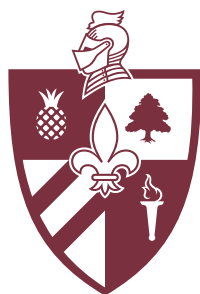


FALL CELEBRATION OF STUDENT RESEARCH AND CREATIVITY

NOVEMBER 7, 2019 • 5 - 6:30 PM



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SPECIAL THANKS TO

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Ms. Chris Ekstrom, College of Health Professions

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Pain Knowledge and Pain Experience in Parkinson's Disease

Alyssa Petty / Faculty Sponsor: Dr. Elizabeth Ulanowski, Dr. Megan Danzl

Recipient of Graduate Research Grant from the Office of Academic Affairs

Pain is a widely prevalent impairment of countless medical conditions, but examination of pain in neurodegenerative disorders, especially Parkinson's Disease (PD) is emerging as an area in need of study. Experiences of pain are one field to address, but complimentary to this is personal knowledge of pain. The purpose of this study is to explore the knowledge of pain neurophysiology and experienced pain in individuals with PD. Eighteen participants with PD were recruited. Demographic data was gathered from 15 of the 18 participants including 10 males, 5 females with ages ranging from 55 to 81. The participants were asked to complete questionnaires to determine their level of knowledge on pain neurophysiology using the Revised Pain Neuroscience Questionnaire (RPNQ) and their rating of pain experienced as it pertains to their PD diagnosis using the King's Parkinson's Pain Scale (KPPS). Eighteen participants completed the RPNQ and 15 completed the KPPS. The mean percentage of correctly answered questions for the RPNQ was 59.46% with a standard deviation of 14.65%. For the KPPS, 14/15 participants experienced some type of pain, with domains of fluctuation-related, musculoskeletal, and nocturnal pain rating highest among the seven domains. The findings from the RPNQ and KPPS reflect a lack of sufficient knowledge about pain in the PD population and indicate there is a potential need for physical therapy to address several domains of pain in people with PD. Further studies could supplement our research by comparing more specifically each pain domain listed on the KPPS to level of pain neuroscience knowledge to discover where the largest discrepancies in pain education may lie. The results of this study could be used to further understand pain as an impairment of PD and advocate for further treatment techniques to promote healthier and higher quality lives for those living with a PD diagnosis.

An Examination of the Use of Reading Fluency Indicators to Predict ACT Scores of First-Year College Students

Elizabeth Cassady / Faculty Sponsor: Dr. David Paige

Also presented at: Kentucky Excellence in Educator Preparation Conference

Recipient of Graduate Research Grant from the Office of Academic Affairs

Using Tinto's student departure theory (Tinto, 1975, 1993, 2012) and the simple view of reading (Hoover & Gough, 1990), this study explores the relationship between reading fluency indicators and achievement on the ACT reading sub-test and the ACT composite score. The study utilizes reading samples obtained from first-year college students attending a small, private university in the southeastern United States. A non-random sample of students ($n = 95$) was recorded while

reading a college-level, informational passage measured at the 1470 Lexile level. Results of using hierarchical linear regression revealed that word reading accuracy as measured by reading miscues predicted unique variance in both ACT reading sub-scores and in ACT composite scores. Reading miscues explained 19.2% of the variance in the ACT reading sub-score and 24.0% of the variance in ACT composite scores. Issues of college-student literacy, readiness, and persistence to degree completion are explored. Implications of the study support the need for pre-matriculation indicators of incoming student academic competencies for universities to provide equitable and adequate academic support for all students for persistence to degree completion.

Evaluation of an Electronic Clinical Algorithm to Improve Screening, Evaluation, and Referral of College Students for Depressive Symptoms: An Evidence-Based Practice Project

Chris Webb / Faculty Sponsors: Dr. Kathy Hager, Dr. Heather Owens, Dr. Ta’Neka Lindsay, Ms. Stacie Steinbock

Recipient of Graduate Research Grant from the Office of Academic Affairs

Depressive symptoms are higher among college students compared to the general population, and LGBTQ+ persons have higher rates of depression than heterosexuals. Evidence supports implementation of automated screenings for depressive symptoms and subsequent follow-up to improve provider compliance. The purpose of this project was to evaluate implementation of an evidence-based, electronic clinical algorithm to improve screening, evaluation, and referral of college students for depressive symptoms. The project took place in a student health clinic at a private, catholic university in the southeastern part of the United States. The electronic clinical algorithm collected PHQ-2 data, and automatically collected Patient Health Questionnaire 9 (PHQ-9) data when indicated. Sexual Orientation and Gender Identity (SOGI) were added to an electronic intake form. The project was evaluated by: (1) comparing pre and post-implementation compliance with PHQ-2, and subsequent PHQ-9 screenings when indicated; (2) assessing data collection compliance of self-reported SOGI data; and (3) comparing PHQ-2 scores between LGBTQ+ and heterosexual students. The use of an electronic clinical algorithm proved to greatly increase compliance in PHQ-2 and PHQ-9 screenings of college students. Results prior to the implementation of the electronic data collection showed only 44.3% of students received depression screening with the PHQ-2 while zero percent needing the PHQ-9 were screened. Depression screening compliance with the PHQ increased nearly 50% after the implementation of electronic clinical intake. This method of intake also allows for collection, per national recommendations, of sexual orientation and gender identify information. The results of this project found no significant difference in PHQ-2 scores of LGBTQ+ and heterosexual patients.

Early Identification of Frailty Predictors in a Vowed Religious Community of Catholic Men: A Strategy for Successful Aging in Place

Julia Senn-Reeves / Faculty Sponsor: Dr. Kathy Hager

Recipient of Graduate Research Grant from the Office of Academic Affairs

Background: The population in the United States is aging and experiencing age- and disease-related changes, leading to increased frailty, as well as increased disability, morbidity, and mortality. Timely recognition of these vulnerabilities, and intervention implementation, are crucial to prevent adverse outcomes and to support successful aging in place. Purpose: The purpose of this project is to develop and implement a multifaceted assessment process to identify early predictors of frailty among members of a vowed religious community of Catholic men to ultimately support successful aging in place. Participants: A single vowed religious community of Catholic men in the United States, living in community and not residing in a skilled nursing facility, were invited to participate. The mean age was 71.7 years old. Methods: The overall health and wellbeing of the community, as well as frailty, were assessed using a survey design. The project survey had 113 questions and took 45 minutes to complete. Those with findings requiring further evaluation or intervention received follow-up. Descriptive statistics were used. Qualitative data were synthesized and summarized. Results: Using a modified Edmonton Frail Scale, 87.5% were not frail and 11.8% were prefrail or vulnerable to frailty. Participants were overweight or obese (66%), at risk for malnutrition (11.8%), reported dizziness (48%), had difficulty negotiating stairs (45.2%), had fallen (26.5%), and screened positive for fall risk (65.6%). Emotionally related predictors included signs of depression in 51.6 % of participants. Participants also indicated a readiness for change (50%). Conclusion: This project creates a unique opportunity to develop new processes that promote successful aging in place such as the implementation of a geriatric assessment tool, with resulting interventions that promote the best possible outcomes for identified frailty predictors.

High Intensity Interval Training Improves Kidney Function in a Patient with Chronic Kidney Disease

Wesley Newman / Faculty Sponsor: Dr. Gina Pariser

Also presented at: American Physical Therapy Association Combined Sections Meeting

The prevalence of chronic kidney disease (CKD) is increasing worldwide. Most people with CKD also have diabetes and hypertension (HTN) and the number of people with all three conditions is rising as populations age. Exercise is an essential strategy for lowering blood glucose and blood pressure and it may lower the risk of progression of CKD to kidney failure. High-intensity interval training (HIIT) elicits

rapid improvements in metabolic and cardiovascular health in people with diabetes and hypertension. There is a paucity of research on HIIT in populations with CKD. We conducted a case study to examine the effects of HIIT combined with resistance training (RT) on kidney function, glycemic control, blood pressure, and physical function in a participant in Active Steps for Diabetes. Active Steps for Diabetes is a community-campus partnership program held at a federally qualified health center serving a diverse population at high risk for multiple chronic diseases. The participant was a 75-year-old Asian Indian man with type 2 diabetes, hypertension, Stage 3B (moderate to severe) CKD, osteoarthritis, and benign prostate hyperplasia (BPH). His BMI was 25.3 and his frailty status was mild. This participant, with multiple health comorbidities, general lethargy, poor cardiovascular endurance and fair balance and functional strength, was able to successfully and safely complete HIIT using a recumbent stepper. Even though progression of his exercise intensity was not consistently linear over the 12-week intervention, due to arthritis pain and due to illness, his glycemic control and kidney function improved. People with CKD typically have a high degree of health comorbidities and poor physical function. Physical therapists are encouraged to educate medical professionals and patients about how highly and uniquely qualified we are to provide exercise therapy needed mitigate the rise in CKD and kidney failure.

Early Physical Therapy Intervention in the Pre-Prodromal Stage of Huntington’s Disease: A Case Report

Meagan Edelen, Ryan Moss / Faculty Sponsor: Dr. Elizabeth Ulanowski

Also presented at: American Physical Therapy Association Combined Sections Meeting

Research has shown that exercise in individuals with Huntington’s Disease helps those individuals retain a better quality of life longer than those who do not participate in exercise. The issue that arises, however, is that every individual with HD is unique and the exercise recommendations that are in the research are very generic and not tailored to an individual. This case study utilized an 8-week exercise program tailored to the individual using the B-FIT model using the participant’s specific impairments. Adherence to the B-FIT model showed increases in TUG, TUG Cognitive, and the 6 MWT outcomes scores, which could indicate using this model can increase or preserve gait speed and dual tasking in individuals in the prodromal stage of HD.

Narrative Theory in Mental Illness Narrative

Kenzi Gooley / Faculty Sponsor: Professor Fredrick Smock

Mental illnesses have long been overlooked and stigmatized in society. It is the responsibility of artists to respond to this stigma by creating empathy through art. One way in which writers answer this responsibility is by creating synthetic experiences

of mental illnesses through narrative. I will focus on writers portraying developed mental illnesses and will analyze the narrative choices of Jean Rhys in *Wide Sargasso Sea* and Tim O'Brien in *The Things They Carried* and how these choices embody the perspective of the mentally ill to evoke empathy and understanding. I will connect these narrative techniques with their respective movements—modernism and postmodernism. In doing so, I will portray how writing from the perspective of the mentally ill can promote healing through story. This healing helps both those affected by developed mental illnesses and those previously unexposed to these conditions, in order to promote a better understanding of what it is to be human. I will use this research to support my own creative writing that is based on interviews with early onset dementia patients.

Cancer Bites Back: A Case of Acute Myelogenous Leukemia Secondary to Chemotherapy Treatment

Linza Busick / Faculty Sponsor: Dr. Karen Golemboski

Acute myelogenous leukemia (AML) is a form of cancer of the bone marrow and blood. The cancerous cells of AML can interfere with normal blood cell production. Without properly formed blood cells, patients can encounter life-threatening health issues, such as anemia and thrombocytopenia. One of the subtypes of AML is treatment-related AML (t-AML), from previous or current cancer therapies. Although these therapies are used to treat different types of cancer, their cytotoxicity can also cause harm by causing t-AML to form. This case study follows a 44-year-old female who developed t-AML. She had a family history of cancer, had previously been diagnosed with lymphoma and breast cancer, and was undergoing treatment for another round of breast cancer at the time of her t-AML diagnosis. The initial evaluation of the patient showed that the patient was experiencing low hemoglobin from cancer-related chronic anemia. It was a known anemia, and the patient had been receiving blood transfusions along with her chemotherapy treatment. However, her lab results revealed that there was much more going on that soon caught the interest of the following laboratory disciplines: hematology, blood bank, chemistry, coagulation, flow cytometry, and cytogenetics. It took the combination and correlation of the results from the various departments in the laboratory to eventually diagnose her with t-AML due to her chemotherapy treatment. The patient decided to forgo further treatment and rapidly declined until she passed away, all within a little over a month of her admission to the hospital.

Strive to Thrive

Hannah Brockmeyer, Caroline Coleman, Joey Davis / Faculty Sponsor: Dr. Beth Quinn

Recipient of Graduate Research Grant from the Office of Academic Affairs

Fear of falling is a major concern for older adults regardless of if they have or have not experienced a fall (Honaker 2014). Studies have shown that balance programs, gait training, and lower extremity strengthening can reduce the risk of falls (Ambrose 2013). Additionally, self-efficacy can influence an individual's participation in daily activities. A case report published by Vendrely et al. in 2012 highlighted the role of cognitive-behavioral therapy in changing a patient's perception of his or her inability to be independent. As a result, this therapeutic approach improved the quality of life of participants by directly addressing their fear of falling. For this project, three Doctor of Physical Therapy students designed a 12-week balance and falls prevention program with the goal of combining traditional individualized and group balance interventions with interactive discussions and educational sessions to promote self-confidence and a positive attitude regarding participation in independent activities of daily living. 10 community-dwelling older adults (mean age 73) completed the Strive to Thrive program hosted at the Thrive Center, Louisville, KY. The balance and education course spanned 12 weeks including: 2 weeks of pre-intervention data collection, 8 weeks of balance training and education, and 2 weeks of post-intervention data collection. Baseline functional status was assessed using the following outcome measures: The Berg Balance Test, the Falls Efficacy Scale and bilateral grip strength. Outcome measures were reassessed at the completion of the program. The Strive to Thrive program met twice a week for 60-minute sessions and implemented individualized balance training, group education sessions and standardized home exercise programs. Data analysis of the outcome measures will be provided in the poster presentation. Participant subjective feedback will also be shared as part of our reflection on the project.

Enacting digital habitus as a framework to disrupt the logical aporia of the “digital native”

Drew Thiemann / Faculty Sponsor: Dr. Grant Smith

The persistence of a digital literacy divide is especially troubling for mobile people, including refugees, migrants, and displaced workers (Díaz Andrade & Doolin, 2016; Oiarzabal & Reips, 2012; Felton, 2015; Yu, Ndumu, Mon, & Fan, 2018), as well as for youth (Park, Kim, & Na, 2014; Ainley, Fraillon, Schulz, & Gebhardt, 2016; Ritzhaupt, Liu, Dawson, & Barron, 2013). However, few studies have examined the effects of digital exclusion on a unique subgroup that exists

at the intersection of these two populations: international university students.

This poster presents findings from a qualitative research project involving foreign-born students at an American university. Through interviews and observation, the author inquired into students' perceptions, experiences, and valuations about the role of digital literacy in their day-to-day lives as they navigate the postmodern information society.

Two research questions informed this study: (1) How do four international university students engage with and use various forms of information and communication technology (ICT)? (2) To what extent do these students find their ICT-based activities significant?

The research methods incorporated a poststructuralist ontological lens wherein language is merely one of many possible textual representations of these students' habitus, i.e. the Bourdieusian concept of the "deeply ingrained habits, skills, and dispositions" that they chose to share or demonstrate in public view (Longhofer & Winchester, 2012; Bourdieu, 1977). By exploring how elements of habitus illustrate these students' beliefs about the value of information, as well as the cultural capital they enact when they use information and communication technology, the project enriches understanding about the significance of orienting, instrumental, and expressive ICT practices of foreign-born university students in America. Furthermore, this exercise of meaning-making conducted by both author and subjects suggests further deconstructive inquiry is needed to challenge the false dichotomies associated with the myth of the "digital native."

Social Media Marketing Benefits for Non-Profit Theatres

Madeline Kurtz / Faculty Sponsor: Dr. Zackary Ross

Also presented at: Kentucky Honors Round Table

Theatre is at a crucial turning point, one where many well-established companies are hemorrhaging money in order to attract an audience. Social Media provides a viable, free, option for companies that might otherwise be out of solutions. Using the Bellarmine University Theatre Program as an assessment case, I have been able to prove that Social Media does in fact affect attendance at performances, as well as build relationships with customers. By providing a "behind the scenes" look at what goes into producing a show, as well as leveraging influencers in the 18-25 age range, the program was able to sell out multiple shows last Spring and has seen an increase of 56.25% in online presence per year. I have conducted four show campaigns, each time analyzing the data from the work I had produced and drawing conclusions. These conclusions can illuminate areas for further development and research.

Front-End Web Development of Shipyard

Olivera Todorovic / Faculty Sponsor: Dr. Robert Kelley

For my Senior Seminar course, I decided to continue from my previous CS – 400: Software Engineering course during the spring 2019 semester. In Software Engineering, I was in a three-person team where we constructed a project called Shipyard. Shipyard is an application designed specifically for students who are looking for internships. As a continuation of that course, I am designing and coding the user interface for Shipyard. This encompasses previous coding and planning I have learned during my time at Bellarmine University. The website is based on past renderings of what my team imagined Shipyard would look like while making it interactive. The website is designed using HTML, CSS, and JavaScript. To help supplement my learning, I enrolled into Treehouse, an online tech learning community. I am also using GitHub to host my code. With the skills I am learning for front-end development, experience with GitHub, and project management, it will help me with any future employment I might have using my computer science degree. This project can also be a steppingstone to perhaps add an implementation portion to CS 400 if future students think it will be beneficial.

The effects of an 8-week core stability program on athletic performance in female, adolescent club volleyball players

Ashley Jefferson, Aaron Brown, Andrew Ford, Bryson Platt / Faculty Sponsor: Dr. Norman Ayotte

*Also presented at: American Physical Therapy Association Combined Sections Meeting
Recipient of Graduate Research Grant from the Office of Academic Affairs*

As volleyball becomes an increasingly popular sport for adolescent female athletes, more competitive, year-round participation is leading to repetitive stress on joints and muscles. With less recovery time, this may result in decreased performance. Poor core stability is a modifiable risk factor among adolescent athletes. By increasing core stability, one would presumably increase postural and dynamic control and, therefore, increase athletic performance. The purpose of this study is to determine the effects of an 8-week core stability program on athletic performance in female, adolescent volleyball players. Players from nine teams (13U-15U) participated in pre-tests and were separated into 3 groups. From the 73 players that participated in pre-testing, 5 were lost to injury or time constraints; 25 participated in the 8-week core-program (experimental), 17 served as control (travel), and 26 served as control (non- travel) participants. Health history, height, weight, and limb length were assessed prior to testing vertical jump, strike velocity, Upper Quarter and Lower Quarter Y-Balance. Order of testing was randomized. All participants were retested after 8 weeks.

There was a statistically significant effect of time for all groups. All three groups improved in core strength and athletic ability over 8 weeks showing significant, within group, positive changes. The experimental group made significant gains in core strength compared to the control-travel group. All other comparisons, though appearing to be greater in the experimental group regarding core strength, were not statistically significant. In conclusion, we believe a combination of core exercises, lower body power and strength exercises, and sport specific training can give an overall desired improvement of athletic performance in volleyball. This research contributes to evidence-based practice of pre-habilitation and sports performance training to increase athletic ability of adolescent, female volleyball players.

Promoting Utility of Student Data in Water Quality Decision-Making

Carolyn Waters / Faculty Sponsor: Dr. Martha Carlson Mazur

Partnerships between universities and local agencies are valuable not only for giving context to student learning but also in helping those agencies meet goals through research (Rosing & Hofman, 2010) In this study, the authors explored the utility of data collected by first-year undergraduates in decision-making related to water quality in urban streams. They also hoped to determine how can the quality of data and student experience could be improved through developing partnerships. Data collected by students were gathered from an urban stream as part of an introductory environmental science course lab assignment. Data were compiled from courses taught by three professors between 2013 and 2019. Data were analyzed against comparable data from government agencies and a citizen science watershed watch group. Initial findings revealed that four of twelve parameters for which students collected data were also collected by the US Geological Survey. The authors documented the development of partnerships to further expand the utility of study data. The university had an existing partnership with the local sewer district whose representatives serve as guest speakers in the courses described here. This agency provided additional data, however the parameters and data collection methods differ from the class data such that the two cannot be effectively compared. As a result of a new partnership with the watershed watch group, students piloted protocol for E. coli testing that will be submitted to a citizen science database. These preliminary findings suggest that establishing partnerships with local government and nonprofit agencies can help to shape more applicable curricular tools in undergraduate environmental science. Developing classroom methods that are consistent with existing local efforts can produce data that are more viable for use in decision making.

Investigating the Utility of a Dynamic Warm Up for Injury Prevention in Collegiate Wrestlers

Thomas Hinkebein, Wesley Lawless, Louis Walker, Hayden Miller / Faculty Sponsor: Dr. Paul Lonnemann

The sport of wrestling has the highest rate of severe injuries out of any collegiate sport. However, there is a paucity of research on injury prevention strategies or useful measures of injury prediction for wrestlers. Tools such as the Functional Movement Screen (FMS), Y-Balance Test, and Closed Kinetic Chain Upper Extremity Stability Test (CKCUEST) have been used to measure asymmetries and dysfunctions to assess injury risk in collegiate athletes. Some athletic organizations, such as FIFA, have found promising evidence in the utilization of an established sports specific injury prevention regimen. Establishing a training regimen for injury prevention could contribute to fewer wrestling injuries and improve collegiate wrestlers' success. For this study, 18 athletes from the Bellarmine University (BU) Men's Wrestling Team attended a pre-season, mid-season, and post-season screening where the FMS, Y-Balance, and CKCUEST were administered. A standardized dynamic warm-up/exercise regimen was designed from impairments found during preseason testing, which was completed by the wrestlers throughout the course of the season. Pre-season, mid-season, and post-season scores of the FMS, Y-balance, and CKCUEST were then re-analyzed. Results showed significant differences between 3 different tests. While the FMS may not correlate to injuries that occur in wrestling, injury prevention is important to the sport of wrestling due to the high injury rate. Therefore, implementation of a standardized dynamic warm-up could help to reduce the risk of injuries and improve the quality of movement in wrestlers. A recent systematic review of the utilization of the FIFA 11 proved to reduce the injury rate of soccer players by 30%. The paucity of literature on injury prevention in the sport of wrestling yields a high demand for further research in the functional and physiological demands of wrestling in order to develop a standardized injury prevention regimen.

A Qualitative Analysis of an Interprofessional Education Workshop: A Rehabilitation Collaboration

Erika Swilley / Faculty Sponsor: Dr. Elizabeth Ulanowski

Background/Purpose: Today's challenges in health care require skilled interprofessional collaboration to improve patient health outcomes. To prepare students for clinical practice, education must be centered on providing opportunities to collaborate with other healthcare professions. Faculty from three universities, Bellarmine University (PT), Spalding University (OT), and the University of Louisville (SLP), created an opportunity to enhance interprofessional learning by hosting an Interprofessional Education (IPE) workshop for students. The goal of this workshop is to

prepare students for working interprofessional. The purpose of this case report was to examine the effects of an interprofessional workshop for OT, PT, and SLP students. Case Description: Qualitative case study methodology was used to examine a one-day IPE workshop with students. Data collection included reflection questions which were coded and analyzed. Faculty from each university were instructed to facilitate discussion and observe communication. Workshop activities included team building exercises, communication, and case studies. Outcomes: Data suggest major themes from all three disciplines. Students identified the workshop as assisting with dispelling stereotypes, improving their confidence and understanding of other disciplines. Discussion: This study demonstrates the benefit of IPE through student responses. Students find the interaction beneficial for preparation into the clinical practice. The use of case studies provided students with an opportunity to practice interprofessional communication. Overall, students feel more empowered in collaboration after participating in the workshop. This study demonstrates the effectiveness of collaboration in the educational setting. This workshop provides a framework for other universities to find ways to provide IPE. Students feel more confident and prepared for clinical placement when being able to work with other health professionals. Finally, it also provided an opportunity to network, meet those outside of their chosen profession, understand their biases and practice communication to feel more well-rounded as a practicing clinician.

Peripheral Sensory Plasticity in the Development of Chronic Pain Following Spinal Cord Injury

Sara Rendon, John Shea, Brandon Taylor, Hailee Bray / Faculty Sponsor: Dr. Sonja Bareiss

*Also presented at: American Physical Therapy Association Combined Sections Meeting
Recipient of Graduate Research Grant from the Office of Academic Affairs*

Chronic pain following spinal cord injury (SCI) affects more than 70% of patients following SCI and is resistant to conventional therapies. Although pain following spinal cord injury was once widely assumed to be maintained by central mechanisms, new evidence suggests peripheral afferent responses may contribute to the development of pain post SCI. Here we evaluated a time course for peripheral sensory growth responses in the days following SCI and correlated these growth responses with the development of pain using an established SCI model. SCI was induced via injection of quisqualic acid (QUIS) in 42 male Long Evan rats to produce pathological and behavioral sequelae mimicking those observed after human SCI including the development of at- and below-level pain. Rats underwent a T12 spinal cord injection of QUIS (SCI) or saline (sham control) and were allowed to survive for 1, 7, 14, or 22 days (n=5-12 per group). At the designated time points, T12 (at level) and L4-5 (below level) dorsal root ganglia (DRGs) were disassociated, cultured

and analyzed for neurite outgrowth and length. Animals were examined daily for onset and severity at-level dysesthesias/pain termed overgrooming. Below-level hyperalgesia to noxious thermal stimuli was determined using Hargreaves apparatus. Mechanical hypersensitivity thresholds were determined with the application of electronic von Frey probes. Spinal cords and DRG were analyzed for corresponding alterations an established mediator of neuronal growth, namely δ -catenin. SCI induced early (1 day) and persistent (22 day) growth responses in DRG neurons in animals that developed at and below-level pain related behaviors. Cultured DRG growth responses correlated with δ -catenin changes in the spinal cord dorsal horn. Our work supports a growing body of knowledge showing that peripheral afferent plasticity is involved in the development of SCI pain. Furthermore, we identify a novel role for δ -catenin in mediating these changes.

Grip strength correlates better with upper quarter strength than Stability Tests in Novice Rock Climbers

Kristin Kleinhenz, Tyler Kornblum, Chelsey Kloss, Cody Schmitz / Faculty Sponsor: Dr. Norman Ayotte

*Also presented at: American Physical Therapy Association Combined Sections Meeting
Recipient of Graduate Research Grant from the Office of Academic Affairs*

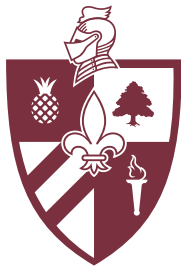
Upper extremity strength, balance and neuromuscular control are important components of climbing. Limited data exists between the relationships of these measures in rock climbers. The purpose of this study is to determine the relationship between anthropometric measures commonly used to assess strength and stability. A total of 24 subjects were enrolled between the ages of 18 and 65, climbing for less than two months, or self-reported climbing level of less than V2. Individuals were excluded if they rated themselves at higher than V2 climbing level or if they had a current musculoskeletal injury. Participants were between 18 and 42 years old, currently healthy and able to climb for at least 2 hours per week. Participants completed baseline assessments using the Power-Up Test (PUT), Flexed Arm Hang (FAH), and Upper Quarter Y Balance Test (UQYBT) tools to assess strength, balance and mobility. A hand-held dynamometer was used to assess standard grip (SG), open hand grip (OSG), index finger/thumb pinch (ITP), and stacked finger pinch (SFP). A bivariate correlational analysis was performed to determine associations between assessment tools and strength measures. Right grip strength was positively correlated to FAH ($r = 0.564$, $P = 0.005$), PUT ($r = 0.600$, $P = 0.002$), OHG ($r = .869$, $P < 0.001$), and ITP ($r = 0.629$, $P = 0.001$) but not to YBT-UQ or SFP. Left grip strength was positively correlated to FAH ($r = 0.571$, $P = 0.004$), PUT ($r = 0.558$, $P = 0.002$), OHG ($r = .740$, $P < 0.001$), ITP ($r = 0.633$, $P = 0.001$), and SFP ($r = 0.664$, $P = 0.001$) but not to YBT-UQ. BMI was not correlated with FAH or PUT. Greater grip strength is correlated with increased

upper body strength in the shoulder girdle and hands but not with shoulder stability as measured with the YBT-UQ.

Readiness & Quality Feeding Scores in NICU Patients

Kelly Gardner / Faculty Sponsor: Dr. Sherill Cronin

Causing physiological stress and negative feeding behaviors which can lead to feeding aversions, volume-driven methods can predispose the infant to long-term learned refusals as neuronal mapping is occurring rapidly when preterm infants are learning to oral feed. Cue-based oral feeding methods are designed to give the caregiver the ability to recognize signs of readiness for feeding regardless of gestational age and signs of distress during feeding. Use of readiness scales, which examine alertness and hunger cues, provides a guide to caregivers to proceed with oral or gavage feeding methods. If oral feeding is provided, the quality of the feeding is scored to monitor stress and progression of the oral feedings. Purpose: To evaluate the use of readiness and quality scales derived from the Infant Driven Feeding (IDF) scales in a specific Neonatal Intensive Care Unit (NICU) population to determine if the scales would display a relationship with positive oral feedings. Methods: Cross-sectional quantitative study observing 29 neonates' age range of 32 to 35 corrected gestational age (CGA) for a total 387 feeding encounters observed. Results: There was not significant relationship between readiness and quality scores ($r(157) = .146, p = .068$). There was a significant moderate to strong positive relationships were displayed between readiness and volume consumed PO among the CGA groups of 33-35 weeks. Conclusion: The use of the IDF scale in the NICU have the appearance to be a valuable instrument to evaluate and guide oral feeding in a diverse premature patient population based on the relationships between variables evaluated in this study. Keywords: cue-based, feeding, neonatal, feeding methods, readiness, quality, volume-driven, infant.



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