of Orthopaedic Section of Spina Bifida, Children’s Orthopaedic Center, Children’s Hospital Los Angeles, Los Angeles, California
  – Director of Education, Children’s Orthopaedic Center, Children’s Hospital Los Angeles, Los Angeles, California
  – Assistant Professor of Orthopaedic Surgery, Keck School of Medicine, University of Southern California, Los Angeles, California

• Does not intend to discuss commercial products or services.
• Does not intend to discuss non-FDA approved uses of products/providers of services.
• Support provided by NIH-NICHD Grant # 5R01HD059826.
• Authors have no disclosures.
Background

- Children and adolescents with myelomeningocele (MM) have difficulty ambulating due to
  - Loss of sensation
  - Muscular weakness/paralysis
  - Decreased efficiency of muscular function
Background

• Ability and/or desire to ambulate may decrease over time.
  – Increased body mass
  – Weak muscle strength
  – Joint contractures
  – Wanting to move faster

• About 1/3 of community walkers initially, have reduced walking ability by their 30s.
Background

• People with MM are more prone
  – To obesity compared to the general population.
  – Abnormal skeletal development due to decreased loading of bones.

• Information about walking activity in children/adolescents with MM may aide in patient management and interventions
The purpose of this study is to quantify the daily walking activity and performance of children with MM using a StepWatch activity monitor.
Ambulatory children and adolescents with MM and without MM

Classified based on manual muscle testing and criteria by the International Myelodysplasia Study Group (IMSG)

- 47 ambulatory children/adolescents with MM
  - 18 sacral
    - 10 years 2 months ± 2 years 8 months
    - 50% female
  - 9 low lumbar
    - 8 years 6 months ± 2 years 5 months
    - 44% female
  - 20 mid-high lumbar
    - 10 years 4 months ± 2 years 6 months
    - 35% female
- 7 typically developing youth
  - 11 years 1 month ± 1 year 11 months
  - 29% female
Methods - StepWatch

• Wore a StepWatch activity monitor for 8 days
  – Recorded steps at intervals of 10 seconds
  – Total step counts
  – Number of steps at low (<30 steps/min), medium (30-60 steps/min) and high (>60 steps/min) intensity

• Only full days used for analysis
Methods - Analysis

• **MM vs. typically developing children**
  • Independent t-test and chi-square tests
  • Bonferroni adjustment for multiple comparisons
Results - Demographics

- **MM and control groups similar**
  - Age
  - Sex distribution
  - Hispanic ethnicity distribution
  - Tanner stage
  - Weekly TV watching and video game playing
  - Height, weight percentiles

- **Mid-high lumbar group had higher BMI percentile compared to controls.**
• Mid-high lumbar walked fewer total steps compared to all groups.
• No difference in total steps among control, sacral and low lumbar groups.
• Mid-high lumbar walked fewer steps at all intensities compared to controls and fewer in the medium intensity compared to low lumbar group.
All groups spent at least 75% of their time without walking activity.

Mid-high lumbar had more time with no walking activity than the sacral group.

No differences between control and other groups for proportions of steps at various intensity levels.
• Walking activity was mostly low intensity in all groups.
• Steps at medium intensity were lower for the mid-high compared to other groups.
• Children with sacral and low lumbar MM had walking performance similar to typically developing children.

• Children with mid-high lumbar MM were less active, which may lead to heightened risk for secondary health conditions in addition to those associated with myelomeningocele.
Conclusion

• Understanding walking activity and intensity in children and adolescents with myelomeningocele may aid in developing focus rehabilitation interventions and strategies.

• Real world walking activity as an objective and quantified measure has the potential to help guide therapists and surgeons to more effective treatments.
THANK YOU!!!

QUESTIONS?