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Sponsor Information

Neuro-Orthopedic Development & Rehabilitation

Optimizing Movement Training & Minimizing Deformities
using Orthotic Modifications & TheraTogs™ Orthotic Systems

AN 8.5 - DAY INTENSIVE COURSE

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

Beverly Cusick, PT, MS, COF is an internationally-renowned physical therapy instructor, consultant, author, and practitioner. **Neuro-Orthopedic Development & Rehabilitation** is an academically rigorous and clinically practical program that renews and expands the assessment and management skills of attending therapists, orthotists, and related rehabilitation team members.

TARGET AUDIENCE: Ms. Cusick is committed to the fostering of collaborative and educated team management of people with complex neuromotor problems. Therefore, this course is open to a range of clinicians who are likely to work together to maximize physical function as a rehabilitation team, including physical therapists, orthotists, interested occupational therapists, rehabilitation physicians, and orthopedists.

LEVEL: INTERMEDIATE. The course content can be challenging to any practitioner who does not ordinarily think in biomechanical terms. In order to prepare for this course, all attendees are required to review and study – a set of pre-course readings and assigned segments of 2 instructional DVDs.

COURSE DESCRIPTION

Experienced clinicians are offered a range of science-based, conservative approaches to management of postural deficits, joint deformity, and movement disorders as they occur in children with orthopedic problems, sensory processing disorders, and CNS dysfunction. The content is based in the sciences of biomechanics, kinesiology, and physiologic adaptation to use history.

As the foot is the body-ground interface for all clients who stand and walk, Ms. Cusick reviews foot anatomy, function in standing and gait, and influences using plane-based nomenclature. Ankle and foot assessments are presented and findings are applied to orthotic modifications and serial casting interventions in the context of the “new paradigm” that has been emerging in orthotic design in recent years. The instructor discusses new findings in the studies of muscle transformation, foot development and related weight distribution on the foot, and the importance of ankle plantarflexion in gait kinetics.

Ms. Cusick briefly reviews the elements of the skeletal modeling process in relation to the typical postures seen after full-term gestation. Principles from Sahrman’s Muscle Balance Theory, postural control acquisition and related somatosensory function, and motor learning theory are woven into a brief review of normal (and ideal) orthopedic and neuromotor developmental events as they emerge in the sagittal, frontal, and transverse planes, with implications for designing an effective neuromotor and physical training program.

These discussions provide evidence of the relationship between specific anatomic components - such as bone geometry, joint shape, and muscle extensibility (the length-tension relationship in clinical terms) - and a history of movement strategies. Videotaped case studies are presented in order to model a components-based, clinical problem-solving process that prioritizes recommended intervention strategies.

Seminar attendees receive a comprehensive and current set of hand-outs with extensive, topic-specific reference lists. Lab attendees receive a set of 6 assessment tools.

Attendees who choose to fulfill the qualification requirements will also be certified as TheraTogs Fitters – Levels 1 & II.

COURSE OBJECTIVES

Upon completion of both the lecture and lab sessions, participants will be able to:

- Relate movement-based compression strains at or under normal body weight to bone growth rate.
- Describe and explain the closed-chain relationships between foot positions –pronation and supination – and the alignment of the lower extremities (LEs) and pelvis.
- Name the 5 attributes of normal gait and the 3 stance-phase rockers as defined by Perry and Gage.
- Describe the ideal foot and ankle kinematics during Rockers 2 and 3, and relate them to the attributes of normal gait and to gait kinetics.
- Describe the mechanism underlying “internal moment” as a pathomechanical phenomenon.
- Discuss the relationship between somatosensory input through the foot and postural control.
- Give examples of orthotic posting in sagittal and frontal planes. Relate orthotic posting to LE closed-chain function in gait.
- Describe the “swing-limb torque generator”, and explain its influence on developing LE long bones and feet.
- Relate center of body mass distribution over the base of support to muscle recruitment strategies and contracture formation.
- Differentiate between “load’ and “strain” as skeletal modeling influences, and relate them to the process of osseous maturation.
- Define torsion, antetorsion, version, anteversion, varus, valgus, tibial slope, acetabular inlet slope, femoral angle of entry, and pelvic obliquity, and assign them to the correct cardinal planes.
- Describe muscle and connective tissue transformation relative to a history of chronic, tonic muscle recruitment.
- Explain why spasticity cannot cause deformity.
- Explain the terms “dominant” and “dominated” as they pertain to muscle force couple imbalances, and describe 2 strategies for identifying each condition.
- Discuss muscle length and related capacity for isometric contractile force generation.
- Explain the hip joint stabilizing function of the Iliotibial Band Complex, and the influence of the presence of excessive femoral antetorsion on this function.

- Explain the biomechanical and kinesiologic rationales for using weight-line training and heel-loading to gain LE soft tissue extensibility.
- Explain the process that results in relative flexibility and the eventual problems. Give 3 examples of common sites of relative flexibility, and suggest orthotic and TheraTogs applications that target relative flexibility concerns.
- Execute the musculoskeletal assessments procedures reviewed in lab sessions with enough competence to continue to practice and use them in clinical practice.
- Demonstrate competency in donning a set of TheraTogs garments and strapping applications for improving postural alignment and scapular stability.
- Bring foot assessment findings to an orthotic posting plan, and implement the plan by posting a shoe insole for a presented case.
- Bring LE and postural assessment findings to the process of designing and prioritizing a rehab management plan that delivers adequate practice of improved alignment and function between therapy sessions.

COURSE SCHEDULE

DAY ONE – SEMINAR & LAB • BRING LAB CLOTHES.

8:15	Registration
8:45	Introduction
9:00	Review of Foot and Ankle Anatomy and Biomechanics
9:45	Postural Control Development - Command of Body COM Orientation over the Base of Support
10:15	SHORT Break
10:30	The Somatosensory System – Contributions to Balance and Walking
11:30	The Ideal Role of the Ankle Joint in Gait Kinetics - Rockers 1, 2, and 3
12:00	Lunch
1:00	Sagittal-Plane Orthotic Posting – Rationale and Strategies
1:45	Videotaped Ankle DFROM Assessments
2:00	Short Break
2:15	LAB – on each other: Ankle DFROM Assessment – Knee Extended
3:00	LAB: Ankle Equinus Posting / TogRite Ankle Motion-Assist Strapping Gait Training
4:30	Videotaped Case Presentation – Max
4:45	Questions, discussion
5:00	Adjourn

We'll start every following course day at 8:30AM unless declared otherwise.

Please mark your calendars. We will start without you if you are not seated at 8:30AM.

We'll start promptly at 8:30AM tomorrow. Bring lab clothes.

DAY TWO – SEMINAR & LAB • *Bring lab clothes today.*

- 8:30 Brief review: Skeletal Modeling Mechanisms
- 9:00 Foot Assessment – Pathomechanics – Posting Implications and Strategies
- 10:00 SHORT Break
- 10:15 More Posting Implications and Strategies
- 11:00 Foot Development
- 12:00 Lunch - Videotaped case at 12:40 (optional)
- 1:00 Name That Foot Deformity!
- 2:00 **LAB – on each other:** Open-Chain Assessments of the Foot
- 3:15 SHORT Break
- 3:30 **LAB on each other:** Resume Open Chain Assessments
- 4:45 Restore classroom set-up
- 5:00 Adjourn

We'll start promptly at 8:30AM tomorrow. Wear lab clothes for tomorrow morning lab.

DAY THREE - LAB, WORKSHOP, & SEMINAR - AM

- 8:30 **LAB (on each other):** Closed-Chain Foot Assessments
- 9:30 **Workshop:** Use Assessment Findings to Design Orthotic Posting
- 10:15 SHORT Break
- 10:30 **Workshop:** Review of workshop results
- 11:15 Movement Systems Analysis in Orthopedic Development - Sahrman's Contributions
- 12:00 Lunch – videotaped case at 12:40 (optional)
- 1:00 Implications of Movement Systems Analysis for Foot Deformity Management
- 1:30 Development of Kinetics of Walking
- 2:00 SHORT break
- 2:15 Development of Kinetics of Walking - continued
- 2:45 Neuromotor Re-ed for Gait Using Orthotic & Shoe Modifications
- 3:45 SHORT Break
- 4:30 Hypoextensibility Management Strategies
- 5:15 Questions and Discussion
- 5:30 Adjourn

Homework: [Read Section 16A](#)

DAY FOUR: MORNING

- 8:30 Q&A –Clarifications, review
- 9:00 Serial Casting – Indications, Precautions, Contraindications, - Mary Weck's Contributions
- 9:45 SHORT Break

10:00 **Live case presentation** – Instructor demonstrates an orthopedic / biomechanical evaluation on a child with diplegic or hemiplegic CP, GMFCS Level I, II, or III – focus on feet & ankles & orthotic implications.

12:30 Lunch / adjourn

DAY FOUR: AFTERNOON

12:30 – 5:00 **Catching Our Breath** - Independent Study (Library is open) - Rest and Refresh – Practice assessments – Review or Preview your handouts - Videotaped cases available on DVD. Instructor is on site and on duty to assist.

Tomorrow, bring shorts or stretchy slacks to wear in case any children have to cancel.

DAY FIVE – SEMINAR & LAB

8:30 Brief Review of Sagittal-Plane Developmental Changes; Biomechanical Influences of Full-Term Gestation

9:00 Review of Sagittal-Plane Musculoskeletal Assessments: Trunk, Pelvis, Hip

10:00 SHORT Break

10:15 Sagittal-Plane Assessments Review: Knee, Patella, Hamstring Muscle Length

12:00 Lunch – *12:30 Bag lunch videotaped case presentation – Sensory Processing Disorder (optional)*

Change into shorts and prep (clean, shave) skin around the knees for patella alta taping lab.

1:00 **DEMO & LAB (on each other):** Patella Angle Assessment & Patella Alta Taping

2:30 **LAB (on each other):** Sagittal-Plane Assessments: Pelvis, 2-Joint Hip Flexor Test

3:15 Clean up, prep for lab with children – set up stations, i-phones, androids, tools, record forms

3:30 **LAB:** Sagittal-Plane Assessment Procedures with Nondisabled Children – 2 hours: Pelvic tilt, hip extension ROM (Sahrmann 2-joint & Modified Staheli Prone Test), hamstring length test, patella angle, ankle DFROM.

5:30 Clean up and adjourn

Tomorrow, bring shorts or stretchy slacks for lab.

DAY SIX – SEMINAR & LAB

8:30 Frontal Plane Developmental Changes and Assessments: Torso, Pelvis, Hip, Knee

10:00 SHORT Break

10:15 Hypoextensibility Management Strategies

10:45 **Try-on TheraTogs LAB #1** – Garment Donning and Sagittal Plane Strapping Applications – CTF-I exams (optional)

12:00 Lunch

1:00 **LAB (on each other):** Frontal-Plane Assessments – Pelvis, Hip, Knee

1:45 SHORT Break

2:00 **LAB:** Open-Chain Foot Assessments with a different partner.

3:15 Prep for assessments lab with children

3:30 **LAB (on nondisabled children):** Frontal-Plane Assessments & Foot in Open Chain (2 hours)

5:30 Clean Up and adjourn

Tomorrow, bring shorts or stretchy slacks for lab.

DAY SEVEN – SEMINAR & LAB

- 8:30 Transverse-Plane Developmental Changes and Assessments: Torso Hip, & Femur
- 10:00 Break
- 10:30 Transverse-Plane Developmental Changes and Assessments: Knee, Leg & Foot
- 12:00 Lunch - 12:40 - videotaped case presentation (optional)
- 1:00 Review: Femoral anteversion & antetorsion
- 1:15 **Try-on TheraTogs LAB #2 and #3** – Frontal- & Transverse-Plane Strapping Applications – CTF-II exams (optional)
- 2:45 Break, prepare for next lab
- 3:30 **LAB (on nondisabled children):** Transverse-Plane Assessment Procedures & Repeat Other Procedures
- 5:30 Clean up and adjourn **We start at 9:00 tomorrow.**

DAY EIGHT- WORKSHOP SESSIONS & LAB - AM

- 9:00 **DEMO:** Videotaped Case Presentation with Review of Findings & Application to Program Planning
- 9:45 **Working Session:** Videotaped Cases - In 3 small groups, attendees:
- Sort recorded findings into orthopedic categories
 - Propose targeted management strategies
 - Think of & prioritize five strategies
 - Don TheraTogs garments on a group member, and demonstrate the proposed strapping strategy
 - Explain any proposed staging of the strapping system
- 10:30 Short Break
- 10:45 Resume Working Session – 30 more minutes to prepare your presentation to the whole group
- 11:15 15-minute presentations by each group: Present the 5 management strategies, explain their selection and the prioritized list, and show and explain your choice of orthosis and strapping plan as indicated.
- 12:00 Short Lunch
- 12:30 **LAB: Live Case Presentation** – Attendees take turns assessing a child with CP (GMFCS Level II) until all findings are acquired.
Graze at will. No formal breaks are scheduled during this long session, though we will take short breaks as needed by our volunteer.
- 2:30 In groups of ≤ 4 , review & sort findings into categories & interventions. Propose 3 strategies.
- 3:30 Undertake orthotic modification and TheraTogs trials with the child as indicated.
- 4:45 Set up for tomorrow's lab, adjourn. **We start at 9:00AM tomorrow.**

DAY NINE: SEMINAR & LAB

- 8:45 **LAB:** Depending upon lab group size and assistant availability, small groups evaluate a child with CNS dysfunction & innervated muscles, GMFCS Levels I, II, or III. Full musculoskeletal assessment. Try shoe modifications if possible and TheraTogs stages 1 & 2 (at least). 3 hours
- 12:15 Questions and Discussion, complete & turn in evals to receive certificates
- 12:30 Adjourn

INSTRUCTOR BIO - BEVERLY (BILLI) CUSICK, PT, MS

EDUCATION:

1972 - BS in PT from Bouve College at Northeastern University (Boston) in 1972, summa cum laude.

1988 - MS in Clinical and College Teaching for Allied Health Professionals - University of Kentucky in Lexington.

WORK EXPERIENCE:

- 1 year – PT staff at (now) Spaulding Rehabilitation Center, Boston, MA
- 3 years – PT staff and Director for UCP Center, Lawrence, MA
- 9 years - PT staff at Children's Rehab. Center (now, Kluge Center), Charlottesville, VA.
- 3 years - PT Education faculty, College of Health Related Professions at MUSC, Charleston, SC, and Director of PT Services for the Div. Of Developmental Disabilities at MUSC.
- 1 year, consultant, Cardinal Hill Hospital's Head Trauma & Pediatrics teams – Lexington, KY.
- 4 years, assisting in the PT Department at Children's Hospital at Stanford, Palo Alto, CA.
- 25 years in private practice.
- 18 years – President, Progressive GaitWays, LLC, Telluride, CO
- 13 years – Chief Medical Office for TheraTogs, Inc., Telluride, CO – product development, training, clinical support and documentation.

PUBLICATIONS:

- Help Patients Manage Equinus Deformity. *O&P Business News*, 2011; April: 74-77.
- *Orthotic Management of Low-Toned Children: The Earlier the Better (Co-author)*. *O&P Edge*. 2011; April: 24-29.
- *Serial Casting and Other Equinus Deformity Management Strategies for Children and Adults with CNS Dysfunction (2010)* by Beverly Cusick, published by GaitWays.
- *Foot Talk (2009)*, a 2-hour lecture on functional foot anatomy and closed chain biomechanics, accompanied by a set of Power Point handouts of the same lecture.
- *Legs & Feet: A Review of Musculoskeletal Assessments (1997, revised 2005)*, an instructional videotape.
- *Lower Extremity Developmental Features (2000)*, a home study monograph for the APTA's Orthopedic Section.
- *Progressive Casting and Splinting for Lower Extremity Deformity in Children with Neuromotor Dysfunction (1990)*, a full-length text.
- Several earlier editions of serial casting texts, textbook chapters, journal articles, conference proceedings, and professional newsletters.

CLINICAL TEACHING:

Associate Professor for the Rocky Mountain University of Health Professions – Pediatrics Program – Provo, Utah

Guest lecturer for annual conferences of the APTA, the NDTA, and the American Academy of CP and Developmental Medicine, in the US and Canada; the ISPO Consensus Conference for Orthotics in CP; the British Association of Prosthetists and Orthotists; and the American Academy of Orthotics and Prosthetics.

Instructor of more than 400 courses by invitation only in the USA, Canada, South America, Hong Kong, Singapore, Italy, Australia, New Zealand, The UK, Israel, and India.

Since 1993 Ms. Cusick has been consulting and practicing privately in or near Telluride, Colorado where she devotes most of her professional effort to generating literature and educational materials, to teaching, and to developing therapeutic products, including her invention, TheraTogs orthotic systems. A curriculum vita is available upon request.