CP Population: Spinal Orthotic Management

Bryan Malas, MHPE, CO
Director, Orthotics/Prosthetics Department
Moria Tobin-Wickes Orthotics Program
Children’s Memorial Hospital
Instructor, PM&R
Northwestern University Feinberg School of Medicine
Consideration

- Clinical approach (Spinal)
- Does the existing evidence support/refute clinical approach
Clinical Approach to the Neuromuscular (CP) Spine

- Quality of life
- Function
- Delay fusion
- Balance
- Cobb
Clinical History/Assessment

- Ambulatory status
- Pulmonary function
- History of ulcers
- Upper limb function
- Current/Previous treatment
  - Surgery
  - Intrathecal baclofen pump
  - Therapy
Clinical History/Assessment

- Balance
- Curve stiffness
- Alignment (standing, seating system, out of seating system)
  - Sagittal (often neglected), coronal, transverse
  - Pelvis
  - Shoulder
  - Head/Neck
  - Lower/Upper limb
Impression/Measurement Consideration

- Balance
- Curve stiffness
- Visco-elastic response
- Force application
  - Constraining vs. translatory
- Sagittal alignment
- Coronal/Transverse
Force Application
Design Consideration

- Material selection
- Alignment
- Trimlines
- Closure system
Fitting/Follow-up

- Application
- Visco-elastic consideration
- Sequence for tightening closure
- Adjustments
- Follow-up
Evidence: Purpose of Orthotic Management of the Spine

- A review of papers and orthopedic textbooks
  - Focus is on Natural History
    - Frequent assumption is that orthotic management does not change natural history of neuromuscular curves
      Conclusion: orthotic management doesn’t work
  - Delay Surgery (Lonstein, 1994, Skinner, 1995)
Evidence: Orthotic Management and Surgical Management

Orthotics Management

Outcome Measures:
- Change in Cobb Angle
- Delay surgery
- Improved sitting balance
- Improved head/neck postures
- No negative effect pulmonary function

Surgery/Surgical Outcome

Outcome Measures:
- Balance
- Change in Cobb Angle
- Pelvic Obliquity
- Decompensation
- QoL questionnaires
- Seated Postural Control Measure
- Paediatric Evaluation of Disability Inventory
- FEV1 sitting ability
Evidence: Efficacy for Spinal Orthotic Management

- Population is not homogeneous
- Research Design (orthotic intervention) lacks detail and makes it difficult to reproduce
  - Impression/measurement
  - Material
  - Force application
  - Adjustments
  - Follow-up
What are the Current Strategies for Clinical Care with limited Evidence?

- Use of existing literature (limited)
- Literature as proxy for insufficient literature on orthotic efficacy
  - Seating systems
  - Orthopedics
    - Visco-elastic
    - Outcome measurers
Consideration for the Future

- Database of design considerations (as described in the consensus findings)
- Inclusion of orthotist in research design (beyond fabrication)
- Need to expand outcome measures beyond cobb angle