

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

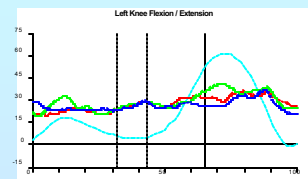
BAD Scale

Spasticity Signs:

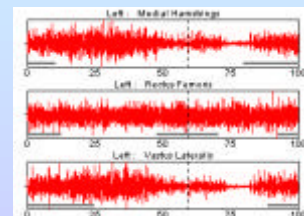
- Mild hip and knee flexion contractures (secondary to spasticity)
- Spasticity in hamstrings – Tardieu Test spasticity angles
- Impaired distal selective motor control in BLE

Gait Data

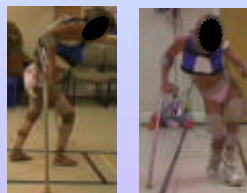
Spatial & Temporal Parameters:			Percent	Adult	
Barefoot			Normal	Normal	
Velocity (m/sec)	0.13	10%	10%	1.32	
Cadence (steps/min)	26	23%	23%	112	
Step Width (m)	0.27	270%	270%	0.10	
Right Left			Right Left		
Step Length (m)	0.38	0.24	52%	35%	0.69
Step Time (sec)	1.78	3.71	324%	675%#	0.55
Single Support (%)	43	11	110%	28%	39
Stance (%)	91	65	140%	107%	61
Swing (%)	9	35	23%	90%	39
Right AFO with Left Lift			Percent	Adult	
Right Left Lift			Normal	Normal	
Velocity (m/sec)	0.28	20%	20%	1.32	
Cadence (steps/min)	38	34%	34%	112	
Step Width (m)	0.28	280%	280%	0.10	
Right Left			Right Left		
Step Length (m)	0.45	0.32	65%	46%	0.69
Step Time (sec)	1.28	2.03	233%	369%	0.55
Single Support (%)	43	15	110%	36%	39
Stance (%)	86	58	141%	95%	61
Swing (%)	14	42	36%	108%	39
Right AFO with Left Lift			Percent	Adult	
Right Left Lift			Normal	Normal	
Velocity (m/sec)	0.25	20%	20%	1.32	
Cadence (steps/min)	36	32%	32%	112	
Step Width (m)	0.28	280%	280%	0.10	
Right Left			Right Left		
Step Length (m)	0.48	0.44	70%	64%	0.69
Step Time (sec)	1.26	2.12	229%	365%	0.55
Single Support (%)	51	16	131%	41%	39
Stance (%)	84	52	138%	85%	61
Swing (%)	16	48	41%	123%	39



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

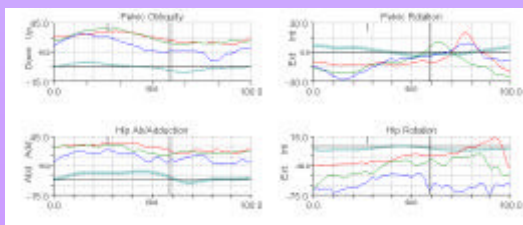


Treatment Decisions

- 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

Gait Data



Red = Barefoot, Green = Right AFO with left shoe lift, Blue = Right AFO without left shoe lift
Light-Blue = Normal motion