

Pediatric Equinus Deformity Development & Management in Children with Cerebral Palsy & Idiopathic Toe Walking: *Principles & Strategies*

Part 1: Didactic Sessions – 2 Days

Instructor: Beverly Cusick, PT, MS, NDT, COF/BOC

DIDACTIC ENROLLMENT: Limited by seating space.

LAB ENROLLMENT: Limited to 12 didactic program alumni with evidence of the most potential to begin using serial casting skills. No auditors.

LEVEL: INTERMEDIATE – Pre-course readings & review materials are assigned in order to open more contact time for labs & videotaped cases. Enrollees are expected to arrive prepared.

TARGET AUDIENCE: This course is designed for the practitioner who has experience in working with children with CNS dysfunction & habitual toe walking, including physical therapists, orthotists, pediatric orthopedists, & PM&R physicians. We believe that team education fosters more effective teamwork.

COURSE DESCRIPTION

The content covered in this program spans a range of topics related to foot function & development; postural control acquisition & influence on foot development; gait development & gait pathology related to foot pathomechanics; physiologic adaptation of lower limb muscle to routine use – both ideal & pathologic; & the contribution of postural control deficits to equinus deformity development.

A review of musculoskeletal assessment procedures prepares participants for training in lab sessions. The assessment findings serve as outcome data & lead to a systematic clinical decision-making process regarding optimizing orthotic design.

Billi (Instructor) applies these sciences to a review of strategies for optimizing body weight loading on - & somatosensory input from - the feet, using customized & specialized cast boots & orthoses, including principles & methods of serial casting for equinus deformity.

COURSE OBJECTIVES

Participants completing the *didactic* portion of this course are expected to be able to:

- Describe, in plane-based terminology, the motions of the joints & various bones of the foot in the open & closed kinematic chains.
- Discuss the kinesiological benefits of optimizing functioning alignment.
- Describe the verticality drive & its role in lower extremity (LE) deformity development in ambulatory children with bilateral CP.
- Describe the role of the foot & ankle load receptors in the achievement & maintenance of postural control in standing & gait.
- Describe the location of the whole-body center of gravity (COG) in infants & preschoolers.

COURSE OBJECTIVES, CONTINUED.

- Relate body weight distribution on the foot to ankle & foot joint function & development.
- Relate body weight acceleration to gait development – typical & pathologic.
- Discuss the vertical tibia period in typical gait development.
- Describe the connection between excessive pronation & equinus deformity development.
- Discuss the validity of the prevailing presumption that spasticity causes equinus deformity.
- Discuss the growing evidence of muscle tissue pathology resulting from any Botox-A injection.
- Define & discuss the physiology & functional significance of R1 (“first-catch”) end range of motion in the triceps surae muscles.
- Discuss the evidence that R1 end range in passive extensibility testing indicates the presence of spasticity.
- Explain the physiologic & structural changes that are known to occur in LE muscles & surrounding tissues following a history of routine, tonic recruitment for upright posture maintenance.
- Distinguish between hypertonic muscle dominance & muscle strength.
- Describe the method of detection of R1A end range in assessing passive ankle dorsiflexion range of motion with knee extended (PDFROM-KE).
- Explain the functional relevance of R1A end range PDFROM-KE.
- Discuss the application of R1A end range to the design of a below-knee cast or AFO.
- Upon discovering a dominant gastrocnemius muscle, name 3 related areas of clinical concern.
- Discuss the evidence of the effectiveness of manual stretching in equinus deformity management.
- Explain the process of progressively casting an equinus deformity by beginning with the ankle plantarflexed & the heel supported, vs. setting the ankle in dorsiflexion in the initial casts.
- Describe orthotic posting in sagittal & frontal planes.
- Name 3 objectives of posting below-knee casts & orthoses.
- Explain the biomechanical rationale for modifying a post-casting AFO with extreme varus posting.
- Discuss the purposes of weight line training in equinus deformity management.
- Name 5 features that identify excessive foot pronation in the closed chain.
- Explain the clinical relevance of undertaking specific assessments to identify features of triceps surae soft tissue extensibility & structural alignment in the ankle & foot.
- Determine whether an equinus deformity meets the criteria for intervention with heel-posting orthoses made in ankle plantarflexion or with serial casting,
- Explain the rationale for instituting strengthening & night splinting after restoring soft tissue extensibility to the triceps surae muscles & fascia.

DAY 2

Start	DESCRIPTION	Contact min
8:45	Arrive, sign in, settle in	--
9:00	Ankle Dorsiflexion ROM: Development & Assessment - Introducing R1A	60
10:00	Sagittal Plane Orthotic Posting: Principles & Strategies	30
10:30	Short break – 15 minutes	--
10:45	Resume Sagittal Plane Orthotic Posting: Principles & Strategies	15
11:00	Orthotic Design Options for Neuromotor Re-education	45
11:45	Lunch – 45 minutes	--
12:30	Anatomical & Functional Features of Typical Foot Development	30
1:00	Foot Joints in Congruity – Relevance in Standing & Gait	15
1:15	Assessment to Management: Foot Pathomechanics & Posting Principles & Strategies	60
2:15	Short Break – 15 min	--
2:30	DEMO: Video- Posting & TheraTogs Displace Body COG Back onto Heels > Forefeet	20
2:50	Highlights of Hypoextensibility Management Strategies	30
3:20	DEMO video: Molding a Turtlebrace AFS into a Sleeping Splint	15
3:40	DEMO Video: Toe Walking Intervention	20
4:00	Short break – 15 minutes	--
4:15	Research – Observations & Ideas.	55
5:10	Review of Planar Motions & Deviations in the Foot	5
5:15	Discussion – Complete didactic course evals & exchange for completion certificates	15
5:30	Adjourn. Day 2 didactic contact hours (min):	6.8 hrs (410)
	Total didactic contact hours:	13.50

Part 1-only participants, thank you for joining us & safe travels!