



# MovePA

**POSTER & PLATFORM**

**ABSTRACT BOOK**

**Oct. 25-27, 2019**

**Seven Springs Mountain Resort | Champion, PA**

# PPTA 2019 MOVEPA ANNUAL CONFERENCE

JOIN US THIS OCTOBER IN CHAMPION, PA

PPTA 2019 Move PA Annual Conference is Oct. 25-27, 2019. Join us at Seven Springs Mountain Resort for a conference packed with continuing education (evaluative and general hours approved by PA State Board), opportunities for legislative updates, networking with friends and employers, our Brew and Business Membership Event, SIG special programming on Sunday, and a re-tooled PAC FUNdraiser, which includes FREE entry to the Saturday night event – and much more. This year we will highlight our PTA colleagues as we continue to celebrate the profession's 50-year anniversary! PPTA PTA SIG Chair Ann Lowrey, PTA, is our invited keynote speaker to kick off a weekend of learning, activity and interaction.

Breakfast is FREE for those staying at the Seven Springs resort, and lunch is included with the price of the registration ticket. Register early to secure our Early Bird rates, and the first 10 PTAs registering for conference also get a special discount – see details on page 19.

Our research and science exhibits continue to draw large crowds, which will again be on display in our exhibit hall this year. And, back by popular demand, we will have Leaders on the Move and other activity-based events to keep us true to MovePA. We look forward to seeing and sharing time and talents with you!

Colleen Chancler, PT, MHS, PhD  
PPTA President

# PLATFORM PRESENTATIONS

## ROOM 1 PRESENTATIONS

### ROOM 1

**Is There a Difference in FSS-ICU ICU Discharge Scores between Hospital Discharge Location?** – Marcel DiFiore, SPT // Amanda Fink, SPT // George Fischer, SPT // Maria Jordan, SPT // Erika Lebron, SPT // Alyssa Rieger, SPT // Michael Pechulis PT, DPT // Julie Skrzat PT, DPT, PhD, CCS

**Defining Students with Medical Complexities: Definition and Case Example** – Ann Marie Stauffer, PT, DPT // Tanya Myers, PT, DPT // Lisa Gradziel, PT, DPT, PCS, C/NDT // Joanne Szabo, PT, DPT, MHA, PCS // Richard Johnson, PT, Ed.D

**Visuospatial and Memory Impairments Correlate with Upper Limb Tracking in Chronic Stroke: Rehabilitation Robotics Approach** – Carol Wamlsey, PT, DPT, NCS, CBIS // Breanna Lyn, BS // Kevin Bui, BS // Matthew Roland // Michelle J. Johnson, PhD

**Sport-Specific Oculomotor Performance Differences Among Collegiate Athletes** – Ethan Hood, PT, DPT, MBA, GCS, NCS // Tyler Cooperman, SPT // Quintin Davis, SPT // Geoffrey Hart, SPT // Jake Klemme, SPT // Colby Kulig SPT // Eddie Milisits, SPT

## ROOM 2 PRESENTATIONS

### ROOM 2

**The Effect of Pain Neuroscience Education on Central Sensitization Secondary to Acetabular Fracture** – Jonathan Ulrich, PT, DPT, OCS

**The Effects of Thoracic High-Velocity Thrust Manipulation and Kinesio-Tape® on Shoulder Strength and Muscle Recruitment** – Christopher Wise, PT, DPT, PhD(c), OCS, FAAOMPT, ATC // Nicholas Bilski // Steven William Koenig // Amber M. Miller // Sean Michael Perry // Rochelle Sousa

**Development of the Critical Illness Recovery Center (CIRC) at UPMC: Role of PT** – Amy Cassidy, PT, DPT // Lauren Malacarne, PT, DPT // Maura Doney, PT, DPT // David Kovach, PT, DPT // James Palonis, PT // Hallie Zeleznik, PT, DPT

**Transdisciplinary Care of Complex Persistent Pain in the Primary Care Setting** – Stacey Gorter, PT, DPT

# PLATFORM PRESENTATIONS

## Is There a Difference in FSS-ICU ICU Discharge Scores between Hospital Discharge Location?

### **PRESENTED BY**

Marcel DiFiore, SPT // Amanda Fink, SPT // George Fischer, SPT // Maria Jordan, SPT // Erika Lebron, SPT // Alyssa Rieger, SPT // Michael Pechulis PT, DPT // Julie Skrzat PT, DPT, PhD, CCS

### **PURPOSE/HYPOTHESIS**

The aim of this study was to determine if there is a difference between the Functional Status Score for the Intensive Care Unit (FSS-ICU) scores acquired within 24 hours of intensive care unit (ICU) discharge across hospital discharge locations. We hypothesized there would be a difference in FSS-ICU scores acquired within 24 hours of ICU discharge across hospital discharge locations.

### **SUBJECTS/MATERIALS/METHODS**

One hundred fourteen subjects (mean age = 65 years [22 – 94 years old], 71 males) were included. Subjects were included if they followed a linear hospitalization defined as entrance through the emergency department followed by a direct admit to ICU. Exclusion criteria was notable for re-admissions to ICU during the same hospital stay and multiple re-admissions throughout the year.

A retrospective chart review was conducted for patients admitted to a medical surgical intensive care unit at a tertiary care hospital over 12 months. The FSS-ICU scores were collected within 24 hours prior to ICU discharge. The FSS-ICU includes 5 functional components and is scored on a scale of 0 – 7, with a maximum cumulative score of 35. The subjects were stratified into 1 of the 4 discharge locations: home, skilled nursing facility (SNF), inpatient rehabilitation (IP), and other (AMA, expired, hospice, long term care facility and psych). A one-way ANOVA and corresponding post hoc analyses were performed to analyze the differences between FSS-ICU ICU discharge scores and hospital discharge location.

### **RESULTS**

Forty percent of the subjects had a respiratory admitting diagnosis. The frequencies of discharge locations amongst all subjects are as follows: home = 71.93%, SNF = 16.67%, IP = 5.26%, and other = 6.14%. Mean FSS-ICU ICU discharge scores for discharge locations are as follows: home = 27.20 (18 – 35), SNF=19.84 (14 – 31), IP=16.34 (9 – 25), and other=20.71 (18 – 23). FSS-ICU scores acquired within 24 hours of ICU discharge were significantly different ( $p<0.001$ ) across discharge locations. Post-hoc analysis showed a statistically significant difference between home and SNF ( $p<0.001$ ), home and IP ( $p<0.001$ ), and home and other ( $p=0.005$ ). There were no statistically significant differences amongst FSS-ICU scores between SNF, rehab, and other.

### **CONCLUSIONS**

There is a difference between FSS-ICU ICU discharge scores across discharge locations, with higher FSS-ICU scores (>18) being associated with a home discharge disposition. Our results show consistent means for discharge to home while narrowing the range from previous literature.

### **CLINICAL RELEVANCE**

This study builds upon previously published literature by expanding the sample by size and medical acuity. This outcome measure successfully discriminated amongst home and other discharge settings for patients receiving usual care physical therapy. Future research should include a larger sample size to discriminate amongst other discharge locations, as well as study which physical therapy interventions are more likely to improve score to optimize home discharge.

# PLATFORM PRESENTATIONS

## Defining Students with Medical Complexities: Definition and Case Example

### **PRESENTED BY**

Ann Marie Stauffer, PT, DPT // Tanya Myers, PT, DPT // Lisa Gradziel, PT, DPT, PCS, C/NDT // Joanne Szabo, PT, DPT, MHA, PCS // Richard Johnson, PT, Ed.D

### **PURPOSE**

A six-member subcommittee, entitled “Students with Medical Complexity”, was formed within the Academy of Pediatric Physical Therapy’s (APPT) School-based Special Interest Group to support and improve the educational needs and clinical practice of pediatric physical therapists serving students with medical complexity. To best serve educational and clinical needs of physical therapists serving this population, a well-developed definition is necessary. This special interest platform presentation will highlight the developed definition of students with medical complexity and include a case example, examination, evaluation, and goals.

### **DESCRIPTION**

This platform presentation will describe in detail the developed definition of students with medical complexity using the International Classification of Functioning, Disability and Health as well as the American Physical Therapy Association’s Movement System. A specific case example will be provided to improve clarity of the definition. Assessment and goals suggestions will also be briefly highlighted.

### **SUMMARY OF USE**

Importantly, during this platform presentation, feedback from pediatric physical therapy stakeholders concerning this definition will be solicited. This feedback will refine and improve the definition of students with medical complexity in order to build consensus. Once finalized, this definition will then support the future development of fact sheets to support the educational and clinical needs of pediatric physical therapists serving children with medical complexity. Future fact sheets will address assessments and interventions specifically for students with medical complexity.

### **IMPORTANCE TO MEMBERS**

Creating a clear and well-accepted definition of students with medical complexity will facilitate the future and ongoing development of much needed fact sheets to address the educational needs and clinical practice of pediatric physical therapists serving students with medical complexity.

# PLATFORM PRESENTATIONS

## Visuospatial and Memory Impairments Correlate with Upper Limb Tracking in Chronic Stroke: Rehabilitation Robotics Approach

### PRESENTED BY

Carol Wamley, PT, DPT, NCS, CBIS // Breanna Lyn, BS // Kevin Bui, BS // Matthew Roland // Michelle J. Johnson, PhD

### PURPOSE/HYPOTHESIS

According to the World Health Organization, 15 million people suffer from stroke each year. Approximately a third of those affected will suffer from lifelong functional disabilities including problems with performing activities of daily living and regaining independence. In the field of rehabilitation robotics, motor and cognitive deficits are traditionally assessed and targeted as separate domains. Many functional activities require the use of both motor and cognitive ability. However, the extent of interplay of cognitive impairment on motor performance is not yet clearly understood. Our hypothesis is that the integrity of particular cognitive domains, specifically memory, attention, and visuospatial processing, are significantly correlated to motor performance in tracking tasks. This pilot study explores this relationship by analyzing both clinical and robot-based assessments of stroke participants in a Rehabilitation Robotics Lab's Haptic TheraDrive study.

### SUBJECTS/MATERIALS/METHODS

17 subjects with upper-extremity hemiparesis ranging from 4 months to 19 years post stroke onset and 35 to 75 years of age. Each subject received a clinical evaluation including the Montreal Cognitive Assessment, Fugl-Meyer Assessment - Upper Extremity, Box and Block Test, and Grip Strength Test to determine the extent of their motor and cognitive impairments. The study then employed a single-degree-of-freedom, haptic force-feedback robotic system used to assess motor performance. A series of sessions consisting of a tracking task "game" facilitated by the device called Haptic "TheraDrive" was administered by asking subjects to follow a pseudo-random curve on a computer screen using a crank/wheel actuator. The robot provided a zero impedance manipulator which recorded the performance of the subject. Motor performance was calculated by taking the root mean square error between actual performance and ideal performance, generating a performance error metric (RMSE). A higher RMSE score indicated poor accuracy. Clinical and robot-based data was analyzed using the Spearman's correlation test.

### RESULTS

Statistical analysis shows a correlation between RMSE and both visuospatial/executive functioning ( $\rho = -0.5807$ ,  $p = 0.0145$ ) and delayed recall ( $\rho = -0.4888$ ,  $p = 0.0465$ ). A correlation was seen between FM-UE scores and both visuospatial/executive functioning ( $\rho = 0.5284$ ,  $p = 0.0292$ ) and delayed recall ( $\rho = 0.5302$ ,  $p = 0.0286$ ). The statistical analysis fails to show a correlation between RMSE and any other cognitive domains.

### CONCLUSIONS

The results support that motor capabilities are jointly affected by cognitive and motor acuity. The specific cognitive domains that were essential in tracking tasks were visuospatial/executive functioning and delayed recall. Further analysis uncovers the capacity of cognitive deficit to effect the functional outcomes of individuals who have high motor ability but decreased cognitive function.

### CLINICAL RELEVANCE

These results could influence future robot-based rehabilitation programs by supporting cognitive interventions to optimize motor recovery.

# PLATFORM PRESENTATIONS

## Sport-Specific Oculomotor Performance Differences Among Collegiate Athletes

### **PRESENTED BY**

Ethan Hood, PT, DPT, MBA, GCS, NCS // Tyler Cooperman, SPT // Quintin Davis, SPT // Geoffrey Hart, SPT // Jake Klemme, SPT // Colby Kulig SPT // Eddie Milisits, SPT

### **PURPOSE/HYPOTHESIS**

Oculomotor performance is a fundamental function for excelling in many sports. Saccadic eye movements, smooth pursuit, and reaction time play a vital role in being successful as an athlete. The purpose of this study was to quantify differences in oculomotor performance between ball and stick sport and non-ball and stick sport Division III collegiate athletes. We hypothesized as oculomotor functional demands varies between sports, differences will exist in baseline oculomotor performance specific to ball and stick versus non-ball and stick sports. Significant differences among the varying sports may suggest the need for sport-specific training programs to improve oculomotor performance.

### **NUMBER OF SUBJECTS**

128 NCAA Division III Athletes

### **MATERIALS/METHODS**

128 participants, 79 ball and stick athletes (BS) (baseball: n=23, softball: n=11, men's lacrosse: n=30, and women's lacrosse: n=15), 49 non-ball and stick (NBS) (men's track and field: n= 17, women's track and field: n=7, men's cross country: n= 18, women's cross country: n= 7), mean age: 19.3 years old (+/- 1.19 SD). Each athlete completed oculomotor performance testing via a circuit. The King-Devick (KDT) assessed saccadic eye movements via timed reading of numbers on standardized cards during 1 warm up round and 2 test trials. The Eye-Guide Focus (EG) assessed smooth pursuit during 1 trial using infrared camera fixation on the eye's pupil while visually tracking a figure-8 on an iPad screen. The Online Reaction Time Test (ORTT) assessed reaction time by clicking a spotlight cue on a laptop computer during 5 averaged trials.

### **RESULTS**

There was no significant difference between BS and NBS scores for any of the three oculomotor performance assessments. Intertester reliability for the KDT was found to be significant with a high intraclass correlation coefficient. Moderate correlation was found between KDT and ORTT performance.

### **CONCLUSIONS**

Our findings do not support the hypothesis that there are differences in oculomotor performance between athletes that participate in ball and stick sports and those that do not. Sport alone may not be an appropriate predictor of an athlete's oculomotor performance. Further research is needed to evaluate other possible predictors of oculomotor performance.

### **CLINICAL RELEVANCE**

Establishing individual preseason baseline oculomotor scores for screening purposes is more sensitive than age matched or sport specific scores to identify oculomotor abnormalities due to the high performance variability among individuals. These findings support individual oculomotor performance screening used to detect abnormality after injury like concussion rather than standardized scores. These findings suggest oculomotor system training should be individualized to the participant rather than the sport they play. Future studies should include larger, randomized, and more diverse sample sizes and higher tier athletes.

# PLATFORM PRESENTATIONS

## **The Effect of Pain Neuroscience Education on Central Sensitization Secondary to Acetabular Fracture**

### **PRESENTED BY**

Jonathan Ulrich, PT, DPT, OCS

### **BACKGROUND AND PURPOSE**

Pain is a primary reason people seek the care of a medical professional. The more recent response of the traditional medical model has been to treat pain via pharmaceuticals, resulting in one factor contributing to the current opioid abuse epidemic across the United States. Pain neuroscience education (PNE) is a recently developed and described approach to address the issue of pain (and misconceptions about pain) within the patient populations we manage as physical therapists. The effectiveness of PNE on various specific populations has been documented, however, the clinical application of this approach has not been well documented within the literature. This case report seeks to describe the use of PNE on a unique patient case in a clinical setting.

### **CASE DESCRIPTION**

The patient was a 19-year-old male referred for “diffuse pain and neuropathy of unknown cause” 14 weeks after a non-displaced right acetabular fracture. His condition had been managed unsuccessfully through traditional medical interventions, such as opioid medications. He reported being unable to participate in weight bearing activities without significant pain, which resulted in avoidance behaviors. As a result, he self-limited to wheelchair mobility and required assistance from his parents for activities of daily living, such as dressing and bathing. He did not engage in social activities or other activities he enjoyed, such as riding his bicycle. He presented with complaints of bilateral total leg and lumbar pain (8-9/10), which was inconsistent with his original medical diagnosis. This case report describes his evaluation and management via physical therapy. The treatment plan consisted of PNE and graded exposure.

### **OUTCOMES**

The patient returned to full function after two treatment sessions, including normal household and community ambulation, as well as returning to riding his bicycle. He reported a significant reduction in pain as reported by the numeric pain scale, to 0-1/10.

### **DISCUSSION**

The use of PNE, along with graded exposure, allowed this patient to reframe his pain experience and be restored to full function and normal participation within his activities of daily living. The success of this approach within this case can provide clinicians with an additional tool to work with patients in which pain is the dominant factor behind their movement system dysfunction.



# PLATFORM PRESENTATIONS

## **The Effects of Thoracic High-Velocity Thrust Manipulation and Kinesio-Tape® on Shoulder Strength and Muscle Recruitment**

### **PRESENTED BY**

Christopher Wise, PT, DPT, PhD(c), OCS, FAAOMPT, ATC // Nicholas Bilski // Steven William Koenig // Amber M. Miller // Sean Michael Perry // Rochelle Sousa

### **PURPOSE/HYPOTHESIS**

The purpose of this study is to assess the effect of Thoracic High Velocity Thrust Manipulation (HVTM) compared to Kinesio-Tape® (KT) on strength and muscle activation patterns of shoulder girdle musculature in individuals with no complaint of shoulder pain. We hypothesized that HVTM would have a greater effect on both strength and muscle activation patterns compared to the effects of KT.

### **NUMBER OF SUBJECTS**

Eleven subjects with no complaint of shoulder pain participated, of which only nine (6 males, 3 females) ages 18-51 yrs (mean=31.3yrs) produced sufficient data to be analyzed.

### **MATERIALS AND METHODS**

Subjects were randomly assigned to receive either KT using the standard three-strip inhibition method or a thoracic HVTM. Prior to and immediately following intervention, surface electromyographic (EMG) data using four sensors placed over the anterior deltoid(AD), posterior deltoid(PD), upper trapezius(UT), and lower trapezius(LT) were used to assess muscle recruitment patterns during performance of active, antigravity shoulder flexion. The ErgoFET2 handheld dynamometer was used to measure maximum voluntary isometric contraction (MVIC) of the shoulder flexors prior to and immediately following intervention.

### **RESULTS**

In response to application of KT, a significant increase in LT mean peak ( $p = 0.041$ ) was observed. AD, PD, LT peak force increased and UT peak force decreased but did not reach significance. In response to thoracic HVTM, mean peak force decreased in AD, PD, LT but did not reach significance. Neither KT or HVTM altered muscle activation patterns. The AD was the 1st or 2nd muscle activated in all trials and the PD and LT were the last muscles to activate.

### **CONCLUSIONS**

KT increases LT and decreases UT force production. The impact of HVTM on force production is contrary to previous studies performed with symptomatic subjects. Further evidence is needed to more thoroughly delineate the role of these interventions in influencing muscle force production and the impact of this effect on the management of individuals with shoulder impingement syndrome.

### **CLINICAL RELEVANCE**

The impact of the application of tape on LT and UT force production suggests that taping may be useful in facilitating enhanced performance of scapulohumeral rhythm by regulating the contribution of these muscles. Reduced force production from the LT is consistent with the use of the inhibition taping procedure. Contrary to prior evidence, HVTM appears to reduce peak force of specific shoulder muscles and does not seem to have a significant impact on activation patterns in asymptomatic individuals. Optimal motor control includes precise timing of muscle activation and deactivation. HVTM may be effective in enhancing motor control by reducing the impact of overactive muscles.

# PLATFORM PRESENTATIONS

## Development of the Critical Illness Recovery Center (CIRC) at UPMC: Role of PT

### **PRESENTED BY**

Amy Cassidy, PT, DPT // Lauren Malacarne, PT, DPT // Maura Doney, PT, DPT // David Kovach, PT, DPT // James Palonis, PT // Hallie Zeleznik, PT, DPT

### **PURPOSE**

Post Intensive Care Syndrome (PICS) was identified in 2012 as a syndrome consisting of new or worsening impairments in physical, mental and/or cognitive abilities in individuals who survive critical illness. UPMC Centers for Rehab Services (CRS) was invited to participate in a new outpatient interdisciplinary clinic with a comprehensive rehabilitation arm, the Critical Illness Recovery Center (CIRC), whose goals include identifying patients at risk for developing PICS and appropriately guiding referrals to rehabilitation services.

### **DESCRIPTION**

Patients were screened and identified during their inpatient stay by the Critical Care Physician and Palliative Care Nurse Practitioner to follow up in the CIRC clinic following hospital discharge. Patients appropriate for the clinic were scheduled for an initial visit 2 weeks after hospital discharge. Follow up visits occurred at 3 months, 6 months and 1 year. At each visit, the physical therapist performed select tests and measures to determine rehabilitation needs and make appropriate recommendations. These measures include: gait speed, Timed Up and Go (TUG), 6 Minute Walk Test (6MWT), 5 Times Sit to Stand (5TSTS) and the Short Physical Performance Battery (SPPB).

### **SUMMARY OF USE**

In 1 year, the CIRC program screened 114 patients following hospital discharge. 70% (n=79) were identified with needs for interdisciplinary outpatient rehabilitative services: 52% (n=59) speech/cognitive, 39% (n=44) OT, 63% (n=72) PT. 22% (n=17) were still in skilled nursing facilities at the time of referral and 9% (n=7) were already enrolled in outpatient therapy programs within the system. For the 55 remaining patients who were residing at home and not currently engaged in a rehabilitation program, 33% (n=18) followed up within the UPMC CRS system for a total of 375 visits (76 SLP, 106 OT and 193 PT). We are unable at this time to account for patients who may have received therapy outside of the system.

### **IMPORTANCE TO MEMBERS/CLINICAL RELEVANCE**

Rehabilitation professionals are uniquely qualified to address impairments associated with PICS and the consequent activity limitations and participation restrictions. Collaborative development of an interdisciplinary clinic can facilitate the identification of patients who may be at risk for, or already have developed PICS. Within the UPMC CIRC, a substantial number of patients have been identified to have comprehensive rehabilitation needs. Future goals aim to improve the follow up rate after referral and track patients who receive services outside of the UPMC CRS system.

# PLATFORM PRESENTATIONS

## Transdisciplinary Care of Complex Persistent Pain in the Primary Care Setting

### **PRESENTED BY**

Stacey Gorter, PT, DPT

### **BACKGROUND & PURPOSE**

Intensive collaborative teams have been effectively implemented for treating chronic health conditions, including chronic pain. There is, however, a dearth of evidence for collaborative treatment pain in the primary care setting. This case report describes comprehensive transdisciplinary management of a patient with complex persistent low back pain and opioid dependence through a biopsychosocial framework.

### **CASE DESCRIPTION**

A 51-year-old male veteran presented to the Veterans Health Administration with a 30-year history of persistent low back pain status post two spinal fusions, on long term opioid therapy for pain management, with insomnia, hypertension, and major depressive disorder. The patient previously participated in outpatient physical therapy (PT) with no improvement in pain or function. He was referred to our transdisciplinary pain primary care team consisting of a physician, physical therapist, psychologist, and registered nurse. The patient participated in 10 sessions of PT focused on pain neuroscience education, pacing, home exercise program (HEP), and mindfulness-based stress reduction. Psychologically informed PT was utilized to reframe pain and decrease fear to promote increased physical activity. Paced activities included walking, household tasks, and social events. The HEP consisted of cognitive homework, nerve glides, gross movement patterns of the spine, and diaphragmatic breathing. The patient was concurrently engaged in a six-session cognitive behavioral therapy program for insomnia. Finally, the patient was transitioned from oxycodone to buprenorphine-naloxone and was treated for hypertension.

### **OUTCOMES**

The Patient Specific Functional Scale (PSFS) was assessed pre and post PT interventions to capture meaningful activity and participation. The patient identified hunting, playing with his grandchildren, and going out for social activities with his wife. All activities improved meaningfully with a PSFS score increase of 3 to 7.3. Gait speed was assessed pre and post PT, with an improvement from 0.77 to 0.99 m/s. Additionally, the patient rated an overall Global Rating of Change (GROC) score of +6 indicating “a great deal better.” Insomnia was recorded through the Insomnia Severity Index, which improved significantly from 23, indicating severe clinical insomnia, to 2, indicating no clinically significant insomnia. Depressive symptoms were measured using the Patient Health Questionnaire 9 with an initial score of 10, indicating moderate depression, and final score of 0. Blood pressure (BP) trends were monitored by the RN, with an initial BP of 160/101 to 125/78 eight weeks later.

### **DISCUSSION**

A comprehensive transdisciplinary approach to complex persistent pain in the primary care setting resulted in meaningful improvements in function, participation, sleep, hypertension, and depression. Future research must be done on a larger scale to track patient outcomes as well as potential healthcare cost savings in this model.

# POSTER PRESENTATIONS

## 1 Value-Based Care Delivery: Strategies, Surprises and Lessons Learned

### **PRESENTED BY**

Jennifer Sidelinker, PT, DPT, GCS // Aimee E. Perron, PT, DPT, NCS, CEEAA // NovaLeigh Dodge-Krupa, PT, CEEAA

### **PURPOSE**

The Centers for Medicare and Medicaid Services (CMS) created the Innovation Center to test alternative payment and service delivery models that reward clinical outcomes, such as Bundled Payments for Care Improvement (BPCI). In 2015, Genesis HealthCare Corporation (GHC) voluntarily initiated participation in the BPCI Model 3 program in 32 skilled nursing facilities. We will describe approaches and lessons learned from the experience, which reinforce research indicating that aligning incentives for providers promotes collaboration and value for patients.

Description: GHC had a desire to advance clinical capabilities and achieve success in a value-based healthcare environment. Genesis Rehab Services (GRS) supported GHC's commitment to care redesign by establishing best practice and interprofessional leadership teams charged with facilitating care delivery changes. The organization committed to implementing core Transitions in Care standards, including a risk for rehospitalization assessment and care plan. Rehab care delivery, focused on patient-centered, outcome driven care, was critical to success. The Modified Barthel Index (MBI) and Physical Performance Mobility Exam (PPME) provided meaningful functional outcomes data. Patient Specific Functional Scale (PSFS) preliminary data reinforced that improved patient engagement results in better outcomes. Rehab care that included individual, concurrent, and group modes of delivery demonstrated equal or better outcomes versus care delivered solely as individual therapy. Successful transition to home was achieved, on average, 2 days faster for patients in the alternative care delivery model.

### **SUMMARY OF USE**

The BPCI Model 3 centers provided a rich "laboratory" to test strategies for implementation and adoption of alternative models of care delivery to achieve value. With healthcare and payment systems rapidly changing, the ability to drive change using objective data is more critical than ever. As a result of our work, we are now able to clearly communicate and lead our staff, customers, and partners in facilitating care approaches that meet the requirements for delivering value. Rehab findings reinforce the need to work as an integrated, interprofessional team to plan for transition from the start of care, and to use meaningful functional outcome measures to objectively analyze effectiveness of care. Comparing cost and outcomes data for patients receiving a multimodal intervention approach versus one-to-one care only helps support the use of a variety of modes of therapy to achieve meaningful, sustainable functional outcomes.

### **IMPORTANCE TO MEMBERS**

Physical therapists demonstrate value to patients and partners by understanding and communicating the impact of their care on outcomes and costs. Our findings help define essential elements that drive value: interprofessional care management, multimodal care delivery, and patient engagement. Strategies outlined and lessons learned can help others solve similar problems, and help support the critical contribution of physical therapy in a value-based healthcare system.

# POSTER PRESENTATIONS

## 2 Conservative Management of a Recreational Wrestler with a History of Recurrent Inferior Glenohumeral Dislocations: A Case Report

### **PRESENTED BY**

Laura Bishop, PT, DPT, Cert MDT, LSVT BIG, ATC, EMT-B // Brian Eckenrode

### **BACKGROUND AND PURPOSE**

Traumatic inferior glenohumeral dislocations are uncommon and account for 0.5% of all reported glenohumeral dislocations. The most common mechanism of injury is axial compression through a fully abducted arm or from a hyperabduction force to an already abducted arm. There is little evidence regarding physical therapy treatment of this injury with most reports focusing on acute management.

### **CASE DESCRIPTIONS**

The patient is a 32 year old male with a body mass index of 43.9 kg/m<sup>2</sup> who presents to out-patient physical therapy with a history of chronic left shoulder pain and instability. He reports multiple left inferior glenohumeral dislocations which initially occurred while wrestling competitively in high school. The patient had declined surgical management in attempts to return to competitive wrestling sooner. He reports approximately 10 dislocations in the past 15 years since the initial trauma. No prior formal physical therapy was reported. The patient currently presents with pain and difficulty with all functional activities involving his left shoulder including lifting overhead, reaching behind his back, and all recreational activities including doing yoga and coaching a high school wrestling team. His Upper Extremity Functional Index score was 58/80 with 8/10 on the numeric pain rating scale at worst. At the initial physical therapy evaluation, the patient demonstrated left shoulder abduction active range of motion (ROM) to 150 degrees, functional external rotation ROM to C7 and functional internal rotation ROM to L1, reduced left shoulder and scapular strength, and hypermobility of the left glenohumeral joint, particularly inferiorly with a reproduction of his symptoms. Physical therapy management consisted of scapular and rotator cuff strengthening including glenohumeral adductor strengthening, closed chain proprioceptive and stability neuromuscular reeducation and manual therapy of cervical/thoracic joint mobility.

### **OUTCOMES**

After 12 visits over 8 weeks, the patient made significant improvements in the Upper Extremity Functional Index (71/80), pain rating (2/10 at worst), left shoulder ROM improvements with abduction to 180 degrees, functional external rotation to T4, and functional internal rotation to T10. The patient's strength improved to within 90% of the uninvolved side for shoulder flexion, internal rotation and external rotation via hand held dynamometry. The patient had improved his ability to lift overhead, reach behind his back, and do yoga, but he continued to report pain with weight bearing through the left upper extremity. No episodes of instability of the left shoulder were reported.

### **DISCUSSION**

The case report demonstrates the effective utilization of a progressive rehabilitation program in the short term for a patient with recurrent inferior glenohumeral dislocations. While the patient had returned to most of his functional activities pain free, he had not yet returned to coaching which requires him to weight bear through his shoulder, due to an unrelated low back injury. Management of this condition should focus on improving proprioception and neuromuscular control of the glenohumeral joint with emphasis on progressive stability training into abducted positions.

# POSTER PRESENTATIONS

## 3 Changes in Muscle Structure and Function in Community-Dwelling Older Adults Stratified by Fall Risk

### PRESENTED BY

Marcia Thompson, DPT, DSc // Charles Arteglie // Kelsey Chatten // Lindsay Knapp // Jessica Koger // Courtney Murray

### INTRODUCTION

Falls are the leading cause of injury and death among adults over the age of 65. In 2015, falls among older adults cost more than \$50 billion in total medical costs. Decreased muscle strength with age is associated with changes in muscle structure and function and is predictive of future falls. However, differences in muscle structure between individuals at risk for falls has not been widely investigated. Real Time Ultrasound (RTUS) has been used to study variations in muscle structure, but no investigations to date have focused on the structure of key muscles associated with falls, the gastrocnemius (GS) and anterior tibialis (AT), or on differences in individuals at risk for falls. Thus, the aim of this pilot study was to investigate the structure of the GS and AT using RTUS, to correlate these findings to functional strength of these muscles measured by Handheld Dynamometry (HHD) and Five Time Sit to Stand (FTSTS), and to examine differences in structure, represented by muscle volume, and functional strength based upon stratified fall risk in a community-dwelling older adults with age-matched controls. We hypothesized differences in muscle volume and decreased functional strength with an increase in fall risk.

### METHODS

Seven subjects (6 female,  $\bar{x}$ =76, range 65-88) were recruited from the Alvernia University's Senior College and were stratified by fall risk using Buatois' simple clinical stratification scale (14% low, 57% medium, 28.5% high risk; no control). Each subject completed HHD of the GS and AT and the FTSTS using standard protocols. Muscle volumes ( $\text{cm}^3$ ) of GS and AT were calculated from RTUS images of the muscles of the dominant leg using ImageJ software. The muscle volumes were then used to calculate a GS/AT volume ratio, which enabled comparison between subjects. Using Pearson Correlation analysis muscle volume ( $\text{cm}^3$ ), strength (HHD, kg), and muscle functional strength (FTSTS, sec) were correlated with fall risk stratification ( $\alpha=.05$ ).

### RESULTS

GS volumes ranged 284.08 - 452.66  $\text{cm}^3$ ; AT volumes ranged 147.72 - 311.18  $\text{cm}^3$ . The normalized GS/AT mean ratios were 1.45 for low fall risk; 1.39 for medium; 1.31 for high, suggesting a decline in relative volume of GS to AT with an increase in fall risk. Results also indicated that as fall risk increased, muscle strength decreased (low risk  $\bar{x}$ =12.4 kg; medium  $\bar{x}$ =9.9 kg; high  $\bar{x}$  =8.75 kg) and FTSTS declined as fall risk increased (low risk  $\bar{x}$ =7.43 sec; medium  $\bar{x}$  =16.8 sec; high risk  $\bar{x}$  =21.5 sec). No statistical significance was identified.

### CONCLUSION

Results suggest a potential relationship between degree of fall risk and muscle volume, as an important factor underlying muscle structure and function. Results also suggest that functional testing may reflect differences in muscle structure of key muscles associated with falls. Clinically, these findings may challenge physical therapists to further emphasize interventions that increase muscle volume to improve functional performance and decrease fall risk in community-dwelling older adults.

# POSTER PRESENTATIONS

## 4 A Unique Pro Bono Model: Medically Complex Geriatric Cohort at Risk for Fall

### **PRESENTED BY**

Stephen Carp, PT, PhD, GCS // Julie Skrzat, PT, DPT, PhD, CCS // Brittany Gumerman, SPT // Carly Bixler, SPT // Abigale LaBar, SPT // Tyler Schweigert, SPT // Alyssa Whitman, SPT

### **PLACE WHERE WORK COMPLETED**

DeSales University (2755 Station Ave, Center Valley, PA, 18034)

We did not receive financial support.

### **PURPOSE**

The American Physical Therapy Association in the Code of Ethics for the Physical Therapist describes an ethical obligation to provide pro bono services to those in need to enhance the well-being of society. There are a variety of documented pro bono models which provide students the opportunity to practice their skills and give back to the community. The purpose of this case report is to outline and elucidate a unique mandated pro bono experience in the DeSales University Doctor of Physical Therapy (DSU DPT) program. Opportunities within this unique model include research, screening for fall-risk, physical therapy evaluation, clinical intervention, the development and the leading of group exercise program, and fall prevention educational instruction.

### **DESCRIPTION**

The DSU DPT curriculum includes four mandated pro bono courses. The fourth pro bono is a ten-week course where students evaluate and treat medically complex geriatric patients. Under the supervision of faculty mentors, twenty-eight 2nd year DPT students alternated between a large local outpatient senior activities center and an inpatient long-term facility for retired priests. The scope of this pro bono experience was to provide care to the medically complex geriatric cohort identified as fall-risk.

### **SUMMARY OF USE**

Students were responsible for consenting the clients, performing balance and fall-risk screening assessments on all participants, counseling clients on identified fall risk factors, developing an evidence-based fall-risk remediation group exercise program for those clients found at risk for falls, conducting physical therapy evaluations for those with identified impairments within the scope of care of physical therapy, applying specific interventions, and collecting outcome data related to faculty-mentored student research related to fall-risk. A rubric-based review of the student initial evaluations and weekly progress notes, two critically appraised topic reports, the quality of the evidence-based fall risk remediation group exercise program, and a clinical rounds presentation on specific patients' comorbidities were used to assess student performance. Client feedback surveys were used to assess client satisfaction and student course evaluations were used to determine student satisfaction and if course objectives were met.

### **IMPORTANCE TO MEMBERS**

A unique mandatory pro bono course serving the physical therapy needs of the medically-complex geriatric cohort identified as fall-risk facilitated a wide-range of learning experiences for the students while meeting the ethical obligations stated in the Code of Ethics for the Physical Therapist. This experience provided students the opportunity to improve clinical decision making through the performance of screening activities, initial evaluations and clinical interventions; stimulate critical thinking; improve research skills; and enhance knowledge of servant leadership while fulfilling the profession's ethical obligation to provide pro bono services for individuals in need.

# POSTER PRESENTATIONS

## 5 Physical Therapist Assistant Program Practices to Enhance Student Diversity

### **PRESENTED BY**

Stacy Sekely, PT, DPT // Jamar Dues, SPTA // Hayley Skovira, SPTA

### **PURPOSE**

The purpose of this study is to examine current practices used by physical therapist assistant (PTA) education programs to recruit students from under-represented minority groups.

### **SUBJECTS/MATERIALS/METHODS**

Directors of all accredited PTA education programs were invited to complete an online survey and seventy-two participated. Respondents provided information about currently enrolled students and the program.

Pearson's correlation coefficient was used to examine the correlation between the percentage of minority students in a PTA program and the percentage of minority residents of the county in which the PTA program is located.

The percentage of PTA programs that engage in targeted efforts to recruit minority students (effort group) was calculated and compared to the percentage of programs that do not engage in targeted efforts to recruit minority students (no effort group). A minority enrollment equity score (MEES) was calculated as a ratio of the proportion of minority group members enrolled in the PTA program to the proportion of minority group members in the county in which the PTA program is located. The Wilcoxon rank sum test, with alpha set at .01, was used to examine the difference in MEES between the effort group and no effort group and examine the difference in MES between PTA programs with minority faculty and without minority faculty.

In addition, for the effort group, the percentage of programs utilizing each recruitment strategy was calculated. For the no effort group, the percentage of programs citing each reason why no specific recruitment strategies were utilized was calculated.

### **RESULTS**

A Pearson's correlation coefficient of  $R = .755$  indicates there is a strong positive relationship between the proportion of minority group members enrolled in the PTA program and the proportion of minority group members in the county in which the PTA program is located.

Thirty-five percent of respondents indicated the program implements specific strategies to recruit students from minority groups. The most common strategies utilized were participation in career fairs (74%), on-campus events about program or physical therapy careers (70%), visits to high schools (67%) reflecting cultural diversity as a program goal (56%), and participation in health fairs (52%).

For programs that do not implement specific strategies to recruit students from minority groups, the most common reasons cited were program has a high number of applicants (34%) and no perceived need (32%).

There was no significant difference in the MEES between programs that do and do not implement specific strategies to recruit students from minority groups. There was also no significant difference in the MEES between programs with and without minority faculty.

### **CONCLUSIONS**

Relatively few PTA programs implement specific strategies to recruit students from minority groups. Moreover, for programs that do implement such strategies, current common practices do not have a significant effect on enrolling students from minority groups.

### **CLINICAL SIGNIFICANCE**

PTA education program are not currently effective in enhancing the diversity of physical therapy providers. One strategy to increase the number of PTAs from minority groups may be to offer PTA education programs in geographical areas with higher minority populations.



# POSTER PRESENTATIONS

## 6 Comparison of High-Intensity Resistance and Power Training Programs in Pre-Frail and Frail Older Adults

### **PRESENTED BY**

Justin Mierzwicki, PT, DPT, GCS // Kevin Griffith, SPT // Madelyn Fox, SPT // Kelsey Harrison, SPT // Nikki Singley, SPT // Daryl Holstay, SPT

### **PURPOSE/HYPOTHESIS**

Frailty is characterized by declines in strength, muscle mass, slowness of movement, fatigue, low levels of physical activity, and predisposes individuals to adverse outcomes. Approximately 6.9% of community-dwelling adults over the age of 65 are characterized as frail and 46.6% are pre-frail. High-intensity resistance training and power training have shown to be effective interventions to combat frailty in the older adult population, however, few studies have directly compared the two interventions. The purpose of this study was to determine if high-intensity resistance training at 87-93% 1 RM or power training at 50% 1RM is a more effective intervention in pre-frail and frail older adults.

### **NUMBER OF SUBJECTS**

n=20

### **MATERIALS/METHODS**

Participants were recruited from a continuing care community, and screened utilizing Fried's Criteria and the FRAIL scale. Twenty participants (14 female, 6 male, mean age = 86.3 years +/-6.89 SD; 7 frail, 13 pre-frail) met eligibility criteria, and were assigned to the high-intensity resistance or power training group in a 1:1 fashion. Intervention, performed two times per week for ten weeks, consisted of: warm up, resistance OR power training utilizing Keiser® pneumatic weight equipment: chest press, shoulder press, elbow extension, leg press, knee extension and hamstring curls; and a cool down. High-intensity participants slowly performed three sets of 3-5 repetitions of each exercise at 87-93% of 1RM. Power group participants performed two sets of 20 repetitions of each exercise at 50% of 1RM as quickly as possible. Pre and post-intervention data collected included 5 times sit to stand, 30 second chair rise, 10 meter gait speed, timed up and go, hand held dynamometry, and 1RM for each exercise performed. Data analysis was performed within groups using paired t-tests and between groups independent samples t-tests.

### **RESULTS**

Six participants withdrew from the study; four due to medical issues unrelated to the study, and two due to dislike of exercise. Final data were collected on the 14 remaining participants (8 High-intensity, 6 Power). Paired samples t-tests results: statistically significant improvement in 16/24 dependent variables in the high intensity group and in 2/24 dependent variables in the power group ( $p < 0.05$ ). Independent samples t-test of the change scores demonstrate statistically greater improvements in the high intensity group than the power group for 6/24 dependent variables.

### **CONCLUSIONS**

Participants in the high-intensity training group demonstrated greater improvements in strength (1RM of knee extension and hamstring curls, as well as hip and knee handheld dynamometry) and mobility function (30 second chair rise) than did participants in the power training group. The two interventions were statistically similar for metrics such as gait speed, timed up and go performance, 5 times sit to stand, and certain 1RM and handheld dynamometry measures.

### **CLINICAL RELEVANCE**

Determining optimal exercise prescription is critical to be able to adequately meet the needs of the growing, frail older adult population. While further research into whether high-intensity resistance or power training is optimal in this population, it is possible that a combination of both intervention approaches would be ideal.

### **REFERENCES**

[1] Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, et al. Frailty in older adults: evidence for a phenotype. *Journal of Gerontology: Medical Sciences*. 2001; 56A(3): M146-156. [2] Collard RM, Boter H, Schoevers RA, Oude Voshaar RC. Prevalence of frailty in community-dwelling older person: systematic review. *Journal of the American Geriatric Society*. 2012; 60(8): 1487-92. [3] Binder EF, Schechtman KB, Ehsani AA, Steger-May K, et al. Effects of exercise training on frailty in community-dwelling older adults: results of a randomized, controlled trial. *Journal of the American Geriatrics Society*. 2002; 50:1921-1928. [4] Raymond MJ, Bramley-Tzerefos RE, Jeffs KJ, Winter A and Holland AE. Systematic review of high-intensity progressive resistance strength training of the lower limb compared with other intensities of strength training in older adults. *Archives of Physical Medicine and Rehabilitation*. 2013; 94:1458-1472. [5] Cadore EL, Rodriguez-Manas L, Sinclair A and Izquierdo M. Effects of different exercise interventions on risk of falls, gait ability, and balance in physically frail older adults: a systematic review. *Rejuvenation Research*. 2013; 16(2):105-114. [6] Hvid LG, Strotmeyer ES, Skjold M, Magnussen LV, Andersen M and Caserotti P. Voluntary muscle activation improves with power training and is associated with changes in gait speed in mobility-limited older adults—a randomized controlled trial. *Experimental Gerontology*. 2016; 80:51-56. [7] Hazell T, Kenno K and Jakobi J. Functional benefit of power training for older adults. *Journal of Aging and Physical Activity*. 2007; 15:349-359. [8] Ramirez-Campillo R, Diaz D, Martinez-Salazar C, Valdes-Badilla P, et al. Effects of different doses of high-speed resistance training on physical performance and quality of life in older women: a randomized controlled trial. *Clinical Interventions in Aging*. 2016; 11:1797-1804. [9] Cadore EL, Casas-Herrero A, Zambom-Ferraresi F, Idoate F, et al. Multicomponent exercises including muscle power training enhance muscle mass, power output, and functional outcomes in institutionalized frail nonagenarians. *Age*. 2014; 36:773-785. [10] Kojima G. Frailty defined by FRAIL scale as a predictor of mortality: a systematic review and meta-analysis. *Journal of the American Medical Directors Association*. 2018; 19(6):480-483.

# POSTER PRESENTATIONS

## 7 Weight Vest Training in Community-Dwelling Older Adults: A Randomized, Controlled Pilot Study

### PRESENTED BY

Justin Mierzwicki, PT, DPT, GCS

### PURPOSE/HYPOTHESIS

Age-related changes within the neuromusculoskeletal system are known to cause declines in strength and functional performance in older adults. Weighted vests, at various dosages ranging from 2.5-15% of body weight, have been used as an intervention to improve strength, power, aerobic capacity, and function in adult populations. However, limited research in this area has focused on healthy community-dwelling older adults. The purpose of this study was to determine the impact of adding weighted vest resistance at 10% of body weight, to an exercise program, on the development of lower extremity strength, functional mobility, and aerobic capacity in community-dwelling older adults.

### SUBJECTS

n=19

### MATERIALS/METHODS

Participants were recruited utilizing an email database of local community-dwelling older adults. Nineteen participants (10 female, 9 male, mean age = 68.7 +/- 5.9 SD) met inclusion criteria and were randomly assigned, in a 1:1 fashion, into either an exercise only control group or an exercise plus 10% body weight weighted vest intervention group. Both groups performed a home program consisting of the same six lower extremity exercises and a 30 minute walking program, 3x/wk for 12 weeks. Pre and post intervention data collection included: lower extremity muscle strength dynamometry, 5-time sit to stand, 30-second chair rise, one leg stance heel rise, 2-minute step test, and 6-minute walk test. Pre to post intervention data for each group were analyzed using paired t-tests. The two groups' mean change for each dependent variable were compared utilizing independent samples t-tests

### RESULTS

Two participants withdrew due to medical conditions unrelated to the study, resulting in 17 (9 Control, 8 Vest) participants completing intervention and data collection. Statistically significant improvements pre-post intervention ( $p < 0.05$ ) were noted in 100% of the weighted vest group dependent variables and 42% of the non-vest control group dependent variables. Statistically significant improvements were noted in the vest group relative to the control group in hip extension strength ( $p = 0.019$ ), hip abduction strength ( $p = 0.037$ ), 30 second chair rise ( $p = 0.015$ ), 2-minute step test ( $p = 0.013$ ) and 6-minute walk test ( $p = 0.004$ ).

### CONCLUSIONS

Weighted vest use during exercise resulted in statistically greater improvements in outcomes than an exercise alone. These improvements spanned impairment based measures of strength and aerobic capacity, as well as measures of functional mobility. Further research is required to determine appropriate dosage parameters, including percentage of body weight loading and length of wearing time required to optimize vest-related improvements in the older adult population.

### CLINICAL RELEVANCE

Weighted vests are safe, portable, and relatively inexpensive devices that can facilitate improvements in strength, aerobic capacity, sit to stand performance, and ambulatory function in community-dwelling older adults.

### REFERENCES

[1] Brouwer B and Olney S. Aging skeletal muscle and the impact of resistance exercise. *Physiotherapy Canada*. 2004; 56:80-87. [2] Mair JL, Laudani L, Vannozi G, DeVito G, Boreham C and Macaluso A. Neuromechanics of repeated stepping with external loading in young and older women. *European Journal of Applied Physiology*. 2014; 114:983-994. [3] Roghani T, Torkaman G, Movasseghe S, Hedayati M, Goosheh B and Bayat N. Effects of short-term aerobic exercise with and without external loading on bone metabolism and balance in postmenopausal women with osteoporosis. *Rheumatology International*. 2013; 33:291-298. [4] Normandin E, Yow D, Crotts C, Kiel J, Beavers KM and Nicklas BJ. Feasibility of weighted vest use during a dietary weight loss intervention and effects on body composition and physical function in older adults. *Journal of Frailty and Aging*. 2018; 7(3): 198-203. [5] Greendale GA, Salem GJ, Young JT, Damesyn M, Marion M, Wang M and Reuben DB. A randomized trial of weighted vest use in ambulatory older adults: strengths, performance, and quality of life outcomes. *Journal of the American Geriatrics Society*. 2000; 48(3):305-311. [6] Salem GJ, Flanagan SP, Wang MY, Song JE, Azen SP and Greendale GA. Lower-extremity kinematic response to weighted-vest resistance during stepping exercise in older adults. *Journal of Applied Biomechanics*. 2004; 20:260-274. [7] Bean JF, Herman S, Kiely DK, Frey IC, Leveille SG, Fielding RA and Frontera WR. Increased velocity exercise specific to task (InVEST) training: a pilot study exploring effects on leg power, balance and mobility in community-dwelling older women. *Journal of the American Geriatrics Society*. 2004; 52:799-804. [8] Hamaguchi K, Kurihara T, Fujimoto M, Iemitsu M, Sato K, Hamaoka T and Sanada K. The effects of low-repetition and light-load power training on bone mineral density in postmenopausal women with sarcopenia: a pilot study. *BMC Geriatrics*. 2017; 17:102. [9] Snow CM, Shaw JM, Winters KM and Witzke KA. Long-term exercise using weighted vests prevents hip bone loss in postmenopausal women. *Journal of Gerontology: Medical Sciences*. 2000; 55A(9): M489-M491. [10] Barnes KR, Hopkins WG, McGuigan MR and Kilding AE. Warm-up with a weighted vest improves running performance via leg stiffness and running economy. *Journal of Science and Medicine in Sport*. 2015; 18:103-108.

# POSTER PRESENTATIONS

## 8 The Impact of Physical Activity on Balance and Gait in Patients with Diabetic Neuropathy

### **PRESENTED BY**

Kristen Karnish PT, MPH, D.Ed, GCS // Alyssa Kehm, SPT// Trisha Hand, SPT

### **BACKGROUND**

Diabetes mellitus affected 30.3 million Americans and was ranked as the seventh leading cause of death in the United States in 2015. The effects of untreated and undermanaged diabetes can have lasting repercussions on patients. Diabetic peripheral neuropathy is the most common complication associated with long-term diabetes and can have a significant impact on a patient's mobility and overall health.

### **PURPOSE**

The purpose of this systematic review was to analyze the literature and evaluate the effects of physical activity interventions on balance and gait in patients with diabetic neuropathy.

### **METHODS**

Four literature searches were conducted between August 2018 and January 2019 using six databases and a variety of key terms. After utilizing the inclusion and exclusion criteria, 12 articles were deemed appropriate for the study.

### **RESULTS**

Physical activity is beneficial in improving symptoms and impairments related to peripheral neuropathy in patients with diabetes. Physical activities/interventions utilized for patients with diabetic peripheral neuropathy include resistance exercises and aerobic weight-bearing exercises to improve muscle strength. Interventions also consist of balance exercises, including TaiChi and Biodex Stability System training, and task-oriented gait training utilized to improve static and dynamic balance and decrease fear of falls. Benefits of physical activity include improvements in physiologic measures such as fasting blood sugar, HbA1c, and VO2 max. Benefits of physical activity also include improvements in balance, gait, and disability measures. Additionally, research indicates physical activity offers no detrimental integumentary effects for patients with diabetic neuropathy.

### **CONCLUSION**

Physical activity has proven to be effective in reducing impairments and improving balance and gait function in patients with diabetic peripheral neuropathy. Exercise programs with aerobic, weight-bearing, and task oriented interventions correlate with the most significant improvements. Additionally, research indicates aerobic exercise with resistance training helps to reverse symptoms associated with diabetic neuropathy. Physical Therapists play an important role with many patients diagnosed with diabetes and pre-diabetes. Physical activity, including balance and gait interventions, should be encouraged to improve patient's functional mobility and to manage secondary complications.

# POSTER PRESENTATIONS

## 9 The Impact of Physical Activity Education on HRQOL for Women Residing in a Homeless Shelter

### **PRESENTED BY**

Tonya Miller PT, DPT, Phd // Corrina Parsons, DPT // Rebecca Tanz, DPT // Paige Brocato, DPT// Samantha Boyce, DPT

### **PURPOSE/HYPOTHESIS**

Previous research shows that physical activity education programs benefit individuals experiencing homelessness. However, the impact of physical activity education on Health-Related Quality of Life (HRQOL) measures and physical performance remains unclear for women who experience homelessness. The purpose of this study was to examine the impact of a four-week physical activity education program on the HRQOL and physical performance of the functional capacity of women who reside in a homeless shelter. We hypothesized that participants would report improved HRQOL measures and would show increased physical performance following participation in a physical activity educational program.

### **SUBJECTS**

The sample population consisted of 14 women ages 18 and older who resided at one of two homeless shelters in Harrisburg, Pennsylvania. Exclusion criteria consisted of women who were unable to ambulate regularly or complete the pre-and post-physical performance of functional capacity.

### **MATERIALS AND METHODS**

The participants completed a physical activity education program. Education sessions occurred one time per week for four weeks. The educational program consisted of standardized education provided by the Health and Human Services entitled, "Be Active Your Way". Each session consisted of group sharing, a brief education lesson related to physical activity, and activity goal reflection. In addition to the education sessions, each participant received educational handouts, activity logs, and a pedometer. Researchers encouraged participants to complete activity logs and track their pedometer information at least four of seven days. Pre- and post-testing consisted of standardized tests including the Center Disease Control and Prevention's (CDC) "Healthy Days" HRQOL measure (4) core questions and 6 Minute Walk Test (6MWT).

### **RESULTS**

Women who participated in the physical activity educational program reported significantly fewer mentally unhealthy days during the program than in the preceding month (pre=13 days vs. post= 7days);  $p < .05$ . The physical performance of functional capacity (6MWT) showed no significant mean change in distance ambulated (pre=372.22 meters vs. post= 392.71 meters);  $p > .05$ .

### **CONCLUSIONS**

The findings are consistent with the hypothesis that participation in a physical activity education program may lead to improved HRQOL for women residing in a homeless shelter. The findings are not consistent with the hypothesis that participation in a physical activity education program may contribute to improved physical performance of the functional capacity for women residing in a homeless shelter.

### **CLINICAL RELEVANCE**

This research adds to the body of knowledge regarding the impact of physical activity education in marginalized populations. The findings support the positive influence of physical activity education on the overall well-being of women who reside in a homeless shelter. This research contributes to the foundation for future program evaluation of cost-effective health promotion strategies for homeless shelters.

# POSTER PRESENTATIONS

## **10 Differential Diagnosis and Conservative Management of Iselin's Disease in an Adolescent Dancer: A Case Report**

### **PRESENTED BY**

Amy Humphrey, PT, DPT

### **BACKGROUND AND PURPOSE**

Apophysitis is a common type of overuse injury that pre-pubescent adolescent dancers may experience. Iselin's disease is a painful traction apophysitis that occurs where the peroneus brevis tendon inserts on the base of the fifth metatarsal. Male and female adolescents between 8 to 14 years of age are most prone to this injury. There is currently a lack of evidence supporting conservative management of Iselin's disease. The purpose of this case report is to bring awareness to Iselin's disease as a diagnosis for lateral foot pain and to assess the conservative management of Iselin's disease.

### **CASE DESCRIPTION**

An 11 year old female recreational dancer presented to physical therapy with a chief complaint of lateral right foot pain and swelling at the region of the proximal 5th metatarsal. No mechanism of injury was noted and the patient was unable to weight bear through her right lower extremity. Examination by the physical therapist revealed swelling and point tenderness over the fifth metatarsal base. Pain was also produced at this site with active eversion and passive inversion of her right ankle. The physical therapist sent the patient to urgent care to rule out a fracture of the 5th metatarsal. The patient was diagnosed with Iselin's disease and physical therapy was prescribed. The patient's physical therapy plan of care focused on therapeutic exercises for foot and ankle mobility, lower extremity strength, core strength, proprioception, and return to dance activity over a twelve week period of time that encompassed sixteen physical therapy visits.

### **OUTCOMES**

Conservative management of Iselin's disease was found to be beneficial for this patient. The improvement was demonstrated by the patient's increase in ankle range of motion, decrease in tenderness with palpation, and decrease in impairment measured by the Foot & Ankle Ability Measure score. The patient was able to return to full pain-free dance activity as evidenced by an increase in the Dance Functional Outcome Score.

### **DISCUSSION**

Awareness of Iselin's disease and differentiating it from fractures is important because this condition can be managed by conservative methods whereas fractures require non-weight bearing immobilization. Further research is needed to investigate the effectiveness of conservative physical therapy in adolescents with Iselin's disease.

# POSTER PRESENTATIONS

## 11 Measuring the Average Peak Timing of Kinematic Variables in Adolescent Baseball Pitchers

### **PRESENTED BY**

Daniel Zambanini, SPT // Joseph Breisinger, SPT // Sean Donegan SPT // Sydney Lee SPT // Kaitlyn Reese SPT // Elizabeth Stiffler SPT // Angela Tyke SPT // Mark Boland DPT, OCS, MBA // Ivan Mulligan PT, DSc, SCS, ATC

### **PURPOSE**

As pitching related injuries rise in adolescent baseball, it is crucial to identify the prevalence of both known reported and measurable risk factors in adolescent baseball pitchers. The aim of the current study is to determine peaks in rotational kinematic variables among adolescent baseball pitchers as compared to previously collected data on collegiate and professional pitchers.

Hypothesis: In the current study, it is hypothesized that adolescent baseball pitchers will exhibit peaks in rotational velocities and ranges of motion earlier in the pitching cycle compared to collegiate and professional pitchers.

### **METHODS**

Twenty-four (24) male pitchers (ages 9-16, mean 12.75, standard deviation (SD)  $\pm$  2.02), recruited from a rural area in central Pennsylvania, participated in the study. Thirty-seven reflective markers were placed on each subject. Kinematic data was captured using an eight camera VICON motion analysis<sup>®</sup> system, with the pitching cycle identified as initial foot contact to ball release.

### **RESULTS**

The average timing of peak trunk rotation range of motion in the 24 subjects occurred during 8.45% (SD  $\pm$  12.72) of the pitching cycle. Maximal pelvic rotation velocity took place at 33.26% (SD  $\pm$  16.42) of the pitching cycle and was shortly followed by peak trunk rotation velocity at 41.59% (SD  $\pm$  9.27) of the pitching cycle. The maximum shoulder external rotation range of motion occurred at 71.34% (SD  $\pm$  6.61) of the pitching cycle. Peak shoulder internal rotation velocity occurred last at 86.93% (SD  $\pm$  6.45) of the pitching cycle. Also, the average stride length, which was recorded in percentage of height of the subjects in this study, was 81.97% (SD  $\pm$  4.57).

### **CONCLUSION**

The current study was able to identify the average peak timing of kinematic variables in the given subject population. The timing of these kinematic events may occur earlier in the pitching cycles of adolescent baseball pitchers versus collegiate or professional pitchers. The subjects within this study had stride lengths that were approximately 10% shorter than the accepted values for professional and collegiate pitchers. This finding suggests that a shorter stride length can cause adolescent pitchers to begin rotating earlier in the pitching cycle.

### **CLINICAL RELEVANCE**

The study suggests that pitchers with a decreased stride length may exhibit peaks in kinematic variables occurring earlier in the pitching cycle.

# POSTER PRESENTATIONS

## 12 Measure the Prevalence of Injury-Related Risk Factors in Adolescent Baseball Pitchers

### **PRESENTED BY**

Daniel Zambanini, SPT // Joseph Breisinger, SPT // Sean Donegan SPT // Sydney Lee SPT // Kaitlyn Reese SPT // Elizabeth Stiffler SPT // Angela Tyke SPT // Mark Boland DPT, OCS, MBA // Ivan Mulligan PT, DSc, SCS, ATC

### **PURPOSE**

As pitching related injuries rise in adolescent baseball, it is crucial to identify the prevalence of known reported and measurable risk factors in adolescent baseball pitchers. Hypothesis: The current study hypothesizes that adolescent baseball pitchers will have a high prevalence of both measurable and reported risk factors.

### **METHODS**

Twenty-four (24) male pitchers (ages 9-16, mean 12.75, standard deviation  $\pm 2.02$ ), recruited from a rural area in central Pennsylvania, participated in the study. Subjects completed a questionnaire comprised of reported risk factors identified by the literature. Kinematic data was analyzed using marker-based VICON motion analysis<sup>®</sup>. In addition, data was collected on the subject's anthropometric measurements, range of motion measurements, and isokinetic strength using Biodex<sup>®</sup> dynamometer.

### **RESULTS**

Of the 24 participating pitchers, 63%(15/24) reported elbow and/or shoulder pain during or after pitching. Of the pitchers who reported pain, 93%(14/15) had a stride length less than 90% of their height. Overall, 54%(13/24) of subjects reported pitching through fatigue, 42% (10/24) exhibited an ER/IR strength ratio on the dominant arm of less than 72%.

### **CONCLUSION**

The current study identified a high prevalence of pitching related risk factors for injury in youth male baseball pitchers, established from previous studies.

### **CLINICAL RELEVANCE**

Injury in youth pitchers is becoming more widespread. This study has confirmed a high prevalence of injury related risk factors in adolescent baseball pitchers that can be measured clinically and addressed before pain/injury ensues.

# POSTER PRESENTATIONS

## 13 Effects of Kinesiology Taping on Quadriceps Musculature Proprioception in Healthy Adults: A Pilot Study

### **PRESENTED BY**

James O'Donohue, Assistant Professor of Physical Therapy/PT, DPT, OCS, ATC, FAFS // Neil Boyle, DPT // Ryan Cassedy, DPT // Adam Siegrist, DPT // Lauren Smith, DPT // Janet L. Mutschler, PT, DPT, MHS

### **PURPOSE/HYPOTHESIS**

Kinesio-Tape® (KT) has been used for many purposes including muscle facilitation and inhibition along with improved proprioception. Evidence supporting its effectiveness remains limited and conflicting. The purpose of this study is to examine the short- and long-term effects of KT in influencing proprioception of the knee with and without fatigue. We hypothesize that proprioception, measured as improved joint position sense, will be improved in both conditions.

### **SUBJECTS/MATERIALS/METHODS**

Ten subjects (9 female and 1 male), ages 19 to 30 years old without recent lower extremity injury participated in this study. Subjects reproduced four randomized knee joint angles of 25°, 35°, 45°, and 55° without visual input. For each measurement the subject's knee joint was passively positioned at the target angle before being returned to the resting position of 90°. They were then asked to actively reproduce this angle. Joint repositioning error of each attempt was recorded using a standard goniometer, measured as the absolute number of degrees from the target angle. A fatiguing protocol for the quadriceps muscle group was employed in order to reduce proprioception. Four total measurements were obtained under four unique conditions. Under condition one the target angle was obtained pre-fatigue and pre-KT application as a baseline measurement of subject proprioceptive ability. Condition two involved producing the target angle immediately after the conclusion of the fatiguing protocol, but before the application of KT. Condition three consisted of reproducing the target angle immediately after condition two as post-fatigue and with KT application. The final condition involved returning 48 hours after the application of KT and attempting to reproduce the final target angle.

### **RESULTS**

There was a statistically significant reduction in the mean positioning error between condition 1 and 4 ( $P = .028$ ) with no significance between condition 2 and 3 ( $P = .091$ ).

### **CONCLUSIONS**

Knee joint proprioception showed statistically significant improvement following the prolonged application of KT supporting long-term (several days) use of this technique for improved proprioception. Immediately following quadriceps fatigue and application of KT, knee joint proprioception showed a trend of improvement that was not deemed statistically significant. Threats to validity include low number of subjects and no control for potential learning effect for joint positioning. Future studies with greater participation (increased power), addition of a fatiguing protocol on the second day of data collection, along with potential variation of conditions are needed to further support or refute these findings.

### **CLINICAL RELEVANCE**

Deficits in proprioception of the knee and quadriceps are commonly noted after injuries and surgical procedures of this region. When working with individuals with deficits in knee and quadriceps proprioception, the results of this study support the use of KT as an adjunct treatment by providing positive proprioceptive input over a several day period of time.



# POSTER PRESENTATIONS

## **14 Is There a Difference in Gaze Stability Scores between Ball Athletes, Non-Ball Athletes, and Non-Athletes?**

### **PRESENTED BY**

Natalie Albright, SPT // Molly Bishop SPT, EP-C// John Chesney SPT// Hannah Dorian SPT// Jessica Fischetti SPT //Rachel Smith SPT, EP-C //Rosemary Smith SPT // Lindsay Wilde SPT // Jessica Cammarata PT, DPT, DEd, NCS

### **PURPOSE/HYPOTHESIS**

Previous research has found that athletes have better performance on gaze stability testing than non-athletes, but little work has been done to determine if there is variation due to specific demands of the sport, such as tracking a ball. Understanding this difference could be used to further individualize vestibular rehabilitation. The purpose of this study was to investigate gaze stability test (GST) scores between 3 participation categories: Division I ball athletes, Division I non-ball athletes, and non-athletes. It was hypothesized that there would be a significant difference in GST scores between the 3 categories.

### **NUMBER OF SUBJECTS**

Subjects included 21 Division I ball athletes, 20 Division I non-ball athletes, and 21 non-athletes from one rural private university.

### **MATERIALS AND METHODS**

Subjects meeting all inclusion and exclusion criteria were separated into 1 of 3 participation categories according to involvement in Division I sports. The NeuroCom inVision® system was used to test static visual acuity, perception time, and high performance gaze stability in the pitch and yaw planes. One-Way ANOVA, Pearson correlation coefficients, and regressions were used to analyze the data.

### **CONCLUSIONS**

No statistically significant relationship was found between participation category and GST performance, disproving the hypothesis. The relationship between participation category and up average achieved velocity approached significance. Future research may attempt to control for hours of practice time, past involvement with sports, and physical activity not associated with the designated sport. Future research may also look at the relationship between dominant hand and velocity symmetry in the yaw plane. The weaknesses of this study included possible misinterpretation of instructions given during data collection, inconsistency of test administrator, and lack of protocol for a result of no score (NS) for gaze stability testing. The strengths of this study included a widespread response across the population of a small, rural university, and the inclusion of a thorough pre-test survey.

### **CLINICAL RELEVANCE**

Even though not statistically significant, the higher average achieved velocities in the upward plane demonstrated by ball athletes as compared to non-ball athletes and non-athletes suggests a need for increased training intensities in the pitch plane following vestibular injury to return this population to baseline function. Additionally, the significant findings related to DU velocity symmetry indicate that there are different factors, including an individual's age and perception time, that may cause velocity asymmetry without a known vestibular deficit. Better understanding of factors that affect GST performance will ultimately serve to improve individualized vestibular rehabilitation.

# POSTER PRESENTATIONS

## 15 Pelvic Floor Physical Therapy Successfully Treats Chronic Pelvic Pain without Opioids: A Retrospective Chart Review

### **PRESENTED BY**

Kirsten Mayhew, SPT // MaryRose Bufanio SPT,/, Morgan McGrane SPT//Christina Perry SPT// Emilee Strange SPT//Karen Snowden PT, DPT WCS,/, Lori Haring PT, MS,/, Melissa A Carroll PhD, MS

### **PURPOSE/HYPOTHESIS**

Chronic pelvic pain (CPP) is a complex, multifactorial condition that is ill-defined and lacks a standard treatment protocol. Opioids have commonly been administered as long-term therapy for CPP, yet due to a myriad of adverse effects associated with prolonged opioid use, recent healthcare trends favor conservative treatment options. Physical therapy (PT) is a successful form of conservative management, however, research on its effectiveness in the realm of CPP is scant. The purpose of this study was to determine if a difference exists between the success levels of women with CPP who participated in pelvic floor physical therapy (PFPT) alone compared to those involved in PFPT and concurrent opioid therapy (PFPT+OT).

### **SUBJECTS/MATERIALS/METHODS**

This retrospective chart review used 100 charts collected from an outpatient PT clinic in Allentown, Pennsylvania. Inclusion criteria consisted of women ages 18 and older with CPP diagnoses who participated in PFPT between June 2013-June 2018. Patients with pelvic organ prolapse or a primary diagnosis of low back pain were excluded. Ultimately, 40 charts were included. Allocation to the PFPT+OT group was determined by the World Health Organization's definition of opioids. Success was defined as improvement in at least one of the following variables: function, activity tolerance (AT), or quality of life (QoL), along with decreased pain from initial evaluation (IE) to discharge (DC). Chart content relating to "Body Structures and Functions" and "Activity and Participation" sections of the ICF model were abstracted and categorized as either function, AT, or QoL.

### **RESULTS**

The 40 included charts were allocated into PFPT (n=33) and PFPT+OT (n=7). The PFPT group (49.97±13.59) was significantly older (p=.021) than the PFPT+OT group (35.86±16.66). Baseline pain scores were homogeneous between groups (p=.192). Overall success from IE to DC was greater in the PFPT group (X<sup>2</sup>(1)=8.464, p=.004). Functional success from IE to DC was also greater in the PFPT group (X<sup>2</sup>(1)=4.675, p=.031). There were no significant differences found between groups for AT success (p=.137) and QoL success (p=.199).

### **CONCLUSIONS**

Both functional and overall success were significantly greater in the PFPT group, indicating that in this study, PFPT alone led to better outcomes than PFPT+OT. For AT and QoL, the addition of opioids provided no advantage over PFPT alone for treating CPP. Primary limitations of this study surround the retrospective nature of data collection and the unequal sample distribution.

### **CLINICAL RELEVANCE**

These results help bridge the knowledge gap that exists in understanding safe, effective treatment protocols for women with CPP. Opioid therapy has been a primary treatment, but rising addiction rates and adverse reactions exemplify that alternate options are paramount. PT is a conservative method that offers considerable success. As such, PFPT alone may negate the need for opioids in treating women with CPP. In order to assist in curtailing the opioid epidemic, the preferred treatment method for women experiencing CPP should be PFPT.

# POSTER PRESENTATIONS

## 16 Part-Time Integrated Clinical Education in DPT Education: Prevalence and Effectiveness in Developing Foundational Skills

### **PRESENTED BY**

Lori Madiara, DCE/ PT, DPT, MSHA // Robert Beach SPT, // Lindsey Hoy SPT, // Dalton Lewis SPT // Megan Lokay SPT // Zachary Zajac SPT

### **PURPOSE**

As the number of DPT programs and DPT class sizes continue to increase, student placements for quality clinical education experiences have become increasingly more challenging. In an effort to place students in varied clinical environments, and meet all CAPTE requirements, many DPT programs have decreased the number of full-time clinical experiences offered to students, and utilize Pro bono clinical experiences, service learning, and part-time integrated clinical education (ICE) experiences to meet these challenges. This study aimed to identify the prevalence and structure of part-time integrated clinical education experiences among CAPTE accredited DPT programs, and explore the assessment methods currently utilized to determine the effectiveness of part-time ICE to meet program specific identified objectives.

### **METHOD**

Following an in-depth literature search, which revealed limited published information on specific structure or assessment of part-time ICE, a twenty-one question survey of multiple choice questions was developed, including geographical information, and self-identification of the program as affiliated with a public or private institution. This survey was distributed electronically to Directors/ Academic Coordinators of Clinical Education of the 242 current CAPTE accredited physical therapy programs. Nine emails were returned as undeliverable, with an assumption that 233 electronic invitations were successfully received by recipients.

### **RESULTS**

A total of 128 surveys were returned completed, representing a response rate of 55% of delivered surveys, with a completion rate of 88.28% of all individuals who opened the survey. Survey responses were almost equally distributed across public and private institutions, and were well distributed across geographical regions of the United States. Preliminary review of survey results revealed that the most significant changes in clinical education curriculum across all DPT programs have occurred in the past four years, with clinical placement challenges being identified as the number one reason for these curricular changes. More than 75% of schools reported student involvement in some type of Pro bono experience, and 85% reported having at least one part-time ICE experience in their clinical education curriculum. The number of part-time ICE experiences, placement within the curriculum, actual structure, types of clinical settings utilized, educational objectives, and ICE assessments varied greatly among programs.

### **RELEVANCE**

This study has confirmed that use of part-time ICE experiences and Pro-bono experiences are becoming more wide spread in DPT education in an attempt to address increasing challenges of student placements, while also providing students' exposure to varied patient populations and settings. Currently there is limited published literature on how the profession is assessing the effectiveness of these new part-time integrated clinical education models, and if there is a best-practice model to guide curricular development across DPT programs. We believe this is the first study of its kind looking at the overall prevalence and varied structure of these part-time integrated experiences, and it is hopefully that this study will provide some guidance into the various structures and assessments currently being used by CAPTE accredited DPT programs in the United States. Further studies comparing various ICE models, using a standardized assessment tool could potentially assist in the development a best-practice model.

# POSTER PRESENTATIONS

## 17 A Comprehensive Distance-Learning Program to Enhance the Spine Program at a Regional Health Network

### **PRESENTED BY**

Jesse Schimmer, PT, DPT//Chris Johns PT, DPT

### **PURPOSE**

To describe an internal educational program developed by a regional health network to enhance skills of physical therapists, improve clinician confidence, improve patient outcomes, and maximize physician support for the evaluation and treatment of patients with low back pain.

### **BACKGROUND**

Patients with lumbar pain conditions comprise over 40% of the orthopedic referrals for physical therapy at Lehigh Valley Health Network (LVHN), making treatment of this population ideal for an educational program designed to enhance physical therapists' skills, improve clinician confidence and improve outcomes. Furthermore, physical therapists are asked more frequently to justify services from payers, patients, and referring providers. Optimization of treatment efficiency is needed in order to remain fiscally solvent. Patients are also becoming better informed about conditions and treatment options. Additionally, referring physicians are seeking clinicians with specialized training to treat patients with spinal pain.

### **METHODS**

A task force of physical therapists with advanced spine rehabilitation training was created. The task force created the conceptual basis for the educational program with consultation from referral sources and termed the program the Spine-Trained Physical Therapist (STPT) program. The task force identified the 2016 update to the treatment-based classification system as an evidence-based framework for the program. This framework provides structure in choosing appropriate, effective interventions while allowing for clinician flexibility based upon personal expertise and patient values. It also describes screening patients for red flags and those in need of psychologically-informed rehab.

Select therapists were enrolled in the program and an eight-module course was developed and uploaded to a network sanctioned, internal electronic learning platform. Participants attended a live laboratory course focusing on manual therapy, directional preference interventions, and therapeutic exercise midway through the program. The modules and lab course were submitted to the Pennsylvania State Board of Physical Therapy for approval for continuing education units. Therapists also completed the American Physical Therapy Association's core values self-assessment and completed shadowing hours with a spine surgeon, physiatrist, and pain-management physician. At the completion of the lab based component of the STPT track, clinicians completed a survey rating clinical confidence pre/post program, satisfaction with departmental spine education pre/post program, and overall level of satisfaction with the STPT program.

### **ANALYSIS/RESULTS**

Thirty six physical therapists enrolled in the flagship iteration of the STPT program. All survey respondents reported increased clinical confidence (13.5%) and all survey respondents reported increased satisfaction with departmental spine education programming (27.5%). Clinicians also reported satisfaction with the STPT program at 8.5/10 on average. The program is anticipated to award a total of 468 continuing education hours within a 6 month period. Referral and outcomes data collection is ongoing and will be reported at a later date as this pilot program progresses.

### **CONCLUSION**

An internal distance-learning spine training program for physical therapists demonstrated effectiveness in providing continuing education, improving clinician confidence, and improving clinician engagement with departmental spine rehabilitation education. In a large health network, this type of programming allows for timely and specific training delivered at low cost and establishes a model for future internal educational programs.

# POSTER PRESENTATIONS

## **18 Best Practice in PTA Education: Developing a Foundation for Clinical Readiness**

### **PRESENTED BY**

Beverly Laboksy, ACCE/PTA // Jennifer Jewell, PT, DPT, GCS // Heather Wells, PT, DPT // Lisa Stejskal, PTA, MAEd

### **PURPOSE**

To discuss common barriers to student clinical readiness and conceptualize strategies to overcome these identified barriers prior to engagement in the clinical setting.

### **RELEVANCE TO PT**

With the increasing demands placed on physical therapist assistants to be highly functioning and productive at career entry, PTA educators are often faced with the challenge of developing the most efficient way to prepare their students for the clinical setting. Recognition and early identification of possible student barriers to clinical readiness are often identified in the classroom setting, however, contending with an at-capacity didactic curriculum may leave PTA educators unsure as to how to specifically target these issues early on. It is important to enhance student clinical readiness prior to terminal clinical experiences to create physical therapist assistants (as well as physical therapists) that are both entry level as well as job ready upon graduation.

### **CONTEXT WITHIN CURRENT EVIDENCE BASE PRESENTED**

The association between classroom behaviors and clinical behaviors/performance were established through literature review. The most common barriers to student clinical readiness were identified as soft skills, self-directed learning, productivity, and communication. The impact of emotional intelligence on soft skills and clinical behaviors was reviewed and presented. Discussion of pedagogical suggestions to address these barriers within the classroom setting prior to clinic entry.

### **STRENGTHS AND WEAKNESSES**

Upon literature review, numerous studies addressed deficits in other allied health professions and careers but were limited with PTA students specifically. Many of the attributes that employers were noted as desirable could be translated as weaknesses in the identified barriers to clinical readiness.

### **SUGGESTIONS FOR FURTHER WORK**

Recommend formal research study of physical therapy students as related to barrier areas during clinical experiences and into early career.

### **OF INTEREST TO AUDIENCE**

Although our topic focuses in PTA education it is also as equally relevant to DPT education. The level of the topic is appropriate for both the novice and experienced academic and clinical faculty and clinical coordinators. It will provide an academic perspective of the challenges that we face with our students and how we can better prepare our students for the future.

### **LEARNING OBJECTIVES**

1. Identify barriers to student clinical readiness
2. Recognize the association between classroom behaviors and clinical performance
3. Recognize the impact of emotional intelligence on clinical behaviors
4. Develop pedagogical strategies to enhance student success in clinical settings

# POSTER PRESENTATIONS

## 19 Exploring Variables Contributing to Functional Outcomes Following CVA: Comparison of Two Cases

### **PRESENTED BY**

Sarah Lopez, PT, DPT // Craig Elliot, PT, DPT

### **BACKGROUND & PURPOSE**

Brain resilience is influenced by components of brain reserve, lesion load, cognitive reserve, and cognitive debt. The purpose of this report is to explore how these components influenced the functional recovery of two medically complex patients presenting post stroke to inpatient rehabilitation.

### **CASE DESCRIPTION**

Two patients presented to inpatient rehab following a cerebral vascular accident with similar physical and cognitive impairments. However, their rate of recovery drastically differed, with one patient requiring nearly triple the duration of inpatient rehabilitative services to achieve similar functional outcomes.

### **OUTCOMES**

On initial evaluation both patients required maximal assistance to total assistance for all mobility. Upon discharge, the patients were functioning with assistance ranging moderate assistance to maximal assistance. Although both achieved similar functional outcomes, one patient received services for 5 weeks, while the other patient required 12 weeks of inpatient rehabilitation. The patients differed significantly related to neuroprotective factors of cognitive reserve including years of education, pre-morbid IQ, and their participation in physically and cognitively demanding tasks prior to their neurologic insults. They also differed drastically related to elements influencing cognitive debt, which negatively impacts cognitive reserve, including their history of depression and drug and alcohol abuse. These differences in cognitive reserve and cognitive debt correlated with their rate of recovery more than the factors of brain reserve and lesion load.

### **DISCUSSION**

Prognostic indicators influencing functional recovery are multifactorial and include pathoanatomical variances in addition to aspects of cognitive reserve and cognitive debt. Considering all of these factors can improve the clinician's understanding of the patient's cognitive resilience and their potential response to remediation or compensation. Furthermore, examining the components of brain resilience can improve goal setting and the predicted length of stay and burden of care.

# POSTER PRESENTATIONS

## 20 The Influence of Kinesiology Tape on Breathing Mechanics in College-Aged Individuals

### **PRESENTED BY**

Nancy Shipe, Associate Professor/PT, DPT, OCS // Kelly Lindenberg, PT, PhD // McKenzie Sweigart DPT // Whitney Wester DPT // Courtney Lichtenfels DPT // Ronald Peacock, Jr. DPT

### **PURPOSE**

Kinesiology Tape (KT) has been used clinically to improve posture, range of motion, muscle activation, and muscle strength. However, limited research has investigated the effect of KT on respiratory function, such as rib mobility or diaphragm and intercostal muscle activity. The purpose of this pilot study was to investigate the influence of KT on chest wall excursion (CWE), diaphragm strength, and respiratory muscle activation.

### **SUBJECTS**

The study utilized a randomized block design. A convenience sample of 20 subjects between the ages of 18 and 25 was recruited from the general university population.

### **METHODS**

Subjects were stratified by gender and randomly assigned to one of two groups: KT group or sham tape (ST) group. Subjects were blinded to their group assignment. Data collection occurred over two sessions. During session one, baseline measurements were taken. A circumferential tape measure measured CWE, a desktop spirometer assessed maximal inspiratory pressure (MIP), and electromyography (EMG) was used to calculate intercostal and anterior scalene muscle average activation during a maximal expiration and inspiration effort at rest. After baseline measurements (T-B) were taken, KT or ST was applied around the anterior and posterior lower thoracic area of each subject based on the group assignment. Ten minutes after the tape application, subjects repeated the maximal expiration and inspiration effort while the same measurements (T-1) were taken. Subjects continued to wear the tape and returned approximately 48 hours later to participate in a final round of the same measurements (T-2). Repeated measures ANOVAs were used to determine the influence of tape at baseline, immediately post-taping, and 48 hours post-taping between the KT and ST groups. Paired T-tests were used for any post hoc analyses.

### **RESULTS**

Analysis of the average EMG activity for each muscle group yielded a significant difference between taping methods for only 3 muscle groups: left scalene during CWE ( $P=0.005$ ), left scalene during MIP ( $p=0.027$ ), and right scalene during MIP ( $p=0.045$ ). Post hoc analysis showed a significant difference ( $p=0.046$ ) between T-B and T-2 for average EMG activity of left scalene during CWE and T-1 and T-2 for average EMG activity of left scalene during MIP ( $p=0.01$ ). No other significant differences were found within group EMG results. Between groups interactions were only found to be significant for average EMG activity of right scalene during CWE ( $p=0.037$ ). A significant difference was found for MIP in the KT group ( $p=0.014$ ). Post hoc analysis showed significant differences for T-B to T-2 ( $P=0.043$ ) and T-1 to T-2 ( $P=0.018$ ).

### **CLINICAL RELEVANCE**

KT application increased MIP, a measure of diaphragm muscle activity during inspiration. Enhanced activation of respiratory muscles can improve the efficiency of breathing. Future research will look at the effect of KT on breathing mechanics in diverse populations and aerobic performance.

# POSTER PRESENTATIONS

## 21 The Effects Of Post Hemiparetic Shoulder Pain On Motor Recovery In Individuals Post-Stroke

### **PRESENTED BY**

Staci Silar, Asst. Prof , PT, DPT // Marcia Thompson, PT, DPT, DSc // Marissa Harrigan, SPT // Brendan Helferty, SPT// Sarah Reynolds, SPT//Candice Troilo, SPT // David Vergulyanets, SPT

### **ABSTRACT**

In the United States, more than 750,000 people are affected by a Cerebral Vascular Accident (CVA) every year, with ischemic stroke being the most common, affecting about 80% of individuals. Occlusion of the Middle Cerebral Artery (MCA) produces extensive neurological damage, including contralateral spastic hemiparesis, and sensory loss. Hemiplegia is often used as a generalized term of motor and sensory deficits and is most common in the upper extremity post-CVA. Between 5% and 84% of those that have had a CVA also suffer from hemiparetic shoulder pain (HSP). Shoulder pain can begin anywhere from 2 weeks to 2-3 months post-stroke and has been associated with prolonged hospital stay and lack of recovery in upper extremity function. With the cause being multidimensional and highly debated within current literature, this often leads to difficulty forming treatment plans to address this type of pain. The purpose of this study is to determine if the presence of HSP limits overall motor recovery post-CVA. Retrospective data was collected from a local hospital system using the search criteria of patients that were being treated for CVA over the age of 18 years old, with hemiparesis and having the following two outcome measures present at initial evaluation and discharge, Stroke Rehabilitation Assessment of Movement (STREAM) and Visual Analog Scale (VAS) for pain. This criterion yielded 80 subjects for analysis. An independent t-test was completed and the results were  $t(78)=2.445$ ,  $p=0.002$  when comparing discharge STREAM values between 2 groups, pain vs no pain. The results are significant, indicating that while the mean change in STREAM was 69 points, those patients without pain were able to demonstrate higher levels of functional movements at discharge compared to those that had pain present at initial evaluation. After a CVA, there are varying degrees of motor and sensory loss, these findings provide evidence that pain should be addressed early in the rehabilitation process to maximize functional recovery. Future prospective study for further outcomes should focus on comparing STREAM results over longer period, throughout the rehabilitation process; as well as interventions that can effectively manage HSP and improve functional outcomes across the stroke rehabilitation continuum.



# POSTER PRESENTATIONS

## 22 Physical Therapy As a Conservative Treatment Option for an Adult With Femoral Anteversion

### **PRESENTED BY**

Abbie Kessler, DPT

### **BACKGROUND AND PURPOSE**

Femoral derotational osteotomy about an antegrade intramedullary nail is a common treatment option for femoral anteversion. There is a large body of research devoted to both surgical and conservative treatment of this condition in adolescents, but little research has been completed on management of this condition with physical therapy for adults. The purpose of this case report is to describe a conservative treatment option through physical therapy for patients suffering with symptoms associated with femoral anteversion.

### **CASE DESCRIPTION**

A 30-year-old female presented to an outpatient physical therapy clinic with bilateral hip and foot pain of 6 months duration. Her symptoms began after an increase in exercise and walking time. Upon evaluation there were measurable deficits in eversion range of motion (ROM) of the right foot, dorsiflexion ROM of the left foot, bilateral hip flexion ROM, and bilateral external rotation ROM. Excessive internal rotation ROM was measured bilaterally. Bilateral hip external rotation, internal rotation, and knee flexion strength were significantly limited. Gait analysis was performed visually and through video analysis. Excessive internal rotation of both hips with heel strike, foot flat, and push off phases was observed, as well as weight distribution through the lateral aspect of both feet throughout stance phase. Outcomes: Over a course of 27 visits which focused on conservative physical therapy the patient showed a reduction in bilateral hip pain from 0-4/10 to 0/10 on the visual analog scale, as well as foot pain from 0-8/10 to 0/10. ROM of right/left (R/L) hip flexion improved from 95 deg/87 deg to 125 deg/135 deg, R/L external rotation improved from 10 deg/15 deg to 25 deg/35 deg, and R/L IR improved from 30 deg/32 deg to 50 deg/48 deg. Significant strength gains were observed in both lower extremities, including bilateral hip internal rotation from 3/5 to 4/5, bilateral external rotation from 3/5 to 4/5. Ankle strength improved to 5/5 for bilateral dorsiflexion, eversion, and inversion. Bilateral plantarflexion improved to 4+/5. LEFS outcome measure improved from 76% ability to 100% ability and FAAM improved from 71% ability to 100% ability. Re-analysis of the patient's gait through visual and video revealed reduced bilateral hip internal rotation through the gait cycle, as well as improved weight acceptance and normalized pronation through foot flat to push off. The patient returned to walking, running, and her daily activities with no pain of her bilateral hips and feet.

### **DISCUSSION**

For adults who are suffering from side-effects of unaddressed hip femoral anteversion as an adolescence, physical therapy may be a practical option to reduce pain and the functional limitations associated with it. As seen in this case study, further research of evaluation of hip femoral anteversion and treatment of associated symptoms is warranted.

# POSTER PRESENTATIONS

## 23 The Effect of Cervical and Upper Thoracic Spine Treatment with Management of Chronic Bell's Palsy

### **PRESENTED BY**

Ashley Miller, DPT

### **BACKGROUND AND PURPOSE**

Bell's Palsy is a condition defined by unilateral paralysis or paresis of the facial nerve, without any associated disorders. Bell's Palsy recovery has shown to have poor outcomes with increased chronicity. The purpose of this case study is to examine the effectiveness of a comprehensive treatment approach of Bell's Palsy dysfunction focused on mechanical treatment of the cervical and upper thoracic spine.

### **CASE DESCRIPTION**

One female patient, diagnosed with Bell's Palsy and cervicgia, was treated for 8 weeks. She had a history of Bell's Palsy in February of 2017 that resolved quickly, and a subsequent exacerbation in February of 2018 without symptom resolution. Symptoms were intensified with increased stress. The patient's symptoms included cheek tightness, neck stiffness, and intermittent radiating pain into the parascapular area. Functional limitations included difficulty eating, smiling, opening her left eye, and intermittent headaches. Treatment sessions were focused on improving cervical and thoracic mobility, parascapular strengthening, cervical and thoracic ROM, and reducing soft tissue dysfunction of the cervical paraspinals and upper trapezius muscles bilaterally. Physical therapy treatment was provided twice per week for eight weeks. Progress was tracked using House-Brackmann outcomes measure, Neck Disability Index (NDI) outcome measure, facial muscle strength testing, and cervical ROM.

### **OUTCOMES**

Facial muscle strength was measured using standard manual muscle testing, noticeable changes in facial features, and via photographs. Grade of Bell's Palsy was assessed using the House-Brackmann scale. Cervical range of motion (ROM) was measured via goniometer. Manual therapy and therapeutic exercises was provided for approximately 45 minutes followed by 15 minutes of modalities on her lower cervical musculature each session. Visual strength gains were observed in the frontalis, corrugator supercili, orbicularis oris, buccinator, risorius, and platysm musculature. Cervical ROM improvements include extension from 45° to 61°, right rotation from 60° to 72°, left rotation from 60° to 90°, right side bend from 35° to 45°, and left side bend from 30° to 35°. NDI score improved from 18% to 8% disability, and headache frequency reduced from 2-3 times per week to occasionally once per week. She reported improved functional abilities with select daily activities such as eating, reading, smiling, and opening her eyelids.

### **DISCUSSION**

Chronic Bell's Palsy should be treated comprehensively to ensure optimal improvement, which includes addressing any cervical or thoracic dysfunction. Chronic Bell's Palsy is difficult to treat with overall poor outcomes and increased chronicity. Improved management of this complex condition could include integration of the regional interdependence concept of treating regions surrounding the facial nerve injury, such as the cervical and thoracic spine. The outcomes of this case study suggest treatment of cervical and upper thoracic spine dysfunction could have a positive impact on patients with chronic Bell's Palsy.

# POSTER PRESENTATIONS

## 24 Outpatient Physical Therapy for a Nine-Year-Old Diagnosed with Guillain Barre Syndrome

### **PRESENTED BY**

Dakoda Leid, PT, DPT

### **BACKGROUND AND PURPOSE**

Guillain Barre syndrome includes progressive muscle weakness of at least one limb along with areflexia or hyporeflexia often leading to gait, balance, and functional deficits. With an incidence of approximately 1 in 100,000 individuals under the age of 18, when treated appropriately and acutely there is the potential for full functional recovery within six to twelve months in the pediatric population. Strength often returns in a descending pattern with proximal muscles recovering the fastest. The purpose of this case report is to report recovery exhibited with a course of outpatient physical therapy in a pediatric patient.

### **CASE DESCRIPTION**

A nine year old boy diagnosed with Guillain Barre syndrome was referred to outpatient physical therapy three weeks post onset. The patient was being seen after treatment in both the hospital and rehabilitation setting. During these settings he did not have respiratory problems. At evaluation, the patient exhibited lower extremity weakness, including the greatest amount of fatigable weakness of the tibialis anterior bilaterally. Deficits included gait dysfunction requiring use of bilateral AFOs along with balance dysfunction. A strengthening program with progression to dynamic balance and coordination exercises was completed at a frequency of two times per week for four weeks. Due to patient's age, sessions included several catching, hopping, and jumping exercises to engage patient in age appropriate activities. Fatigue was monitored throughout sessions with patient's mother monitoring patient's post session discomfort levels at home.

### **OUTCOMES**

Throughout the course of treatment, the patient's Lower Extremity Functional Scale score improved from 48/80 to 79/80. The patient no longer had weakness in dorsiflexion and was able to ambulate normally without AFO's and without gait deviations. Reports of pain were 0/10 improved from occasional 15 minute sessions of 6/10 requiring Gabapentin at start of therapy. Strength improved to 4/5 and 4+/5 within bilateral LEs. The patient was able to return to his previous level of function.

### **DISCUSSION**

The outcomes of this case report suggest that physical therapy within an outpatient setting can help to facilitate a person's return to their previous level of function after diagnosis of Guillain Barre syndrome. Further research is warranted on the benefits of physical therapy for this diagnosis.

# POSTER PRESENTATIONS

## 25 Post-Traumatic Amnesia Protocol: An Interdisciplinary Approach in the Acute Rehab Setting

### **PRESENTED BY**

Elizabeth Marcy, PT, DPT, NCSQ

### **PURPOSE**

An interdisciplinary memory work group developed caregiver education, a staff competency, and a team protocol to create effective interactions with patients who are in a state of post traumatic amnesia following a brain injury.

### **DESCRIPTION**

Post Traumatic Amnesia (PTA) is a state of confusion brought on by physical and chemical changes in the brain after a traumatic brain injury (TBI). Key features include disorientation, confusion, inability to store new memories of ongoing events, and possible agitation, anxiety, or distress. Therapists caring for patients in PTA face many challenges when trying to provide effective treatment and develop a plan of care. A poor understanding of PTA can result in care providers using potentially unreliable, inaccurate information to inform clinical decisions, inadvertently causing patient distress with inappropriate questioning, and reinforcing false memories or incorrect procedures. The MossRehab Memory Work Group identified an opportunity to enhance care delivery to patients in a state of PTA. The group met regularly for more than a year reviewing evidence-based guidelines, working with TBI Model Systems researchers as well as consulting with a visiting scholar content expert. The interdisciplinary team then developed a protocol to clearly identify patients who are in a state of PTA, outline recommendations to structure patient interactions, and provide training to all staff. The group also provided education to clinicians on treatment considerations to promote more effective therapy sessions.

### **SUMMARY OF USE**

The PTA Protocol education is now incorporated into the hospital-wide annual competencies. Patients in a state of PTA are clearly identified to all staff, including physicians, therapists, nurses, social work, consultants, dietary staff, and housekeeping. Therapy and nursing team leader audits of patient treatment sessions reveal improved consistency of communication strategies aligning with evidence-based guidelines. Patient family members report improved understanding of PTA and ways to interact with and support their loved one.

### **IMPORTANCE TO MEMBERS**

A protocol that identifies patients in a state of PTA can direct care providers to use appropriate resources to obtain accurate information. A better understanding of PTA can also enable clinicians to communicate more effectively with their patients, provide appropriate support and reassurance to those individuals, and foster a therapeutic relationship that can improve treatment participation.

# POSTER PRESENTATIONS

## 26 THC to CBD: A Review of Medical Cannabis and Implications for the Physical Therapist

### **PRESENTED BY**

Maureen Pascal, PT, DPT // Tyler Hannon, SPT // Harrison Kerch, SPT // Timothy Wallenburg, SPT // Thomas Radic, SPT

### **OBJECTIVE**

To examine common disorders and symptoms treated with cannabinoids, and how physical therapy treatment and outcomes may be affected by patient use of medical cannabis and related products.

### **DATA SOURCES**

Two primary searches of literature were conducted August 2018 -October 2018, and January 2019 -March 2019. Electronic databases utilized were PubMed, CMAJ, Science Direct, EBSCO subsets: CINAHL, MEDLINE, and Academic Search Ultimate. A hand search of "medical marijuana" was performed in March 2019.

### **STUDY SELECTION**

Inclusion criteria included experimental studies using natural or synthetic cannabis products for diagnoses that might be seen in rehabilitation. A PEDro Score of 5/10 was established as a minimum requirement to ensure the quality and validity of articles. Final decision for article inclusion was based on the consensus of all researchers. Searches yielded 218 articles. Nine articles (4.1 %) met the selection criteria for review.

### **DATA EXTRACTION**

Data was extracted using Garrad's Matrix Method. Studies were reviewed by individual researchers. Data was included in the matrix following consensus by all researchers.

### **DATA SYNTHESIS**

The studies included people with multiple sclerosis (2 studies, n= 660) , spinal cord injury (1 study, n= 42), post-surgical, neuropathic, and/or chronic pain (3 studies, n= 362), as well as generally healthy individuals (3 studies, n=40). Administration methods included smoking, THC capsules, inhaled cannabis, synthetics, and oral sprays. Positive results included reductions in spasticity, pain, and opioid use. Negative results included impairments in memory, blood pressure, and work capacity.

### **CONCLUSION**

The main benefits of medical marijuana are attributed to improvement of the patient's perception of their condition. While further research is needed to fully understand the physical effects, the current findings can be applied to physical therapy. Physical therapists may observe improvements in body function impairments in patients who use medical cannabis, and are likely to see a reduction in a patient's perception of symptoms. The possible negative outcomes will need to be considered as part of treatment planning and during therapy sessions. This research provides information to help guide physical therapists as they educate patients who might inquire about the use of medical cannabis and its expected benefits.

# POSTER PRESENTATIONS

## **27 Body-Weight-Supported Gait for an Adult Stroke Survivor with a Ventricular Assist Device and Intensive Care Unit-Acquired Weakness**

### **PRESENTED BY**

Brittany Kelly, DPT, PT

### **PURPOSE**

Heart disease is the first leading cause of death and stroke fifth in the United States (US), with stroke a major cause of serious disability. There are stroke survivors with a left ventricular assist device (LVAD) and the number of ambulatory patients with this is increasing. Our purpose is to discuss the effectiveness and safety of body-weight-supported (BWS) gait training intervention overground for an individual with a stroke, intensive care unit-acquired weakness (ICUAW), and LVAD considering percutaneous driveline placement.

### **CLINICAL RELEVANCE**

The heart failure epidemic has led to an increase in those with advanced heart failure, requiring therapies of mechanical circulatory support with approximately 2,400 LVADs implanted in the US annually. An improvement in survival and quality of life, have been observed in clinical trials of those patients with ventricular assist support. Cardiac myopathy has been studied in the LVAD population but, little is known of concomitant peripheral myopathy and body function. Information is lacking on the interventions for medically complex individuals with a stroke, LVAD, and peripheral weakness after a prolonged hospitalization.

### **DESCRIPTION**

A 59-year-old male with cardiogenic shock and ischemic cardiac myopathy had a HeartMate II™ LVAD placed October 2015. The subject had a complex history including ICUAW, diabetic neuropathy and a past intracerebral hemorrhage with right hemiparesis. Inpatient rehabilitation stays occurred: 1/19 - 2/11, 2/25 - 4/16/2016. He was discharged on 2/11/2016 and five days later presented to the hospital with worsening volume overload, supratherapeutic blood clotting, and diarrhea with a second rehabilitation admission. Impairments included: hypotonic legs; aerobic capacity complicated by symptomatic Pulsatility Index (PI), decreased coordination, quadriparesis (strength of torso 2+/5 with both legs symmetrical for 0-2/5), integumentary concerns involving the left foot, and symmetrically absent light touch knees to toes. Gait training was provided using the LiteGait® BWS with assistance of two to three. Consistent monitoring was on-going for any changes at the LVAD percutaneous line by the gait harness, and the following were present: bilateral ace wraps facilitating dorsiflexion, an abdominal binder, thigh-high elastic compression stockings to assist peripheral return, and a neoprene hinged-joint brace for right knee stability. Ten treatments in total for both admissions for 12-35 minutes were provided in the body weight supported system. The individual's symptomatic PI, mood, fatigue, and impaired motor power impacted his outcome. He progressed to therapeutic gait in the parallel bars.

### **EVALUATION OF RELEVANCE**

The LiteGait® harness was carefully placed, allowing clear visualization of the driveline, avoiding shearing forces with LVAD parameters monitored. The body weight system allowed safe navigation on level ground with progressive gait function with a maximum 35 minute duration in the body weight system. Additionally, it allowed improvements in therapeutic standing from 0 to 4 minutes and progression towards resisted lower extremity exercise of 0 -1.5 pounds increasing volume for targeting ICUAW.

### **CONCLUSION/IMPLICATIONS**

This suggests the applicability and safety of BWS intervention after stroke and LVAD implantation considering presence of the abdominal driveline placement. This report demonstrates the need for effective interventions of complex diagnoses, including ICUAW.

# POSTER PRESENTATIONS

## 28 Multimodal Pain Behavior in a Teenage Female with Wrist Pain

### **PRESENTED BY**

James M. O'Donohue, PT, DPT, OCS, ATC, FAFS

### **BACKGROUND AND PURPOSE**

In its simplest form, pain is transmitted when a noxious stimulus exceeds nociceptor thresholds, with an impulse transmitted via thinly myelinated (A $\delta$  and non-myelinated (C) nerve fibers to the dorsal horn lamina I, II and IV. For the perception of pain, impulses travel via the anterolateral spinothalamic tract, to the thalamus, and on to multiple cortical centers for interpretation.

Pain perception is complicated by neural changes and sensitization within the peripheral and central nervous system pain structures. Repeated noxious stimuli can cause peripheral sensitization of neurons, accounting for dysesthesia or hyperalgesia (increased sensitivity to stimuli), with stimulation of mechanoreceptors resulting in nociceptor transmission, resulting in allodynia (pain from non-painful stimuli). Dorsal horn interneurons can also become sensitized, increasing the size of nociceptive receptor fields and hyperalgesia.

Spinal nerve root compression can be interpreted as symptoms occurring at a site more distal to the compression. When pain pathways are sensitized, noxious and non-noxious stimuli may be enhanced thus causing a minor peripheral injury to be interpreted as more severe. This case study investigates these potential contributors to wrist pain in a teenage patient as they influenced treatment and recovery.

### **CASE DESCRIPTION**

A fifteen-year-old, left hand dominant female was referred to physical therapy with chronic left ulnar wrist pain of 8 weeks duration. She had been assessed by her athletic trainer and hand surgeon as having a potential transverse fibrocartilage complex (TFCC) injury after the insidious onset of pain while playing tennis. Pain limited her participation in tennis and ability to play clarinet in the band. Tingling was also noted over the tips of digits 2 through 5. MRI and radiographs were negative. Initial pain rating ranged from 0/10 (rest) to 8/10 (activity). Quick DASH score was 40.9% (0% no disability). Left wrist ROM, strength and grip strength were reduced up to 50%. TFCC load test and palpation suggested a mild (TFCC) irritation, with positive carpal and cubital tunnel Tinel Signs. A mismatch of examination findings regarding location of symptoms, pain levels, disability and testing was noted. Further questioning revealed additional symptoms of cervical spine stiffness with cervical spine examination, including loaded cervical retraction, revealing mild centralization of tingling.

Treatment included traditional ROM and strengthening focused on structural and functional limitations of the left wrist component. In addition, cervical retraction and postural exercises were included based upon nerve root findings. Further interventions included activities focused on function and participation.

### **OUTCOMES**

Symptoms fully resolved with normalization of impairments and return to full participation in band and recreational activities after 6 visits over 4 weeks of treatment.

### **DISCUSSION**

This case displays the complex nature of pain and the importance of clearly identifying underlying mechanisms through examination. Initial complaints suggested a localized pathology, but further history and examination indicated sensitization by a more proximal cervical root lesion. This case emphasizes the importance of a comprehensive history, examination and treatment which considers other potential sources for pain behavior, particularly when pain reports and functional limitation are not well correlated with the structural findings.

# POSTER PRESENTATIONS

## 29 Does Contact with Older Adults Improve Knowledge about Aging in DPT Students?

### **PRESENTED BY**

Michelle Criss, PT, DPT

### **PURPOSE/HYPOTHESIS**

With the expanding population of older adults in this country, there is a need to foster interest in geriatrics and combat ageism in healthcare professionals. The Chatham University Physical Therapy Program added 10 hours of content in a foundational course to improve knowledge about aging and begin to address negative perceptions about aging. The purpose of this project was to 1). investigate whether added content altered geriatric knowledge in DPT students, and 2). assess if adding older adults as participants in a learning activity improves student knowledge more than content without interaction with older adults (data about attitudes is under analysis). The hypotheses are that 1). geriatric knowledge and ageism focused content will improve knowledge about aging and 2). that course content including interaction with community dwelling, non-patient older adults will improve knowledge more than course content without that interaction.

### **SUBJECTS/MATERIALS/METHODS**

A pre-posttest design was utilized to evaluate geriatric knowledge and attitudes in students enrolled in the 4th semester of DPT education (Class of 2018 and 2019). A second, between cohort intervention occurred when a single class during this content was altered to include interaction with community-dwelling older adults. Content remained the same between cohorts, but for one cohort older adults participated in discussion groups and a lecture incorporating question and answer to address aging myths. Students from Class of 2018 (without older adult interaction) were compared to Class of 2019 (with interaction). All students were assessed for knowledge (Palmore's Facts on Aging) and attitudes about aging (UCLA Geriatric Attitudes Scale and Relating to Older People Evaluation) before and after geriatric course content. Data were analyzed using parametric tests for continuous variables (Facts of Aging quiz) and non-parametric tests for ordinal variables (Geriatric Attitudes Scale and Relating to Older People Evaluation). Reported here is the data concerning knowledge, as data concerning attitudes is pending.

### **RESULTS**

Facts on Aging mean correct scores were significantly improved in both cohorts. However, after geriatric coursework the knowledge scores were statistically significantly greater in the class with older adult interaction (mean 19.06 +/- 2.80SD) compared to the class without interaction (16.76 +/- 2.09). Scores on this knowledge quiz were not different between classes before geriatric focused coursework.

### **CONCLUSIONS**

Providing contact with community dwelling older adults that are active and equal partners in education, and not patients, can increase knowledge about aging. It is expected that attitudes will also improve in classes with contact with older adults as well (data analysis pending).

### **CLINICAL RELEVANCE**

Unwin et al (2008) noted that negative perceptions about aging persist in health care practitioners, demonstrating a continued need to expose students to geriatric-focused content. Attempts to improve attitudes and knowledge about aging often involve education only, service learning, mentor programs with seniors, or home visits. This program, however, incorporated older adults into classroom activity as equal education participants, not as mentors, care recipients, or patient examples. This innovative approach has shown the potential to improve knowledge about aging and provide positive role models to DPT students.