



Course Description • 4-Session Live Webinar

Developmental Orthopedics

A Review of Operating Processes with Implications for Management

TARGET AUDIENCE: Rehabilitation team members, including physical therapists, orthotists, physical therapy assistants, and occupational therapists.

LEVEL: INTERMEDIATE – Pre-course readings are assigned.

Course Description

This program features an overview of somatosensory function and development, the role of postural control in movement acquisition and physiologic adaptation, skeletal modeling mechanisms and influences, and ideal and pathomechanical features of orthopedic development of the trunk and selected aspects of the extremities.

Instructor describes selected musculoskeletal assessments and the clinical implications of their findings and brings them to therapeutic and orthotic management planning designed to optimize bone and joint development via building postural control and movement skills. The relevance of the findings obtained in the musculoskeletal assessment to target selected interventions is made evident in videotaped cases.

Course Objectives

Participants completing this course are expected to be able to:

- Describe these features of normal, postnatal immaturity of skeletal structure and alignment: thoracolumbar kyphosis, hip flexion contracture, increased femoral anteversion, increased femoral antetorsion, coxa valga, genu varum, and leg and foot rotation.
- Distinguish between strain and load and apply this distinction to the skeletal modeling process and to modeling potential in an aging child.
- Relate movement-based loading history to bone growth rate in children.
- Explain the significance of the innate drive for verticality.
- Explain the presence of symmetry in supine and prone positions at age four months as evidence of fundamental postural control.
- Describe how the normal neonatal hip flexion contracture influences the early modeling of the lumbar spine in the sagittal plane.
- Relate ideal, full-term neonatal lower limb joint alignment to the acquisition of skilled transitions between quadruped and sitting positions.
- Relate the achievement of competent weight shifting in the frontal plane to emerging limb use.
- Relate the ideal early lower limb alignment to early foot development.
- Relate early movement history to changes in shape of the pelvis and proximal femur in the frontal plane.
- Explain the apparent relationship between frontal-plane weight shift skill, the swing limb torque generator in gait, and long bone torsion reduction in the lower extremities.
- Relate segmental foot loading history to the development of the medial longitudinal arch.

- Relate foot alignment – pronation and supination – to body weight (COM) projection onto the feet.
- Name the five body segments included in examining relative limb lengths in the prone position.
- Name four LE musculoskeletal assessments that can identify the source of the foot progression angle in gait.
- Differentiate between femoral anteversion and femoral antetorsion and explain the relevance of the distinction to the safe use of orthotic interventions.
- Explain why measurements of “hip” medial and lateral rotation range of motion (ROM) do not represent hip joint motions.
- Describe the anatomical components of the thigh-foot angle and its typical developmental progression.
- Discuss SA Sahrman’s proposed management sequence after identifying dominant muscles.
- Explain the apparent impact of direction-specific postural responses on the development of common contractures in ambulatory children with diplegic cerebral palsy and idiopathic toe walking.
- Name four features of hypertonic lower-limb muscle tissue that appear to contribute to a loss of strength.
- Explain the potential somatosensory and therapeutic benefits of optimizing the postural base of support in daily life.
- Explain the potential somatosensory and therapeutic benefits of optimizing functioning joint alignments in daily life.

Program Schedule

(All times Pacific DST.)

Session 1 • August 22, 2021

Start	Topic	Contact minutes
3:00	An Overview of Developmental Changes in the Spine and Lower Extremities	20
3:20	Strain and Load: Shaping Bones and Joints with Skeletal Modeling	40
4:00	Break – 5 minutes	-
4:05	Proximal Before Distal: Contributions of Postural Control Acquisition & Maintenance to Orthopedic & Neuromotor Development	65
5:10	Break– 5 minutes	-
5:15	Biomechanical Advantages to Orthopedic Development of Full-Term Gestation	40
5:55	Movement-Related Skeletal Modeling Opportunities	50
6:45	Questions - discussion	15
7:00	Adjourn	Day 1 didactic contact hours: 3.75

Session 2 • August 23, 2021

Start	Topic	Contact minutes
3:00	Ideal Lower Limb Soft-Tissue Extensibility - Evidence of Use History	70
4:10	Short break – 5 min	-
4:15	The Role of Postural Control Deficits in Deformity Development	70

Start	Topic	Contact minutes
5:20	Short break – 5 min	-
5:25	Limb Length Inequality: Assessment & Implications	30
5:55	Carry-Over Strategies for Improving Postural Control	30
6:25	Short Break – 5 minutes	-
6:30	Carry-Over Strategies for Improving Postural Control, continued	15
6:45	Questions - discussion	15
7:00	Adjourn	Session 2 didactic contact hours: 3.75

Session 3 • August 29, 2021

Start	Topic	Contact minutes
3:00	Nomenclature Lab	35
3:35	Developmental Changes in the Pelvis & Femur in the Transverse Plane	45
4:20	Short Break – 10 minutes	-
4:30	Assessing the Hips & Femur in the Transverse Plane	60
5:30	Short Break – 5 minutes	-
5:35	Clinical Implications of Transverse-Plane Hip and Femur Findings	70
6:45	Questions - discussion	15
7:00	Adjourn	Session 3 didactic contact hours: 3.75

Session 4 • August 30, 2021

Start	Topic	Contact minutes
3:00	Developmental Changes in the Knee, Leg, & Foot in the Transverse Plane -TFA	30
3:30	Clinical Implications of Transverse-Plane Knee & Leg Findings	60
4:30	Short break – 10 minutes	-
4:40	Associating Foot Alignment with Orthopedic Development in Diplegic CP	30
5:10	Research Concerns & Ideas	45
5:55	Short Break – 5 minutes	-
6:00	Summary with Q&A	60
7:00	Adjourn	Session 3 didactic contact hours: 3.75
Total didactic contact hours:		15.00

Thanks for joining us!

Beverly Cusick, PT, MS, NDT, COF/BOC – Brief Biography



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.

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 Medical university of South Carolina (MUSC), Charleston, SC, and Director of PT Services for the Division 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.
- 31 years in private practice.

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; Apr: pp. 24-29.
- Serial Casting and Other Equinus Deformity Management Strategies for Children and Adults with CNS Dysfunction. 2010. Published by Progressive GaitWays.
- *Foot Talk*. 2009. A DVD of a 2-hour lecture on functional foot anatomy and closed chain biomechanics, accompanied by a CD with a set of Power Point handouts of the same lecture.
- Serial Casting for the Restoration of Soft Tissue Extensibility in the Ankle and Foot (2007 and 2009).
- Legs & Feet: A Review of Musculoskeletal Assessments (1997, revised 2015), an instructional DVD.
- *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. Published by Therapy Skill Builders.
- Several textbook chapters, articles for journals, conference proceedings, and professional newsletters, including a series (2006 and 2007) on Pediatric Orthopedics for the *NDTA Network*.

CLINICAL TEACHING:

Guest lecturer for conferences sponsored by the APTA, the NDTA, and the American Academy of CP and Developmental Medicine, in the US and Canada; the British Association of Prosthetists and Orthotists; Enable Ireland; the American Academy of Orthotics and Prosthetics, the American Orthotic and Prosthetic Association, and the Queensland Paediatric Physiotherapy Clinical Network.

Instructor of more than 460 courses, by invitation only, in 19 countries.

Associate Professor for the Rocky Mountain University of Health Professions – Pediatrics Program – Provo, Utah, 2006 to present.

Since 1993 Ms. Cusick has been consulting and practicing privately in Telluride, Colorado. There, 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.