IC 26 - LINKING STRUCTURE AND FUNCTION: DOSING PARAMETERS AND PROTOCOLS FOR CURRENT AND NOVEL THERAPIES TO IMPROVE MUSCLE AND BONE OUTCOMES IN CEREBRAL PALSY
Authors: Noelle G. Moreau, PT PhD; Robyn K. Fuchs, PhD; Mary E. Gannotti, PT PhD

Level: Intermediate
Purpose: To review the current state of the science for interventions that target muscle and bone for people with cerebral palsy (CP); and to identify effective dosing parameters for frequency, volume, duration, intensity, and movement speed.
Target Audience: Pediatricians, physical and occupational therapists, orthopedic surgeons
Course Summary: Rehabilitation strategies vary greatly due to vast differences in the dosing of interventions. This course will explore the state of the science in dosing as it relates to children with CP for the musculoskeletal system. The speakers will place an emphasis on treatment strategies with established criteria for dosing—including frequency, volume, duration, intensity, and movement speed—with a focus on structural and functional changes of muscle and bone. Plasticity and recovery outcomes will guide the clinical discussion on how to use targeted interventions by applying the best available evidence. Minimal and optimal dosing parameters will be discussed.
Learning Objective 1: Evaluate current interventions and their potential to influence structural changes in muscle and bone in children with CP.
Learning Objective 2: Differentiate between levels of evidence of effective interventions for muscle and bone adaptation.
Learning Objective 3: Analyze what we currently know regarding dosing parameters and protocols for improvements in muscle and bone structure and function.
Learning Objective 4: Integrate the knowledge of dosing parameters from evidence-based research with clinical expertise.

IC 27 - EMERGING ROLE OF DEEP BRAIN STIMULATION IN DYSTONIC CEREBRAL PALSY
Authors: Warren A. Marks, MD; Eric Levey, MD; Alec Hoon, MD

Level: Intermediate
Purpose: To explain the emerging role of deep brain stimulation in the treatment of medically refractory dystonia due to cerebral palsy.
Target Audience: Physicians, therapists and nurses involved in treating children and adults with cerebral palsy.
Course Summary: As a background, there will be a review of the pathophysiology and classification of cerebral palsies, with an emphasis on the dystonic component. Dystonia will be defined so that participants will be better able to differentiate spasticity form dystonia. This is increasingly important as more specific treatment options for each form of hypertonia become more widely accessible. The basal ganglia play a central role in the pathophysiology of extrapyramidal movement disorders. Understanding the structural and neurochemical pathways of the basal ganglia are vital to understanding dystonia and potential treatment options. Pharmacologic options for dystonia will be reviewed. Direct stimulation of the basal ganglia is emerging as a treatment option for various forms of medically refractory dystonia, including dyskinetic cerebral palsy. The evolving role of DBS in the treatment of cerebral palsy will be explored, including outcomes and challenges.
Learning Objective 1: To understand the different types of abnormal tone that can be part of the cerebral palsy.
Learning Objective 2: To understand the central role of the basal ganglia in the pathophysiology of cerebral palsy.
Learning Objective 3: To have a basic understanding of how deep brain stimulation works.
Learning Objective 4: To understand the emerging role of neuromodulation (deep brain stimulation) in the treatment of dystonia due to cerebral palsy.
IC 28 - SUBJECTIVE VERSUS OBJECTIVE EVALUATIONS FOR LOWER LIMB ORTHOTIC PRESCRIPTION: BELIEFS VS. EVIDENCE AND THE LABORATORY VS. PATIENT ENVIRONMENT

Authors: Marcie Ward, MD; George Gent, CPO; Sue Sohrweide, PT

Level: Intermediate
Purpose: To explore and compare the benefits and limitations in subjective clinical evaluation of patients and objective gait analysis when determining ideal orthotic prescription.
Target Audience: Physicians, orthotists, and therapists who prescribe, provide or recommend lower limb orthotics for their patients.
Course Summary: Orthotic prescription is typically a subjective decision. Function goals and alignment goals can conflict. Physicians, therapists, and orthotists may differ in their opinions regarding the type of orthotic to provide. Gait and motion analysis offers some objective evidence to guide this decision making. This course will review some of the available literature guiding orthotic prescription including consensus recommendations and how to apply them clinically. The available information gait analysis provides will be discussed to highlight some pros and cons of various orthotic designs in a few commonly treated gait patterns. Case studies will illustrate patients in whom orthotics may or may not be of benefit. The audience will choose by electronic audience response system the type of orthotic they would recommend based on first physical exam data, second after the addition of gait video, and finally when gait data is added. Discussion will also include patient care needs and goals that may influence the final orthotic that is provided.

Learning Objective 1: Discuss typical alignment and functional goals in orthotic prescription.
Learning Objective 2: Review the available literature guiding orthotic prescription.
Learning Objective 3: Explore gait analysis data for evidence suggestive of improved function and/or alignment with the application of orthotics.
Learning Objective 4: Consider the short-term and long-term goals in orthotic prescription and how patient goals and compliance influence prescription choice.

IC 29 - NEUROPLASTIC RESPONSES TO REHABILITATION IN CHILDREN AND INFANTS WITH CEREBRAL PALSY

Authors: Jill Heathcock, MPT PhD; Andrew Gordon, PhD; Thubi Kolobe, PT PhD; Laura Prosser, PT PhD

Level: Intermediate
Purpose: This course will present the state of the science in rehabilitation and dosing as it relates to children with Cerebral Palsy and includes two main topic areas: 1) current and novel rehabilitation protocols, and 2) brain plasticity specific to dosing and early brain injury. This workshop will help attendees integrate evidence on neuroplastic adaptations to rehabilitation into their clinical practice.
Target Audience: Physicians, occupational and physical therapists, speech and language therapists, nurses
Course Summary: Using the ICF model this course will familiarize the participant with the current research on the responses of the brain to pediatric neurorehabilitation. An emphasis will be placed on rehabilitation with known efficacy and established criteria for dosing including frequency, intensity, type of treatment, and timing. A focus will be on structural and functional changes in the context of lower and higher intensity protocols. Plasticity and recovery outcomes will guide the clinical discussion on how to use targeted interventions by applying best available evidence. Minimal and optimal dosing parameters will be discussed. The format for this session will include lecture and interactive discussions between presenters and attendees. The multidisciplinary panel consisting of researchers and clinicians will also guide workshop attendees through case examples that focus on plasticity and rehabilitation.

Learning Objective 1: To evaluate current interventions and their potential to influence structure-behavior change in children with CP.
Learning Objective 2: To evaluate dosing parameters and their potential to change brain structure and function.
Learning Objective 3: To apply relevant pediatric neurorehabilitation evidence to functional outcomes in infants and children.
Learning Objective 4: To integrate knowledge of brain plasticity and recovery in the context of clinical guidelines.
IC 30 - SALIVA CONTROL IN CEREBRAL PALSY: MULTIDISCIPLINARY MANAGEMENT AND RESEARCH FINDINGS FROM THE AUSTRALIAN AND DUTCH DROOLING TEAMS

Authors: Dinah Reddihough, MD; Karen van Hulst, MSc; Jan van der Burg, PhD; David Chong, FRACS

Level: Intermediate

Purpose: The objectives of this workshop are to - 1. Describe the assessment process and the interventions that are recommended for poor saliva control. 2. Present the results of research into assessment, behavioural strategies, the effectiveness of medication, botulinum toxin injections and saliva control surgery.

Target Audience: Physicians, dentists, speech and language therapists, occupational and physiotherapists, nurses, psychologists, teachers

Course Summary: Drooling impedes socialization, interpersonal relationships, and integration into school and community life and may limit employment options in adults. Saliva control clinics in Australia and the Netherlands have adopted a hierarchical approach to the treatment of drooling, from the least to the most invasive. The assessment of the child with saliva control problems (anterior and posterior drooling), including the available clinical and research tools, will be discussed with the role played by each multidisciplinary team member. The research evidence underlying the various management options will be presented along with information as to how treatment is selected for the individual child.

Learning Objective 1: To understand the factors that impede saliva control.
Learning Objective 2: To gain knowledge about the various assessment tools that are available and the issues to be considered when assessing children with saliva control problems including oral health, concomitant medications and child / family factors.
Learning Objective 3: To understand the treatment options: behavioral, speech pathology management techniques, medication, botulinum toxin, palatal appliances, surgery.
Learning Objective 4: To develop an appreciation of the research evidence for the various approaches.

IC 31 - CEREBRAL PALSY, NEUROGENIC BLADDER AND OUTCOMES OF LIFETIME CARE

Authors: Kevin P. Murphy, MD; Jenna Katorski, CNP; Charles Durkee, MD

Level: Intermediate

Purpose: To create awareness, basic understanding and skill in the diagnosis and treatment of symptomatic neurogenic bladder in children and adults with cerebral palsy (CP).

Target Audience: Physicians, nurses, physical, occupational and speech therapists.

Course Summary: Urinary incontinence has been identified as a problem in people with CP. Multiple studies have shown neurogenic bladder (NB) to be a common cause of incontinence in the population of people with CP present in over 16% of those symptomatic. Many other causes of incontinence are present in addition to NB in this population and need to be identified for proper intervention and optimal outcome. This problem of young and old, often neglected but easily treated, has a 90% success rate of achieving continence in selected individuals with conservative care. The course will focus on identifying those individuals needing appropriate diagnosis and care both medical and surgical. Nursing interventions will be discussed including specialty catheterization techniques, lifespan care protocols and basic computerized urodynamic studies. A surgical discussion will include review of bladder augmentation, urinary and ureteral diversion and the Mitrofanoff procedures. Case examples will be presented in the final segment.

Learning Objective 1: To list multiple causes of urinary incontinence in people with CP across the lifespan.
Learning Objective 2: To identify the appropriate individual with CP most capable of achieving urinary continence within a functional toileting environment (FTE).
Learning Objective 3: To display a basic understanding of urodynamic testing, catheterization techniques, medications and protocols of care as it relates to the individual with CP.
Learning Objective 4: To appreciate the surgical urology options of care for the individual with CP including, bladder augmentation, ureteral and urinary diversion and the appendicovesicostomy (Mitrofanoff) procedures.
Instructional Course 32 has been moved to Thursday, October 17, 2013 2:00 pm – 4:00 pm

IC 32 - USE OF GAIT ANALYSIS IN SURGICAL TREATMENT PLANNING FOR PATIENTS WITH DEVELOPMENTAL DISABILITIES
Authors: Robert M. Kay, MD; Deirdre Ryan, MD; Susan Rethlefsen, PT DPT

Level: Intermediate
Purpose: To educate attendees in use of gait analysis for evaluation and treatment planning for children with developmental disabilities.
Target Audience: Physicians, physical and occupational therapists
Course Summary: Faculty will introduce attendees to computerized gait analysis data collection and interpretation. They will discuss how data are used in planning for surgical and non-surgical intervention in children with CP and myelomeningocele. Discussion will focus on common clinical problems and ways gait analysis alters treatment plans. Content will be based on the presenters’ clinical expertise and evidence-based review of literature. Computerized gait data, videos, photographs and x-rays will be used. Attendees will participate in breakout sessions in which gait data will be interpreted and treatment plans determined for sample cases.
Learning Objective 1: List common gait problems in CP and myelomeningocele.
Learning Objective 2: Identify deviations on joint kinematic, kinetic and EMG plots.
Learning Objective 3: Outline a treatment plan for a child with CP or myelomeningocele using gait analysis data.
Learning Objective 4: Gain perspective on the complexity of evaluation and treatment planning for children with developmental disabilities.

IC 33 - TOE WALKING: HOW DO YOU KNOW WHO TO WORRY ABOUT?
Authors: Kristan A. Pierz, MD; Sylvia Ounpuu, MSc

Level: Basic
Purpose: The purpose of this course is to describe the many variations of toe walking to help clinicians understand the diversity of presentation, underlying diagnoses, and treatment options.
Target Audience: Physicians, mid-level practitioners, physical therapists, orthotists, kinesiologists, and others who are interested in a more detailed understanding of toe walking and how to assess for underlying diagnoses.
Course Summary: Toe walking is frequently seen in childhood. Although the idiopathic version is common, caregivers need to be aware of underlying, often subtle, etiologies that warrant evaluation and timely treatment. This course will begin with a selection of videos of patients who toe walk followed by a brief review of disorders that may result in toe walking (e.g. spasticity/cerebral palsy, weakness/hereditary sensory motor neuropathies, limb asymmetry/leg length difference/hip dysplasia/joint contractures/tumors, sensory integration disorders, and idiopathic/habitual patterning). The course will provide an overview of the comprehensive assessment of toe walking including the following: visual/video analysis, physical exam, kinematics, and electromyography (EMG) and how each of these components can support or refute differential diagnoses. The initial cases will then be examined in more detail, focusing on the gait parameter differences. Clinical exam findings, sagittal plane ankle/knee/hip/pelvis kinematic profiles, and EMG data will be used to support or refute different diagnoses and treatment options.
Learning Objective 1: Be familiar with the limitations of assessing toe walking by observation alone.
Learning Objective 2: Be familiar with many of the underlying diagnoses associated with the clinical presentation of toe walking.
Learning Objective 3: Be familiar with the components of computerized gait analysis relevant to toe walking.
Learning Objective 4: Be aware of “red flags” or gait features of toe walkers that warrant additional evaluation or treatment.

IC 34 - REVIEW OF NEUROPHARMACOLOGY IN PEDIATRIC BRAIN INJURY
Purpose: This course will present a review of the literature and current practices regarding the use of neuropharmacologic agents in the treatment of children with moderate to severe acquired brain injuries (ABI).

Target Audience: Physicians, physician assistants, advanced practice nurses, occupational and physiotherapists, speech and language pathologists, nurses

Course Summary: A 2010 study estimated that the number of hospitalizations for Traumatic Brain Injury in children ages 0 -14 years was just over 35,000 annually. Over the past several years there has been increasing use of pharmacologic agents as adjuncts to the rehabilitation of these individuals. Though most of the limited number of clinical studies that have been performed to date have been performed in the adult population these medications are increasingly finding their way into pediatric usage. This course will provide a review of existing literature on this topic and provide a framework for the judicious use of these agents in clinical settings.

Learning Objective 1: To become aware of the array of neuropharmacologic agents which have been utilized to augment the rehabilitation of children with ABI's.

Learning Objective 2: To review the available literature on neuropharmacology in ABI including ratings of Level of Evidence.

Learning Objective 3: Become familiar with a clinical framework for the judicious use of these medications in children with ABI.

Learning Objective 4: Become familiar with those areas of neuropharmacology in ABI requiring further study.

Level: Intermediate

Purpose: This course aims to improve knowledge of age-appropriate treatment of young people with childhood onset disability. We will share expertise from The Netherlands and Canada on interventions to promote self-management capabilities of adolescents and young adults with disabilities.

Target Audience: Health care professionals working with youth and adults with childhood onset disabilities or interested in effective transition programs.

Course Summary: Youth with childhood onset disabilities often experience poor healthcare and a delayed transition to adulthood in several life areas. A key element for young people with a disability is to learn how to self-manage their health and their life. In the presentation of The Netherlands we will share our experience with a modular transition program with a special focus on self-management and autonomy. We will present our novel intervention 'Manage Your Life', which provides training of self-management skills in young adults and the Rotterdam Transition Profile (RTP). The Canadian presentation will draw on the ongoing 4-year Transition to Adulthood with Cyber Guide Evaluation (TRACE) study that entails innovative transition resources for youth with chronic health conditions. The TRACE study investigates the use of two transition resources designed to promote self-care management: the Youth KIT® and an online Transition Coordinator.

Learning Objective 1: To learn about models of transitional care in The Netherlands and in Canada.

Learning Objective 2: To learn methods to promote self-management of young people with disabilities.

Learning Objective 3: Illustrate the application of the RTP for goal setting.

Learning Objective 4: To learn from lived experiences of youth and caregivers.

Level: Intermediate

Purpose: The purpose of this course is to provide information and procedures for conducting The CVI Range; a reliable and valid evaluation that determines the degree of affect of CVI in individuals 6 months- 21 years of age.
Target Audience: Pediatric medical providers, therapists and parents
Course Summary: This course will provide content that will enable participants to learn the principles and procedures for conducting The CVI Range. The CVI Range (Roman, 2007), is a functional vision assessment used to determine the degree of affect of cortical visual impairment. The CVI Range results place the individual's level of CVI on a 0-10 scale and that numeric range can also be used to guide intervention strategies. The presentation will include observation, interview and direct assessment methods used to obtain the range score. The CVI Range is designed to investigate the unique visual and behavioral characteristics associated with CVI. These characteristics are the defining elements used to describe and define cortical visual impairment. The CVI Range is a valid and reliable assessment (Newcomb, 2010) and produces stable information about visual functioning. Improvements in the functional vision of individuals with cortical visual impairment is expected to improve; The CVI Range provides a consistent method to monitor improvements and to guide intervention strategies to facilitate future improvements. This presentation will present results of several studies that have evaluated the validity of The CVI Range and use of The CVI Range in clinical and educational settings. Video sample of individuals conducting The CVI Range will be used in this Instructional Course. Participants will be provided with an opportunity to complete and score The CVI Range via video assessment experience.

Learning Objective 1: Participants will be able to identify the unique visual and behavioral characteristics associated with CVI.
Learning Objective 2: Participants will be able to conduct assessment techniques associated with use of The CVI Range.
Learning Objective 3: Participants will be able to determine the level of CVI across a range from little or no visual functioning (score of zero) to near age-typical visual functioning (score of 10).
Learning Objective 4: Participants will be able to increase understanding of the research associated with the use of The CVI Range.

IC 37 - THE FRAMEWORK OF MOVEMENT: UPDATING THE EVIDENCE ON ANTICIPATORY POSTURAL CONTROL IN CHILDREN WITH CEREBRAL PALSY AND IMPLICATIONS FOR PRACTICE
Authors: Gay L. Girolami, PT PhD; Deborah Gaebler-Spira, MD

Level: Intermediate
Purpose: This instructional course is designed to review the importance of postural control for function and participation and to update the evidence on the internal and external actions which elicit the need for feed forward (anticipatory) postural control and to present applications for clinical practice.
Target Audience: Physical therapists, occupational therapists, physiatrists, pediatricians, orthopedic surgeons
Course Summary: This instructional course will describe the importance of postural control and the prognostic implications for participation for children with cerebral palsy (CP). A review of the recent evidence on anticipatory postural adjustments (APAs) in children with typical development and CP will deepen the participants’ understanding of postural control. Application of the research evidence to clinical practice and ideas for treatment based on the research will also be presented.
Learning Objective 1: The participants will be able to describe the importance of postural control and the prognostic implications for function and participation in children with CP.
Learning Objective 2: The participants will be able to explain how impaired postural control can impact all aspects of the ICF model.
Learning Objective 3: The participants will be able to discuss activity and participation implications of altered APAs and strategies to improve these postural mechanisms in children with CP.
Learning Objective 4: Based on the evidence presented, the participants will be able to design treatment strategies addressing deficits in feed forward postural control in infants and children with neurological conditions.

IC 38 - FITNESS - FUN - FRIENDS - THE POTENTIAL OF ADAPTED PHYSICAL ACTIVITY
Authors: Tor Erik H. Nyquist, Master; Reidun Jahnsen, PT PhD; Astrid J. Nyquist, PhD

Level: Intermediate
Purpose: This course will look at potential benefits to persons with disabilities by being introduced
to/participating in adapted physical activities, like; enhancement of basic skills, fitness, empowerment and motivation for “Active Living.”

**Target Audience:** Multidisciplinary - anyone with interest in adapted physical activity

**Course Summary:** The course is mainly based on experiences from Beitostølen Healthsport Center (BHC). BHC is a pioneer institution within rehabilitation in Norway, recognized as an official part of the national specialist health service system in physical medicine and rehabilitation. Over a long period of time there has been research cooperation with the Norwegian School of Sport Sciences. A result of this cooperation are two PhD dissertations with the themes “Physical Activity and Motivation in young adults with a physical disability” (Saebu 2011) and “I can participate! Children with disabilities and participation in physical activity - a mixed methods study in a habilitation context” (Nyquist 2012). Earlier research at BHC resulted in the program: “The Local Environment Model” (Nyquist 2007), focusing on transfer of learned skills to the home environment. This model is implemented in the programs at BHC and are made use of by professionals and families around the country in cooperation with BHC.

**Learning Objective 1:** To learn about different programs at BHC with the purpose of enhancing learning and motivation of children with disabilities to actively participate in physical activities.

**Learning Objective 2:** Clinic - research and return. To discuss how systematic clinical work can become a source for research, which can generate knowledge that can be brought back to the clinic.

**Learning Objective 3:** To discuss certain instruments that can document participation, which is the ultimate goal of a stay at BHC.

**Learning Objective 4:** To reflect upon, and discuss, topics related to the presentations and own experiences.