Dystonia and Spasticity in Cerebral Palsy: Expanding the Treatment Plan to Optimize Gait Efficiency
Kimberly Wesdock PT, MS, PCS; Susan Blair MSPT; George Masiello BSEET; Chester Sharps MD
Children’s Hospital - Richmond, Virginia

Patient History
- 34 year old female with CP
- GMFCS III: forearm crutches, R solid AFO, L shoe lift
- 5 cm functional leg length discrepancy (L<R), scoliosis, pelvic obliquity
- Multiple surgeries for recurrent left hip dislocation in addition to medial and lateral hamstring lengthenings, TALS, SPLATT right foot/ankle, derotation osteotomy R hip
- No history of Botox
- No history of intrathecal baclofen (ITB)

Clinical Data

Dystonia Signs:
- Posturing of left hip at rest; inversion posturing of right foot prior to last surgery; hand posturing when not using crutches
- Non-velocity dependent increase in LE muscle tone in left hip adductors and bilateral rectus femoris muscles
- Absent pyramidal neurologic signs (~ Babinski, ~ clonus, absent patellar and Achilles DTRs)
- Facial grimacing, body builder appearance
- Severe muscle spasms

Spasticity Signs:
- Mild hip and knee flexion contractures (secondary to spasticity)
- Spasticity in hamstrings – Tardieu Test spasticity angles
- Impaired distal selective motor control in BLE

Gait Data

Spatial & Temporal Parameters:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Subject</th>
<th>Adult</th>
<th>Barefoot</th>
<th>Normal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Velocity (m/sec)</td>
<td>Right</td>
<td>0.26</td>
<td>0.26</td>
<td>0.26</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td>0.32</td>
<td>0.32</td>
<td>0.32</td>
</tr>
<tr>
<td>Step Length (cm)</td>
<td>Right</td>
<td>0.28</td>
<td>0.28</td>
<td>0.28</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td>0.25</td>
<td>0.25</td>
<td>0.25</td>
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<tr>
<td>Cadence (steps/min)</td>
<td>Right</td>
<td>112</td>
<td>112</td>
<td>112</td>
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<tr>
<td></td>
<td>Left</td>
<td>112</td>
<td>112</td>
<td>112</td>
</tr>
<tr>
<td>Step Time (sec)</td>
<td>Right</td>
<td>1.28</td>
<td>1.28</td>
<td>1.28</td>
</tr>
<tr>
<td></td>
<td>Left</td>
<td>1.26</td>
<td>1.26</td>
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<tr>
<td>Single Support (%)</td>
<td>Right</td>
<td>43</td>
<td>43</td>
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<tr>
<td></td>
<td>Left</td>
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<tr>
<td>Stance (%)</td>
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<td>Swing (%)</td>
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<tr>
<td></td>
<td>Left</td>
<td>16</td>
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</tr>
</tbody>
</table>

Markedly reduced knee excursion consistent with dystonia findings on clinical exam

Co-contractions during stance and swing phases, consistent with reduced kinematic excursion and dystonia on clinical exam

Treatment Decisions

- Oral medication trials of levodopa (Sinemet), trihexyphenidyl (Artane), or other dystonia drugs
- Botox to LEFT adductor longus, adductor magnus, gracilis, and rectus femoris
- Obturator nerve block with Marcaine; followed by more permanent Phenol block (physiatrist decision)
- Consider test trial of ITB
- Physical Therapy program
  - Alternating night-time knee immobilizers for KFC
  - Re-eval left shoe lift height with effects on gait velocity
  - Stretching program for bilateral hip flexors, rectus femoris, and joint mobilization for posterior knee capsular tightness
  - Strengthening of hip abductors, extensors (including hamstrings), end-ROM quads, and plantarflexors during gait
  - Partial body support treadmill-training program
- No surgery at this time
- Re-evaluate in Motion Analysis Laboratory to assess effectiveness of interventions

e-mail: kwesdock@chva.org