College of Health Sciences Research Day

POSTER PRESENTATION #177

Abstract Title:	**Electronic Patient-Reported Outcomes Data Collection Reduced Clinician Time Associated with Traditional Paper Forms**
Author(s):	M. R. Almaddah, Rehabilitation Sciences, U of Kentucky C. A. Jacobs, Lexington Clinic, Lexington, KY

Abstract: Background–In the clinical setting, paper forms are often used to collect patient-reported outcomes (PROs) after orthopedic procedures; however, electronic data capture may provide a more efficient method to collect PROs. Objectives–We hypothesized that using electronic forms to collect PROs would reduce the time needed for the patient to complete the PROs and the time required for data entry by the orthopedic technician when compared with paper forms. Methods–24 total knee arthroplasty patients were used to compare the two methods. Subjects were recruited from an outpatient clinic to complete the Knee Osteoarthritis and Outcome Score, Joint Replacement (KOOS-Jr), the EQ-5D general health, and patient satisfaction PRO questionnaires. Twelve subjects completed the PROs on paper forms and 12 subjects completed the questionnaires electronically. The time needed for the patient to complete the PROs and the time required for data entry by the specialist was compared between the paper and electronic capture methods using independent t-tests, and we also collected the number of calculation errors for the two capture methods. Results–The two methods did not differ in terms of the time required by the subject to complete (p=0.057). The time required of the orthopedic technician to calculate the score and enter into the patients' medical record was significantly greater with paper forms than with electronic capture (79.79± 29.27 sec vs. 41.32±5.08 sec, p=0.0004). There was one calculation error with paper PRO collection compared to no errors with electronic capture. Conclusion–Electronic PRO collection required significantly less time of the clinician and did not result in any calculation errors, and is likely the preferred method of PRO collection in the clinical setting.

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College of Health Sciences Research Day

POSTER PRESENTATION #178

Abstract Title:	**A Non-Instrumental Method for Establishing Vocal Economy Goals**
Author(s):	M.H. Bane, College of Health Sciences, U of Kentucky J.C. Stemple, College of Health Sciences, U of Kentucky

Abstract: Establishing a measureable voice therapy goal is thought to support patient adherence and motivation during treatment. One voice therapy intervention, Vocal Function Exercises, uses a physiologic maximum phonation time goal as an indication of vocal economy. Vocal economy refers to maximizing acoustic output while minimizing vocal fold collision. The physiologic goal for vocal economy is calculated using maximum airflow volume (MAV), a measurement recorded using a pneumotachograph. The problem is that many facilities offering voice therapy do not have access to sophisticated instrumentation such as pneumotachographs. The purpose of the proposed study is to determine whether a non-instrumental measurement can be utilized to determine a vocal economy goal. The proposed study requires 50 participants to complete three trials of three aerodynamic tasks for a total of nine randomly ordered trials. One task measures MAV using a pneumotachograph. The second task involves sustaining the speech sound /s/ for as long as possible into the pneumotachograph. The third task requires sustaining /s/ for as long as possible without the pneumotachograph. Results are expected to indicate each participant's MAV, use of MAV during sustained /s/, and length of sustained /s/ in seconds. The best trial for each task will be selected and vocal economy goals will be calculated. Statistical analysis will compare instrumental and non-instrumental methods for establishing vocal economy goals. Although the gold standard for determining vocal economy goals in voice therapy often requires sophisticated instrumentation, it may be possible to establish motivating therapy goals without instrumentation.

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College of Health Sciences Research Day

POSTER PRESENTATION #179

Abstract Title:	**Effect of Chronic Low Back Pain and Post-Traumatic Stress Disorder on the Risk for Separation from the U.S. Army**
Author(s):	T. M. Benedict, Department of Rehabilitation Sciences, U of Kentucky M. Singleton, Department of Biostatistics, U of Kentucky J. Kardouni, United States Army Research Institute of Environmental Medicine, US Army T. L. Shing, United States Army Research Institute of Environmental Medicine, US Army

Abstract: Introduction: Co-morbid post-traumatic stress disorder (PTSD) and low back pain (LBP) are common reasons for increased disability in the Veteran communities. Medical discharge from the military represents a considerable financial cost to society. Little is currently known about the impact of LBP and PTSD as longitudinal risk factors for medical discharge from Active Duty military service. Methods: We performed a retrospective cohort analysis on all U.S. Army Active Duty Soldiers from 2002-2011 to determine the risk for medical discharge. We identified four levels of exposure for our independent variables: no chronic LBP or PTSD, chronic LBP only, PTSD only, and co-morbid PTSD and chronic LBP. We performed a modified Poisson regression while controlling for sex, age, rank, time in service, deployment, mental health, sleep disorders, alcohol abuse, tobacco use, obesity, and military occupation. Results: The unadjusted relative risk (RR) for chronic LBP was 3.29, 3.76 for PTSD, and 5.27 when combined. After controlling for potential confounding variables, the RR for chronic LBP and PTSD independently was 3.65 (95% CI: 3.59-3.72) and 3.64 (95% CI: 3.53-3.75), respectively, and 5.17 (95% CI: 5.01-5.33) when both were present. Discussion: This is the first study to identify a history of both chronic LBP and PTSD as significant risk factors for medical discharge from the U.S. Army. PTSD and chronic LBP may mutually reinforce one another and deplete active coping strategies, making them less likely to be able to continue military service. Conclusion: Future research should target therapies for co-morbid PTSD and chronic LBP as these conditions contribute a substantial increase in risk of medical discharge from the U.S. Army.

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College of Health Sciences Research Day

POSTER PRESENTATION #180

Abstract Title:	**Vocal Function Exercises for Normal Voice: With and Without Semi-Occlusion**
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Abstract: Vocal Function Exercises (VFEs) are a physiologic approach to voice therapy which seek to strengthen and rebalance the laryngeal musculature and enhance the relationship among the three subsystems of voice: respiration, phonation, and resonance. Coordination of the subsystems results in efficient vocal fold vibration, determined by maximum phonation time (MPT). A variety of studies have demonstrated VFEs to be effective in enhancing both normal and pathological voices, but little is known about the mechanism of change. One possible mechanism of change is use of a semi-occluded vocal tract (SOVT), which achieves greater vocal output with less vocal fold stress and physical effort. The purpose of this study was to investigate the efficacy of VFEs performed with varying degrees of vocal tract occlusion. Use of traditional VFE protocol with SOVT posture was hypothesized to result in best outcome. 26 female participants were randomized into groups: traditional VFEs (SOVT), modified /o/ (partial occlusion), and modified /a/ (absent occlusion). Participants completed VFEs for 6 weeks using the assigned vocal tract posture. Results indicated significantly increased MPT in the traditional VFE group (SOVT); modified VFE groups did not result in significant change. Results indicate VFEs with SOVT posture is most efficacious.

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College of Health Sciences Research Day

POSTER PRESENTATION #181

Abstract Title:	**Mantra Meditation to Improve Chronically Impaired Attention after Stroke: A Planned Non-Concurrent Multiple-Baseline Across-Subjects Trial**
Author(s):	C. Carrico, Department of Rehabilitation Sciences, U of Kentucky J. Patterson, Department of Gerontology, U of Kentucky L. Sawaki, Department of Physical Medicine and Rehabilitation, U of Kentucky D. Howell, Department of Occupational Science and Occupational Therapy, Eastern Kentucky U

Abstract: Impaired attention is a common problem after stroke. Only modest improvement characterizes the natural course of attentional recovery after stroke. Moreover, there is insufficient evidence that cognitive rehabilitation effectively addresses this problem. Interventions that improve attention would have potentially wide-ranging benefit because attention affects engagement in rehabilitation and correlates with recovery of movement function after stroke. Meditation could serve as an intervention to improve attention insofar as systematic self-regulation of attention—a defining characteristic of meditation—may conduce adaptive neuroplastic change in attentional substrates. In healthy volunteers, mantra meditation has been shown to modulate attentional substrates and improve performance on neuropsychological tests of attention. The planned trial will be the first to investigate the central hypothesis that mantra meditation after stroke will lead to improved performance on standardized neuropsychological tests of attention (primary outcome: Sustained Attention to Response Task; secondary outcome: Trail-Making Test). Each subject will participate in 9 sessions of mantra meditation (chanting the syllable “um”). Each 30-minute session will occur 3 times per week for 3 weeks in an outpatient occupational therapy research lab. In keeping with single-case research design standards, the effects of the independent variable (meditation) on the dependent variable (attention) will be replicated across at least 3 subjects (maximum n=4) in a series of AB designs to establish evidence of a functional relationship between variables. Results will lay groundwork for future studies of the mechanisms and potential benefits of meditation in clinical stroke rehabilitation.

Supported by: poster printing University of Kentucky Department of Rehabilitation Sciences

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College of Health Sciences Research Day

POSTER PRESENTATION #182

Abstract Title:	**Early Detection of Pancreatic Ductal Adenocarcinoma (PDAC): Concordant Assignments Among Blank and Cancer Exosome Lipid Extracts**
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Abstract: Purpose/Introduction Pancreatic cancer (PCa) is the 3rd most deadly cancer with a dismal 7% overall 5-year survival rate. The 5-year survival rate is 27% for localized PCa, but only 9% of cases are caught at this stage. A robust, efficient means of early detection is urgently needed, along with improved treatment options for this deadly disease. We have been developing blood plasma exosomes-based screening tools for early detection of human cancers. These vesicles can be released by blood cells and tumor tissues to elicit important biofunctions including immune modulation and tumor development. The preliminary evidence is showing very promising differences in exosome lipid profiles between healthy and PCa subjects. Methods A total of 19 blank (controls) controls and 9 pancreatic cancer samples were analyzed. Pancreatic cancer samples were obtained by drawing blood from patients and extracting exosomes. The blank samples were quality control samples (loading samples). Both blank and pancreatic cancer samples were analyzed using nanoelectrospray Ultra-high resolution Fourier-transformed mass spectrometry (UHR-FTMS). Raw m/z data was extracted using Xcalibur and referenced against a lipid m/z database using PREMISE to generate assignments. Data/Results A total of 19 blank and 9 samples were analyzed with the number of assignments ranging from 280 to 125 and 380 to 100 in blank and sample, respectively. The average number of assignments in both blank and sample was 180. 33 assignments repeated across 19 blanks and 23 assignments repeated across 9 samples, of those that repeated in both blank and sample 22 were identical. The average m/z of duplicate assignments was 300 m/z and was not significantly different between blank and sample. Conclusions While the preliminary evidence shows differences between exosome lipid profiles between healthy and PCa subjects we have found some non-specific concordance of assignments. Overlapping assignment values could be due to the algorithm used by PREMISE, background noise, or contamination. Further work is needed to determine the nature of duplicates, to improve PREMISE algorithm, or develop a threshold that will screen out a certain percentage of concordant values. This will allow better identification of assignments specific to PCa.

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College of Health Sciences Research Day

POSTER PRESENTATION #183

Abstract Title:	**Prediction of first-extubation success in preterm infants: the value of a spontaneous breathing test.**
Author(s):	L.N. Davidson, Department of Pediatrics, Division of Neonatology, U of Kentucky H.O. Ballard, Department of Pediatrics, Division of Neonatology, U of Kentucky T. Roark, Department of Pedatrics, U of Kentucky J.A. Bauer, Department of Pediatrics, Division of Neonatology, U of Kentucky M.D. Cunningham, Department of Pediatrics, Division of Neonatology, U of Kentucky L. Wright, Department of Pediatrics, U of Kentucky

Abstract: Background: Preterm infants often require mechanical ventilation in the first day of life. This respiratory support if vital for early survival but long term ventilator reliance is associated with pulmonary injury and other chronic morbidities. Thus, early extubation is highly desirable. However, a failure that requires re-intubation also has significant consequences (acute respiratory distress, lung parenchymal injury, etc). Here, we investigated the value of a spontaneous breathing test (SBT) protocol implemented to assess respiratory readiness in ventilated preterm infants. Objective: To investigate the value of SBT length for prediction of extubation success in premature infants. Design/Methods: Outcomes of first extubation cases that occurred in the first 30 days of life were evaluated from the EMR of our neonatology service line from Jan 2015 - Sept 2016. First-extubation failure was defined as a requirement for reintubation within 72 hrs post extubation. Success rates were compared across all gestational ages, using an SBT protocol that was 15 minutes in duration (2015) vs. 10 minutes in duration (2016). Extubation success rates were compared among patients at 24 gestational age ranges: <28wks and 28-32wks. Results: A total of 69 patient extubation outcomes were investigated using successful SBT protocols of 15 minutes (n=47) or 10 minutes (n=22) as entrance criteria. Infant birthweight ranged from 555 grams to 1440 grams, with gestational ages ranging from 23 weeks to 32 weeks. Patient extubation readiness was well predicted by the passing of a 10 minute SBT protocol and was associated with 70 to 90% extubation success, depending on gestational age. The use of a longer SBT (15 min) was associated with worse extubation success, especially among the most premature infants (47%, $p<0.05$). Conclusion(s): We postulate that the longer SBT duration may induce physiological stress that complicates result interpretation (eg. skeletal muscle fatigue, etc). These data demonstrate that a SBT protocol may have value in guiding the decision to extubate in preterm infants and that a shortened SBT protocol may be more insightful, especially in the smallest patients. Further refinement of predictors of extubation readiness in preterm infants is clearly warranted.

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POSTER PRESENTATION #184

Abstract Title:	**Cellular Senescence in Human Muscle: The Skinny on Cell Cycle Arrest in Satellite Cells During Aging and Obesity**
Author(s):	C.M. Dungan, Center for Muscle Biology and Department of Rehabilitation Sciences, U of Kentucky B. Peck, Department of Rehabilitation Sciences, U of Kentucky J.J. McCarthy, Department of Physiology, U of Kentucky C.A. Peterson, Center for Muscle Biology and Department of Rehabilitation Sciences, U of Kentucky

Abstract: Cells that undergo terminal cell cycle arrest (senescence) are a hot topic in muscle research due in part to their senescence associated secretory phenotype (SASP), composed of chemokines and inflammatory cytokines, which negatively affect the local microenvironment. Currently, there is little evidence that satellite cells in human muscle undergo senescence. p16 and γH2AX are used to identify senescent satellite cells in vitro, but have not been examined in human muscle tissue. The purpose of our study was to examine the effectiveness of these markers in human skeletal muscle to quantify the abundance of senescent satellite cells during aging and obesity. Muscle biopsies were obtained from the vastus lateralis in young (18-25 years), old (65-86 years), and obese (BMI>30) men and women. Immunohistochemistry was used to quantify p16 and/or γH2AX positive nuclei that expressed Pax7, a satellite cell marker. Surprisingly, >90% of all nuclei expressed p16 in young, old, and obese muscle, however, labeled nuclei were preferentially localized within the muscle fiber, suggesting that in muscle, p16 is a marker of post-mitotic nuclei. γH2AX expression was undetectable in both young and old individuals, but was robustly expressed in obese individuals, suggesting that obesity, rather than aging, promotes a senescent phenotype. We conclude that p16 is not an ideal marker of cellular senescence in human skeletal muscle, and obesity may be a greater risk factor for muscle dysfunction when compared to aging.

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College of Health Sciences Research Day

POSTER PRESENTATION #185

Abstract Title:	**Qualitative Study Regarding the Experiences of Adult-Oriented Physical Therapists Providing Services for Individuals with Lifelong Disabilities**
Author(s):	C.L. Gohrband, College of Health Sciences, U of Kentucky D. Howell, Department of Occupational Science and Occupational Therapy, Eastern Kentucky U

Abstract: Background and Purpose: The life expectancy for persons with lifelong disabilities (LLDs) has increased due to improved living conditions, development of antibiotics, and advancements in technology. As the lifespan of this population increases, so too have the impairments occurring as a result of overuse of an already compromised musculoskeletal system. Persons using abnormal movements since childhood are prone to overuse injuries, arthritis and chronic pain into their adult years. Young adults with LLDs often have restricted access to general and specialty health care. There is also a corresponding lack of knowledge by adult health care providers, including physical therapists (PTs), about the needs of this population with LLDs. The purpose of this study is to explore the perceptions and experiences of adult-oriented PTs as they are providing services to patients with LLDs. Number of Subjects: This purposive sampling of subjects consisted of 6-10 licensed PTs working in outpatient orthopedic clinics. Procedures: Multiple semi-structured interviews were conducted with the study subjects using Phenomenological qualitative research methodology. The interviews focused on understanding the experiences of adult-oriented PTs when providing services to adults with LLDs. Data Analysis: Interview data was thematically analyzed following guidelines by Colaizzi. Significant statements were identified from the interview transcriptions and then were grouped into areas of common meaning. Results: The results of this study with ongoing data analysis will serve to help adult-oriented PTs better understand how to provide effective services to individuals with LLDs.

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College of Health Sciences Research Day

POSTER PRESENTATION #186

Abstract Title:	**Comparison of Academic Performance Between Rural and Urban Physical Therapy Students**
Author(s):	C. Hanebuth, College of Health Sciences, U of Kentucky R. Remer, Office of Student Affairs, Clinical Leadership Management, Human Health Sciences, U of Kentucky M. Butina, Department of Medical Laboratory Science, U of Kentucky

Abstract: Research suggests that rural education, in elementary and high schools, is associated with lower performance rates when compared to urban schools. Most often, the lower academic performance rates are due to socioeconomic disparities. There is little data on the impact of the rural geographical setting on professional level of education. Data was collected from five of the most recent Physical Therapy (PT) graduating classes, spanning from 2010-2014 (300 students) at a research institution in the southeast. The professional program consists of two campuses, rural and urban, which were used in comparison. Approximately 46 students are accepted into the urban campus each year, while only 16 students into the rural campus. Overall participants reported being 67.6% women, 97.4% white, 92.3% of traditional age, and 38.5% growing up in a rural community when entering the program. Two groups of variables will be analyzed: undergraduate academics (grade point average, graduate records examination, highest degree achieved) and PT program success (course grades, board pass rates, overall grade point average). A multiple regression analysis will be used to determine if the rural campus created any variance in any of the above variables. These results are expected to indicate that students in rural school settings perform lower academically at a professional level. These findings can help further research into implementing effective intervention programming to students in rural communities who would like to attend professional programs, so they enter with similar academic footing to their urban counterparts.

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College of Health Sciences Research Day

POSTER PRESENTATION #187

Abstract Title: **Single-center retrospective analysis of pre-lung transplant patient psoas muscle mass**

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Abstract: Background: Frailty is increasingly recognized as a risk factor for poor outcomes in solid organ transplantation. As much as 10% of the population in need of lung transplantation is frail. Frailty in this population correlates with lung allocation score, disability, removal from the anticipated transplant list and death. The optimal stratification of patient risk for poor transplant outcome by use of formal frailty measures, surgical risk stratification tools, and other benchmark indices, remains unknown. Muscle mass is one of the determinants in the frailty index and may be helpful in the prediction of transplant patients' functional outcomes. Objectives: A pilot project was undertaken to retrospectively determine whether patients who underwent a lung transplant had lower muscle mass measures than healthy controls. Methods: We compared muscle measures, in pre-transplant patients (n=22) at the University of Kentucky Hospital to an age and gender-matched control population extracted from the UK trauma registry. Abdominal CT scans were retrospectively analyzed and utilized for calculation of psoas muscle area, average lean muscle mass, and total body fat free mass. Values were normalized to the patients' height. Results were compared utilizing a t-test. Results: There was no statistical difference in normalized psoas muscle area (p=0.069) or lean muscle mass (p=0.067) between the pre-lung transplant patients and control patients. However, transplant patients had 7% higher values for normalized total body fat free mass than the control patients (p=0.043). Conclusion: In this single center cohort of pre-lung transplant patients, there was no difference in psoas muscle mass compared to control patients. Further study will be necessary to both contrast these findings with a larger pre-transplant population and to determine whether transplanted patients experience a more rapid muscle loss over time than age-matched controls.

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12th Annual CCTS Spring Conference
Thursday, March 30, 2017 Lexington Convention Center

College of Health Sciences Research Day

POSTER PRESENTATION #188

Abstract Title:	**Increasing Communication Output by a Child with Cerebral Palsy in the Classroom Setting**
Author(s):	K. Hensley, Division of Communication Sciences and Disorders, U of Kentucky M. Blayney, Division of Communication Sciences and Disorders, U of Kentucky J. Kleinert, Division of Communication Sciences and Disorders, U of Kentucky

Abstract: Cerebral palsy (CP) refers to a group of neurological disorders that appear in infancy or early childhood and permanently affect body movement and muscle coordination (NINDS 2017). Speech and language disorders, such as difficulty forming words and speaking clearly, are present in more than a third of persons with CP (NINDS 2017). Not only does the characteristic of the condition make speech and language difficult, “but also [the] personal (education, behavioral problems) and environmental (siblings, parental stress, social economic status) factors” (Developmental Medicine & Child Neurology 2014, 56: 951–959.) This project implemented a classroom-based, evidenced-based intervention package of instruction including: delayed modeling, imitation, peer support and classroom carryover of verbal prompting techniques targeting increased verbal output with a 10 year old student with Cerebral Palsy and minimal oral speech. Two undergraduate students in the College of Health Sciences, Communication Sciences and Disorders Program implemented this project. Data analysis indicates that the subject is receptive to the package instruction intervention carried out in this study.

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College of Health Sciences Research Day

POSTER PRESENTATION #189

Abstract Title:	**No Overt Muscle Damage in Response to Multiple Bouts of Cyclic Compressive Loading in Young and Old Rat Skeletal Muscle**
Author(s):	E. R. Hunt, College of Health Sciences, U of Kentucky A. L. Confides, College of Health Sciences, U of Kentucky S.M. Abshire, College of Health Sciences, U of Kentucky E.E. Dupont-Versteegden, College of Health Sciences, U of Kentucky T.A. Butterfield, College of Health Sciences, U of Kentucky

Abstract: Introduction Massage is a widely accepted modality that modulates the inflammatory response of muscle and also augments regrowth and restores function. Although massage has beneficial effects on perturbed muscle, prolonged compression can potentially cause damage in the form of muscle fiber injury as well as sarcolemmal disruption. Previously we showed that one bout of massage did not induce damage in young or aged muscle, but the effect of multiple bouts is currently unknown, particularly in the aged. We hypothesize that multiple bouts of massage will have a damaging effect on young and aged rat muscle. Methods Male BN/F344 rats were divided into four groups (n=8) for each age, 10 and 30 months. Groups included weight bearing control (WB), hindlimb suspended for 14 days (HS), HS and reloaded for 8 days (RE), and HS and reloaded with 4 bouts of massage every other day for 8 days (REM). Massage was applied using cyclic compressive loading (CCL) to the right gastrocnemius at 4.5 N for 30 minutes per bout. Muscles were dissected, frozen and cross sections were stained with IgG for the presence of damage. One way ANOVA was performed to detect differences. Results IgG density in muscle fibers was not different between the groups at either age, indicating that there was no damage. Conclusion Multiple bout of massage at a load which has been shown to be immunomodulatory can be applied safely to young and aged skeletal muscle.

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College of Health Sciences Research Day

POSTER PRESENTATION #190

Abstract Title:	**A Systematic Review od Aphasia Therapy in Post-Stroke Acute and Subacute Phases of Recovery**
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Abstract: Background: Most treatment studies in aphasia research have used participants with chronic aphasia. Less is known about the effectiveness of aphasia therapy during the acute (<1 month post-onset) and subacute (1 to 4 months post-onset) phases of recovery. Aims: The aim of this study was to describe and examine the evidence on the effectiveness of aphasia treatment initiated during the acute and subacute phases of post-stroke recovery. Methods & Procedures: A systematic search of the literature was conducted between January 1960 and December 2016 on relevant electronic databases utilizing 13 search terms. Retrieved studies were evaluated for methodological quality using the PEDro scale. Studies were summarized according to three clinical questions about the provision of aphasia therapy in the acute and subacute periods of recovery: (1) Is treatment efficacious, (2) does the type of treatment make a difference, and (3) does the amount of treatment matter? Results: The initial search yielded 1,116 citations, of which 19 met the selection criteria. Seven of the studies investigated the effectiveness of aphasia therapy in the acute phase and twelve studies investigated the effectiveness of treatment in the subacute phase. Methodological quality was stronger for the studies investigating therapy in the acute phase compared to those that examined treatment in the subacute period. Six studies reported significant findings in favor of treatment efficacy in the early phases of post-stroke recovery. No study found that the type or amount of treatment administered significantly affected treatment outcomes in the acute or subacute periods. Conclusion: Support for early aphasia treatment was demonstrated in several studies. Additional research is needed for examining factors associated with treatment compliance, frequency, and type.

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College of Health Sciences Research Day

POSTER PRESENTATION #191

Abstract Title:	**The Potential Role of Synovitis in Femoroacetabular Impingement Symptoms and Osteoarthritis Progression**
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Abstract: Purpose: The purpose of this study was to determine the relationship between synovitis and femoral acetabular impingement (FAI) presentation. We hypothesized that the more severe synovitis would correspond with worse symptoms. Subjects: 67 consecutive patients were identified from our IRB-approved outcomes registry (52F/15M; age=34.3±10.8 years). Procedures: Prior to surgical intervention subjects completed patient reported outcomes (PROs) including the Hip Disability and Osteoarthritis Outcome Score (HOOS) and the Vetrans RAND 12 Item Health Survey (VR-12). Synovitis severity was classified via intra-operative images using the Hip Synovitis Severity Scale (HSSS). Statistical Analysis: Patients were categorized into three groups using the HSSS (mild or no synovitis (LOW), moderate synovitis (MOD), and severe synovitis (SEV)). Patient demographics, surgical findings, radiographic measures, and PROs were compared between groups using ANOVAs, chi-square or Fisher Exact tests. Results: 32(48%) patients were in the LOW group, 19(28%) in the MOD, and 16(24%) in the SEV. Patients in the SEV group were significantly older than those in the LOW group ($p<0.001$), and there was a significantly greater prevalence of depression in the LOW group ($p=0.045$). Patients in the SEV group had significantly greater tissue damage (reduced joint space, larger labral tears, and more frequent cartilage lesions). Conclusion: Despite more severe injury patterns, patient reported pain and function did not differ based on the severity of synovitis. These results demonstrate the need for additional research to identify the drivers of patient pain and function in FAI patients allowing clnicans to optimize patient care and enchance outcome consistency.

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College of Health Sciences Research Day

POSTER PRESENTATION #192

Abstract Title:	**Strength and Biomechanical Contributions to Vertical Ground Reaction Forces in a Single Limb Landing Task**
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Abstract: Reducing peak vertical ground reaction forces (vGRF) is a key goal in injury prevention landing mechanics programs. We hypothesize greater knee flexion at initial contact (KFIC), hip flexion at initial contact (HFIC) and quadriceps strength (IKQS) will be significant predictors of lower vGRF in a single limb landing. Thirty-four physically active males (Age: 27.6±4.6yrs; Height: 177.74±7.15cm; Mass: 84.31 11.83kgs) completed a single limb drop landing off a 45.7cm box onto a force plate. A 3D motion analysis system was used to collect dominant (DOM) and non-dominant (NON) HFIC, peak knee flexion (PKF), KFIC, peak ankle flexion, ankle flexion at initial contact and vGRF. DOM and NON IKQS was collected using an isokinetic dynamometer at 60°/s. Simple linear regression models were run for each limb to detect independent contributions to vGRF. Backward stepwise multiple linear regression was used to determine the best model to predict vGRF. KFIC independently accounted for 11.8% (p= 0.047) of variance in DOM vGRF. No DOM limb multiple linear regression model was significant. KFIC and PKF independently accounted for 15.7% (p=0.021) and 16.5% (p=0.017) of the variance in NON vGRF, respectively. KFIC and IKQS as a multiple linear regression model accounted for 18.9% (p=0.043) of variance in NON vGRF. This study highlights how active males use sagittal plane knee motion and quadriceps strength to influence vGRF in a single leg landing task. Active individuals with weak quadriceps and stiffened knee at initial contact are likely at risk for injuries associated with increased impacts during single limb landings.

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College of Health Sciences Research Day

POSTER PRESENTATION #193

Abstract Title:	**Mobility BOOST: A Quality Improvement Project Implemented to Enhance Patient Function within a Model for Safer Care Transitions**
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Abstract: Project BOOST (Better Outcomes by Optimizing Safe Transitions) is a readmission reduction program promoted by the Society of Hospital Medicine, designed to control costs and improve patient outcomes. Typical team members include an internal medicine physician, pharmacist, nurse case manager and bedside nurses. The hallmark of the program includes interprofessional bedside rounding and discharge education using teach back. We found that physical therapists are generally not included in the team. A quality improvement project that added a physical therapist to the Project BOOST team and promoted increased patient mobility level during hospitalization was implemented on the seventh floor of Good Samaritan hospital (Internal Medicine Team 4), while the other team (Internal Medicine Team 5) operated as usual. The physical therapist tracked general medicine patient's functional status from admission to discharge using the AM-PAC "6 Clicks," recommended physical therapy and occupational therapy consults for appropriate patients, recommended physical activity and mobility carried out by a mobility tech, and communicated discharge recommendations with the Project BOOST team. In a comparison between the two BOOST teams, using difference in difference statistical methods, PT consults increased from 30% (253 patients) to 38% (348 patients) (p=0.04) in MD4 patients. PT consults in the comparison team remained the same. Hospital length of stay (LOS) decreased from 6.8 days (253 patients) to 5.5 days (348 patients) (p=0.03) in MD4 patients. The comparison group LOS decreased from 5.9 days (294 patients) to 5.6 days (331 patients), which was not statistically significant. Tracking functional status and promoting mobility of adult general medicine inpatients under the direction of a physical therapist may improve function and decrease hospital LOS.

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College of Health Sciences Research Day

POSTER PRESENTATION #194

Abstract Title:	**Endothelial Function is Associated with White Matter Microstructure and Executive Function in Older Adults**
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Abstract: Age-related declines in endothelial function can lead to cardiovascular disease and cognitive decline. Little is known about the potential relationship between endothelial function, white matter (WM) microstructure, and executive function in older adults without cardiovascular disease. This study explored the relationship between measures of endothelial function (reactive hyperemia index; RHI), WM microstructure (fractional anisotropy; FA), and executive function (Trail Making Test; Trail B – Trail A). Participants were 36 older adults between the ages of 59 and 69 (mean age = 63.89 years, SD = 2.94). Results indicated a positive relationship between RHI and FA in the genu and body of the corpus callosum. RHI and FA demonstrated a positive relationship with executive function, such that superior endothelial function and WM microstructure were associated with smaller increases in the amount of time required to complete Trail B compared to Trail A (Trail B – Trail A). Tractography results provided a physiological basis for this relationship. Specifically, the RHI-FA relationship observed in the corpus callosum primarily involved tracts interconnecting frontal regions, the superior frontal gyrus and frontopolar cortex, associated with high-level cognitive function. These findings suggest that superior endothelial function may help to attenuate age-related declines in WM microstructure in portions of the corpus callosum that interconnect homologous prefrontal regions involved in executive function.

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College of Health Sciences Research Day

POSTER PRESENTATION #195

Abstract Title:	**Earlier Anterior Cruciate Ligament Reconstruction (ACLR) Surgery After Injury May Lead to Better Quadriceps Strength and Function.**
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Abstract: Hypothesis: We hypothesized that a smaller lapse in time between injury and surgery would result in greater symmetry in muscle strength and function following ACLR. Number of Subjects: 27 ACL-reconstructed subjects (14 females, 13 males; age 20.1±8.0 years, BMI=23.0±2.4kg/m2) were identified and divided into early surgical timing (≤21 days post-injury) and standard surgical timing group (42-84 days post-injury). Procedures: Three months post-op, subjects performed isometric quadriceps strength (QS) testing, single-leg step down test (SLSD), and the Knee Injury and Osteoarthritis Outcome Score (KOOS) assessment. Symmetry of SLSD results and QS were then expressed as a percentage of injured to non-injured limb. Statistical Analysis: Two-tailed independent t-tests and the prevalence of patients that were able to achieve >80% symmetry of the contralateral limb during the SLSD and strength testing using Fisher Exact tests. Results: The QS symmetry was significantly greater for the early group than the standard group (84 ±25% versus 59±19%, p=0.006). More subjects in early group were 80% symmetrical in QS (8/14 vs 2/13, p=0.046). Additionally, SLSD was significantly improved in the early group (81±25% versus 52±28%, p=0.009). Earlier surgery also related to better patient reported KOOS Sports scores (p=.040). Conclusion: These are the first results to show earlier ACLR timing is physically advantageous. Earlier surgery was associated with significantly greater strength, better function, and better self-reported sports function in the early postoperative period. Future studies are needed to determine if earlier surgery is related to an earlier and safer return to work or sport.

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College of Health Sciences Research Day

POSTER PRESENTATION #196

Abstract Title:	**Barriers to Implementation of the Recommended Amount of Physical Activity for Children in Public Schools: A Systematic Review**
Author(s):	N.E. Kearns, Rehabilitation Sciences Doctoral Program, U of Kentucky J. Lowman, Communication Sciences and Disorders, U of Kentucky E.E. Dupont-Versteegden, Rehabilitation Sciences Doctoral Program, U of Kentucky

Abstract: Identification of the barriers to implementation of the recommended physical activity minutes in public schools would provide information for local and national policymakers, school administrators, teachers and parents to improve current practices of the amount of physical education (PE) minutes children receive. Therefore, the purpose of this systematic review is to determine the most commonly reported barriers to implementation of the recommended amount of physical activity for children in United States public schools. An electronic literature search with pre-determined inclusion and exclusion criteria was conducted using Medline, ERIC, Sportdiscus, and CINAHL from 1966 to 2016. The literature was assessed by two reviewers of articles identifying barriers to implementation of physical activity minutes with inclusion criteria of level 3 evidence or above, public school setting in grades K-12, respondents of the study were either physical education teachers or administrators, and English language only. Methodological quality of the final articles was assessed and data extracted on identified barriers. Results identified the frequency of barriers reported from 9 total articles with the top four barriers being: physical education having low priority compared to other academic subjects, lack of professional development, lack of funding and lack of support. This hierarchical ranking of reported barriers to implementation of recommended physical activity minutes provides national, state, and local policymakers, administrators, and teachers with information that can direct the efforts targeted at improving compliance and implementation strategies with recommended minutes.

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POSTER PRESENTATION #197

Abstract Title:	**Hip-Dominant Landing Strategy During the Second Landing of a Drop Vertical Jump After ACL Reconstruction**
Author(s):	P. Kline, Department of Rehabilitation Sciences, U of Kentucky M. Marquez, College of Health Sciences, U of Kentucky D. Johnson, Department of Orthopaedic Surgery & Sports Medicine, U of Kentucky M.L. Ireland, Department of Orthopaedic Surgery & Sports Medicine, U of Kentucky B. Noehren, Division of Physical Therapy, U of Kentucky

Abstract: Drop vertical jump (DVJ) performance is often used to aid in the decision to return to sport after anterior cruciate ligament reconstruction (ACLR). In healthy subjects, the 2nd landing from a DVJ imposes greater demand in the sagittal plane. Sagittal plane mechanics of the ACLR limb compared to a control group during the 2nd landing of a DVJ are unknown. Hypothesis: Sagittal plane mechanics of the ALCR limb will be altered compared to a control group. Number of Subjects: 22 patients post-ACLR; 12 control subjects Procedures: Three-dimensional motion analysis was conducted while subjects performed a DVJ by stepping off a 30.5 cm box, landing on two feet (1st landing), immediately transitioning into a maximal vertical jump, and landing on two feet a second time (2nd landing). Statistical analysis: Independent sample t-tests were used to compare groups. Results: The ACLR limb had significantly greater knee and hip flexion angles than the control group (Knee:-31 vs -22°, p=0.004, Hip: 27.2 vs 17.2°, p=0.04). Additionally, the ACLR limb demonstrated less knee extensor moment, but greater hip extensor moment compared to the control group (Knee: -0.22 vs 0.03 Nm/kg*m, p=0.002, Hip: -0.32 vs -0.13 Nm/kg*m, p=0.01). Important Findings: The combination of greater knee flexion angles with a reduced knee extensor moment suggests the ACLR limb is unable to control the increased sagittal plane demands of the 2nd landing. Additionally, increased hip extensor moment in the ACLR group indicates an altered landing strategy to transfer load absorption from the knee to the hip musculature.

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POSTER PRESENTATION #198

Abstract Title:	**Differences in Subjective Symptoms Related to Joint Degeneration in Those With and Without Chronic Ankle Instability**
Author(s):	K. B. Kosik, Department of Rehabilitation, U of Kentucky M. Terada, Department of Sport and Health Science R.S. McCann, Department of Rehabilitation, U of Kentucky P.A. Gribble, Department of Rehabilitation, U of Kentucky

Abstract: Context: Neuromuscular impairments surrounding the ankle are believed to contribute to cartilage degeneration in young-adults with chronic ankle instability(CAI). Unfortunately, impairments associated with CAI are not confined to the ankle; rather, proximal neuromuscular alterations at the knee, thought to be responsible for reductions in knee joint health, are also found in those with CAI. While neuromuscular impairments and self-reported functional limitations have been examined in those with CAI, patient-generated symptoms associated with a decline in joint health of the ankle and knee have not been investigated. Objective: Compare patient-generated outcomes associated with ankle and knee joint health in those with and without CAI. Participants: Twenty-three CAI participants, (26.45±6.50years,166.64±8.06cm,73.13±13.23kg) and 23 healthy controls(HC) (25.08±5.47years,171.26±9.6cm,70.85±16.3kg) volunteered. Outcome: The Ankle Osteoarthritis Scale(AOS) and the Knee Injury and Osteoarthritis Score(KOOS) assessed region specific ankle and knee function. Mann Whitney U Tests and Cohen's d effect sizes with 95% confidence intervals (CI) were used to assess group differences in each outcome variable. Significance was set a priori at P≤0.05. Results: Individuals with CAI reported more foot pain(P<0.001, d=0.84[0.22,1.43]) and disability(P<0.001, d=0.77[0.16,1.36]) than HC. CAI individuals scored worse on the KOOS Symptoms (p=0.008, d=0.88[0.26,1.47]); Pain(p=0.024, d=0.59[-0.01,1.17]); ADL(p=0.013, d=0.55,[-0.05,1.12]); Sport & Recreation(p=0.002, d=0.96[0.33,1.55]) and Quality of Life(p=0.004, d=0.79[0.18,1.38]) subscales. Conclusion: The increased self-reported symptoms associated with a decline in ankle joint health further support recent information demonstrating cartilage degeneration in those with CAI. Though CAI is a self-reported ankle pathology, CAI participants also reported having greater self-reported knee dysfunction compared to HC. Further research is needed to understand the relationship between the previously identified proximal neuromuscular alterations and knee joint health in CAI patients.

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College of Health Sciences Research Day

POSTER PRESENTATION #199

Abstract Title:	**The Center for Muscle Biology (CMB) Core Facility: an Interdisciplinary Hub for Collaboration**
Author(s):	K. Kosmac, College of Health Sciences, Rehabilitation Sciences Department, U of Kentucky C. A. Peterson, College of Health Sciences, Rehabilitation Sciences Department, U of Kentucky

Abstract: Muscle powers health: Aging and chronic diseases including stroke, heart disease, liver disease, arthritis and cancer are characterized by progressive muscle weakness and wasting. Clinical studies have illustrated that increased muscle weakness is often an early and strong predictor of increased disability and mortality. The Center for Muscle Biology (CMB) aims to support and integrate basic, clinical and translational muscle research throughout the University of Kentucky. Our mission is to catalyze research projects, facilitate extramural funding success and serve as a hub of interdisciplinary collaboration. The CMB strives to foster studies aimed at developing therapeutic strategies to combat muscle weakness and wasting, in concert with primary injury and disease treatment. We envision the translation of treatment and therapeutic strategies for muscle weakness and wasting through the integration of strong bench to bedside programs. We believe we can reach these goals by engaging students, early-stage and senior investigators of various scientific backgrounds to understand mechanisms underlying the regulation of muscle structure and function and the impact on physical activity and chronic disease; thus improving clinical outcomes with lowered mortality, shorter hospital stays, decreased hospital readmissions and increased quality of life. The CMB is proud to facilitate muscle research by providing essential services to researchers within the University of Kentucky, and at other institutions. Services offered include histological analyses, microscopic image capture and RNA isolation. Additionally, the CMB provides access to the Normal Muscle Tissue Bank, composed of isolated primary myoblasts and specimens (histological mounts and snap-frozen tissue) from over 100 subjects.

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POSTER PRESENTATION #200

Abstract Title:	**Does Blood Flow Restricted Training Improve ACL Quadriceps Strength Preoperatively?**
Author(s):	K. Lucas, College of Health Sciences, U of Kentucky D. Johnson, Department of Orthopaedic Surgery & Sports Medicine, U of Kentucky M.L. Ireland, Department of Orthopaedic Surgery & Sports Medicine, U of Kentucky B. Noehren, Division of Physical Therapy, U of Kentucky

Abstract: PURPOSE: Following an anterior cruciate ligament (ACL) injury, patients experience significant quadriceps weakness, associated with poor long-term outcomes. High resistance strengthening is not well tolerated after this injury, and most preoperative protocols last 6 weeks. Potentially, blood flow restricted training (BFRT) may be an effective technique. While BFRT has been well studied in healthy populations, the effectiveness in an injured population has not been established. We hypothesized that a preoperative 4-week blood flow restricted quadriceps strengthening protocol will significantly improve quadriceps strength. SUBJECTS: 9 (8 males, 1 female, 27 ±11 years) METHODS: After determining the subjects' preoperative strength, they performed a 4-week BFRT protocol. Training was performed at 30% of the subject's 1 rep maximum with optimal pressure determined per manufacturer instructions. At the end of 4 weeks, quadriceps strength was reassessed. A paired t-test was used to compare quadriceps strength normalized to body weight, and limb symmetry indexes were calculated. RESULTS: Quadriceps strength of the involved side significantly increased ($p<0.000$) from 2.24 ± 0.67 Nm/kg to 2.82 ± 0.71 Nm/kg. The limb symmetry index improved from 0.70 pre-BFRT to 0.88 post-BFRT. CONCLUSIONS: A four-week BFRT protocol significantly increases quadriceps strength in a preoperative ACL reconstruction population. By training at 30% of the individual's 1RM, the risk of further injury or pain is minimized. Restoring quadriceps strength before surgery may result in a faster recovery and better long term outcomes. Further research should investigate if blood flow restrictive training is appropriate for other injured populations.

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College of Health Sciences Research Day

POSTER PRESENTATION #201

Abstract Title:	**Blood Flow Restriction Training Improves Functional Tests Associated with Return to Sport After Injury**
Author(s):	M. MacDonald, College of Arts & Sciences, U of Kentucky K. Lucas, College of Health Sciences, U of Kentucky M. Marquez, College of Health Sciences, U of Kentucky B. Noehren, Division of Physical Therapy, U of Kentucky

Abstract: Introduction: Traditional strength training requires high load resistance exercise that is not practical for patients with orthopedic injuries. Blood flow restricted training (BFRT) is an emerging way to increase strength using low loads and high repetitions. However, whether this training method also affects function is unknown. We hypothesized that BFRT would significantly improve muscle strength and hop test performance in healthy subjects when compared to a control group. Methods: 4 females and 7 males 24.5 ± 7.25 years old were in the BFRT group and 3 females and 1 male 19.75 ± 1.26 years old were in the control group. Kaatsu BFRT bands were placed on the subjects' thighs while they performed leg extension, calf raises, and leg press exercises starting at 30% of their 1 RM max 3 times per week for 6 weeks. Weights were adjusted every other training session. Isometric quadriceps strength and rate of torque development (RTD) were measured isometrically on the Biodex. Single leg hop and triple jump were measured before and after the study. Groups were compared with an independent samples t-test. Results and Conclusions: Significant improvements were found in the BFRT group for peak strength (pre: 170.0 ± 47.98° Nm, post: 197.1 ± 57.2° N, p=.037, 15.95% change), single leg hop (pre: 128.9± 33.8cm, post: 154.2± 33.4cm, p=.0079), and triple jump (pre: 405.5± 106.4cm, post: 428.4 ± 104.1cm, p=.025). The combination of BFRT and low-load resistance exercise resulted muscle hypertrophy and novel functional improvements in healthy BFRT subjects. Hop testing results were indicative of functional improvements associated with ACL rehabilitation, leading to the possibility of creating BFRT programs that target injury-specific muscle groups when high load resistance training is contraindicated.

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College of Health Sciences Research Day

POSTER PRESENTATION #202

Abstract Title:	**Comparison of post-ACLR kinematics between landings of a drop vertical jump: implications for re-injury risk**
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Abstract: The drop vertical jump (DVJ) task is used to assess functional recovery after an anterior cruciate ligament reconstruction (ACLR). Composed of two landings, the 1st landing is more commonly analyzed. However, the 2nd landing follows a maximal jump and could better represent higher-risk sport situations. Comparing landings would provide insight about hip and knee kinematics during each phase. Purpose: To compare hip and knee kinematics of the reconstructed limb between the 1st and 2nd landing of a DVJ in patients after ACLR. Subjects: 22 subjects (10 F, age 20.6±5 y, H 1.7±0.1 m, M 71±12 kg) 6 months post-ACLR were included. Procedure: Individuals were asked to step off of a 30.5 cm box, land, maximally jump, and land once more. Subjects performed three trials. Statistical Analysis: Visual 3D was used to calculate hip and knee kinematics at initial contact. Paired sample t-tests were used to compare between landings. Results: The ACLR limb demonstrated less knee flexion (-31.0±9.4°; p<.007) but greater knee abduction (0.2±3.9°; p<.000) and internal rotation (-8.3±9.2°; p<.001) angles during the 2nd landing. The hip exhibited less flexion (27.3±12.9°; p<.000) and internal rotation (4.6±6.8°; p<.002). No differences were observed in frontal plane hip motion. Conclusion: Less knee flexion combined with greater knee abduction and internal rotation of the ACLR limb during the 2nd landing suggests that this landing better detects abnormal mechanics associated with subsequent injury risk. The 2nd landing could warrant additional study to identify patients who may be at greater risk for re-injury after ACLR.

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College of Health Sciences Research Day

POSTER PRESENTATION #203

Abstract Title:	**Muscle Activity during Gravity-Facilitated Weight-Bearing using a Total-Lift Bed: A Pilot Study**
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Abstract: Introduction: Total lift beds (TLB) have recently been introduced as an early, alternative intervention for rehabilitation of critically ill patients in the intensive care unit. Through innovative technology the TLB safely tilt patients into an upright, gravity-facilitated weight-bearing position without leaving the bed. Weight-bearing potentially can mitigate the response of prolonged immobility associated with critical care preventing ICU-acquired weakness. The aim of this study is to determine the average muscle activity and the peak activation during tilted weight-bearing. Methods: 20 healthy subjects were placed in the TLB with three safety straps and tilted through 9 intervals (0-81 degrees). Muscle activity was recorded using surface electromyography (EMG) in anti-gravity lower extremity muscles (tibailis anterior, rectus femoris, and gluteus medius) and one postural muscle (lumbar erectors spinae). In addition, weight-bearing was recorded as a percent of total body weight using the TLB foot plate (force transducer). Results: EMG activity gradually increased as the angle of tilt increased in rectus femoris and tibalis anterior muscles. EMG activity increased from mean amplitude of 3-5uV at baseline to 8-12uV at 81 degrees. This is not significant when analyzing the data as a percentage of max voluntary isometric contraction. However, when compared to baseline EMG activity increased 310%. Minimal to no changes were noted in gluteus medius and erector spinae. Conclusion: Gravity-facilitated weight-bearing in a TLB with healthy subjects elicits minimal muscle activity.

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POSTER PRESENTATION #204

Abstract Title:	**Isometric Hip Strength and Landing Mechanics of Those with and without Chronic Ankle Instability**
Author(s):	R.S. McCann, Department of Rehabilitation Sciences, U of Kentucky M. Terada, College of Sport and Health Sciences, Ritsumeikan U K.B. Kosik, Department of Rehabilitation Sciences, U of Kentucky P.A. Gribble, Department of Rehabilitation Sciences, U of Kentucky

Abstract: HYPOTHESIS: Individuals with CAI will display lower hip muscular strength, and a more extended, adducted, internally rotated hip position during landing compared to individuals without CAI. NUMBER OF SUBJECTS: Seventy-six volunteers separated into CAI (22F, 4M; 24.2±4.0yrs; 167.2±7.3cm; 73.5±14.9kg), LAS-Coper (19F, 6M; 24.0±5.2yrs; 166.7±8.8cm; 69.5±17.1kg), and Control groups (14F, 11M; 23.0±3.6yrs; 168.7±7.6cm; 69.1±13.6kg). PROCEDURES: Participants performed 5 vertical jumps with single-leg landings. Kinematics were collected with 10 high-speed cameras, 56 retroreflective markers and 3D motion capture software. Participants completed three 5-second trials of isometric hip extension (EXT), abduction (ABD), and external rotation (ER) strength using a hand-held dynamometer. STATISTICAL ANALYSIS: We collected hip kinematics from 200ms pre-initial contact (IC) to 50ms post-IC. We collected normalized peak hip extension, abduction, and external rotation torque (Nm/kg) with hand-held dynamometry. One-way ANOVAs assessed group differences in hip strength and 3D hip kinematics. Linear regression determined the contribution of hip strength to hip kinematics for each group. Significance was set a priori at $P<0.05$. RESULTS: The CAI group exhibited less hip abduction than LAS-Copers for the entire time interval ($P=0.01$) and Controls from 109ms pre-IC to 50ms post-IC (P-value range=0.01-0.05), and less hip external rotation than Controls from 67ms pre-IC to 4ms pre-IC ($P=0.01$). The CAI group had significantly lower ER ($P=0.01$) than LAS-Copers ($P=0.04$,d=0.62[0.05,1.17]) and Controls ($P<0.01$,d=0.87[0.28,1.43]). ER explained a significant amount of frontal plane hip angle variance in LAS-Copers from 31ms pre-IC to 50ms post-IC (R2 range=0.15,0.18; P-value range=0.03-0.05). CONCLUSION: The CAI group displayed decreased hip muscular strength, but increasing isometric hip strength is likely not an effective means of correcting hip movement patterns in this population.

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College of Health Sciences Research Day

POSTER PRESENTATION #205

Abstract Title:	**Epigenetic factors associated with Hepatitis C in Appalachian Kentucky:**
Author(s):	F.A. Miles, College of Medicine, Washington U of Health and Sciences U. Shankar, Department of Gastroenterology, Applalachian Regional Hospital, Hazard, KY M.B. Dignan, Prevention Research Center, U of Kentucky

Abstract: BACKGROUND : Data from the Centers for Disease Control and Prevention reported the rate of Heptatitis C as being 0.7/100,000 compared to 4.0/100,000 for Kentucky. Numerous reports have stated Appalachian Kentucky has the highest rates of hepatitis C. This retrospective investigation was designed to explore epigenetic factors related to the elevated rates of hepatitis C in the Appalachian region of Kentucky. METHODS: Retrospective data on hepatitis C cases were abstracted from medical records in a large private practice in Southeastern Kentucky for the period 2014-2017. Data including diagnosis, viral load, risk factors and demographic characteristics were analyzed using SPSS. RESULTS: Data on 71 cases of hepatitis from 2014-2017 were included. The age range was 23-68 (mean=44). Of the 71 cases, 39% were age 40. Mixed Hepatitis B and C- 11 (15.5%) and 60 with Hepatitis C (84.5%). Hepatitis C genotyping: type 1=28(39.4%) , type 2=7(9.8%), and type 3=16(22.5%). Across all ages, 46% had tattoos and 29% reported IV drug use. IV drug use was more common among patients under age 40 (33% vs 26%) but tattoos were more common among those age 41 and older (48% vs 42%). Of available fibrosis scores (59 total),30 were F0-F1 (50.8%). 14 were between F1-F2 (23.7%), 14 were between F3-F4 (23.7%). CONCLUSIONS: The rates of hepatitis C in Appalachian Kentucky are associated with behavioral risks factors including high rates of tattoos and history of IV drug use. Further evaluation of additional factors supporting hepatitis infection is needed. High incidence without significant fibrosis suggests high cure rate with short duration therapy.

Supported by:	Funding not provided as this was a retrospective study performed during Clinical Rotation year 3 under Dr. Uday Shankar, Gastroenterologist based out of his private office.

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College of Health Sciences Research Day

POSTER PRESENTATION #206

Abstract Title:	**Inter-rater Reliability of Diagnostic Language Testing Administered via Telepractice**
Author(s):	S. E. Mullins, Division of Communication Sciences & Disorders, U of Kentucky J. J. Lowman, Division of Communication Sciences & Disorders, U of Kentucky

Abstract: Purpose: Federal law mandates children with language disorders receive free and appropriate intervention. Diagnosis is the first step in the intervention continuum; however, children in rural American are underserved due to personnel shortages. Limited studies have demonstrated the reliability of language testing conducted via telehealth. Further validation of language tests administered via telehealth is necessary, particularly tests requiring high-quality audio transmission for accurate scoring. The purpose of this study was to assess inter-rater reliability of three language tests administered via telehealth. Method: Ten children ages 5 to 12 years were assessed using the Structured Photographic Expressive Language Test (SPELT-3), Peabody Picture Vocabulary Test- Fourth Edition (PPVT-4), and the Expressive Vocabulary Test- Second Edition (EVT-2). Children were randomly assigned to one of two testing conditions: tele-administration or in-person administration. Regardless of group assignment, child performance was simultaneously scored by an investigator in the room with the child and by an investigator participating via video-conferencing. Results: Preliminary data analyses reveal inter-rater agreement of 80% on standard scores for the PPVT-4 and EVT-2. Due to age cut-offs, standard scores on the SPELT-3 could not be calculated for all children in the sample. Inter-rater agreement for raw scores was 70%. Lower levels of agreement on the SPELT-3 are attributed to differences in discriminating unstressed morphosyntax markers. Scoring discrepancies would not affect eligibility for language services, regardless of test, according to the Kentucky Eligibility Guidelines – Revised. Conclusion: The results of this study support scoring reliability of the SPELT-3, PPVT-4, and EVT-2 when administered via telehealth.

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College of Health Sciences Research Day

POSTER PRESENTATION #207

Abstract Title:	**Maturational Age Alters the Requirement for Satellite Cell-Mediated Myonuclear Accretion During Mechanical Overload-Induced Hypertrophy**
Author(s):	K.A. Murach, College of Health Sciences S.H. White, College of Health Sciences Y. Wen, Department of Physiology A. Ho, College of Health Sciences K. Kosmac, College of Health Sciences J.J. McCarthy, Department of Physiology C.A. Peterson, College of Health Sciences

Abstract: Satellite cell-mediated myonuclear accretion is not necessary for overload-induced muscle hypertrophy in adult mice (≥16 weeks old). However, recent evidence suggests maturational age may alter the requirement for satellite cells during hypertrophy. Using the Pax7CreR-R26RDTA mouse, we conditionally depleted satellite cells in adolescent mice (8 weeks of age) via five consecutive daily tamoxifen injections, then allowed a two-week washout (SC-). Age-matched vehicle-treated Pax7CreR-R26RDTA mice were used as controls (SC+). SC+ and SC- mice were then sham surgerized or synergist ablated for 10 days via a modified technique that overloads the plantaris muscle, but minimizes muscle regeneration (n=6-7 per group). Satellite cell density (Pax7+ cells/fiber), embryonic myosin heavy chain expression (eMyHC), and muscle fiber cross sectional area were evaluated via immunohistochemistry. Myonuclear counts (myonuclei/100 millimeters) were performed on isolated single muscle fibers. Only tamoxifen-treated mice with ≥90% satellite cell depletion were included in this analysis. Following 10 days of mechanical overload of the plantaris, SC+ mice experienced a 70% increase in satellite cell density ($P<0.05$). Muscle fiber cross sectional area and myonuclear number increased by 20% in SC+ ($P<0.05$), but did not change in SC- mice ($P>0.05$). Expression of eMyHC across all mice was <1%, indicating that overload surgery did not induce regeneration. The lack of muscle fiber growth without satellite cells in adolescent mice demonstrates that maturational age must be considered when conducting muscle hypertrophy experiments. The reason for an age-dependent requirement for satellite cells during growth merits further investigation.

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POSTER PRESENTATION #208

Abstract Title:	**Aerobic exercise compared to pharmaceutical treatment of patients with migraine: A critically appraised topic (CAT)**
Author(s):	G.S. Naze, Departments of Rehabilitation Sciences and Orofacial Pain, U of Kentucky

Abstract: Aim of investigation: Prophylactic treatment of symptoms in patients with migraine headache often includes use of medications such as topiramate, amitriptyline, sodium valproate, and propranolol. While these medications have been shown to be effective, they can also produce unwanted side effects. The purpose of this critically appraised topic was to determine the effectiveness of aerobic exercise as an alternative or adjunctive treatment to prophylactic medications in patients with migraine. Methods: A systematic search of the peer reviewed literature using specific search terms was performed to identify clinical trials investigating aerobic exercise +/- medication compared to medication alone. Articles that met inclusion criteria were assessed for quality. Data was extracted relating to sample demographics, diagnostic criteria, intervention dosing, and values needed to calculate effect size (Hedges' g). Results: Two articles were eligible for inclusion. Both aerobic exercise and topiramate were effective in reducing headache symptoms over a six-month period and effect sizes did not favor one group to the other. Large effect sizes favored the combination of aerobic exercise + amitriptyline to amitriptyline alone over a 3-month period. Conclusions: Limited, "good" quality evidence supports the use of aerobic exercise as an alternative treatment to topiramate in patients with migraine headache. Limited, "fair" quality evidence supports aerobic exercise as an effective adjunct in the treatment of patients with migraine headache when combined with amitriptyline alone. Further research is needed to validate the findings of these two studies and compare aerobic exercise with and against other pharmaceutical interventions.

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College of Health Sciences Research Day

POSTER PRESENTATION #209

Abstract Title:	**Satellite Cell Depletion does not Affect the Adaptation to Low Oxygen in Mouse Diaphragm Muscle**
Author(s):	P.B. Patel, Department of Biology, U of Kentucky A.L. Confides, Department of Rehabilitation Sciences, U of Kentucky E.E. Dupont-Versteegden, Department of Rehabilitation Sciences, U of Kentucky

Abstract: Satellite cells, or muscle stem cells, are essential for muscle regeneration of all skeletal muscle, but their role in muscle maintenance and plasticity is still being debated. In addition, whether these cells play a role in diaphragm muscle that is active throughout life has not been determined, particularly under stress conditions. The goal of the study was to investigate whether satellite cells are required for muscle maintenance, particularly under a hypoxic stress. For our study, we used the Pax7-DTA mouse model, which exhibits greater than 90% depletion of Pax7+ satellite cells in diaphragm muscle upon tamoxifen treatment. Mice at 5 (young) and 22 (aged) months of age were randomized to groups exposed to either hypoxic (10% O2) or normoxic environment (20.9% O2) for 4 weeks. Single fibers from diaphragm muscles were analyzed for fiber width, myonuclear domain and nuclear number. Fiber width and myonuclear domain were both lower with hypoxia independent of age, but nuclear number was not changed with hypoxia or age. Interestingly, satellite cell depletion did not influence any of the variables at either age. In conclusion, diaphragm muscle adaptations to hypoxia are independent of the presence of satellite cells.

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College of Health Sciences Research Day

POSTER PRESENTATION #210

Abstract Title:	**Calculation of Resistive Loads for Elastic Resistive Hip Exercises**
Author(s):	K.J. Picha, Rehabilitation Sciences, U of Kentucky T.L. Uhl, Rehabilitation Sciences, U of Kentucky

Abstract: What is the correct resistive load to start exercise with elastic resistance (ER) to gain strength? The isotonic literature states to start exercise at 50% of a 1-repetition maximum (RM), but in a clinic it is likely to have an isometric assessment. Objective: To determine average ER an individual starts with that gains strength when performing hip exercises following isometric testing. Design: Pre-test/post-test. Setting: Clinical. Participants: Thirty-seven subjects. Interventions: To determine starting load, three critical components were captured; “force produced”, “force distance”, and “exercise distance”. Participant’s isometric strength was measured with a dynamometer. Isometric hip abduction and extension force in Newtons was averaged. The “force distance” was measured from greater trochanter to femoral lateral epicondyle in meters to represent the location where the dynamometer pads were placed during testing. Hip abduction and extension were performed with ER around ankle. The “exercise distance” was measured in meters between greater trochanter to lateral malleolus. The force produced was converted to torque and the exercise force was calculated with the following equations. 1)Force Produced(N) x Force Distance(m) = Test torque(Nm). 2)Test Torque (Nm)/Exercise Distance(m)= Exercise load(N)/4.45 to convert to pounds of force. The Exercise load was presented as 15%, 25%, 30%, and 50% using a load cell attached to the ER. Participants performed standing hip exercises. Strength was re-tested at 8 weeks. Main Outcome Measures: Fraction of maximal load calculated for the exercise was recorded and torque produced was normalized to body weight (BW). Results: Average percentage of maximal isometric force used to initiate exercises was 30±7%BW. Average strength gain for 8 weeks was 11.5±6.4%BW. Conclusions: This provides clinicians with a target force to start ER training. Utilization of a load cell during ER provides objective documentation of exercise progression. Isometric strength measures do not transfer to isotonic exercise recommendations.

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College of Health Sciences Research Day

POSTER PRESENTATION #211

Abstract Title:	**Epidemiological Characteristics of Jockey Musculoskeletal Injuries in Thoroughbred Racing**
Author(s):	C. Quintana, Department of Rehabilitation Sciences, U of Kentucky J. Crots, Division of Athletic Training, U of Kentucky A.C. Glueck, Department of Rehabilitation Sciences, U of Kentucky J. Abt, Department of Rehabilitation Sciences, U of Kentucky C.G. Mattacola, College of Health Sciences, U of Kentucky

Abstract: Context: Professional Jockeys are high level athletes that are at particularly high risk for musculoskeletal injuries. Our aim was to report injuries sustained by jockeys participating in Thoroughbred Horse Racing in the United States. We hypothesized upper extremity injuries would be the most frequent with most injuries happening at the start of the race. Objective: To describe characteristics and identify modifiable risk factors for musculoskeletal injuries in jockeys. Design: A descriptive epidemiological study. Aggregate injury data were collected from reported incident reports from racetracks throughout the United States. Participants: Data were collected from the Jockey Injury Database. A total of 975 male and 64 female jockeys (Experience level 11.0 ± 9.5 years, range 0.16- 30 years) were included with 1054 reported incidents. Data were obtained from September 2014 and September 2016. Main Outcome Measures: Descriptive statistics were used to identify frequency of musculoskeletal injuries. Results: The majority of incidents occurred at the start (352/34.08%), in the stretch (251/24.30%) and in the final turn (170/16.45%) respectively. The majority of the resulting 407 injuries were unspecified (108/33.75%), strain/sprains (77/24.06%) and fractures (75/23.44%) were also among the most common. A predominant number of injuries were caused during a fall from the horse (326/80.10%), followed by being injured on the horse (26/6.39%), and being trampled by a horse (14/2.44%). The most commonly injured regions were upper extremity (98/34.39%), lower extremity (74/25.96%) and head/facial (56/19.65%). Conclusions: This information can help identify modifiable risk factors and work towards reducing risk.

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12th Annual CCTS Spring Conference
Thursday, March 30, 2017 Lexington Convention Center

College of Health Sciences Research Day

POSTER PRESENTATION #212

Abstract Title: **The Development of a Seated Clinical Trunk Test to Assess Lower Extremity Injury Risk**

Author(s):
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Abstract: PURPOSE: Poor neuromuscular control of the trunk is associated with injuries, including anterior cruciate ligament tears. Currently, few reliable methods exist to assess trunk neuromuscular control. The objective of this study was to assess the between and within session reliability of a new seated clinical trunk control test. SUBJECTS: 10 healthy female subjects METHODS: Subjects were asked to sit on a wobble board placed on a solid surface on a plinth. Test length was 30 seconds and subjects had three practice trials followed by 2 test trials with their eyes closed. Performance on the test was measured as the time to the first predefined error and how many errors occurred in 30 seconds. Reliability with and between days was assessed with an Intraclass Correlation Coefficient (ICC). RESULTS: Values for the variables of interest were as follows, between day reliability for the time to error ICC=0.77, reliability for the number of errors ICC=0.93, and within session rater reliability for the number of errors and time to error ICC <0.99. The average time to error was (day 1: 17.3±9.2 seconds, day 2: 21.5±8.6 seconds), and the average number of errors was (day 1: 1.4±1.8 errors, day 2: 1.2±1.4 errors). CONCLUSION: The seated trunk control test shows excellent within and between day reliability. Furthermore, there were minimal differences between trials, indicating that after the practice trials, there was no additional learning, yielding stable consistent results. These results indicate that the test is a reliable assessment of trunk neuromuscular control.

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College of Health Sciences Research Day

POSTER PRESENTATION #213

Abstract Title:	**The Effectiveness of Interprofessional Trainings in Improving Communication for Students with Low Incidence Disabilities**
Author(s):	K.L. Richardson, Division of Communication Sciences and Disorders, U of Kentucky N.A. Gibson, TAALC Project, U of Kentucky J. Kleinert, Communication Sciences and Disorders, U of Kentucky

Abstract: The current data indicates that there is no significant change in expressive communication abilities across grade bands from elementary school to high school for public school students with significant intellectual disabilities (Kearns et al, 2011). In response to this, the Teaching Age Appropriate Learning through Communication (TAALC) project was developed. TAALC was initiated via a State Personnel Development Grant to the University of Kentucky's Human Development Institute and College of Health Sciences. TAALC is designed to advance the communication for students with especially challenging needs by providing statewide training on Augmentative Alternative Communication (AAC) devices and strategies. This research project analyzed the effectiveness of the TAALC's Communication 101 training sessions for school-based teams deigned to improve skills in implementation of AAC programming for students with the most significant disabilities. Qualitative and quantitative data was collected from all 414 attendees. The data analysis concluded that the training sessions were effective in teaching professionals strategies when working with students with significant disabilities. Initial data analysis of the Communication 101 training sessions received an average of 4.88/5 on the participant's rating scale. The qualitative analysis further verified the success of Communication 101 with themes of overall satisfaction of information presented and specific information on the most useful training strategies utilized.

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College of Health Sciences Research Day

POSTER PRESENTATION #214

Abstract Title: **The Relationship Between a New Test of Trunk Control to Cutting Mechanics**

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Abstract: Introduction: Poor neuromuscular control of the trunk has been identified as a significant risk factor for lower extremity injuries in females. Few clinical tests have been developed to capture trunk control that has been compared to lower extremity. Establishing the relationship between multidirectional trunk control and lower extremity control during a cutting task would serve as a measure to identify females at risk for injury in a clinical setting. Number of Subjects: 8 female subjects (20.9± 1.6 years) Methods: An unanticipated cutting task was assessed using three dimensional analysis. Visual 3D was used to analyze the three planes of motion at initial contact (IC). Subjects were asked to sit on a wobble board with their eyes closed. Errors were counted and averaged during the two 30 second trials. Statistical Analysis: Pearson Product Moment Correlations were calculated between kinematics at IC and the mean number of trunk errors. Results: Mean frontal plane angles were trunk -1.1±1.8º, hip, -4.7±3.5º, knee 2.9±4.1º and the numbers of trunk errors were 1.7±1.5. A significant relationship was observed with errors and hip adduction (r=0.84, p=0.009). No significant associations at the trunk (r=0.23, p=0.578) and knee (r=-0.59, p=0.126). Conclusions: There was a significant relationship between greater hip adduction which is associated with numerous injuries to the errors on the seated trunk test. The lack of relationship to trunk mechanics could be due to a greater contribution of trunk rotation than frontal plane motion during cutting from the trunk. Future analysis will further assess this possibility.

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College of Health Sciences Research Day

POSTER PRESENTATION #215

Abstract Title: **Acute Stroke, Effect on Mood, and Music Therapy: A Non-Pharmacological Intervention**

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Abstract: Introduction: Past studies identified that 40.9 percent of first time ischemic stroke patients report depression within the first 7-10 days.1 Post stroke depression (PSD) may negatively impact recovery and participation in rehabilitation. The main therapeutic approach to PSD is currently pharmacological. A Cochrane review from 2008 identified music therapy as a promising non-pharmacological intervention for depression.3 Objective: The purpose of the current study is to assess the efficacy of active music based intervention on mood in one treatment following acute ischemic stroke as measured by The Faces Scale. Treatment will include music making interventions that elicit and encourage active participation from subjects. Methods: Participants include adults (age >18) with first ever ischemic stroke, admitted to the acute hospital, and recruited within the first two weeks of hospitalization. Target enrollment is 30 participants. We will examine outcomes across multiple treatments, changes in Mini MoCa and PHQ-9 scores pre to post intervention, patient comments, and types of music therapy intervention utilized. Results: Fifteen of 30 participants have been enrolled thus far, with fourteen completing the study in its entirety, with ten receiving one AMT session before discharge and four receiving multiple sessions. 64.3% of participants showed improvement in Faces score following one treatment (n=9), 28.6% were unchanged (n=4), and 7.1% deteriorated (n=1). The median change in Faces score is -1, indicating an improvement in participants' mood. All participants provided positive comments at discharge. Conclusion: Preliminary review demonstrates study feasibility and promising outcomes. Recruitment is ongoing.

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College of Health Sciences Research Day

POSTER PRESENTATION #216

Abstract Title:	**Vitamin D Modulates Lipid Storage and Mitochondrial Function In Skeletal Muscle**
Author(s):	D. M. Schnell, Department of Pharmacology and Nutritional Sciences, U of Kentucky L. Bollinger, Department of Kinesiology and Health Promotion, U of Kentucky D. T. Thomas, Division of Clinical Nutrition, U of Kentucky

Abstract: Background: Many obesity-related diseases are associated with lipotoxicity: a complex set of cellular responses and dysfunctions driven by lipid accumulation in non-adipose tissues. However, ample vitamin D has been associated with reduced lipotoxicity. Previous research has shown that vitamin D increases oxygen consumption and lipid content while improving function in human skeletal muscle. This suggests a vitamin D-mediated shift in lipid storage and metabolism that may ameliorate complications of lipotoxicity in skeletal muscle. Methods: Myotubes C2C12 myotubes were treated with 100 µM palmitate (Palm) and/or 100 nM calcitriol (VitD) in a 4-group design for 0, 24, 48, or 72 hours. Gene expression was measured in response to treatment duration via RT-qPCR and lipid storage was measured using oil red O (ORO). Additionally, we measured oxygen consumption rate (OCR) in mature human myotubes treated with 100 nM VitD for 24 hoursusing a Seahorse XF96. Results: Palm+VitD produced a time dependent increases in PLIN2 (6.7x at 72 h), DGAT (8.9x at 72 h) and ATGL (1.8x at 72 h) not seen in the Palm treatment. ORO revealed increased lipid staining in VitD+Palm treated cells compared to Palm at all time points and protected against cell stress seen in Palm. OCR analysis showed that VItD treatment increased oxygen consumption at baseline by 57% (p=0.01) and ATP linked OCR by 75% (p=0.03). Conclusions: Vitamin D mediates beneficial changes in lipid droplet physiology and mitochondrial function to prevent lipotoxicity in skeletal muscle in vitro. Future work will use siRNA to identify the roles played by PLIN2 in the observed changes in lipid storage and metabolism.

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College of Health Sciences Research Day

POSTER PRESENTATION #217

Abstract Title: **Trends for Success**

Author(s): B.F. Sigler, Division of Human Health Sciences, U of Kentucky

Abstract: The purpose of this research is to examine previous physician assistant students in an effort to see what trends in both their demographics and scholastics proved to make for a successful student in the graduate program. For our research, success is defined as graduation for the program. The goal is to eventually be able to develop and confirm certain trends that allow us to form working hypotheses about what demographics and scholastic success has made for successful physician assistant students. The research is carried out with data from physician assistant students from the University of Kentucky and Morehead State University dating from to 2003 to 2016. The demographic data we are examining are students' ages, genders, ethnicities and international statuses as well as city and county of origin. As for scholastics, we are examining students' majors, degrees, GPAs, undergraduate colleges attended, GRE scores as well as letter grades in the physician assistant program courses. An example of a specific area we have focused on is looking at whether students are from rural areas, urban areas or international students. By looking at these areas we can develop trends about how a students success could be correlated to the area they grew up. Although these trends tend to be very precise, by developing these types of trends we will be able to provide valuable information about exact demographic and scholastic characteristics in a significant amount of students that has led and will continue to lead to student success within these physician assistant programs.

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College of Health Sciences Research Day

POSTER PRESENTATION #218

Abstract Title:	**Vocal Function Exercises for the Treatment of Presbyphonia: Pilot Data**
Author(s):	J.E. Sloggy, Rehabilitation Sciences, U of Kentucky J.C. Stemple, Rehabilitation Sciences, U of Kentucky

Abstract: Voice changes in the elderly (presbyphonia) are common with aging of the subsystems of voice production, respiration, phonation, and resonance. This deterioration of voice is recognized as part of the normal aging process but may significantly affect quality of life. Vocal Function Exercises (VFEs) comprise a series of exercises designed to strengthen and balance the laryngeal muscles, thus improving vocal fold vibration and voice quality. Several studies have focused on the efficacy of VFEs as a treatment modality for presbyphonia, however these studies are limited by the lack of an experimental control and limited outcome measures. The current study is the first to use a randomized, placebo-controlled design while comparing pre and post-treatment measures involving all five domains of voice assessment (audio-perceptual, acoustic, aerodynamic, self-assessment, visual-perceptual). The treatment group receives six weeks of VFEs and the control group receives six weeks of placebo therapy with both pre and post-treatment assessments and a one-month follow-up assessment. It is hypothesized that the experimental group will show significant improvement in all five domains of voice assessment post-treatment while there will be no significant difference in the pre and post-treatment measures for the control group. This poster will present the results from the initial participants of this study in both the exercises (VFE) and control group.

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College of Health Sciences Research Day

POSTER PRESENTATION #219

Abstract Title:	**Beliefs and Attitudes of Speech Language Pathologists and Classroom Teachers Using Collaborative Service Delivery Models in Elementary Schools.**
Author(s):	L.T. Stone, Rehabilitation Sciences Doctoral Program, U of Kentucky D. Howell, Department of Occupational Therapy and Rehabilitation Sciences, Eastern Kentucky U

Abstract: Few studies have been conducted to determine the effectiveness of collaborative teaching between SLPs and classroom teachers. The studies that have been found have reported positive findings for children with language impairments and supported by Individual Education Programs (IEPs) who were being taught within their regular education classrooms. One study indicated that children with language skill impairments made greater gains in vocabulary skills in a coteaching/team teaching setting than in the traditional pull out setting (Throneburg, et al. 2000). Since SLP's have been shown to continue to primarily work within the traditional pullout therapy model (ASHA, 2012), this study seeks to further understand the beliefs, attitudes and needs the SLPs and classroom teachers have regarding their roles as collaborative partners when working with children who have speech and language needs. The purpose of this phenomenological study is to understand and describe the broad beliefs, attitudes and needs of SLPs and elementary regular education classroom teachers who have experience with collaboration, have regarding their roles as collaborative partners. Subjects were recruited through purposeful criterion sampling and all were Speech Pathologists and Classroom teachers that had experience with collaborative service delivery models in schools. Data were collected through face to face or phone interviews which were transcribed. From the significant statements in each interview, meanings were formulated and themes were developed from these. This poster will present the qualitative research design and the main themes found through this research project.

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College of Health Sciences Research Day

POSTER PRESENTATION #220

Abstract Title:	**Human skeletal muscle M2 macrophages are increased following aerobic exercise and may modulate Fn14/TWEAK signaling**
Author(s):	R.G. Walton, College of Health Sciences and Center for Muscle Biology, U of Kentucky K. Kosmac, College of Health Sciences and Center for Muscle Biology, U of Kentucky J. Mula, College of Health Sciences and Center for Muscle Biology, U of Kentucky C.S. Fry, College of Health Sciences and Center for Muscle Biology, U of Kentucky S. Michaelis, College of Health Sciences and Center for Muscle Biology, U of Kentucky B. Finlin, Dept. of Medicine, Div. of Endocrinology, Barnstable Brown Diabetes & Obesity Center, U of Kentucky B. Zhu, Dept. of Medicine, Div. of Endocrinology, Barnstable Brown Diabetes & Obesity Center, U of Kentucky P.A. Kern, Dept. of Medicine, Div. of Endocrinology, Barnstable Brown Diabetes & Obesity Center, U of Kentucky C.A. Peterson, College of Health Sciences and Center for Muscle Biology, U of Kentucky

Abstract: Skeletal muscle tissue resident macrophages are plastic and heterogeneous, and participate in tissue regeneration, repair, neovascularization, and homeostatic functions. We sought to determine whether skeletal muscle macrophages would change in response to aerobic exercise training. We also sought to determine whether changes in macrophage characteristics are associated with other physiological responses to aerobic training. Twenty six human subjects underwent muscle (vastus lateralis) biopsies before and after 12 weeks of cycle ergometer training. Subjects were 75% female and had a broad range of age (mean age 48.4, range 26-68), BMI (mean BMI 30.9, range 22.5-41.8), and insulin sensitivity (mean SI 3.1, range 0.65-7.1). In a sub-set of 20 subjects, macrophages were quantified via immunohistochemistry for total macrophages (CD11b+), pro-inflammatory M1 macrophages (CD11b+/CD206-), anti-inflammatory M2 macrophages (CD11b+/CD206+), and the anti-inflammatory and tissue remodeling M2c macrophages (CD206+/CD163+). Overall, M1 were less abundant than M2 macrophages (0.13 ± 0.02 SEM M1 macrophages per fiber versus 0.26 ± 0.02 SEM M2 macrophages per fiber); there was a trend toward increased M1 abundance following exercise (17% increase, P=0.06). However, total muscle macrophages were significantly increased following exercise by 30% (P<0.01), primarily due to an increase in M2 macrophages (32%, P<0.01), and M2c macrophages increased by 45% (P<0.05). In an overlapping subset of 20 subjects, gene expression of macrophage and inflammation-related genes was quantified using the NanoString nCounter analysis system. In keeping with increased M2 and M2c macrophages following aerobic exercise training, we observed increased expression of IL-4 (55% increase, P<0.05). We also observed increased gene expression of the TWEAK receptor Fn14 (78% increase, P<0.05), which is expressed in muscle fibers. Fn14 has recently been associated with muscle mass gains and we found that the change in Fn14 gene expression following exercise was significantly inversely associated with the change in MuRF (TRIM63, E3 ubiquitin ligase) gene expression (R=-0.46, P<0.05). We next hypothesized that M2c-derived soluble CD163 increases following aerobic training, and functions to bind soluble TWEAK, promoting pro-growth signaling through the Fn14 receptor. We therefore inhibited Fn14 expression using siRNA in vitro in mature human myotubes (77% decrease in Fn14 expression, P<0.001), and measured pro- and anti-hypertrophy gene expression. Following Fn14 knock-down, there were no changes in myogenin or myostatin, but there was a 3.3-fold increase in MuRF expression (P<0.05), indicating that the CD163/TWEAK/Fn14 axis participates in regulation of protein degradation, that may be regulated by resident M2 macrophages in muscle.

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College of Health Sciences Research Day

POSTER PRESENTATION #221

Abstract Title:	**Effect of Previous Cartilage Surgery Failure on 3-month Strength Outcomes in Osteochondral Allograft Patients**
Author(s):	C.E. Whale Conley , College of Health Sciences, U of Kentucky C.G. Mattacola , College of Health Sciences, U of Kentucky K.N. Jochimsen, College of Health Sciences, U of Kentucky J.S. Howard, College of Health Sciences, Appalachian State U C.A. Jacobs, College of Medicine, U of Kentucky C. Lattermann, College of Medicine, U of Kentucky

Abstract: Purpose: Patients undergo Osteochondral Allograft (OCA) procedures for deep defects violating the subchondral bone or after failed cell-based procedures. Lower outcomes have been reported in patients with previous cartilage surgery; however, the effect on quadriceps strength is unknown. Our purpose was to evaluate the effect of previous cartilage surgery on 3-month quadriceps strength and physical therapy (PT) attendance. Materials & Methods: Patients were identified from an orthopaedic practice. Pre-operatively and at 3-months post-surgery patients completed quadriceps maximal voluntary isometric contractions bilaterally (Nm/kg). Limb symmetry index (LSI=involved peak torque/uninvolved peak torque) and post-surgical PT attendance (visits attended/visits prescribed) was calculated. Medical records were reviewed for history of previous cartilage surgery. Patients were categorized as having previous cartilage surgery (PCS) or no previous cartilage surgery (NPCS). Repeated measures ANOVAs were used to compare all strength values over time based on previous cartilage surgery ($p<.05$). Results: Eleven patients were included, 6 PCS (age=25+9yrs,BMI=29+5,gender=4F,2M) and 5 NPCS (age=28+14yrs,BMI=30+9,gender=3F,2M)($p>0.05$). For normalized strength there was no interaction or main effect for time or group for the surgical ($p=0.066$,$p=0.236$,$p=0.236$), or non-operative limb($p=0.572$,$p=0.378$,$p=0.483$). For LSI there was no interaction ($p=0.173$) or main effect for group ($p=0.869$); however, there was a main effect for time ($p=0.015$). Attendance to prescribed physical therapy visits was PCS=53% and NPCS=66%. Conclusion: Pre-operative strength values were similarly weak for both groups. At three-months the means for PCS strength measures were lower when compared to NPCS means. Interestingly, both groups only attended approximately half the physical therapy prescribed, with the PCS attending slightly less. Education for both groups, especially the PCS, regarding the importance of post-surgical PT attendance may be required.

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College of Health Sciences Research Day

POSTER PRESENTATION #222

Abstract Title: **Epidemiology of Upper Extremity Injuries is High School Baseball and Softball**

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Abstract: Context: Data on high school (HS) baseball and softball upper extremity injuries are limited. Objective: To describe the epidemiology of HS baseball and softball injuries during the 2011-2012 through 2013-2014 academic years. Design: Descriptive epidemiology study. Setting: Aggregate injury and exposure data collected from 147 high schools in 26 states. Patients or Other Participants: High school student-athletes participating in varsity boys' baseball and varsity girls' softball. Intervention(s): High school baseball and softball data from the National Athletic Treatment, Injury and Outcomes Network (NATION). Main Outcome Measure(s): Athletic Trainers documented injuries and exposures using commercially available injury-tracking software packages. The software was modified and exported a set of common data elements to be verified and validated before being included in the NATION database. Injury rates and rate ratios will be reported with 95% confidence intervals (CIs). Results: Over the 3-year period, data collection resulted in a total of 47,014 injuries and 5,146,355 athlete-exposures across 27 sports. For the sports of HS boys' baseball and girls' softball, injury rate and rate ratios will be calculated and compared using injury frequencies and athlete-exposures. Return-to-play timeframes will be determined for at least 1 injury and compared across sexes. Conclusions: Findings will determine which sport suggests a higher injury rate and the return-to-play timeframe for 1 specific upper extremity injury will be compared across sexes.

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College of Health Sciences Research Day

POSTER PRESENTATION #223

Abstract Title:	**Hmgb2 is a novel transcriptional regulator of Lxn in hematopoietic stem cells**
Author(s):	C. Zhang , Departments of Toxicology and Cancer Biology, U of Kentucky Y. Liang, Departments of Toxicology and Cancer Biology, U of Kentucky

Abstract: Hematopoietic stem cells (HSCs) provide life-long production of blood cells and undergo self-renewal division in order to sustain the stem cell pool. Precisely regulated HSC pool maintenance and blood cell production is vital for organismal survival. We have identified a protein, latexin (Lxn), as a novel regulator of HSCs in mice, whose natural variation in the expression is inversely correlated with HSC population size. However, the molecular mechanisms involved in transcriptional regulation of Lxn in HSCs have not been clearly defined. By using DNA pull down and mass spectrometry, we identified several proteins that bind to the promoter region of Lxn. One top candidate is Hmgb2. ChIP assay confirmed the binding of Hmgb2 to Lxn promoter with the potential role of transcriptional repressor. We also found that knock-down of Hmgb2 increases the endogenous Lxn expression at both mRNA and protein levels. As a result, HSC number was decreased due to decreased self-renewal and proliferation and increased apoptosis. This study, for the first time, revealed the transcriptional regulation of Lxn by Hmgb2.

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