Pediatric Gait Analysis and Orthotic Management: OSKAR - an Optimal Segment Kinematics and Alignment Approach to Rehabilitation of Standing and Walking

October 13th - December 15th, 2023
FLEX COURSE: VIRTUAL AND ON-DEMAND
The Academy is the educational arm of Shirley Ryan AbilityLab, a non-profit rehabilitation hospital in Chicago that has been ranked number one by US News and World Report since 1991. The Academy (formerly RIC) offers a wide range of accredited programs with the common goal of improving patient outcomes through clinical excellence. Our commitment to sharing the best evidence and rehabilitation practice with clinicians around the globe has always been an integral part of our mission.

The Academy is committed to creating an inclusive, authentic and comfortable learning environment that celebrates and supports all learners. We are dedicated to providing the highest-quality teaching regardless of race, age, ethnicity, nationality, gender, sexual orientation/identity, ability, religion, language or culture. Above all, we believe that everyone should feel safe, respected and welcomed when attending our programs at the hospital or online. We encourage the sharing of experiences and perspectives so we can learn from one another, and from our varied points of view.

**Course Description:**

This 9-session course takes a fresh approach to the observation and analysis of typical and atypical patterns of standing, stepping, and walking with full gait cycles, OSKAR. The alignments, kinematics and kinetics of standing and walking, and the atypical patterns of disabling conditions will be reviewed with particular reference to OSKAR orthotic management and rehabilitation programs. Patient cases will focus on cerebral palsy, neural tube defects and other childhood-onset disabling conditions and are applicable to adults with a childhood-onset disability or acquired neurological conditions.

Participants will review the short- and long-term goals of orthotic management, in all areas of the International Classification of Functioning Disability and Health (ICF Framework). The course will explore how to achieve these goals through: optimizing the biomechanical effects of footwear, ankle-foot orthoses and “AFO Footwear Combinations”; the use of clinical algorithms to design, align and tune “AFO Footwear Combinations” in order to optimize standing and walking for the variety of gait patterns; OSKAR rehabilitation programs that may accompany orthotic provision including functional gait training and motor learning programs with orthoses and footwear. Newly published Pictorial and Table Tools, to facilitate collaborative decision-making between clinicians and families, about goals, optimum orthosis design, and dosage, will be presented, together with a new Dosage Tool.

Video Vector gait laboratory case examples will help participants refine their clinical decision-making skills in gait analysis, orthosis and footwear design, and alignment of the ankle-foot orthosis and the AFO Footwear Combination.

Upon completion of the course, participants will be able to apply the principles directly to their working practice. A comprehensive manual accompanies the course.

The course will span 9 weeks with 5 half-days of live lectures and interactive discussions, including extensive video vector gait laboratory case studies, and 22 hours of self-study activities. If you are unable to attend a live session, the program will be recorded and can be watched on-demand.
**Location and Delivery Method:**

This is a flex course being taught virtually using the Academy Learning Portal and Zoom, an online video conference platform. You can choose to attend the live sessions virtually through Zoom or watch the recordings on-demand. Mixing and matching based on your schedule is ok!

**Successful Completion:**

Participants will complete 39.5 hours of content comprised of 4 hours of self-study activities in advance of the course, 12.0 video + 6 hours homework, reading assignments, and assessment hours during the course, and 17.5 (3.5 x 5) live contact hours. The pre-course self-study activities will consist of reading assignments, on-demand viewing of webinars on Maturation of Gait and Clinical Assessment, and exercises to better understand the terminology and definitions necessary to the fundamentals of the course. Participants will complete an assessment of this material prior to the live course.

This course is being offered both live and on-demand. You will make your selection during registration.

1. **Live**, attending one online session each week. If you miss a live session, a recording will be available the following day. 2023 live lecture dates: October 13th and 27th, November 10th, December 1st and 8th.

2. **On-Demand**, on a self-paced basis. The recordings of each session will be released one day following the live event. This program has been designed to allow the learner to progress at their own pace. It is recommended that each session be completed within 1 week.

There will be six, one-hour, live discussion sessions (office hours) with Elaine Owen on the following dates: October 13th and 27th, November 10th, December 1st, 8th and 13th from 3-4PM CST.

For both tracks, the course requirements must be completed by December 15, 2023 to receive credit. Course rosters will be sent to ABC (for orthotists) at this time. Participants will have extended access to view materials through March 18, 2024 for review purposes only.

All course pre-work will be made available by August 21, 2023.

**Who Should Attend:**

Orthotists, Pediatric Physical Therapists, Physical Therapists working with acquired or childhood-onset disability in adulthood, Orthotic Assistants, Physical Therapist Assistants, Orthotic Technicians, Orthotic Fitters, Pedorthists, Physicians, and Surgeons (not offering CME). Other professionals working in pediatrics have also found the content relevant and valuable.

**Learner Outcome:**

Upon completion of this course, participants will be able to:

- Apply Pictorial, Table and Dosage Tools for collaborative goal setting across the ICF components of body structures, body functions, activities, and participation, for children who use ankle-foot orthoses.
• Demonstrate the 6 clinical algorithms for determining optimal orthotic designs, alignments, and dosage in order to implement OSKAR (an Optimal Segment Kinematics and Alignment Approach to Rehabilitation.) The algorithms consider not only the ankle-foot orthosis but the entire AFO Footwear Combination.

The Principles of OSKAR - an Optimal Segment Kinematics and Alignment Approach to Rehabilitation of Standing and Walking

GOAL-SETTING & OSKAR PRINCIPLES
• Describe and Discuss the potential short- and long-term goals, across the ICF, for children who use AFOs, and use of Pictorial and Table Tools for collaborative goal-setting.
• Describe and Discuss the essential concepts of the Optimal Segment Kinematics and Alignment Approach to Rehabilitation (OSKAR)
• Describe and Discuss the biomechanical and neuro-biomechanical effects of optimally aligned and designed AFO Footwear Combinations that may contribute to positive outcomes for bones and joints, muscles, motor control of standing and walking, pain and tissue viability.
• Describe OSKAR functional gait training and motor learning programs for standing and walking with AFO’s and Footwear, and other OSKAR therapy interventions.

STANDING & WALKING – AN OSKAR APPROACH
• State the relevance of segment alignment and proportion to stable standing and walking, and orthotic prescriptions.
• Describe optimum segment alignment, proportion, and kinetics of stable standing.
• Differentiate between and explain the subdivisions and temporal events of a gait cycle.
• Differentiate between and explain stepping walking and full gait cycle walking.
• Describe kinematics of the subdivisions of the gait cycle of typical walking, with equal emphasis on movements of the joints and movements of the segments relative to the vertical and horizontal
• Describe kinetics of the subdivisions of the gait cycle of typical walking, and the interaction of kinematics with kinetics
• Describe muscle actions of the subdivisions of the gait cycle of typical walking.
• Describe the kinematics and kinetics of stepping walking.
• Discuss how the intersegmental coordination of maturing typical gait patterns changes with age
• Describe the kinematics and kinetics of atypical gait patterns, deviations at segments and joints, and Owen’s categorization by segment deviation.

ANKLE-FOOT ORTHOSIS FOOTWEAR COMBINATIONS - DESIGN, ALIGNMENT, EFFECTS
• Describe the essential lower limb physical examinations required for gait analysis and orthotic management and differentiate typical and atypical values for all ages.
• Distinguish and Discuss the biomechanical effects of a variety of AFO and footwear designs and AFO Footwear Combinations.
• Describe the biomechanical optimization of AFO Footwear Combination designs and alignment, and their refinement by tuning to optimize standing, stepping and walking with full gait cycles.
• Distinguish static and dynamic alignment of AFO Footwear Combinations.
• **Demonstrate** the use of 6 clinical algorithms for designing, aligning and tuning AFO Footwear Combinations, to determine optimum prescriptions for each atypical gait pattern, to optimize standing, stepping, and walking with full gait cycles.

• **Describe** the potential benefits of stepping walking with AFOFCs, compared to full gait cycle walking with AFO Footwear Combinations.

• **Demonstrate** the use of a clinical algorithm for determining whether a dorsiflexion-free AFO design is appropriate.

• **Distinguish** the assessments required to determine the optimum alignment of the ankle in an AFO and demonstrate the use of a clinical algorithm for determining the optimum ankle angle.

• **Demonstrate** the use of a clinical algorithm for determining metatarsal phalangeal joints free or fixed AFO design.

**CLINICAL APPLICATION**

• **Integrate** AFO Footwear Combination design, proportion, alignment, and tuning concepts with patient case examples.

• **Demonstrate** kinematic and kinetic gait analysis, from video vector images of sagittal and coronal planes.

• **Use** digital video, to obtain quality sagittal and coronal plane views of standing and walking, to perform 2D kinematic gait analysis.

**Faculty:**

*Elaine Owen, MBE, MSc, SRP, MCSP*

This course is presented by Elaine Owen, who has developed the OSKAR approach to rehabilitation. Elaine Owen has been practicing as a physical therapist since the 1970s, working within and managing interdisciplinary multiagency childhood onset disability services. She has postgraduate training in all areas of paediatric therapy, and qualifications in Lower Limb Orthotic Biomechanics and Clinical Gait Analysis. Her MSc in Rehabilitation Studies included a thesis about orthotic management of neurological conditions, normal standing and gait. She is ESMAC trained in Clinical Gait Analysis. For over 30 years she has used a video vector gait laboratory for gait analysis, and orthotic and physical therapy management of children and adults, at Bangor, UK and other locations, during which time OSKAR was developed. She has peer reviewed publications and has regularly been invited to teach her course and lecture internationally. As well as through her own courses these principles have been presented at the International Society for Prosthetics and Orthotics (ISPO) World Congress, American Academy for Cerebral Palsy and Developmental Medicine (AACPDM), American Academy of Orthotists and Prosthetists (AAOP) and the European Society of Movement Analysis of Adults and Children (ESMAC). She has received a UK national award (MBE) for Services to Children with Disability and in 2019 AAOP awarded her the Clinical Creativity Award. She has lived experience as a caregiver of a child with a disability.
Agenda:

October 13, 2023: LIVE COURSE DAY 1
LIVE SESSIONS OCCUR FROM 8:00AM -12:00PM CST
[10 MIN BREAKS AT 8:50 AM, 9:50 AM, 10:50AM]

1. Goals and Outcomes for Orthotic Interventions
   • Pictorial Tool for collaborative goal setting - short- and long-term
   • An ‘Inside-out approach’ to goal setting, incorporating ICF and ISO

2. Review of terminology and definitions
   • Segment and joint alignment
   • Segment and joint kinematics
   • Segment proportion
   • Segment stiffness and profile

3. Introduction to kinetics; the ground reaction force, joint forces, and moments

4. Introduction to OSKAR principles – an Optimal Segment Kinematics and Alignment Approach to Rehabilitation

October 20, 2023: SELF-STUDY PART 1
WATCH PRE-RECORDED LECTURES & DO ACTIVITIES

1. Standing, an OSKAR approach
   • Typical and atypical segment and joint alignments, kinematics, kinetics, and their interaction
   • Segment proportion, base of support
   • Foot segment length, stiffness and profile, and effect of footwear design
   • Conditions for stable standing, relevance for stable walking

2. Walking, an OSKAR approach
   • Temporal events and divisions of typical walking patterns
   • Full Gait Cycle walking
   • Stepping walking
   • Conditions for stable walking, stable stepping, and stable full gait cycles

3. Typical/normal walking patterns, an OSKAR approach
   • Kinematics; segments and joints
   • Kinetics; joint forces and moments, muscle actions, the interaction between kinematics and kinetics
   • Stepping and full gait cycles
October 27, 2023: LIVE COURSE DAY 2  
LIVE SESSIONS OCCUR FROM 8:00AM -12:00PM CST  
[10 MIN BREAKS AT 8:50 AM, 9:50 AM, 10:50AM]

1. Review, discussion, and quizzes –
   • OSKAR approach to typical/normal walking patterns
   • Kinematics, Kinetics, Muscle actions
   • Stepping and full gait cycles
2. Introduction to atypical walking patterns, an OSKAR approach.
   • Categorization of atypical gait patterns by segment alignment
   • Segment alignment and kinematics for each gait category
   • Joint alignment, kinematics and kinetics for each gait category
3. Orthotic Conditions for Stable Standing, Stable Stepping, Stable Full Gait Cycles
4. Review and discussion – Development of mature walking patterns and intersegmental coordination, an OSKAR approach

November 3, 2023: SELF-STUDY PART 2  
WATCH PRE-RECORDED LECTURES & DO ACTIVITIES

1. Biomechanics of Ankle-Foot Orthoses and Footwear
   • Alignment, proportion, stiffness, profile
   • Sagittal, coronal, transverse, and tri-planar considerations
   • Influence of footwear designs
2. Clinical Algorithm 1. Designing, Aligning and Tuning AFOs & Footwear for Full Gait Cycles
3. Clinical Algorithm 2. Determining Suitability for Dorsiflexion-Free AFOs
5. Clinical Algorithm 4. Determining MTPJ free or fixed AFO design

November 10, 2023 : LIVE COURSE DAY 3  
LIVE SESSIONS OCCUR FROM 8:00AM -12:00PM CST  
[10 MIN BREAKS AT 8:50 AM, 9:50 AM, 10:50AM]

1. Review, discussion, and quizzes - Clinical Algorithms 1-4
2. Clinical Algorithm 5. Designing, Aligning and Tuning AFOs & Footwear for Stepping
3. Clinical Algorithm 6. Designing, Aligning and Tuning AFOs & Footwear for Standing
4. Guidelines for Shank to Vertical Angle Static Alignments for atypical gait categories
5. Guidelines for Optimizing Heel Designs for standing, stepping, full gait cycles
6. Guidelines for Optimizing Sole Designs for standing, stepping, full gait cycles
November 17, 2023: SELF-STUDY PART 3
WATCH PRE-RECORDED LECTURES & DO ACTIVITIES

1. Muscle tendon units – properties and adaptation
2. Clinical Assessment
3. Capturing quality clinical videos for two-dimensional motion analysis
4. Toolkit for video capture and optimizing AFO Footwear Combinations
5. Preparation for Case Studies, Days 7 & 8
6. Orientation with case study documentation
7. Review of clinical assessment charts for each case study
8. Review gait categories lecture
9. Toe walking webinar

November 24, 2023: BREAK – NO SESSION

December 1, 2023: LIVE COURSE DAY 4
LIVE SESSIONS OCCUR FROM 8:00AM -12:00PM CST
[10 MIN BREAKS AT 8:50 AM, 9:50 AM, 10:50AM]

1. Goal Setting with Pictorial Tool
2. Influence of OSKAR in achieving goals and outcomes for bones and joints; muscle tendon and skin; motor control, learning and development; activities; participation; pain.
3. OSKAR Functional Gait Training
4. Use of Pictorial Tool to determine optimal orthosis and footwear designs
5. Use of a Pictorial Tool and Dosage Tool to determine optimal dosage
6. Case Studies
7. Video Vector Gait Laboratory demonstration of atypical gait pattern
8. Review of clinical assessment chart
9. Goal setting, short- and long-term, using Pictorial Tool
10. Use of algorithms, to determine the optimal orthotic prescription
11. Use of goals, Pictorial Tool and Dosage Tool to determine AFOFC dosage, frequency of use
12. Demonstration of outcomes, short- and long-term

December 8, 2023: LIVE COURSE DAY 5
LIVE SESSIONS OCCUR FROM 8:00AM -12:00PM CST
[10 MIN BREAKS AT 8:50 AM, 9:50 AM, 10:50AM]

1. Case Studies
2. Video Vector Gait Laboratory demonstration of atypical gait pattern
3. Review of clinical assessment chart
4. Goal setting, short- and long-term, using Pictorial Tool
5. Use of algorithms, to determine the optimal orthotic prescription
6. Use of goals, Pictorial Tool and Dosage Tool to determine AFOFC dosage, frequency of use
7. Demonstration of outcomes, short- and long-term

**Registration Fee:**

| Early Bird Registration Fee until August 24, 2023 | $600 |
| Registration Fee After August 24, 2023          | $675 |

**Cancellation Policy:**

All cancellations must be requested by email at academy@sralab.org. Refunds less a 20% administrative charge will be given until 30 days before the start date of the course. If the cancellation notice is received less than 30 days from the start date of the course, a credit towards a future continuing education program would be applied for 1 year from the start date of the canceled course. The Academy reserves the right to cancel or change any programs for due cause. The cancellation of a program by the Academy will result in a full refund of tuition.

**Important Registration Information:**

Registrations will be taken in the order in which tuition checks or credit card information is received. We highly encourage you to register online as these are processed more quickly than mailed registrations. **Full tuition must accompany the registration form in order to confirm your place in this course.** Until you receive your confirmation letter, you are not officially registered for the course. For online registrations, you will receive email confirmation on the same day that you register. For registrations received by standard mail, the confirmation may take up to 3 weeks for processing. If you do not receive confirmation within this period, please call 312-238-6042. **One week prior to the course, only internet registrations that include an email will be accepted.** Please note that once the course has reached its maximum enrollment, no additional spots will become available.
Technology Requirements:

To participate, you will need access to a computer with an internet connection. High-speed broadband access (LAN, Cable or DSL) is highly recommended.

- Internet connection: broadband wired or wireless (3G or better)
- Web browser:
  - Apple Safari: Latest stable version
  - Google Chrome: Latest stable version
  - Mozilla Firefox: Latest stable version
  - Microsoft Edge: Latest stable version
- JavaScript and Cookies enabled
- Speaker or headset to listen to audio files and participate in Zoom calls
- Do NOT use Internet Explorer, as it is not supported.

Accessibility:

Please contact the Academy if you require any special accommodation for this course.

Continuing Education Credit:

Early Intervention: The Illinois Early Intervention Training Program has been approved for this event for EI credential credit in the area of 2.0 – Assessment, 3.0 - Atypical Development, 33.0 – Intervention, 1.5 - Typical Development

Physical Therapy: This course has been approved by the Illinois Physical Therapy Board for 39.5 Contact Hours (22.0 Hours Self-Study 17.5 Live). Approval #216-000069

The Shirley Ryan AbilityLab is recognized by the New York State Education Department's State Board for Physical Therapy as an approved provider of physical therapy and physical therapist assistant continuing education. This 9-week course has been approved for 39.5 Contact Hours (22 Hours Self-Study, 17.5Live).

The following states require continuing education units with no state-specific approval: CT, IA, and WA

Orthotics: This program has been approved for up to 39.5 scientific credits through the American Board for Certification in O&P (ABC) for Orthotists, Orthotic Assistants, Orthotic Technicians, and Orthotic Fitters and Pedorthists. Full participation in this program is required to be eligible for the full amount of credits.

Faculty Disclosures:

Elaine Owen has no relevant financial or non-financial disclosures
Register online at [https://www.sralab.org/PedsGait23](https://www.sralab.org/PedsGait23) or complete the form below and return with payment.

Mail to: Academy
Shirley Ryan AbilityLab
355 E. Erie Street, Suite 12-West
Chicago, Illinois 60611

Check One:  Live ________  On-Demand _________

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Questions? Contact Melissa Kolski, at mkolski@sralab.org and 312-238-7731.

Please TYPE or PRINT your name and professional initials (MD, OT, PT, RN, etc.) as you would like them to appear on your continuing education certificate.

First Name _______________________________ Last Name _______________________________

Home Phone (___________) ___________________________ Prof. Initials ___________________________

Home Address ________________________________
City________________________________ State________ Zip_____________________

Organization/Facility ________________________________

Work Address ________________________________
City________________________________ State________ Zip_____________________

Work Phone (___________) ___________________________ Fax (___________)

Position ________________________________

E-mail (required) ________________________________

Please note: registration will not be processed without full payment.

Method of Payment:  
☐ Check enclosed (Payable to: Shirley Ryan AbilityLab)
☐ Credit Card

Credit Card Users Must Complete the Following Information:

☐ MasterCard  ☐ VISA  ☐ American Express

Credit Card # ___________ - ___________ - ___________ - ___________
Expiry Date __ / ____  CVV __ __ __ (security code on back of card)

Name on Card ________________________________

Billing Address ________________________________
City________________________________ State________ Zip_____________________