Moss-Magee Program in Advanced Application of Clinical Technologies for Lower Extremity (MMPAACT for LE)

Individual Session Descriptions

Tuesday, April 16, 2024 – 7:00 to 9:00 PM

Session 1: Live Webinar: Overview of Use of Robotics and Technology in Lower Extremity Rehabilitation
Speakers: Erika Dixon, PT, DPT, NCS, Unique Williamston, PTA, BS, Andrew Packel, PT, NCS
Time: 120 minutes

This session will provide a broad overview of the use of robotics and technology in lower extremity rehabilitation. The Consolidated Framework for Implementation Research (CFIR) will be introduced as a framework in order to comprehensively organize this topic. Within this framework, participants will consider the scope of knowledge required to effectively implement the use of robotics and technology in their own practice or to facilitate wider adoption among peers. This will range from the 1-to-1 patient-clinician interaction during treatment sessions, to considerations at the facility-specific level, to an understanding of the larger field of rehabilitation robotics.

Objectives: At the conclusion of this course the participants will be able to:

1. Recognize the 5 domains of the Consolidated Framework for Implementation Research (CFIR)
2. Identify how the domains of the CFIR can influence the integration of technology in LE rehabilitation.
3. Discuss the scope of considerations for using advanced technologies, from the patient / client interaction to understanding the larger field of rehabilitation robotics.

April 17 – 22, 2024

Independent Study - Worksheet: Learning about Common Technology Used in the Clinic
Leaders: Erika Dixon, PT, DPT, NCS, Kelly Sprik, PT, DPT, Elizabeth Watson, PT, DPT, NCS
Time: 45 minutes

Participants will individually view 7 videos of technology devices and will select 3 devices from the 7 and submit a summary of which patients and patient problems would benefit from those devices. This will allow participants to begin practicing the evaluation of technology and to begin considering its' benefits and applications in clinical care. Session Leaders will review the content and incorporate it into Session 2 Lectures.

Objectives: At the conclusion of this course the participants will be able to:

1. Analyze characteristics of various technology.
2. Discuss patient characteristics and presentation that may benefit from specific technology.
3. Compare and contrast the benefits of different types of technology.

Tuesday, April 23, 2024 – 7:00 to 9:00 PM

Session 2: Live Webinar: The Innovation Domain: Lower Extremity Robotics and the State of the Current Literature
Speakers: Erika Dixon, PT, DPT, NCS, Kelly Sprik, PT, DPT, Elizabeth Watson, PT, DPT, NCS
Time: 120 minutes

This session will provide an overview of the different types of devices and equipment that are used in lower extremity rehabilitation, including different means of categorizing and identifying different devices. A summary of the current

state of the literature and evidence for different devices among different patient populations will be presented, along with a discussion of limitations in the current state of knowledge.

Objectives: At the conclusion of this course the participants will be able to:

1. Identify the current types of technology that are being utilized in locomotor rehabilitation
2. Compare and contrast different characteristics of current lower extremity robotics and advanced technology based on published literature.
3. Examine the state of current literature for implementation of LE technology across continuum of care

April 24 – 29, 2024

Independent Study: Recorded Lecture: Overview of the Rehabilitation Treatment Specification System
Speaker: Andrew Packel PT, NCS
Time: 60 minutes

The Rehabilitation Treatment Specification System (RTSS) is a systematic, theory-driven system for specifying the essential elements of therapy treatments. Use of an organized approach for defining and, ultimately, measuring the quality and quantity (dose) of specific treatments will enhance education, clinical practice and research. The RTSS offers a framework to educate new therapists on essential therapist actions (ingredients) that matter and offers a method to transfer knowledge from expert to novice clinicians. Such a system can enhance the clinical reasoning of practicing clinicians by examining the relationship between the treatment ingredients selected/delivered and the functional changes that are expected.

Objectives: At the conclusion of this course the participants will be able to:

1. Define key concepts discussed in the RTSS, such as treatment and enablement theories, target, aim, ingredient, treatment component.
2. Demonstrate how the RTSS can stimulate critical thinking and strengthen clinical reasoning underlying the planning and delivery of interventions.
3. Apply RTSS to the use of Technology in patient care.

April 30, 2025 – 7:00 to 9:00 PM

Session 3: Live Webinar: Application of frameworks in clinical decision making for device selection
Speakers: Amanda Charles PT, DPT, Kelly Sprik PT, DPT, Andrew Packel, PT, NCS
Time: 120 minutes

This session will focus on the specific interaction between the therapist and an individual patient, and specifically the clinical reasoning behind the use of technology-based interventions. Using the structured framework of the Rehabilitation Treatment Specification System (RTSS), participants will consider the process by which patient-specific walking goals can be broken down to specific treatment targets. The importance of practice to address these targets will be discussed, as a key concept. Various characteristics of devices will be identified as ingredients that impact this practice. Attention to principles of motor learning and neuroplasticity including dosage, intensity, salience, and level of challenge will be incorporated as well.

Objectives: At the conclusion of this course the participants will be able to:

1. Apply the Rehabilitation Treatment Specification Scale (RTSS) framework to identify patient specific walking goals and treatment targets.
2. Apply the principles of motor learning and neuroplasticity to address walking targets.
3. Analyze clinical reasoning process for device selection for 2 aspects of walking.

May 1 – 6, 2024

Independent Study: Survey - Developing a survey to engage local stakeholders in the use of technology for clinical care.
Leaders: Kimberly Miczak PT, NCS, Colleen Johnson, PT, NCS, Amanda Charles, PT, DPT, and Elizabeth Watson, PT, DPT, NCS
Time: 60 minutes

Independent learning activity in which participants will develop an initial draft of a survey which they can use to engage stakeholders in their particular setting in the development or refinement of a plan to utilize technology. The activity will require participants to reflect on both their current practice, knowledge and barriers to utilizing technology as well as the resources, personnel and characteristics of their individual facility.

Objectives: At the conclusion of this course the participants will be able to:

1. Develop an initial draft of a survey regarding technology use, considering individualized characteristics of a specific setting.
2. Integrate understanding of the roles of individuals, facility characteristics, and potential barriers/facilitators in initial consideration of a plan for implementing or expanding use of technology in clinical care.

May 7, 2024 – 7:00 to 9:00 PM

Session 4: Live Webinar - Getting started: Considerations for implementation of lower extremity technologies.
Speakers: Kimberly Miczak, PT, NCS, Colleen Johnson, PT, NCS, Amanda Charles, PT, DPT, Elizabeth Watson, PT, DPT, NCS
Time: 120 minutes

What can you do to facilitate adoption of the use of technology in your specific practice or setting? This session will take us beyond the therapist-patient interaction and consider the facility-specific "inner setting" in which the use of technology is looking to be expanded. We will explore setting-specific constraints in terms of resources, personnel, physical characteristics of the facility, and other areas, and discuss strategies for how these can be overcome. Using an implementation science framework, the roles of personnel from aides and support staff to individual clinicians, to administrators and funders will be explored and how all of these can impact a developing program.

Objectives: At the conclusion of this course the participants will be able to:

1. Analyze a practice setting to determine facilitators and barriers to integration of technology into clinical practice.
2. Formulate at least 2 strategies to increase clinical staff engagement for use of technology

Tuesday, May 14, 2024 – 7:00 to 9:00 PM

Session 5: Live Webinar: Thinking big: The world of rehabilitation technology and how it can positively impact your practice.
Speakers: Kimberly Miczak, PT, NCS, Andrew Packel, PT, NCS
Time: 120 minutes

This session will identify multiple stakeholders in the field of rehabilitation technologies, including device developers, manufacturers, researchers, and other leaders in the field. Their relationships and contribution to the enterprise of rehabilitation will be considered within the CFIR framework. Literature related to the implementation of technology

will be reviewed considering the roles of these various stakeholders. Specific strategies and benefits of familiarizing and forging relationships among these different partners will be discussed, as well as exploration of how each individual can establish their presence in this complex, dynamic ecosystem.

Objectives: At the conclusion of this course the participants will be able to:

1. Identify at least 3 professional groups that have interest in dissemination of information related to the field of rehabilitation technology as a source for continued personal learning.
2. Appraise the literature related to key principles regarding implementation of technology in rehabilitation
3. Create a SWOT analysis to develop 3 personalized strategies for integration of newly acquired knowledge related to technology

Tuesday, May 21, 2024 – 7:00 to 9:00 PM

Session 6: Live Webinar: Implementation cases for in-depth review and discussion
Speakers: Andrew Packel, PT, NCS, Erika Dixon, PT, DPT, NCS
Time: 120 minutes

This session will integrate the information provided across all of the previous sessions within the context of real-world cases. Videos of several patient cases will be used to facilitate discussion of the patient / clinician interaction. Considerations will then be expanded to include the influence of facility-specific and outer setting domains on these cases. Discussion and problem-solving will be facilitated as each participant develops a personalized plan to establish their role as a leader in the application of technology.

Objectives: At the conclusion of this lecture the participants should be able to:

1. Evaluate clinical cases of the use of advanced technologies, identifying three areas of strength and three opportunities for improvement.
2. Analyze the impacts of the Individuals Domain and the Implementation Process Domain on cases of advanced technology use.
3. Create a personalized plan to establish their own unique role in the application of advanced technology.

In-person sessions:

Friday May 31, 2024

Emerging Technology Demonstrations: Non-invasive Brain Stimulation, Ecologic and Remote Monitoring, Virtual Reality and Personalized Algorithms for Robotics
Speakers: Shailesh Kantak PhD, PT, Amanda Rabinowitz, PhD, Andrew Packel, PT, NCS, Rachel Higdon, PT, DPT
Time: 120 minutes

This session will explore four types of technology that are currently still in development with demonstrations from clinicians and researchers. Participants will be able to experience how research contributes to the implementation of technology in the clinic.

Objectives: At the conclusion of this lecture the participants should be able to:

1. Explain rehabilitation applications for Non-invasive Brain Stimulation
2. List potential benefits of using technology to monitor patients in their community.
3. Describe advances in robotic algorithms and virtual reality for clinical care.

Expert Panel Discussion: Emerging Technology
Panel: Andrew Packel, PT, NCS Shailesh Kantak PhD, PT, Amanda Rabinowitz, Rachel Higdon, PT, DPT
Time: 60 minutes

The clinical and research experts will field questions and propose questions about the current emerging technology and how researchers and clinicians can work together to improve technology and promote knowledge translation for clinical care. All participants will have an opportunity to ask questions and make suggestions about the state of technology in rehabilitation.

Objectives: At the conclusion of this lecture the participants should be able to:

1. Discuss the intersection between inventors, researchers, and clinicians when new technologies are created.
2. Identify barriers to knowledge translation.

Saturday June 1, 2024

Walking Specific Patient Evaluations and Identification of Walking Specific Targets
Speaker: Andy Packel PT, NCS
Time: 30 mi nutes

The use of the Rehabilitation Treatment Specification System (RTSS) will be reviewed as a basis for identification of aspects of walking, for use in both assessment and treatment planning. Strategies for isolating individual aspects of walking during assessment will be discussed in preparation for the assessments with actual patients.

Objectives: At the conclusion of this lecture, participants will be able to:

1. Identify 4 key aspects of walking to be used when considering walking treatments.
2. Identify 3 important considerations when assessing walking in individuals who require assistance to walk.
3. Explain how assessment results of walking deficits can drive decisions about the use of technology for treatment of walking dysfunction.

Case Based Demonstration of Assessments
Speakers: Amanda Charles PT, DPT, Kelly Sprik PT, DPT
Time: 120 minutes

Leaders will demonstrate the assessment of a person with lower extremity dysfunction due to a neurologic insult. The participants will be able to interact with and observe an assessment of a real patient with lower extremity dysfunction that will emphasize the key considerations for assessment and guide participants to identify targets for their robotic interventions as well as traditional rehabilitation interventions. Emphasis will be placed on clinical decision making for identifying targets.

Objectives: At the conclusion of this demonstration the participants will be able to:

1. Perform an assessment of walking that identifies key walking targets
2. Utilize assessment findings to prioritize patient problems.
3. Perform evaluation of activities specifically related to walking for individuals with a variety of walking dysfunctions.

Review of Assessment and Facilitated Discussion
Amanda Charles PT, DPT, Kelly Sprik PT, DPT, Andrew Packel PT, NCS
Time: 45 minutes

This session will review the assessments performed on live patients and discuss strategies for optimizing assessment, with an emphasis on helping to drive clinical decision making. Strategies for adjusting assessment techniques based on individual patient presentations will be discussed, as well as best practices to share the assessment strategies and teach it to others.

Learning Objectives: At the conclusion of this demonstration the participants will be able to:

1. Analyze the data collected in assessment and develop targets for intervention.
2. Prioritize targets for intervention.

Treatment Planning Based on Walking Specific Evaluation

Amanda Charles PT, DPT, Kelly Sprik PT, DPT, Andrew Packel, PT, NCS
Time: 45 minutes

Based on the assessment of patient cases including patient characteristics and targets, participants will develop a treatment plan that is specific to individualized patterns of walking dysfunction for individual patients. They will compare and contrast various types of technology to identify how technology may or may not enhance treatment or benefit patient. There will be in-depth discussion of matching the "ingredients" that the technologies provide with the individualized treatment targets for each patient.

Objectives: At the conclusion of this activity the participants will be able to:

1. Develop detailed treatment plans incorporating the use of technology-based interventions for individuals with a variety of walking dysfunctions.
2. Compare and contrast types of technology for walking in relationship to specific patient problems.
3. Analyze the benefits of one type of technology vs. another to benefit treatment plans.

Case Based Patient Interventions with Technology

Leaders: Amanda Charles PT, DPT, Erika Dixon, PT, DPT, NCS, Unique Williamston, PTA, BS,
Kelly Sprik PT, DPT, Andrew Packel, PT, NCS
Time: 120 minutes

In this session, leaders will demonstrate interventions with multiple patients using technology, including those discussed in the previous assessment section.
The participants will be able to interact with and observe these interventions on patients with lower extremity dysfunction that will emphasize the key considerations for treatment and guide participants to consider the multiple ingredients that contribute to a successful intervention. Emphasis will be placed on clinical reasoning to most effectively structure treatment sessions.

Objectives: At the conclusion of this demonstration the participants will be able to:

1. Discuss selection of technology-based treatment for individuals with lower extremity dysfunction.
2. Prioritize walking-related treatment targets identified in the assessment in order to drive treatment selection.
3. Analyze a treatment session and offer 3 suggestions to better align ingredients provided with individual patient deficits.

Treatment Selection and Intervention

Amanda Charles, PT, DPT, Erika Dixon, PT, DPT, NCS, Unique Williamston, PTA, BS, Andrew Packel, PT, NCS, Kelly Sprik, PT, DPT
Time: 45 minutes

This session will review the interventions performed on live patients and discuss strategies for their optimization to address individualized patient presentations. Detailed features of devices will be reviewed that allow them to address important considerations such as intensity and dosage, along with principal walking-related targets. Guided discussion of the clinical decision-making process for technology selection will facilitate participants' expertise in this area.

Objectives: At the conclusion of this activity the participants will be able to:

1. Evaluate strengths and weaknesses of the clinical use of various technologies for walking dysfunction.
2. Identify important considerations and strategies for evaluating their utility when considering emerging technologies.
3. Describe how the identified targets of treatment can be addressed through selection of correct technology.

Lab Based Activity: Practice with Various Technologies
Leaders: Amanda Charles PT, DPT, Erika Dixon, PT, DPT, NCS, Unique Williamston, PTA, BS,
Kelly Sprik PT, DPT, Andrew Packel, PT, NCS
Time: 60 minutes

Participants will be able to do experiential learning with various technologies including robotics, soft exoskeletons, virtual reality. They will have the opportunity to practice applying technology and selecting parameters on various components.

Objectives: At the conclusion of this Lab activity, participants will be able to
1. Demonstrate safe application of common harnesses.
2. Select intervention parameters on devices to optimize treatment effect.
3. Evaluate the effectiveness of treatment intervention with technology while you are in treatment session based on patient response.

Putting it all together: A review of clinical Implementation cases
Lecturer: Andrew Packel PT, NCS
Time: 45 minutes

Summary review of the content of the entire learning event that will revisit all the components of the effort to successfully incorporate technology into clinical care. The review will include decision making frameworks to help clinicians to identify treatment goals and intervention that will optimize care.

Objectives: At the conclusion of this Lab activity, participants will be able to
1. Articulate the benefits and controversies of technology for clinical practice.
2. Evaluate individual knowledge gaps and barriers to incorporating technology into practice.
3. Synthesize current literature regarding implementation of technology into walking practice.