

17<sup>th</sup> Annual CCTS Spring Conference  
Tuesday, April 5, 2022

Gatton Student Center

# Abstracts

**College of Health Sciences Research Day**

**Posters 98 -120**

**Oral Presentations Abstracts**

# Abstracts

## Poster Number 98

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### **Title: Learner Outcomes from an ECHO in Augmentative and Alternative Communication**

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**Authors:** M. J., Cooley Hidecker, PhD, CCC-A/SLP, Department of Communication Sciences and Disorders, U of Kentucky L. Reinhart, BS, Department of Communication Sciences and Disorders, U of Kentucky J. Page, PhD, CCC-SLP, F-ASHA, F-NAP, Department of Communication Sciences and Disorders, U of Kentucky K. Slone, MS, CCC-SLP L-A. Land, MEd, Human Development Institute, U of Kentucky J. Kleinert, PhD, CCC-SLP, F-ASHA, P. Logsdon, MA, Human Development Institute, U of Kentucky J. DeGrant, MEd, Human Development Institute, U of Kentucky A. Folczyk, BS, OTR/L, NBCOT, Child Development Center of the Bluegrass, U of Kentucky E. Kearns, MS, PT, Department of Physical Therapy, U of Kentucky A. Olson, PhD, CCC-A, Department of Communication Sciences and Disorders, U of Kentucky J. Kearns, ED.D, Human Development Institute, U of Kentucky M. Dorsey, BS, Department of Communication Sciences and Disorders, U of Kentucky

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**Abstract:** Project ECHO (Extension for Community Healthcare Outcomes), originally developed to improve evidence-based treatment for patients in rural areas is a guided practice model in which educators and specialists learn and problem-solve together. In Spring 2021, a multidisciplinary team from the University of Kentucky adapted the ECHO model for use with augmentative and alternative communication (AAC). Each 1-hour ECHO in AAC session included a brief educational presentation on AAC feature matching issues, followed by discussion of a deidentified case presented by a participant. We surveyed participants who attended at least one ECHO in AAC session, to gauge participants' knowledge, capacity, and self-efficacy. Using a post then pre-retrospective survey, participants self-reported changes in knowledge, confidence in implementing ECHO suggestions, and overall satisfaction. Attendance at ECHO sessions ranged from 40 to 76 participants. Participants reported satisfaction with the ECHO sessions, increased knowledge, and confidence implementing ECHO suggestions. 94% of participants planned to share information from the ECHO sessions with others. Overall, the ECHO was an effective model for training in AAC and allowed a wide variety of professionals to participate.

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**Funding:** No Funding

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# Abstracts

## Poster Number 99

### Title: Applications of Hospital-Based Massage Therapy in Patients with Cancer: A Retrospective Chart Review

**Authors:** J. S. Cole, MA, LMT, BCTMB, Departments of Integrative Medicine and Health and Rehabilitation and Health Sciences Ph.D. Program, U of Kentucky C. Jauco-Trott, MPH, LMT, Department of Integrative Medicine and Health, U of Kentucky M. E. Burke, LMT, Department of Integrative Medicine and Health, U of Kentucky H. B. W. Gallivan, MA, LMT, Department of Integrative Medicine and Health, U of Kentucky J. F. Hammonds, LMT, Department of Integrative Medicine and Health, U of Kentucky S.V. Brown, DPH, Department of Epidemiology, U of Kentucky E. E. Dupont-Versteegden, Ph. D., Department of Rehabilitation and Health Sciences PhD Program, U of Kentucky

**Abstract: Objective:** Patients with cancer, receiving a multitude of treatments, experience cumulative side effects resulting in pain and anxiety. This study examined the results of Hospital-Based Massage Therapy (HBMT) intervention for pain and anxiety of people living with cancer. **Methods:** A retrospective chart review of 177 adult patients with cancer. Patients received a 15-minute hand, foot, or both hand/foot massage at different pressures, from HBMT trained licensed massage therapists, during their chemotherapy-infusion treatments or hospital stay at an academic medical center. Pain and anxiety were measured using the visual analog scale (VAS) on scale from 1-10, before and after intervention. Data are presented as medians and non-parametric tests were used to identify differences. Spearman correlations were determined when appropriate. Statistical significance is assumed at  $p < 0.05$ . **Results:** Full data sets were collected on 85 patients. Pain and anxiety significantly improved by 25% and 60%, respectively, ( $P < 0.0001$ ) after the hand and foot massage. There was a significant positive correlation between the level of pain pre-massage and the difference in pain before and after treatment ( $r = 0.26$ ,  $P = 0.025$ ). There was an even stronger correlation between the level of anxiety pre-massage and the difference in anxiety before and after treatment ( $r = 0.58$ ,  $P < 0.0001$ ). **Conclusion/Discussion:** One session of massage therapy decreased pain and anxiety in patients undergoing treatment for cancer and, moreover, pain and anxiety decreased more in those patients who had higher initial values. These results indicate that massage is a potentially beneficial non-pharmacological treatment in patients suffering pain and anxiety after cancer treatment.

**Funding:** No Funding

**Presenter:** Cole, J. S. [ljscole1@uky.edu](mailto:ljscole1@uky.edu)

# Abstracts

## Poster Number 100

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**Title: Adults with Developmental Disabilities & Augmentative and Alternative Communication**

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**Authors:** Grace Jones, Student, University of Kentucky Kinsey Roberts Student, University of Kentucky Mary Jo Cooley Hidecker, Ph.D., CCC-A/SLP1, Department of Communication Sciences and Disorders, University of Kentucky Judith Page, Ph.D., CCC-SLP, F-NAP1, Department of Communication Sciences and Disorders, University of Kentucky Katie Sloan, MS, CCC-SLP1, Department of Communication Sciences and Disorders, University of Kentucky Jacqui Kearns, EdD2, Human Development Institute, University of Kentucky

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**Abstract:** National Core Indicator Data suggests that the communication needs of many adults with developmental disabilities (DD) are not being met. This research explored the barriers and support for adults who need AAC. Methods: Participants included five caregivers and one adult with a developmental disability. Procedures: Participants were interviewed by a speech-language pathologist using a semi-structured interview format. Interviews were recorded and transcribed word-for-word by trained research assistants. Transcripts were reviewed by a second research assistant to assess accuracy. Based on preliminary open coding, there appears to be common threads of ideas from participants which include the lack of training using AAC, the heavy weight of the AAC device, and lack of overall services and accessibility. In summary, initial results of the study demonstrate the need for AAC to be individualized and accessible. People who use AAC and parents both noted the need for AAC to be easy to use and carry. Caregivers more frequently reported lack of progress when the child was school age due to resistance or lack of support from the school.

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**Funding:** No Funding

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**Presenter:** Jones, G. \ gejo227@uky.edu

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# Abstracts

## Poster Number 101

### Title: The Impact of Social Determinants of Health on Patient Recovery After ICU Admission

**Authors:** L. E. Jubina, Rehabilitative Sciences PhD Program, U of Kentucky K. P. Mayer, Department of Physical Therapy, U of Kentucky R. Hogg-Graham, Department of Health Management and Policy, U of Kentucky, A. Montgomery-Yates, Division of Pulmonary, Critical Care and Sleep Medicine, U of Kentucky, A. Kalema, Division of Pulmonary, Critical Care and Sleep Medicine, U of Kentucky

**Abstract: Background:** Post intensive care unit (ICU) patients are frequently lost to medical care follow-up after a prolonged hospital stay. A study conducted at the University of Kentucky reported the attrition of post ICU recovery clinic patients was impacted by their distance from clinic and hospital length of stay. Understanding how social determinants of health (SDOH) impact recovery trajectory for post ICU survivors is crucial to better serve this patient population and improve long-term outcomes. **Methods:** The study is a retrospective observational of adult patients who were referred to the ICU recovery clinic. The primary outcome of interest is attendance to at least one scheduled appointment. Independent variables of interest include demographics, clinical variables (diagnosis, severity of illness, and length stay), and social determinants of health including social vulnerability index (SVI), distance from clinic, rurality, and insurance status. Descriptive statistics, correlative testing, and group statistics will determine the relationship between attending routine follow-up and SDOH. **Results:** A total of 338 patients received a referral to the ICU Recovery Clinic from 2018-2021. Two-hundred seventy-seven patients (67%) attended at least one appointment and 111 patients (33%) never attended the ICU Recovery Clinic. Data are currently being extracted from the electronic medical record and will be ready at the time of CCTS presentation. **Conclusions:** The aim of this study is to identify how social factors impact patients after an ICU stay. We expect to demonstrate that patients never attending the ICU Recovery Clinic live further away, have a SVI, and more likely to be without insurance.

**Funding:** No Funding

**Presenter:** Jubina, L. E. [lindsey.jubina@uky.edu](mailto:lindsey.jubina@uky.edu)

# Abstracts

## Poster Number 102

### **Title: Regional Differences in Muscle T1 Rho Relaxation Times between Healthy and ACL-deficient Limbs**

**Authors:** M.K. Owen, Department of Physical Therapy, U of Kentucky E. Schuler, Department of Physical Therapy, U of Kentucky, P. Hardy, Department of Radiology, U of Kentucky, D.L. Johnson, Department of Orthopaedic Surgery and Sports Medicine, U of Kentucky, A. Andersen, Department of Anatomy and Neurobiology, U of Kentucky, B. Noehren, Departments of Physical Therapy and Orthopaedic Surgery and Sports Medicine, U of Kentucky

**Abstract:** After anterior cruciate ligament injury (ACL), the quadriceps muscles experience 3 times greater reduction in strength compared to the hamstring muscles, and the vastus lateralis (VL) muscle has a dysregulated extracellular matrix (ECM). Utilizing magnetic resonance imaging, it is possible to measure the dysregulation of the ECM for all the muscles of the thigh. Measuring the T1Rho relaxation time of the quadriceps and hamstrings may provide insight on regional differences between the muscles of the thigh after ACL tear. 11 individuals (age:  $20.5 \pm 4.8$  years) with ACL tears underwent T1rho MRI scans of both limbs. T1Rho relaxation times for muscles of interest of the injured and non-injured limb were determined using custom code. Relaxation times were compared between limbs with a paired t-test. Mean T1rho relaxation times in seconds for the injured and non-injured limb are  $0.0298 \pm 0.0031$  and  $0.0277 \pm 0.0013$  (VL,  $p=0.01$ ),  $0.0296 \pm 0.0029$  and  $0.0270 \pm 0.0016$  (vastus intermedius,  $p<0.01$ ),  $0.0291 \pm 0.0016$  and  $0.0267 \pm 0.0027$  (vastus medialis,  $p=0.04$ ),  $0.0307 \pm 0.0028$  and  $0.0263 \pm 0.0027$  (rectus femoris,  $p<0.01$ ),  $0.0291 \pm 0.0016$  and  $0.0287 \pm 0.0016$  (biceps femoris,  $p=0.55$ ),  $0.0280 \pm 0.0022$  and  $0.0290 \pm 0.0024$  (semitendinosus,  $p=0.38$ ), and  $0.0291 \pm 0.0032$  and  $0.0301 \pm 0.0039$  (semimembranosus,  $p=0.58$ ). Regional differences in T1Rho relaxation time suggest that dysregulation of ECM is limited to just the quadricep muscles following ACL injury. Potentially, this dysregulation is an adaptation that weakens the quadriceps but maintains hamstring strength to limit anterior translation of the tibia causing knee buckling.

**Funding:** NIH R01AR071398

**Presenter:** Owen, M.O.\mow229@uky.edu

# Abstracts

Poster Number 103

**Title: Clinician Perspectives of Telerehabilitation Pre-COVID-19: an Interdisciplinary Meta-Synthesis**

**Authors:** H. Douglass, M.S., CCC-SLP, Department of Rehabilitation Sciences, University of Kentucky, J. Lowman, Ph.D., CCC-SLP, Department of Communication Sciences & Disorders, University of Kentucky, R. Causey-Upton, Ph.D., OTD, MS, OTR/L, Department of Occupational Science and Occupational Therapy

**Abstract: Objective(s):** To synthesize qualitative research regarding clinicians' attitudes and beliefs about telerehabilitation at the international level prior to the COVID-19 pandemic. **Data Sources & Study Selection:** Seven databases were searched. The systematic search strategy was implemented February 2020 and updated June 2020. In total, 1,039 unique results were retrieved. Selected studies used interviews or focus groups, included at least one or more rehabilitation professions in the sample, and addressed attitudes toward telerehabilitation as a service delivery model. Nine studies were included in this meta-synthesis. **Data Extraction & Synthesis:** Data were extracted and coded by the first author using thematic synthesis. Analytical themes were created by the first and third authors. Six themes were formed from the data: (1) constant comparison of TR with in-person guides attitude and acceptance; (2) TR presents barriers and opportunities for communication; (3) lack of TR education and training impacts clinician confidence; (4) the flexibility of TR changes service delivery options and access for patients; (5) the TR environment creates challenges with safety and engagement; and (6) technical components and support are influential to the TR delivery process. **Conclusions:** This study provides evidence that clinician perceptions of telerehabilitation are similar across disciplines within rehabilitation and across other allied health fields. Views were generally positive. Less experienced clinicians were more likely to have reservations about telerehabilitation, indicating a need for more education and training. It is recommended that themes be utilized to support methods for increasing clinician acceptance of telerehabilitation. The overall strength of recommendation is moderate.

**Funding:** No Funding

**Presenter:** Douglass, H. \hannah.douglass@uky.edu

# Abstracts

## Poster Number 104

### **Title: Quadriceps Strength and Rate of Torque Development Deficits are Associated with Altered Jumping Mechanics Post-ACLR**

**Authors:** M.C. Graham, Department of Rehabilitation Sciences, University of Kentucky, K.A. Reeves, Department of Rehabilitation Sciences, University of Kentucky, B. Noehren, Department of Rehabilitation Sciences, University of Kentucky, D. Johnson, Department of Orthopaedic Surgery & Sports Medicine, University of Kentucky

**Abstract: PURPOSE/HYPOTHESIS:** Athletes with persistent quadriceps strength deficits after anterior cruciate ligament reconstruction (ACLR) exhibit reduced loading rates and knee flexion moments on the involved limb during the landing portion of a drop vertical jump (DVJ). While the landing portion of the DVJ has been thoroughly investigated, little research exists regarding the concentric portion. Therefore, the purpose of our study was to examine the relationship between quadriceps strength and rate of torque development (RTD) to knee joint kinetics and kinematics during the concentric phase of a DVJ in athletes 6-month post-ACLR. **NUMBER OF SUBJECTS:** 41 (age  $20.4 \pm 5.5$ , BMI  $23.6 \pm 2.6 \text{ kg/m}^2$ , 17 female) **MATERIALS/METHODS:** Subjects were recorded during a DVJ using a 12-camera motion analysis system with force plates. Visual 3D was used to analyze each limb during the DVJ using a custom MATLAB code. Maximal voluntary isometric quadriceps strength was performed on an isokinetic dynamometer. **RESULTS:** There were significant differences ( $p < 0.02$ ) between limbs in knee power, impulse, moment, and velocity. PT LSI was significantly correlated with knee power LSI ( $r = 0.67$ ,  $p = 0.00$ ) and knee impulse LSI ( $r = 0.47$ ,  $p = 0.005$ ). RTD LSI was moderately and significantly ( $p < 0.02$ ) correlated to power LSI ( $r = 0.39$ ), impulse LSI ( $r = 0.45$ ), and velocity LSI ( $r = 0.36$ ). **CONCLUSIONS:** Significant deficits in quadriceps strength and RTD persist in athletes 6-months post-ACLR and are associated with alter knee mechanics during the concentric phase of a DVJ.

**Funding:** No Funding

**Presenter:** Graham, M.C. \megan.graham@uky.edu



# Abstracts

## Poster Number 105

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**Title: Providers and Electronic Health Record Systems: Correlating Time Spent in the EHR and User Satisfaction to Understand a Leading Cause of Provider Burnout**

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**Authors:** G. Anspach, Clinical Leadership & Management, College of Health Sciences, U of Kentucky, A. Marcelletti, Clinical Leadership & Management, College of Health Sciences, U of Kentucky, K. Clancy, Clinical Leadership & Management, College of Health Sciences, U of Kentucky, P. Talari, Division of Hospital Medicine, Department of Internal Medicine, U of Kentucky

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**Abstract:** A shortage of healthcare providers currently exists within the United States healthcare system. Many models predict that this shortage will continue to grow throughout the country, while continuing to further cause gaps in care for medically underserved communities. While training a greater number of providers increases those in the workforce, we continue to see many providers leave their profession. Often, provider burnout leads to the decision of leaving the profession and impacts other areas of healthcare. Both recruitment of future providers and the quality of care provided to patients receive harm as burnout rates increase. With Electronic Health Record Systems (EHRs) cited as one of the leading causes of provider burnout, we must understand providers' satisfaction with the system. The proposed study looks to correlate time spent within the health record system to the level of satisfaction the provider has with the system. While previous studies show that greater time spent in the EHR leads to lower satisfaction and an increased chance of burnout, a gap exists in understanding which areas of the EHR greatest contribute to lower satisfaction. Through a survey of actively practicing providers, we look to quantify the level of satisfaction they have with their respective record systems. The quantified satisfaction is correlated to a variety of EHR-provided metrics from four respective metric areas within the system as well as one metric area of overall use outside of scheduled hours. Understanding this correlation provides significant insight in intervention programs to prevent future burnout.

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**Funding:** No Funding

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**Presenter:** Anspach, G. \gban222@uky.edu

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# Abstracts

## Poster Number 106

### **Title: Inertial Sensors Based Postural Sway Jerk: A Sensitive Measure of Sensory-Cognitive Interaction**

**Authors:** D. M. Hall, Human Health Sciences, College of Health Sciences, U of Kentucky, A. J. Stromberg, Department of Statistics, U of Kentucky, G. Gera, Department of Physical Therapy, College of Health Sciences, U of Kentucky

**Abstract:** This study investigated the effects of performing a cognitive task on sensory integration of balance in healthy individuals. 10 subjects (5F/5M; 21.5±2.17 years; 69.9±3.4 inches; 155.6±26.1 lbs; Caucasian), without known balance issues, performed the modified Clinical Test of Sensory Interaction of Balance (mCTSIB) with and without a cognitive task. The cognitive task involved counting down by 3's from a randomly assigned number between 97 and 100. Postural sway area and postural sway jerk were assessed through the use of inertial sensors placed around the subjects' lumbar region. Each subject performed four trials for the four conditions of mCTSIB: eyes open firm (EOFirm), eyes closed firm (ECFirm), eyes open foam (EOFoam), and eyes closed foam (ECFoam). We tested the effect of performing a cognitive task on sensory integration of balance. We hypothesized that sensory cognitive interaction would be more apparent for more complex conditions and would be better assessed with postural sway jerk compared to postural sway area measure. With the addition of a cognitive task for mCTSIB: 1) postural sway area increased for the baseline condition i.e., EOFirm ( $p < 0.05$ ) but did not increase for the most difficult condition i.e., ECFoam; 2) Postural sway jerk increased for all conditions of mCTSIB ( $p < 0.05$ ); 3) Cognitive performance did not deteriorate across conditions of mCTSIB. Postural sway jerk was shown to be a more sensitive measure in detecting the effect of a cognitive task on sensory integration for postural control.

**Funding:** College of Health Sciences

**Presenter:** Hall, D. M. \dmha272@uky.edu

# Abstracts

## Poster Number 107

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### **Title: Test-Retest Reliability of Postural Sway to Assess Interaction of Sensory Integration and Cognition with Inertial Sensors**

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**Authors:** E. Tweel, Human Health Sciences, College of Health Sciences, U of Kentucky, A. Stromberg, Department of Statistics, U of Kentucky G. Gera, Department of Physical Therapy, College of Health Sciences, U of Kentucky

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**Abstract:** We investigated the effects of performing a cognitive task on sensory integration of balance in healthy individuals. Our goal was to assess test-retest reliability of postural sway area using inertial sensors for different surface, vision and cognitive conditions. We hypothesized that postural sway area would be similar for the test-retest sessions. We recruited 11 young, healthy individuals but here report the findings for 10 subjects (one subject's data was excluded because of technical issues). Ten healthy subjects, (5F/5M; 21.5±2.17 years; Caucasian), without known balance issues, performed the instrumented Modified Clinical Test of Sensory Interaction on Balance (mCTSIB). This standardized test assesses sensory integration of postural control with four balance task conditions: eyes opened or closed on firm or foam surface. The mCTSIB was performed with (cog mCTSIB) and without a cognitive task (non-cog mCTSIB). The study randomized whether the subjects performed the non-cognitive or cognitive task first. Test-retest reliability was assessed by having subjects repeat the experimental paradigm after a 30-minute break. The order of non-cog and cog mCTSIB for the retest session was kept the same as the test session. Postural sway area was assessed using the acceleration signal from an inertial sensor placed around the waist, close to the lumbar 4-5 region. Inertial-sensor based assessment revealed no difference in test-retest measures for postural sway area for surface ( $p=0.97$ ), vision ( $p=0.95$ ), and cognition ( $p=0.8$ ). Thus, postural sway area can be used as a reliable measure to assess the interaction of sensory integration of postural control and cognition.

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**Funding:** College of Health Sciences

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**Presenter:** Tweel, E. [emily.tweel@uky.edu](mailto:emily.tweel@uky.edu)

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# Abstracts

## Poster Number 108

### Title: How Hospitalized Bone Marrow Transplant Patients' Exercise and Physical Wellbeing Decline During the Pandemic?

**Authors:** Megan Johar, Department of Computer Science, U of Kentucky, Ming-Yuan Chih, Department of Health & Clinical Sciences, U of Kentucky, Gerhard C. Hildebrandt, Department of Internal Medicine, U of Kentucky

**Abstract: Background:** Physical activity following a Bone Marrow Transplant (BMT) is beneficial for recovery. However, covid restrictions and the lack of formal programs posed challenges for BMT patients to exercise during hospitalization. We reported data documenting declined physical activity and functioning among participants in a pilot randomized trial testing an Apple Watch application called "BMT Go!". **Methods:** Adults receiving BMT at the Markey Cancer Center from Fall 2021 to Spring 2022 were recruited and randomly assigned into the **Watch-Only group** (n=11) with a locked Apple Watch (no app) or the **BMT Go! group** (n=10) with an unlocked Apple Watch and the BMT Go! app. Physical activity data (e.g., steps) collected in the app was retrieved and parsed using "python" and "pandas" computer languages. The change rates of the step counts and physical wellbeing (reported in the Functional Assessment of Cancer Therapy (FACT) survey) before and after transplant/intervention were reported. **Results:** Seven out of 10 BMT Go! Group patients completed pre- and post-surveys, and their BMT Go! apps also recorded steps data. On average, a 50% decrease in daily steps until the day of discharge occurred, corresponding to a 9% decrease in physical wellbeing. As a comparison, the Watch-Only group patients reported an average of 14% decrease in physical wellbeing. **Conclusions:** Patients experienced a significant decline in physical activity and wellbeing after BMT during the pandemic. Although reliable steps data are not obtainable for Watch-Only patients, a steeper decline in steps among them is likely due to their declining physical wellbeing.

**Funding:** American Cancer Society Institutional Research Grant, NIH P30CA177558

**Presenter:** Johar, M. [mjjo247@uky.edu](mailto:mjjo247@uky.edu)

# Abstracts

## Poster Number 109

### **Title: High Intensity Cycling in Conjunction with Physical Therapy in a Patient with Primary Lateral Sclerosis**

**Authors:** D. Lykins, Department of Physical Therapy, U of Kentucky, K. Lee, Department of Physical Therapy, U of Kentucky, B. F. Turner, Department of Physical Therapy, U of Kentucky M. K. Whitworth, Department of Physical Therapy, U of Kentucky

**Abstract: Background /Purpose:** Primary Lateral Sclerosis (PLS), a progressive neurological disease, impacts .78/100,000 persons/year, aged 40-60. PLS comprises 1-4% of motor neuron diseases. There is a dearth of literature addressing physical therapy intervention for persons with PLS (PwPLS). This case report documents a PwPLS using high intensity aerobic exercise and focused PT interventions, tracking his scores on the Functional Gait Assessment (FGA) and mini-BESTest monthly for four years. **Case Description:** An active 55 year-old ran 4-6 miles/day before PLS. Initial symptoms in 2013: right knee pain and foot drop. Neurology workups pursued amyotrophic lateral sclerosis (ALS) or Parkinson's Disease. He continued exercise at high levels and integrated PT for dynamic balance to decrease falls/severity of injury with falls. Final reassessment during data collection (October 2020, age 63) captured standing balance improvement and persistent difficulty with stepping reaction and corrective stepping. **Outcomes:** The participant sustained almost identical scores on the miniBEST and FGA across four years, with initial functional gains and occasional functional dips attributed to a fall with hip fracture and cholecystectomy. Expected outcomes for PwPLS include progression of the disease to wheelchair dependence 8 years into the disease. The participant continued to walk with a cane or bilateral trekking poles for support while sustaining a very rigorous workout schedule. **Discussion:** Evidence for PT interventions for PLS is scarce. This case demonstrates high intensity exercise and challenging physical therapy to maximize function for PwPLS. Further research could include case series for PwPLS to further delineate appropriate exercise parameters.

**Funding:** No Funding

**Presenter:** Lykins, D.\ddeel0@uky.edu

# Abstracts

## Poster Number 110

### **Title: Gait Changes Following Cerebrospinal Fluid Drain, NPH Diagnosis, and Ventriculoperitoneal Shunt Placement in Clinical Populations**

**Authors:** T. Cooper ATC, SPT, Department of Physical Therapy, U of Kentucky, L. Stolz, SPT, Department of Physical Therapy, U of Kentucky, A. Hoey, SPT, Department of Physical Therapy, U of Kentucky, K. Lee PT, DPT, NCS, Department of Physical Therapy, U of Kentucky

**Abstract: Purpose/Hypothesis:** Measure gait metrics changes (velocity, cadence, heel to heel step width, stride length, and double limb stance time) of persons who responded to CSF removal and post ventriculoperitoneal (VP) shunt placement if they choose to receive one. **Hypothesis:** Gait metrics will improve following CSF removal. **Number of Subjects:** 14. **Materials and Methods:** Retrospective chart review examined the course of participants at the Kentucky Neurology Institute NPH Clinic who exhibited Hakim's triad, underwent CSF removal, and diagnosed with NPH. If VP shunt placed and participant returned to clinic for follow-up visits, data was followed. Gait data was collected via the GaitRite instrumented walkway. **Results:** Gait variables pre- to post-CSF removal: significant improvement in gait velocity, right and left stride length. Eight participants returned for long-term follow-up. Analysis of this data demonstrated variability in the presence and amount of improvement seen at 6 months, 1 year, and 2 years post-VP shunt placement. Participants with high and low complexities exhibited increased function at 6 months, declined at 1 and 2 years post-shunt. Moderate complexity participants had gait velocity, right stride, and left stride length declines at 6 months and increase at 1 year follow-up. **Conclusions:** Gait velocity and bilateral stride length improve following CSF removal and VP shunt procedures, declined approximately 1-2 years post-VP shunt. Limitations include small convenience sample. Clinical Relevance: Prior studies have not stratified participant complexities and followed them longitudinally. This study provides a basis of significant variables for change.

**Funding:** No Funding

**Presenter:** Lee, K. [kara.lee@uky.edu](mailto:kara.lee@uky.edu)

# Abstracts

## Poster Number 111

**Title:** Perceptual-Cognitive Function in Healthy Adults

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**Authors:** A. M. Parks, College of Health Sciences and Education, U of Kentucky, D. M. Torp, Department of Athletic Training and Clinical Nutrition, U of Kentucky, M. C. Hoch, Department of Athletic Training and Clinical Nutrition, U of Kentucky

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**Abstract:** **Introduction:** Participation in physical activity is associated with higher risk of injury. In response to injury, inhibition of visuomotor processes causes reduction of information processing and motor reactions. This may predispose individuals to repetitive injury during complex motor tasks, such as physical activity. Following injury, clinicians often utilize perceptual-cognitive tests (PCT) to guide treatment progression, however these tests are lengthy and often redundant. **Purpose:** Currently, there are no established normative values of PCTs for healthy adults. Establishing these values will help guide clinicians' rehabilitation progression for patients experiencing injury. **Methods/Procedures:** Twenty-five physically active, healthy adults will participate in this cross-sectional study at the University of Kentucky's Sports Medicine Research Institute. Once informed consent is obtained, participants will complete questionnaires to assess demographics, injury history, physical activity level, post-concussive symptoms, and region-specific health. Next, participants will perform 9 PCTs in a randomized order. Tests will assess simple and peripheral reaction time, inhibitory control, spatial memory, and pattern recognition. **Expected Results:** Participant performance on PCTs which examine similar constructs will exhibit positive statistical correlations. Uncovering redundancies in testing batteries may allow clinicians to administer testing sessions that are more efficacious. **Conclusions:** Clinicians may condense the number of tests utilized in treatment sessions, yet still capture an accurate assessment of patients' perceptual-cognitive function.

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**Funding:** No Funding

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# Abstracts

## Poster Number 112

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**Title: Utilizing the International Classification of Function, Disability, and Health as a Framework in Music Therapy**

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**Authors:** A.S. Robinson, Department of Rehabilitation and Health Sciences, U of Kentucky, N.F. Johnson, Departments of Physical Therapy and Rehabilitation and Health Sciences, U of Kentucky

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**Abstract:** The therapeutic use of music is a complex, diverse treatment strategy applicable to a wide range of diagnoses. Like other therapy-based professions (i.e., physical or occupational therapy), music therapy requires a highly individualized plan of care. Thus, music therapists not only need to consider the therapeutic function of music (i.e., biopsychosocial response to rhythm), but also the functional and contextual factors that each patient brings to the table. Such considerations are critical for the clinical decision-making process. The International Classification of Functioning, Disability, and Health (ICF) Model is a biopsychosocial approach to health and disability that many healthcare practitioners use to define the spectrum of problems in the functioning patient. It provides a globally accepted language and framework that helps healthcare practitioners identify physical, environmental, and personal factors affecting the overall health of the patient. Music therapists have yet to readily adopt the ICF framework. To facilitate the use of an ICF approach, we expand upon Hanson-Abromeit's *Therapeutic Function of Music Plan* to support music therapists as they: 1) identify the functional and contextual factors of the patient, 2) describe the impact on patient activity and participation, 3) develop detailed intervention strategy and objectives and 4) prescribe a recommended dose. The resulting model is a theory-driven, evidence-based approach that considers the patient's biopsychosocial needs and lived experiences during plan of care development. The aim is to provide a common language and approach to describing the purpose and justification for the role of music in patient care.

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**Funding:** No Funding

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**Presenter:** Robinson, A.S.\austin.robinson@uky.edu

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# Abstracts

## Poster Number 113

### **Title: The Efficacy of Canalith Repositioning Maneuvers in the Treatment of Benign Paroxysmal Positional Vertigo for Individuals Following Traumatic Brain Injury: A Systematic Review**

**Authors:** H. Witt, Department of Physical Therapy, University of Kentucky, N. Johnson, Department of Physical Therapy, University of Kentucky

**Abstract: Introduction:** The objective of this systematic review was to assess the efficacy of canalith repositioning maneuvers in the treatment of benign paroxysmal positional vertigo (BPPV) for individuals following traumatic brain injury. Dizziness following traumatic brain injury can increase fall risk and decrease rate of recovery. Following traumatic brain injury, all individuals should be screened for traumatic BPPV. **Methods:** EbscoHost, PubMed, and Web of Science were the databases used for the literature search. Articles were assessed via a priori inclusion/exclusion criteria. Fourteen articles were included in the review. Data extrapolated included year of publication, first author, article title, number of participants, participant age (mean, range), participant sex, setting, number of post-traumatic BPPV participants, number of participants with other causes of BPPV, severity of TBI, number of maneuvers required for symptom resolution, canal involved, conclusions, and limitations. A risk of bias was performed using a modified Downs and Black checklist. **Results:** Articles were published between 1999 and 2019 with the majority published after 2009. Four articles had large sample sizes; the majority had small sample sizes. Participants with traumatic BPPV were slightly younger than participants with idiopathic BPPV. Females were diagnosed with both traumatic BPPV and idiopathic BPPV. The most common setting reported was outpatient. Often, the severity of the traumatic brain injury was not reported. The most frequent severity studied was mild or mild to moderate. Multiple canal and bilateral canal involvement were more prominent for traumatic BPPV. Increased canalith repositioning maneuvers were required for traumatic BPPV. **Discussion:** There is emerging literature looking at traumatic BPPV and the efficacy of canalith maneuvers as treatment. Most individuals have full symptom resolution with 1-2 maneuvers, however there is a portion of the traumatic BPPV population that require further canalith repositioning maneuvers for treatment. There is also an increased likelihood of multi-canal or bilateral canal involvement for individuals with traumatic BPPV. This could lead to an increase of required maneuvers for individuals with traumatic BPPV. **Conclusions:** Individuals with traumatic brain injury should be screened for traumatic BPPV. Clinicians should expect a higher likelihood of multiple canal or bilateral canal involvement. Clinicians should educate individuals with traumatic BPPV that it sometimes takes more treatment maneuvers to reach symptom resolution and to allow for increased treatment maneuvers before considering different treatment options.

**Funding:** No Funding

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# Abstracts

## Poster Number 114

### **Title: Targeted Gait Training Improves Biomechanics in Patients with Chronic Ankle Instability: A Randomized Controlled Trial**

**Authors:** D. M. Torp, Department of Clinical Nutrition and Athletic Training, U of Kentucky L. Donovan, Department of Applied Physiology, Health, and Clinical Science, UNC Charlotte, Charlotte, NC

**Abstract:** Individuals with chronic ankle instability (CAI) often demonstrate a disadvantageous lateral biomechanical pattern during functional activities, which may promote osteoarthritis through altered cartilage stress distributions. Unfortunately, interventions capable of changing these potentially destructive patterns are lacking. The purpose of this randomized-controlled trial was to assess the immediate effects after 2-weeks gait training with auditory biofeedback (AudFB) compared to a control (NoFB) on plantar pressure during walking and functional activities in participants with CAI. Eighteen CAI participants completed all testing sessions. AudFB (n=11, 23.82 years; 26.49 kg/m<sup>2</sup>) and NoFB (n=7, 22.25 years; 27.89 kg/m<sup>2</sup>) were fitted with athletic shoes and plantar pressure insoles to assess biomechanics during treadmill walking, a step-down task, and a lateral hop at Baseline and Post-Training. AudFB was administered via a thin pressure sensor that was placed on the insole underneath the fifth metatarsal head of the involved limb. The sensor set to elicit noise when the sensor experienced excessive pressure. AudFB participants were instructed to walk without causing noise during the entire 30-minute gait intervention. NoFB participants were never introduced to the AudFB and instructed to walk comfortably. Within and between group differences were analyzed with repeated-measures analysis of variance with pairwise comparisons and a-prior significance at p<0.05. Two weeks of gait training with AudFB improved walking and step-down biomechanics compared to NoFB. There were no changes in lateral hop biomechanics. Clinicians should implement AudFB during gait training for patients with CAI to improve biomechanics and potentially impact long-term joint health.

**Funding:** National Athletic Trainers' Association Doctoral Research Grant (1920DGP07), Summer Graduate Fellowship at the University of North Carolina at Charlotte.

**Presenter:** Torp, D. M. \danielle.torp@uky.edu

# Abstracts

## Poster Number 115

**Title:** Jockey Positional Stability and Workday Habits

**Authors:** M. M. Keener, Rehabilitation and Health Sciences, U of Kentucky, K. I. Tumlin, Epidemiology, U of Kentucky

**Poster:** **BACKGROUND:** Occupational demands of jockeys include weight-making practices, exercising horses in the morning, traveling often, and working outdoors regardless of the weather. **PURPOSE:** 1) To characterize daily habits of jockeys during a workday, and 2) to evaluate if stability during an occupation-specific task changes over a workday. **METHODS:** 37 jockeys completed an occupation-specific stability task. They squatted in their race position on an unstable surface for two minutes while researchers collected accelerometer and 2D biomechanics data. Jockeys answered questions about the amount of sleep, liquid and caloric intake, and time in the sauna. They also reported thirst, hunger, and energy perceptions. These evaluations were completed pre and post-racing activity during a workday. **RESULTS:** On average, jockeys consume 263 calories and 27 fl. oz. of liquids, spend 33 minutes in the sauna, and sleep 6.8 hours. Additionally, 54% exercised horses in the morning before racing. Jockey stability worsened significantly ( $p=0.01918$ ) throughout the day, represented by increased resultant root mean square values from accelerometer data. Additionally, jockeys 41 years or older reported perceptions of energy and hunger decreasing significantly throughout the day compared to younger jockeys. **CONCLUSION:** Jockeys currently rely on limited caloric and fluid intake during their workday to meet weight requirements for their mounts. Stability worsens across the workday regardless of age and represents fatigue jockeys experience in a single day. Stability worsening could be a result of different lifestyle factors to maintain weight.

**Funding:** Central Appalachian Regional Educational Research Center (CARERC)

**Presenter:** Keener, M. M. [M.keener@uky.edu](mailto:M.keener@uky.edu)

# Abstracts

## Poster Number 116

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**Title: Understanding How Dentists Treat Patients with Communication Disorders**

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**Authors:** C. Altadonna, College of Health Sciences - Human Health Sciences, U of Kentucky, M. Hidecker, College of Health Sciences - Communication Sciences and Disorders, U of Kentucky

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**Abstract: Background:** Patients with communication disorders are an under-served population within dentistry, especially children with these disorders. **Aim/Research Question:** The research question was to identify the training process of dentists regarding patients with communication disorders. **Methods:** A scoping review framework was used to identify potential literature to evaluate. Relevant databases (CINAHL, PubMed, etc.) were searched based on pre-defined parameters. **Results:** Seventeen articles were deemed relevant. The articles discussed dental training, as well as access barriers for patients with communication disorders and their families. **Conclusion:** This research found that many barriers exist for children and their parents when visiting a dental office. For example, some of these barriers include the specific training of the dentist, insurance issues, and the willingness of the dentist to treat.

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**Funding:** No Funding

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**Presenter:** Altadonna, C. \caal237@g.uky.edu

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# Abstracts

## Poster Number 117

**Title:** How to Drink Water: Guiding Measurement of Post-Stroke Recovery

**Authors:** J. Huber, Department of Physical Medicine and Rehabilitation, U of Kentucky, S. Slone, Department of Statistics, U of Kentucky

**Abstract:** **OBJECTIVES:** Stroke impacts nearly 800,000 Americans each year with 85% cases involving upper extremity impairment. An important measure of neural restitution after stroke is quality of upper extremity movement, and recent expert consensus has recommended kinematics of the drinking task as a standard measure of movement quality. While previous literature describes the basic setup for the drinking task, there are aspects of the setup where further specification may improve acceptance among the research community. The objective of this preliminary study was to examine three dichotomous factors of the drinking task setup and to determine how these factors impact the kinematic data for healthy participants. **METHODS:** For this prospective study, 6 healthy participants were recruited from a sample of convenience. The following factors of the drinking task setup were considered: seating protocol, reach distance, and target definition. Using a three-factor balanced incomplete block design experiment, the measurements were analyzed using ANOVA to identify dichotomous factors with significant effect and then to identify levels of those factors associated with reduced variation in measurement data. Participants were randomly assigned to treatment combinations. Dependent variables of interest included movement time, number of movement units, trunk displacement, and peak angular velocity of the elbow during reach. **RESULTS:** Results from this preliminary study indicate movement time is significantly affected by target definition ( $p=0.029$ ), and variation in movement time may be reduced by adopting the box target definition. Additionally, trunk displacement is significantly affected by reach distance ( $p=0.001$ ) and seating protocol ( $p=0.028$ ). The remaining kinematic metrics of interest did not change significantly due to any of the considered setup factors. **CONCLUSION:** Our findings suggest that all considered factors have a significant effect on at least one kinematic metric of the drinking task for healthy participants. This highlights the importance of factor specification as seemingly minute details may lead to significant confounding effects. We hope this preliminary study guides future implementation of this important assessment standard and supports its acceptance among the stroke research community.

**Funding:** Cardinal Hill Rehabilitation Hospital NeuroRehab Endowment (0705129500)

**Presenter:** Huber, J. [justin.huber@uky.edu](mailto:justin.huber@uky.edu)

# Abstracts

## Poster Number 118

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**Title: Resilience, Grit, and Professional Quality of Life Among Firefighters**

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**Authors:** J.E. Tinsley, Department of Athletic Training and Clinical Nutrition, U of Kentucky J.M. Hoch, Department of Athletic Training and Clinical Nutrition, U of Kentucky

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**Abstract:** Context: High job-related stress is strongly associated with firefighter musculoskeletal injuries. However, exposure to stress and high-risk performance demands is inevitable for firefighters. Recent endeavors have begun exploring how psychological factors (e.g. resilience and grit) may impact a firefighter's capability to withstand occupation-related physical and psychological stressors. However, the relationship between these psychological constructs and personal factors, such as age and professional quality of life, remains unknown. Methods: This cross-section study aims to quantify the relationship between psychological and personal/contextual factors between firefighters and age/gender-matched civilian controls. The Short Grit Scale(SGS), Brief Resilience Scale(BRS), a demographics, and injury history questionnaire were given to both cohorts. The firefighter cohort will complete Professional Quality of Life(ProQOL) to assess occupation-associated compassion fatigue/satisfaction and secondary trauma. Independent t-tests will identify between-group differences for resilience and grit. Stepwise linear regression analyses will examine the relationship of resilience/grit with personal factors (e.g. age, years of service, ProQOL findings) as predictor variables among firefighters. Anticipated Results: We aim to recruit 100 participants. We hypothesize that resilience and grit will be greater( $p < 0.05$ ) among firefighters than civilians. Additionally, we hypothesize that firefighters that are older, with greater years of service, show increased compassion satisfaction/decreased compassion fatigue will demonstrate greater resilience/grit. Finally, we believe presence of injury history will be present in our final regression model. Conclusions: Completion of these aims enables both the development of meaningful, psychologically-informed care-plans, as well as the ability to develop population-relevant longitudinal studies aiming to identify injury risk-factors and predictors of long-term health outcomes following rehabilitation among firefighters.

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**Presenter:** Tinsley, J.E.\jennifer.tinsley@uky.edu

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# Abstracts

## Poster Number 119

**Title:** Understanding the Use of AAC in Inclusive Settings

**Authors:** N. Gorr, College of Health Sciences, U of Kentucky, E. Davis, College of Health Sciences, U of Kentucky

**Abstract:** The proposed poster session is based on the findings and conclusions drawn from a recently-completed review of the literature (Kleinert, Kearns, et.al.,2019). This review identified all research published since 1998 addressing AAF interventions for children from kindergarten to 8<sup>th</sup>grade in inclusive classrooms Three primary factors were identified as supporting students' use of AAC in inclusive classrooms. Those factors include 1) peer mediated supports, 2) aided language modeling, 3) professional collaboration and planning for implementation. This session will focus on strategies for implementing these four factors to improve AAC use, social relationships, and academic learning for students with complex communication needs.

**Funding:** No Funding

**Presenter:** Davis, E. S.[lesda229@uky.edu](mailto:lesda229@uky.edu)

# Abstracts

Poster Number 120

**Title:** Scoping Review of the Communication Function Classification System (CFCS)

**Authors:** T. L. Hensley, Department of Communication Sciences and Disorders, U of Kentucky, M. J. Hidecker, Department of Communication Sciences and Disorders, U of Kentucky

**Abstract:** The Communication Classification Function System (CFCS) is a tool that allows clinicians to rate the functional communication of their patients. The CFCS provides five levels, each describing the ability to communicate with unfamiliar and familiar partners. Originally developed for cerebral palsy, the CFCS is now used for additional disorders. This research will explore how the CFCS has been used over the past decade. **Methods:** Relevant databases have been searched for articles that reference the CFCS. From these articles, multiple data points were gathered including the type of article, the disability of interest, and how many of the studies report alternative and augmentative communication (AAC) methods when rating functional communication. These data points were then translated into frequency statistics using SPSS. **Results:** Using the University of Kentucky Libraries database, 304 articles were found that reference the CFCS (Hidecker, M\*, 2011). 161 of these articles used the CFCS as background information and 155 of them used the tool for research purposes. 231 of the articles primarily studied the disorder of cerebral palsy. Finally, only 40 of the articles reported participants AAC methods of communication. **Discussion:** In communication science research, it is evident that there are multiple different definitions of functional communication that exist. The CFCS has the potential to rid of these discrepancies and create one universal definition and classification mechanism.

**Funding:** No Funding

**Presenter:** Hensley, T. L. \the227@g.uky.edu



# Abstracts

## Oral Presentation

### Title: Computerized Cognitive Function Does Not Correlate with Choice-Reaction Time During a Hopping Task

**Author:** KH Porter, Sports Medicine Research Institute, Department of Athletic Training and Clinical Nutrition, University of Kentucky, N Morelli, Medtronic Inc., NR Heebnner, Sports Medicine Research Institute, Department of Athletic Training and Clinical Nutrition, University of Kentucky J Wilson, Sports Medicine Research Institute, University of Kentucky A Parks, Sports Medicine Research Institute, University of Kentucky DY Han, Department of Neurology, College of Medicine, University of Kentucky MC Hoch, Sports Medicine Research Institute, Department of Athletic Training and Clinical Nutrition, University of Kentucky

**Abstract:** **Context:** Cognitive performance has been shown to be associated with musculoskeletal injury risk. Cognitive assessments are often administered in controlled environments despite sport settings challenging cognition in uncontrolled, less predictable environments. Cognitive assessments should be representative of sport demands, thus integrating motor with cognitive assessments may be more clinically relevant. Accordingly, the purpose of this research was to investigate the relationship between tablet-based cognitive tests and choice-reaction time during a hop-to-stabilization task. **Methods:** Twenty-two healthy participants volunteered to participate. Participants completed three tablet-based cognitive assessments then a composite score was calculated from the scores. Additionally, participants completed a choice-reaction hop-to-stabilization task to capture motor-cognitive reaction time. Participants completed a forward hop over a hurdle, landing on a single limb. Light sensors were utilized for the choice-reaction component to capture reaction time, cue them when to hop, and indicate which limb to land on (i.e., red indicating the right limb). The relationship between the tablet-based cognitive assessments and the hop-to-stabilization reaction time were examined with Pearson's correlations ( $\alpha=0.05$ ). **Results:** The hop-to-stabilization reaction time ( $1.26\pm 0.18$  s) had a weak correlation to the Flanker Inhibitory Control and Attention Test ( $49.73\pm 13.10$ ,  $r=-0.14$ ,  $p=0.54$ ), Dimensional Change Card Sort Test ( $61.18\pm 7.37$ ,  $r=-0.24$ ,  $p=0.28$ ) and Pattern Comparison Processing Speed Test ( $57.95\pm 17.98$ ,  $r=-0.03$ ,  $p=0.90$ ). **Conclusions:** This study determined that tablet-based cognitive assessments had weak relationships to choice-reaction time on the hop-to-stabilization task. Although reaction time was a critical component of all the assessments in this study, they may be challenging different aspects of cognition and to varying degrees.

**Funding:** No Funding

**Presenter:** Porter, K.H.\kela.porter@uky.edu

# Abstracts

## Oral Presentation

### Title: Satellite Cell and Myonuclear Dynamics Contribute to ACL Injury-Induced Quadriceps Atrophy

**Authors:** N. T. Thomas, U of Kentucky, C. R. Brightwell, U of Kentucky, C. E. Scheitzach, U of Kentucky, L. K. Eastwood, U of Kentucky, M. L. Wagers, U of Kentucky, D. L. Johnson, U of Kentucky B. Noehren, U of Kentucky C. S. Fry, U of Kentucky

**Abstract:** Anterior cruciate ligament (ACL) tears are prevalent injuries that present protracted quadriceps atrophy. We have previously shown lower satellite cell (SC) abundance accompanies atrophy following ACL-injury; whether this loss of SCs is causative or a consequence of atrophy is unknown. Following ACL-injury, reduced SC density may compromise muscle regrowth. *Human:* Vastus lateralis biopsies were obtained from ACL-injured and healthy limbs of 25 participants (13M,12F; 19±1yr) before reconstruction surgery. Muscle fibers were isolated, and 3-dimensional fiber characteristics were obtained. *Mouse:* Pax7<sup>CreER/CreER</sup>:Rosa26<sup>DTA/DTA</sup> mice were treated with tamoxifen (SC-depleted/SC-dep: n=6) or treatment vehicle (SC wild type/SC-WT: n=5) before unilateral ACL transection (ACLT). Quadriceps from ACLT and healthy limbs were obtained 7 days following ACLT to measure SC density and fiber size. Limb differences were detected using paired t-tests while differences between SC-WT and SC-dep mice were detected using t-tests and ANOVAs. *Human:* Fiber volume was 19.8% lower in the ACL-injured limb (ACL-injured:  $2.6 \times 10^6 \pm 1.7 \times 10^5 \mu\text{m}^3$ ; Healthy:  $3.3 \times 10^6 \pm 2.8 \times 10^5 \mu\text{m}^3$ ; p=0.001) with no difference in myonuclear density (p=0.425). Myonuclear domain of ACL-injured muscle was 16.3% lower versus Healthy (p=0.001). *Mouse:* Main effect of ACLT for fiber size was observed (p=0.014), with SC-dep mice undergoing 18.7% greater atrophy than SC-WT mice in the injured limb (SC-dep: Healthy:  $3152 \pm 310$ ; ACLT:  $2564 \pm 339$  p=0.006. SC-WT: Healthy:  $3025 \pm 412$ ; ACLT:  $2631 \pm 615 \mu\text{m}^2$  p=0.059) Our results show lower SC abundance may exacerbate atrophy following ACL-injury without changes in myonuclear density. SCs may represent a therapeutic target to mitigate muscle atrophy after ACL-injury.

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