



Course Description • 4-Session On-Demand Webinar

## Developmental Orthopedics

### *A Review of Operating Processes with Implications for Management*

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

**LEVEL: INTERMEDIATE** – Pre-course readings are assigned.

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## Course Description

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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.

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## Course Objectives

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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.
- 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 functioning joint alignments in daily life.

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## Program Schedule

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### Session 1: Skeletal Modeling and Kinesiology of Movement Acquisition

Topic	Presentation Length (min)
Introduction	5
An Overview of Developmental Changes in the Spine and Lower Extremities	18
Strain and Load: Shaping Bones and Joints with Skeletal Modeling	31:50
Proximal Before Distal: Contributions of Postural Control Acquisition & Maintenance to Orthopedic & Neuromotor Development	63:51
Biomechanical Advantages to Orthopedic Development of Full-Term Gestation	32:40
Movement-Related Skeletal Modeling Opportunities	33:35
<b>Session 1 presentation - min/ hours:</b>	<b>187 min / 3.12 hours</b>

### Session 2 • Postural Control and Lower Limb Muscle Tone – Typical and Pathologic

Topic	Presentation Length (min)
Introduction	4
Limb Length Inequality: Assessment & Implications	28.23
Developmental Features of the Knee Joint in the Frontal Plane	19.46
Ideal Lower Limb Soft-Tissue Extensibility - Evidence of Use History	52.42
The Role of Postural Control Deficits in Deformity Development	51.43
Carry-Over Strategies for Improving Postural Control	52.07
Session 1 & 2 Q&A / Review	28.57
Session 1 & 2 Quiz	34
<b>Session 2 presentation – min/ hours:</b>	<b>272 min / 4.53 hours</b>

### Session 3 • Identifying and Managing Features of Hip and Femur Development in The Transverse Plane

Topic	Presentation Length (min)
Intro & Nomenclature Lab	33.45
Developmental Changes in the Pelvis & Femur in the Transverse Plane	30.27
Assessing the Hips & Femur in the Transverse Plane	34
Clinical Implications of Transverse-Plane Hip and Femur Findings	81.20
<b>Session 3 presentation hours:</b>	<b>180 min / 3 hours</b>

### Session 4 • Identifying and Managing Features of Knee, Leg, and Foot Development

Topic	Presentation Length (min)
Intro & Developmental Changes in the Knee, Leg, & Foot in the Transverse Plane	37.31
Clinical Implications of Transverse-Plane Knee & Leg Findings	57.11
Associating Foot Alignment with Orthopedic Development in Diplegic CP	21.06
Research Concerns & Ideas	21.06
Summary	17
Session 1 & 2 Q&A / Review	8.41
Session 3 & 4 Quiz	35
<b>Session 4 presentation hours:</b>	<b>198 min/ 3.3 hours</b>
<b>Total presentation hours:</b>	<b>14 hours</b>

Thanks for joining us!

