Neuroplasticity

Health care providers are facing greater time restrictions to render services to the individual with neurological dysfunction. However, the scientific community has recognized that the dynamic capacity of the central nervous system (CNS) is far greater than previously thought. The tremendous potential for CNS reorganization and recovery is being realized. Intervention strategies designed to help patients access this potential for recovery while engaging in functional task practice will help in meeting these two opposing challenges. This webinar will explore research in neuroplasticity and consider important parameters of intervention known to induce both brain and behavioral recovery in individuals with neuropathological disorders.

Objectives
1. To review scientific and clinical literature related to recovery of function after neurologic insult due to traumatic, vascular, and degenerative processes.
2. To identify how behavioral compensation can limit brain recovery.
3. To name practice parameters that can be manipulated in order to induce neuroplasticity and behavioral recovery.
4. To understand mechanisms underlying neuroplasticity from cellular to systems level analyses.
5. To learn about various forms of measuring neuroplasticity in animal models of neuropathology and in healthy humans as well as individuals with neuropathological disorders.

Differential Diagnosis

Objectives
1. Discuss a conceptual framework to establish links between health condition, body structure and function, activity and participation limitations for individuals with neurologic related diagnoses.
2. Describe components of a neurologic examination.
3. Identify the presence of special concerns related to the nervous system.
4. Hypothesize neuroanatomic lesion locations based on subjective history and objective examination data.
5. Apply a hypothesis-driven reasoning strategy to formulate a list of probable pathological causes of an individual’s chief concern and movement dysfunction.
6. Determine appropriate course(s) of action based on hypothesized lesion locations and probable causative pathologies.
7. Integrate clinical judgment and external evidence to determine a patient’s appropriateness for physical therapy.

Normal Gait

The purpose of this webinar is to provide the details of normal gait in preparation for effectively evaluating and treating pathologic gait. The instructors will provide the framework for observational analysis of gait by addressing the components of normal gait including muscle activity, joint motions, torque and critical events essential to achieving normal gait at each phase of the gait cycle.

Objectives
1. Identify the components of normal gait including gait cycle, phases, functional tasks and critical events.
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2. Identify and describe the significance of normal joint positions, muscle activity, torque demand and functional accomplishments for each phase of gait
3. Develop a framework for systematic observational gait analysis based on a foundational understanding of normal gait

Evidence Based Practice
Introduces critical resources for the evidence-based neurologic physical therapist. Learn where and how to look for the best available evidence to inform neurologic practice. Learn how to develop an EBP technology profile to stay current as evidence for neurologic practice evolves.

Objectives
1. Define EBP and describe how it can be realistically integrated into everyday practice
2. Write a focused clinical question to support efficient searching
3. Use widely available databases to quickly access relevant research evidence
4. Develop a technology profile for EBP

Motor Control
Commonly, data gathered from the neurologic exam represents the clinicians' assessment of impaired 'motor control.' Limitations with respect to the utility of this perspective for developing interventions aimed at improving motor control in individuals with neuropathology will be highlighted. Instead an alternative representation of the field of motor control and potential translation of this basic science research to clinical practice will be presented. Reach and Grasp, Locomotion and Postural Control are three key areas of research in the field of motor control. These are also functions that are severely affected in a variety of neurological disorders. Limitations in the use of the upper extremity, in postural control and in locomotion represent profoundly disabling problems for individuals with neurological disorders. Effective intervention can be developed through an understanding of guiding principles derived from basic motor control research. In this webinar hypotheses with respect to clinical intervention that will promote improved motor control in each of these three areas will be presented.

Objectives
1. To identify and discuss the relevance of motor control research in reach and grasp to neurorehabilitation
2. To identify and discuss the relevance of postural control research to neurorehabilitation
3. Learn intervention strategies to improve both reactive and anticipatory postural control strategies
4. To identify and discuss the relevance of motor control research in locomotion to physical therapy practice
5. To understand the limitations in interpreting the results of the neurologic exam as the assessment of motor control deficits in individuals with neuropathological disorders

Motor Learning Principles

Objectives
1. Participants will be able to summarize research addressing the added value of expectations and choice in motor learning.
2. Participants will be able to identify at least three ways in which physical therapists can strengthen patients' learning and engagement through competence enhancement and provision of choices.

**Pediatrics**

The purpose of this webinar is to present key information (e.g. etiology, incidence, clinical signs, and differential diagnosis) and discuss current evidence-based interventions of the common pediatric neurological conditions that the residents may encounter (e.g. cerebral palsy and autism).

Objectives: Upon completion of this webinar, the resident will be able to:

1. Discuss key information (e.g. etiology, incidence, clinical signs, and differential diagnosis) related to cerebral palsy and autism spectrum disorder.
2. Design treatment goals and interventions for children and adolescents with cerebral palsy and/or autism spectrum disorder.
3. List impairments often associated with cerebral palsy and autism that might present unique challenges to the physical therapist.

**Electrophysiology**

**Pharmacology**

Pharmacologic interventions are the mainstay of medical treatment for a variety of neurologic conditions. Although many of these medications are effective in ameliorating symptoms and controlling progression of neurologic disease, side effects and complications of therapy can limit their effectiveness and lead to functional impairments, worsening disability and difficulty participating in therapy. The relatively long periods of time rehabilitation therapists spend with patients provides them a unique vantage point to evaluate the effectiveness of medical therapy and provide feedback to the referring providers on both the impact of medical therapy on function, and on the complications of therapy. Rehabilitation therapists are also in a strong position to recommend non-pharmacologic interventions that may meet the same goals without adverse effects. To effectively take on this role, rehabilitation therapists need a foundation of knowledge in basic pharmacology, neuroscience and neuropharmacology. The speaker will review the principles of basic pharmacology as well as the pharmacologic basis of neurologic disease and the mechanisms of drugs used to treat these diseases. Case discussions will provide the opportunity for participants to review and apply this knowledge in real clinical scenarios.

- Understand the basic mechanisms and clinical relevance of drug-receptor interactions
- Identify the common modes of drug administration, absorption and excretion
- Recognize the role of drug therapeutic index in dosing and risks for toxicity
- Describe the practical and physiologic challenges of prescribing drugs to an aging population
- Recognize the names of the prototypic and commonly used medications used to treat neurologic disease
Webinar Course Descriptions and Objectives

• Briefly explain the mechanisms of action of these drugs and their relationship to disease pathophysiology

• Identify common side effects of these medications and the potential implications on patient rehab

• Apply knowledge of pharmacologic and non-pharmacologic interventions to solve real-world clinical problems

Vestibular I
Review of the anatomy and physiology of the vestibular system followed by an overview of common conditions that affect the vestibular system and how patients with these conditions present in practice.

Objectives
1. Link peripheral and central vestibular anatomic structures to common diagnoses of vestibular dysfunction.
2. Recognize impairments, functional limitations, and potential for recovery associated with common conditions of vestibular dysfunction.

Vestibular II
Introduction to examination and evaluation of patients who have dizziness and disequilibrium followed by an introduction to the fundamental interventions used in vestibular rehabilitation.

Objectives
1. Describe the components of an examination for persons with dizziness and disequilibrium.
2. Interpret the results of a physical therapy examination for persons with dizziness and disequilibrium.
3. Describe the underlying principles of vestibular rehabilitation with respect to canalith repositioning and adaptation, substitution, and habituation exercises.

Cerebellar Rehabilitation
This course is designed to assist participants in applying neuroscience knowledge and motor control principles to the physical therapy examination, assessment, and treatment of individuals with cerebellar damage. The role of the cerebellum in predictive motor control and motor learning is emphasized. Learning is facilitated through lecture, discussion, case examples, and videos.

Objectives
1. Analyze the role that the cerebellum plays in the control of voluntary limb movements, gait, and balance.
2. Describe the typical causes of cerebellar damage
3. Summarize the types of movement control problems, sensory and perceptual deficits observed in persons with cerebellar damage
4. Understand and describe the clinical signs of cerebellar ataxia
5. Explain how cerebellar damage affects motor learning and adaptation
6. Based on the evidence, describe the “key ingredients” of a rehabilitation program to
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- Improve function in patients with cerebellar damage
- Understand the rationale behind the use of splitbelt treadmill training in understanding locomotor adaptability

Locomotor Principles

Locomotor training (LT) is one example of a task-specific training strategy to promote recovery of walking function. Several variations of LT exist in current clinical practice, and there is decided controversy regarding both the optimal training approach and the target outcomes. Locomotor training has its foundation in principles of activity-dependent neural plasticity and was originally developed for rehabilitation of individuals with incomplete spinal cord injuries and stroke. Limited work has addressed its utility in other populations such as people with traumatic brain injury and cerebral palsy. As evidence continues to emerge, LT will likely continue to develop as a possible “tool” in a therapist’s “toolbox”. This webinar will advance participants’ understanding of both the current evidence and controversies relevant to promoting locomotor recovery in patients with neurological disorders. Key variables in an effort to understand the "active ingredients" of effective therapeutic interventions will be examined.

Objectives
1. Provide a framework for clinical decision-making as it pertains to locomotor rehabilitation.
2. Consider current controversies regarding current approaches to locomotor rehabilitation, including body-weight support systems and approaches to guidance.
3. Compare and contrast different approaches to locomotor training
4. Identify the urgent clinical questions regarding locomotor training.
5. Identify barriers and solutions to implementing current concepts, principles, and evidence in clinical practice.

Contemporary Management of Parkinson’s Disease

Parkinson disease is considered a chronic health condition which must be successfully managed over the course of the disease. Despite advances in medical management, patients with Parkinson disease experience a decline in quality of life and physical function over the course of the disease. There is a growing body of evidence revealing the benefits of physical therapy and exercise in improving participation, activity limitations and impairments of body structure and function in people with Parkinson disease. This webinar will begin with differential diagnosis and pharmacological/surgical intervention. An evidence-based approach to examination, diagnosis, prognosis and intervention will follow. Responsiveness of commonly used outcome measures will be discussed. The most current research supporting specific elements of treatment will be highlighted – including the use of external cueing, treadmill training, cardiovascular fitness training, strengthening and balance training.

Objectives
1. Compare and contrast the signs and symptoms associated with typical and atypical Parkinsonism
2. Categorize the types of pharmacological treatments for PD and explain their mechanism of action
3. Explain the how fluctuations in status associated with PD impact PT intervention
4. Summarize the evidence supporting the benefits of PT for people with PD
5. Justify the benefits of physical therapy intervention to persons with PD, other health care providers and to 3rd party payers based on the evidence from the literature
6. Appraise commonly used outcome measures for evaluating person with PD
7. Evaluate which outcome measures to implement considering disease stage and clinical presentation
8. Describe the key elements of treatment that may be necessary to promote a neuroprotective effect
9. Select and apply evidence-based therapeutic interventions to improve cardiovascular fitness, flexibility and strength in persons with PD
10. Select and apply treatment strategies to improve postural instability, freezing of gait and mobility deficits
11. Explain the relevance of physical therapy for people with PD across the continuum of care starting with early through moderate and advanced PD

**Exercise-induced brain changes (neuroplasticity) in Parkinson’s Disease**

The brain’s capacity for recovery from damage is far greater than previously recognized. It is now understood that neuroplasticity can be facilitated through experience including environmental enrichment, exercise, forced-use, and complex skills training. Most of our understanding of this recovery, termed experience-dependent plasticity is derived from animal models of stroke and spinal cord injury, but there is now evidence that the same phenomenon occurs in animal models of Parkinson’s disease (PD). Animal models of stroke and spinal injury have led to successful human trials and the development of specific interventions to develop neuroplasticity and behavioral recovery. Most PD physical intervention studies in the past have promoted compensation and training individuals with PD to use compensatory strategies to achieve functional outcomes. This approach to intervention stems from the assumption that in the case of a neurodegenerative process as exists in PD, there is no potential for recovery. A significant challenge to this assumption has come with the demonstration of experience-dependent behavioral recovery and neuroplasticity in animals with basal ganglia injury (model of PD) that undergo intensive treadmill exercise or forced-use of the affected limb. An indication that this phenomenon of neuroplasticity and recovery extends to humans with PD has come with recent intervention studies and is turning the attention of the field on determining the potential disease-modifying effects of physical therapy intervention.

**Objectives**

1. Participants will identify the neuroanatomical structures of the Basal Ganglia
2. Participants will describe basal ganglia physiology and circuitry important for motor control
3. Participants will describe the underlying neurochemical and morphological mechanisms that govern neuroplasticity in the injured basal ganglia
4. Participants will explain the role of physical therapy intervention in promoting neuroplasticity and behavioral recovery in individuals with stroke and Parkinson’s disease.
5. Participants will distinguish between intervention strategies for Parkinson’s disease that are currently being tested in clinical trials and relate them to clinical practice
6. The participant will be able to design a treatment plan that demonstrates an understanding of parameters of practice that may induce experience-dependent neuroplasticity in Parkinson’s disease.
Motivational Principles of Rehabilitation

1. Participants will be able to summarize research addressing the added value of expectations and choice in motor learning.
2. Participants will be able to identify at least three ways in which physical therapists can strengthen patients' learning and engagement through competence enhancement and provision of choices.

Innovating change in neurologic rehabilitation: Investigating novel clinical efforts to more effectively induce neuroplasticity.

This will be a cutting-edge look at a different type of EBM - EMPIRICALLY based medicine in the neurologic rehabilitation clinic. This webinar will showcase the tried and true attempts at forcing changes in patients using applications that have a basis in evidence, yet are not currently in practice (yet). If you dare to be challenged to think critically, you will want to attend this webinar.

Objectives
1. Attendees will be proficient in analyzing clinical applications to determine merit based on current evidence and understandings of neuroplasticity.
2. Attendees will be able to state how to utilize objective measures in the examination and re-examination of a patient in an effort to determine the efficacy of an intervention for each patient as their own case study.
3. Attendees will be able to critically appraise interventions in neurologic rehabilitation, individualizing their merit based on the condition being treated.

Innovations in Neuro-Rehab

Technology in the 21st century is advancing healthcare at lightning speeds. To the practitioner, the constantly evolving technology can be overwhelming. This course serves to introduce students to digital technologies that can be used in neuro rehabilitation including the classroom, lab and clinical setting. Students will be provided with broad scope introductions to robotics, apps, and games for use in rehabilitation

Objectives:
1. Demonstrate knowledge of technologies used in rehabilitation
2. Learn how to evaluate games, apps and technologies for use in rehabilitation
3. Learn how to access the app store, search for games, and read reviews
4. Learn about how robotics can be used in rehabilitation
5. Demonstrate knowledge and understanding of how to use digital technology in rehabilitation.

Wheelchair Seating & Positioning

Persons with disabilities have a need for standard and custom seating and positioning devices. This webinar will review the key elements needed for a comprehensive seating evaluation and the current tools available for assessment. Case studies will be used to identify which devices (wheelchairs, cushions, backrests and other accessories) are appropriate for individuals based on their function, impairments, environment and goals.

Objectives
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1. Identify the key elements of performing a comprehensive seating evaluation
2. Review payment for Durable Medical Equipment
3. Explain the relationship between vendors and health care professionals
4. Understand how to adapt seating and positioning based on common orthopedic changes.
5. Understand the role of pressure mapping; common causes of pressure sores and available seat cushions
6. Describe the different categories of manual wheelchairs
7. Describe the different categories of powered mobility

Aging with a Disability

Persons living long term with a disability often describe themselves as ‘aging prematurely’ as they experience changes in health, function and psychosocial needs earlier in the life course than most able bodied individuals. This webinar will review the common medical, musculoskeletal, functional and psychosocial issues people face as they age with a neurologic impairment and describe the current evidence of the impact of prevention and early intervention activities on these changes.

Objectives:
1. Identify why problems associated with aging with a disability seem more apparent now than in the past
2. Identify common symptoms experienced by persons aging with a disability.
3. Describe the outcomes and clinical application of several intervention studies addressing issues of aging with a disability
4. Gain further understanding of clinical considerations at various points of contact along the life course for persons living long term with a neurologic impairment.

Health & Wellness (will become available)

Ethics

This talk will review our health care values and how they drive our moral decision-making and behavior. It will include a brief historical overview of the landmark cases in health law that have shaped our application of the ethical principles involved in deciding for others, including respecting autonomy and providing a benefit. Interactive case discussions will serve to reflect on and highlight our ethical responsibilities in cases where patients refuse to follow our recommendations and / or discontinue their care.

Objectives
1. Understand how values drive moral decision-making and behavior
2. Define informed consent and competency
3. Differentiate between refusing medical intervention and committing suicide
4. Outline legal framework for understanding ethical principles related to the right to refuse
5. Recognize quality of life judgments made regarding individuals with disability
6. Participate in a discussion of potential evaluative strategies for determining informed consent after acquiring a disability
Documentation & Billing

Effective documentation and accurate billing are essential for success in today’s healthcare market. Medicare standards continue to change and new departments from the federal government to conduct audits continue to appear. This webinar will review current payment and billing methodologies specific to Medicare. Case studies will be used to identify effective documentation for patient care in a variety of settings. Tips and resources for surviving internal audits will also be reviewed.

Objectives
1. Understand payment and billing methodologies specific to Medicare beneficiaries.
2. Identify the appropriate code to bill for each intervention
3. Discuss documentation needs for various areas of practice and review examples
4. Discuss how to best document maximizing: Efficiency, Defensibility, and Payment
5. Identify resources for improving documentation