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PROGRAM & ABSTRACTS

14th Annual Symposium on Graduate Research and Scholarly Projects



April 27, 2018

Rhatigan Student Center

Kerry Wilks & Heidi Bell: GRASP Co-Chairs





2018 GRASP SYMPOSIUM

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Graduate Research and Scholarly Projects 14th Annual Symposium

Agenda

8:30 – 9:00	Registration & Poster set-up
9:00 – 9:45	Opening Session: <ul style="list-style-type: none">• Opening remarks – Interim Provost, Dr. Rick Muma• Keynote Speech – Dr. Jodie Hertzog
9:45 – 10:00	Break
10:00 – 12:00 noon	Poster Session (Beggs Ballroom 1 & 2)
12:00 noon – 1:00	Break/Lunch/Judging Tabulation
1:00-1:30	Closing Session <ul style="list-style-type: none">• Final Remarks – Dean of the Graduate School, Dr. Dennis Livesay• Presentation of Graduate School Awards – Associate Dean of the Graduate School, Dr. Kerry Wilks• Presentation of GRASP Awards – GRASP Co-Chair, Dr. Heidi Bell

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Abstracts

14th Annual Symposium on Graduate Research and Scholarly Projects



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Multivariate Approaches to Evaluating Quality in Trauma Care

Lucy Aragon

Faculty: Laila Cure

Department of Industrial, Systems, and Manufacturing Engineering, College of Engineering

The need to assess the performance of healthcare systems to improve quality and reduce costs has gained increasing attention in recent years. The Trauma Quality Improvement Program (TQIP) developed a database to measure and compare trauma centers' performance. In 2001 the Institute of Medicine (IOM) proposed six aims to guide quality improvement efforts: safety, effectiveness, patient-centeredness, timeliness, efficiency, and equity of care. However, most quality improvement programs still use one aim at a time, often corresponding to effectiveness. In this study, the viability of using all the IOM quality aims in the evaluation of trauma care quality is investigated. Data from the Michigan-TQIP is used to quantify quality metrics associated with each aim. Correlation analysis is used to identify relationships between metrics, and composite measures are developed to represent each aim. The traditional, univariate analysis approach is compared with two other approaches involving more than one aim at a time: (1) combining all aim-metrics into a single composite measure of quality to replicate the traditional analysis methods and (2) using deterministic dominance theory to overcome the heterogeneity of quality metrics. Results indicate that considering several aims at a time may add value to performance evaluation. Limitations of the approaches and possible implications for practice are discussed.

Factors Affecting Heat Generation during Bone Drilling and Implant Surgery

Kunza Arifa

Faculty: Eylem Asmatulu

Department of Mechanical Engineering, College of Engineering

Bone drilling is a complicated process and creates deformations on the hard and soft tissues, as well as surrounding organs during the implant surgery and drilling process. The drills used in surgeries must have sharp cutting edge, rake angle, specific stiffness and adequate toughness along with high precision. The drill should also provide excellent heat dissipation to keep temperature below 47°C on applied area to reduce the damage as well as healing time of the patient. It is discovered that structural shape of drills has an important impact on the drilling temperature of commercial as well as medical drills. The purpose of this study is to investigate the effects of cutting parameters and cooling modes on bone drilling temperature. From the cutting parameters we concentrated on the shape and material composition of the drills. Mostly, thermocouples are employed for experimental determination of temperature rise during the bone drilling and cutting. The maximum drilling temperatures were noted for different drill heads and drilling temperatures at different drill speeds, which were calculated under different drilling parameters. As a result, shape of the drills, feed rate, drill speed and type of the cooling lubricants highly affect the drilling temperature of the bone. Appropriate drill must be collaborated to reduce the drilling temperature. The shape of the drill also affects temperature greatly. The maximum drilling temperature of diamond spherical grinding head is 46.31°C, while the maximum temperature of common twist drill is 42.1°C. The diamond bullet like grinding head is 38.29°C, which is relatively low. It is very important to select an appropriate drill to reduce the drilling temperature as much as possible during drilling and cutting the hard tissues.

Concealed Carry on University Campuses: Attitudes, Behaviors, and Safety Knowledge Before and After July 1, 2017

Adam J. Armijo* and Joel Suss

Department of Psychology, Fairmount College of Liberal Arts and Sciences

Since July 1st 2017, in Kansas it is legal to carry a concealed weapon on some state government properties (e.g., university campuses). But little is known about the rate of concealed carry on campuses, and why members of the university community choose to carry—or not to carry—weapons on campus. The current study surveyed faculty, staff, and students at Wichita State University campuses before and after July 1st 2017 about their attitudes toward weapons on campus and whether they themselves carry a weapon on campus. As one general concern about concealed carry is safety, we developed a unique measure of firearm safety knowledge that was included in the survey. As expected, prior to the July 1st, no members of the university community (apart from campus police) carried weapons on campus. But, after July 1st a small proportion of faculty (7%), staff (5%), and students (10%) indicated that they carried a weapon on campus. The most frequent reason given for carrying a weapon on campus was protection of self and others. The most frequent reason for not carrying a weapon on campus was not owning one and not enough training. Consistent with psychological research showing that people who perform below average erroneously perceive themselves to be competent, those who scored lowest on the test of firearm safety knowledge were the most overconfident in their abilities (i.e., unskilled and unaware). The results suggest that many individuals lack basic firearm safety knowledge and could therefore benefit from campus-based, tailored firearm safety training.

The Great Debate of College Achievement: Which Nonacademic Factors Contribute Most to College Readiness and Success?

Randy J. Barbour, Jr.

Faculty: Charles Burdsal

Department of Psychology, Fairmount College of Liberal Arts and Sciences

Today, graduating from high school, enrolling in college, and obtaining a bachelor's degree are the primary means of increasing one's cultural capital and upward social mobility (Barnes and Slate, 2010). In fact, many scholars explain that "Education beyond high school is the passport to the American dream" (Symonds, Schwartz, and Ferguson, 2011, p.2). Too often, however, high school graduates enroll in colleges and universities and realize they are not completely prepared for the college environment/culture and academic rigor. Considering these findings, emphasis is being placed on which academic factors best predict college readiness and success. The traditional indicators (e.g., high school GPA, standardized test scores, etc.) continue to lose their predictive power, and it is now time to research other nontraditional, nonacademic factors (e.g., perseverance, social support, empathy, college knowledge, etc.).

The aim of this study was to investigate which nonacademic factors improve the prediction of perceived college preparedness and college GPA. The study was conducted using a survey questionnaire and by analyzing the questions with statistical methods. Results indicated that nonacademic factors do improve the predictive power for regression models—including traditional academic factors—and improve the prediction of perceived college preparedness and college success. Results also indicated that students who complete all enrolled credit hours during their first semester of college is associated with greater college knowledge, feeling more confident to continue college, and earning higher college GPAs.

Intranasal Lidocaine to Block the Sphenopalatine Ganglion in Refractory Chronic Migraines: A Case Report

Marlon Bazan

Faculty: LaDonna Hale

Department of Physician Assistant, College of Health Professions

Intranasal lidocaine to treat chronic migraines may be a viable option after first and second line treatments are exhausted. It is thought to work by blocking the sphenopalatine ganglion. Although data from randomized placebo-controlled trials are inconsistent, intranasal lidocaine is rapid, safe, and easily implemented in an outpatient setting. This is a case report of a 58-year-old female who initially presented with migraines and associated phonophobia and photophobia who failed multiple treatment options including topiramate, propranolol, ketorolac, promethazine, nortriptyline, botulinum toxin injections, daith piercing, lamotrigine, and narcotics. She responded favorably to lidocaine 4% intra-nasally. She continued receiving this treatment for more than 12 months before it ultimately diminished in efficacy.

The Role of Skin Complexion on African American Emerging Adults

Alissa Bey

Faculty: Rhonda K. Lewis

Department of Psychology, Fairmount College of Liberal Arts and Sciences

It is important to explore the role of skin complexion to diminish the social equity gap between various skin complexions discussed in the literature by Keith & Herring (1991), Edwards (1972), and Hunter (2007) & Hunter (2013) to foster a better understanding of psychological well-being for individuals in the African-American community. This qualitative study expands on the skin complexion literature using a Critical Race lens to explore colorism throughout the lifespan of African-American emerging adults. A brief survey was also used to gather information about the participants' current well-being, self-perception of skin complexion, and satisfaction level with skin complexion. In addition, focus groups were conducted with 14 African-American emerging adult college students aged of 18 to 26 to gather information regarding how skin complexion has played a role throughout their lifespan until emerging adulthood. After examining participants' responses, five themes were found within the data: 1) gender matters, 2) mate selection bias, 3) family dynamics, 4) media, and 5) resilience. These themes are used to discuss implications for intervention. We suggest that future researchers explore these themes with participants who have a broader range of skin complexion identifications.

Physician Assistant Students Supporting the Integration of Oral Health now (PASSION)

Elyse Bigler*, Brett Gliem*

Faculty: Kim Darden

Department of Physician Assistant, College of Health Professions

Oral health is a vital component of preventive medicine. Routine oral health care is associated with decreases in both systemic infection and heart disease. The American Academy of Pediatrics (AAP) recommends children, beginning at six months of age, receive an oral health risk assessment. In Kansas, 91 of 105 counties have dental professional shortages making routine oral health screenings and prevention inaccessible. These "dental deserts" are most prevalent in western Kansas. Oral health exams are underutilized across the nation in primary care facilities. Our research focuses on teaching primary care providers (PCPs) in a rural clinic the importance of oral health screenings and techniques to provide a preventive service of fluoride varnishes to pediatric patients. Wichita State University (WSU) physician assistant (PA) students received interprofessional education from the WSU dental hygiene program on fluoride application technique. A rural pilot site in western Kansas was selected. PA students from WSU taught and orientated the PCPs at the site on incorporating fluoride varnish and oral health screenings into routine well-child exams. Data was tracked through coding and billing for services provided. Before the intervention, zero pediatric oral health screenings were completed and documented at the pilot site. Post intervention, there was an increase in the number of fluoride varnish applications and overall oral health prevention at the pilot site. The study aimed to establish precedence for routine preventative oral health care in rural primary care settings.

Normal Serum Lactate Values in Various Adult Populations: A Literature Review

Lindsey Carson¹

Faculty: Sue Nyberg,¹ Gina M. Berg^{2,3}

¹*Department of Physician Assistant, College of Health Professions*

²*Department of Family and Community Medicine, University of Kansas School of Medicine*

³*Wesley Medical Center*

Introduction: There are many causes for serum lactate to elevate, but literature and clinical practice predominantly focus on elevated lactate signifying sepsis or septic shock. Elevated lactate levels indicate tissue hypoperfusion in sepsis; an early diagnostic marker that guides treatment. Currently, a single range of values (0.5-2.2 mmol/L (venous) and 0.5-1.6 mmol/L (arterial)) is accepted as normal for the entire population.

Purpose: To investigate lactate values in various populations to determine if the accepted clinical lactate reference range accurately represents populations outside of the acutely ill adult.

Methods: Utilization of Wichita State University SmartSearch tool that mines multiple databases including, but not limited to, Science Direct, CINAHL, MEDLINE, and Cochrane Library. Articles included between January 15, 1979 and November 1, 2017.

Results: Forty studies were identified and reviewed. It is well known that lactate levels are elevated in acutely ill populations, including sepsis and trauma. Lactate levels were also elevated in other, less studied, populations including exercising, gestational diabetes, transient loss of consciousness, and individuals with migraines. There were discrepancies within the laboring population.

Conclusion: One range of normal lactate is not reliable; the clinical lactate reference range does not accurately represent populations that are not acutely ill. Lactate in various populations compared to a normal population was found to be elevated. Causes for elevated serum lactate levels are not well studied or recognized outside of an acutely ill population. When evaluating lactate values, there should be consideration for variation in lactate levels outside of the acutely ill population.

Semi Inclusive Neutral Current Neutral Pion Production Selection At The NOVA (Numi Off-Axis Electron Neutrino Appearance) Near Detector Using Prong Level Convolutional Neural Networks

Alan Cedenio

Faculty: Mathew O. Muether

Physics Department, Fairmount College of Liberal Arts and Sciences

The NOvA neutrino experiment based in Fermilab is designed to measure $\nu_\mu \rightarrow \nu_e$ neutrino oscillations. Neutral current (NC) muon neutrino events (events where there is no outgoing charged lepton) can mimic the muon neutrino to electron neutrino oscillation signal and therefore are an important background for NOvA to understand. Neutral pions decay into two photons which can fake a single electron shower (electron neutrino appearance signal) in two ways: either the 2 gamma's can merge together or one of them may escape detection. In order to constrain this background, NOVA utilizes the Near Detector to measure neutral current π^0 neutrino interactions. In this analysis, neutrino-Nucleus (muon neutrinos to Nucleus) NC π^0 interactions with total pion energy greater than 0.3 GeV are studied by selecting 2 prong events with a final state π^0 as determined by prong based CVN (Convolutional Visual Networks). The analysis is performed on 3.54×10^{21} POT (Protons On Target) of NOvA Near Detector data. Optimization of the selection based on fractional cross section uncertainty and energy resolution of the final sample are presented.

West High School Winnable Battles

Brie Harmer, Marcus Chavez, Kelly Croci, Kacey Maldonado, McKenna Seiler

Faculty: Gina Brown

Department of Physician Assistant, College of Health Professions

Utilizing CDC Winnable Battles, Healthy People 2020, and the most common causes of death among US teenagers, we choose five topics we felt would have the greatest impact on the health of high school students. Five modules were created and presented by WSU PA students, to upperclassmen in the Health Professions Track at West High School in Wichita, Kansas. Topics included substance abuse, suicide and mental health awareness, physical activity and nutrition, teen pregnancy, and teen motor vehicle accidents. Each module included a PowerPoint presentation and several interactive activities. In order to analyze the impact of our project, a survey was completed by the students prior to the presentation of the models and will be completed again after completion of the modules. These presentations will be used at West High for several years and will hopefully help to motivate and inform students on how to live safer and healthier lives.

Induced Pluripotent Stem Cell-Seeded Collagen Scaffolds as a Mechanism for Regeneration after Spinal Cord Injury

Ashley DeBrot

Faculty: Dr. Li Yao

Department of Biology, Fairmount College of Liberal Arts and Sciences

Spinal cord injuries (SCIs) are highly debilitating conditions for which no effective treatment or cure currently exists. Stem cell replacement therapies may offer hope to people suffering with SCIs. The use of biomaterial scaffolds, both alone and combined with stem cells, has also been suggested for spinal cord repair. A relatively new type of stem cells, induced pluripotent stem cells (iPSCs) originate from adult somatic cells and bypass the ethical and immunological concerns of other stem cell lines. In this study, iPSCs were cultured and subsequently differentiated into neural stem cells (NSCs). These iPSC-derived NSCs were able to survive and extend axons after multiple reseedings, indicating the possibility of creating reservoirs in clinical use. Additionally, iPSC-derived NSCs were shown to survive in a biomaterial hydrogel during 3D-culturing and extend axons into the gel. A collagen scaffold was designed with four channels running parallel through its center. Hydrogel containing iPSCs was injected into the channels to test for cell survivability. This cell-seeded scaffold is a strong candidate for surgical implantation with the aim of generating host-integrated neurons and functional recovery in a rat model of SCI. Such a model will serve as a potential mechanism for curing SCI and other neurological defects in humans.

Monochromatic Molecular Absorption Coefficients for Use in Calculations of Stellar Opacity

Kari Ehrmann

Faculty: Jason W. Ferguson

Physics Department, Fairmount College of Liberal Arts and Sciences

In order to fully understand stellar structure, it is necessary to know the opacity, as it influences the behavior of radiative transfer within the stellar interior. Opacity plays an important role in the onset of convection as well as driving stellar winds in cool stars. Opacity is the interaction of light with the surrounding medium, with major contributors being atoms, molecules and grains. Tables of average opacity values are highly dependent on the composition and if any values are altered, a completely new set of tables must be recalculated.

Using molecular line lists, a computer program was written to calculate the bound-bound transition cross-section absorption coefficients for eight different molecular species, including C₂, CH, CN, CO, C₂H₂, HCN, H₂O and TiO. Molecular line lists, like H₂O, consist of hundreds of millions of lines of data that slow down the process of calculation. Since the frequency specific opacity is dependent on temperature, the molecular absorption coefficients must be calculated for each and every temperature. This project computed cross-sections computed for a range of temperatures, $\log T = 2.8 - 4.0$. Molecules were examined thoroughly at $\log T = 3.0$. This research allows for an update in mean opacity tables based upon each molecular species and its abundance. This would provide necessary improvements in the computation of mean opacity tables used in stellar interior models.

Normal Serum Lactate Values in Various Pediatric Populations: A Literature Review

Kendall Cole,*¹ Rachel Eldersveld*¹

Faculty: Sue Nyberg,¹ Gina M. Berg²

¹*Department of Physician Assistant, College of Health Professions*

²*Department of Family and Community Medicine, University of Kansas School of Medicine*

³*Wesley Medical Center*

Introduction: There are many causes for serum lactate to elevate, but literature and clinical practice predominantly focuses on elevated lactate signifying sepsis or septic shock. Elevated lactate levels indicate tissue hypoperfusion in sepsis; an early diagnostic marker that guides treatment. Currently, accepted normal serum lactate levels in children are ages 0-90 days: 1.1-3.5 mmol/L, ages 3-24 months: 1.0-3.3 mmol/L, and ages 2-18 years: 1.0-2.4 mmol/L.

Purpose: To investigate lactate values in various pediatric populations to determine if the accepted clinical lactate reference range accurately represents populations outside of the acutely ill child.

Methods: Utilization of Wichita State University SmartSearch tool that mines multiple databases including, but not limited to, Science Direct, CINAHL, MEDLINE, and Cochrane Library. Articles included between February 1, 1996 and November 1, 2017.

Results: Seventeen studies were identified and reviewed. Lactate values were elevated above normal in, exercising children, preterm infants, infants with low birth weight, and infants with trauma and hypoxia. Lactate levels in children with sepsis were not found to be globally elevated, but an elevated lactate in a child with a sepsis predicted a higher mortality.

Conclusion: One range of normal lactate does not accurately represent all populations that are non-acutely ill. Lactate in various pediatric populations compared to a normal population was found to be elevated. Causes for elevated serum lactate levels are not well studied or recognized outside of an acutely ill population. When evaluating serum lactate values, there should be consideration for variation in lactate level in the non-acutely ill population.

Music Teacher Beliefs and Classroom Environments

Kaitlin Exline¹

Faculty: Elaine Bernstorf,¹ Marlene Schommer-Aikins,² Steve Oare,¹ Carmen Lemoine¹

¹*Department of Music, College of Fine Arts*

²*Department of Educational Psychology, College of Education*

The purpose of this study was to examine what music teachers believe “should” be happening in their classrooms and what they say people “will see” happening in their classrooms, with regard to “informal music learning,” as defined by researcher Lucy Green (2008, 2016). In this mixed methods study, participants (N=79) completed an optional, twenty question survey ranking their beliefs and perceived classroom activities on a five- point scale. Using factorial analysis, the results suggested a relationship between teacher beliefs and their perceived classroom activities, especially with regard to student choice and the role of teacher planning for activities. Furthermore, the results suggested that teachers who have more flexibility in their classroom activities may be more open to informal learning practices.

Host-delivered RNA Interference May Confer Plant Resistance Against Charcoal Rot Disease

Heather Forster

Faculty: Bin Shuai

Department of Biology, Fairmount College of Liberal Arts and Sciences

Macrophomina phaseolina, the causative agent of the plant disease charcoal rot, impacts over 500 plant species, and causes devastating crop failures globally. It attacks plants primarily through fungus-infested soil. Once infected, plant tissues become clogged, leading to yellowing and death of the leaves. Traditional means of pathogen control, such as crop rotation and fungicides have proven ineffective or otherwise problematic. This study aims to evaluate using host-delivered RNA interference (HD-RNAi) to manage charcoal rot. HD-RNAi exploits the natural process of RNA interference found in many organisms and may provide a new path toward conferring plant resistance against *M. phaseolina*. In this process, small interference RNAs (siRNAs) are designed, manufactured, and incorporated into plant genomes, and can then enter invading fungus and prevent the expression of genes necessary for successful infection. HD-RNAi has been successful against some nematodes, insects, and other fungal pathogens. In the current study, we have identified ten genes as candidates against which to test the viability of HD-RNAi. The genes code for chitin synthase and β -1,3-glucan synthase, enzymes necessary for synthesis of major components of the fungal cell wall. We hypothesize that preventing the synthesis of chitin and β -1,3-glucan, which are needed when new fungal tissues are rapidly forming, can slow down the infection process. Preliminary assessment of gene expression indicates all ten genes are expressed in rapidly growing *M. phaseolina* tissue. These data will be used to develop siRNAs to test the effectiveness of HD-RNAi.

A Usability and Safety Study of Bone-Conduction Headphones During Driving while Listening to Audiobooks

Jasmine Granados,*¹ Matthew Hopper²

Faculty: Jibo He¹

¹*Department of Psychology, Fairmount College of Liberal Arts and Sciences*

²*Department of Communication Sciences and Disorders, College of Health Professions*

Bone-conduction technology has been around since the 1800s but using this technology in headphones is relatively new. Bone-conduction transmits sound through the bones of the skull. This research compared the effect of different auditory input methods (bone-conduction versus traditional air-conduction) on driving performance, story comprehension, and subjective workload. Results showed that auditory input method did not significantly affect driving performance or story comprehension. This supports one of the hypotheses that bone-conduction headphones are no more distracting than air-conduction speakers. There were significant differences in workload between driving conditions compared to non-driving conditions but, there was no difference in workload between bone conduction headphones in driving conditions. Bone-conduction headphones do not impair story comprehension and may leave the ear canal open making it a viable option for use while driving.

My Plan: Family Planning Health Promotion Project

Emily Arbuckle,^{1*} Chloe Hadley,^{1*} Christina Powell,^{1*} Natalya Weber^{1*}

Faculty: Nikki Keene Woods²

¹*Department of Physician Assistant, College of Health Professions*

²*Department of Public Health Sciences, College of Health Professions*

Introduction: The rate of unintended pregnancy and infant mortality in Sedgwick County is among the highest in Kansas despite efforts to reduce pregnancy rates among adolescent females. Comparable urban communities reported successes in decreasing teen births and unplanned pregnancies by increasing access and utilization of LARC (long-acting reversible contraception).

Purpose: As part of a larger community-based effort, the “My Plan” health promotion project was developed to promote access, education and utilization of existing LARC services in the community.

Methods: The project prioritized women of low income, minority, less than 30 years of age, and sexually active with men. In the first year, the project developed a text-for-information number and a website with educational and resource information. Forty-five businesses across multiple sectors and geographic locations agreed to promote “My Plan” including barbers, gas stations, local libraries, apartment complexes, mental health providers, etc. A social media presence was also developed. This project created the collaborative foundation to improve birth outcomes and reduce health disparities.

Results: Our preliminary data showed that for the first six months we had 676 website visits. The text-for-information had 37 subscribers--with more anticipated as word of the project continues to spread.

Conclusion: My Plan has developed a base of community awareness of LARC in Sedgwick County. With additional health promotion efforts (local city bus, etc), a continued increase in subscribers is anticipated. The long-term health benefit is expected to be a decrease in unintended pregnancy and infant mortality.

Validity and Reliability of Step Count Measures Using a Wrist Worn Activity Tracker During Treadmill Walking

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INTRODUCTION: Wearable technology devices are becoming increasingly popular. Many of these devices offer features allowing users to monitor physical activity levels through the reporting of step-count. However, as many different types of activity monitors are widely available, it is necessary to examine the validity of each.

PURPOSE: To determine the validity of step-count measures reported by the IP65 activity tracker compared to direct observation.

METHODS: Eighteen subjects (25.2±3.8 years) volunteered to participate in this study. Anthropometric measures (height, weight) were recorded on each subject. Each subject was fitted with an IP65 activity monitor on their right wrist and instructed to complete a 5-minute warm-up on the treadmill, walking at a self-selected pace. For the testing protocol, subjects were instructed to walk on the treadmill at a self-selected moderate pace for 5-minutes. Step-count data was concurrently recorded from the IP65 activity monitor and via direct observation during the final 3-minutes of the protocol.

RESULTS: Paired sample t-test indicated a statistically significant difference between mean step counts reported by the IP65 device and via direct observation ($p=0.007$) with a mean absolute error of 12%. Pearson correlation coefficient indicated a positive moderate correlation between the measures ($r=0.52$). However, a weak concordance correlation coefficient was observed ($R_c=0.26$).

CONCLUSION: The IP65 activity tracker significantly underestimated step-count when compared to direct observation. It is possible that this resulted from the location of the device on the body; as it is worn on the wrist, step-count measures may be impacted by arm movement.

The Risk of Recreational Trampoline use in the Pediatric Population: A Retrospective Study

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INTRODUCTION: Indoor recreational trampoline parks are increasing in number across the US and with this trend has come an increase in trampoline related injuries. Extensive research has been conducted dating back to the introduction of trampolines; however, with the emergence of trampoline parks, few studies have been done to evaluate the risk to the pediatric population in this new setting.

PURPOSE: The purpose of this study is to provide insight into the risks of trampoline parks and home trampolines by identifying common injuries associated with recreational trampoline use in the pediatric population.

METHODS: A retrospective medical record review of pediatric patients presenting to one urban emergency department from October 1, 2015 to December 31, 2016, was completed. Extracted information included weight, height, sex, mechanism of injury, type of injury, location of trampoline, disposition of care, diagnostic studies used, and treatment required.

RESULTS: Of the 173 children seen in the ED for trampoline-related injuries that met the inclusion criteria, 46% suffered a fracture, 15% required procedural sedation and/or surgery, and 65% required follow-up care with a primary care physician or orthopaedic surgeon. The most common injuries occurred in the lower extremity with 17% of all visits involving treatment for a fracture of the tibia.

CONCLUSION: The data collected emphasizes the risk to children with recreational trampoline use. It may assist in improving regulations and safety protocols at trampoline parks and help healthcare providers guide parents on safety issues of trampoline parks and home trampolines.

Implementation of an Early Mobility Protocol in an Intensive Care Unit

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INTRODUCTION: Early mobility is recognized as an important intervention to avoid adverse outcomes in intensive care unit (ICU) patients, although only about one-half of ICUs have adopted early mobility programs.

PURPOSE: This quality improvement project evaluated outcome data before and after an early mobility protocol was implemented in a 26-bed ICU at one hospital.

METHODS: Data was extracted from the medical record, 6-weeks before and 6-weeks after protocol implementation to evaluate changes in outcomes. Data was extracted from 50 randomly selected patients in the ICU at each time period, and aggregate data derived for hospital length of stay (LOS), ICU LOS, number of days on mechanical ventilation, and out of bed activities. Data was analyzed using descriptive statistics and independent t-tests

RESULTS: The primary findings indicate that implementation of a mobility protocol increased mobility activities and resulted in decreased hospital LOS, and slight improvement in ICU LOS and days on mechanical ventilation. Although not statistically significant, these findings are clinically relevant. Mobility activities increased from 13 to 64, illustrating that the protocol was successful in increasing patient mobility.

CONCLUSION: Protocol implementation improved patient mobility, although ongoing evaluation of the protocol related to patient outcomes is recommended. These results lay the foundation for establishing mobility teams, incorporating early mobility protocols, and decreasing the stigma of mobility in mechanically ventilated patients, with a goal of improving patient outcomes and quality of care. Ongoing staff support is needed to continue this practice change, overcome any barriers, and facilitate positive outcomes for ICU patients.

Cases Over the Lifespan of Patient Penny Adams

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INTRODUCTION: A patient's medical record is a transcription of events having occurred in relation to one's health, including previous office visits, diagnoses, hospitalizations, screening and diagnostic test results, procedures, and treatment records. Healthcare providers are expected to document each encounter properly and utilize previous records to guide treatment.

PURPOSE: This project gives physician assistant students the opportunity to apply medical knowledge to practical case scenarios and to utilize the various components of a patient's chart to ensure comprehensive care for the patient.

METHODS: Students will receive the medical record of Penny Adams, which includes pertinent information needed to complete each case. Throughout their didactic year, six case scenarios are presented, each including assignments related to various aspects of the medical record. As Penny ages, new documentation is added to her medical record. Each scenario pertains to the current student's course topics, including preventive medicine, dermatology, endocrinology, obstetrics/gynecology, musculoskeletal, and neurology. Case assignments involve documenting patient encounters, developing assessments and plans, writing progress notes and admission orders, and discussing end of life care. Additionally, students can review the cumulative chart to ensure milestones are met, medications are appropriate, and vaccinations and preventive screenings are up-to-date.

EXPECTED OUTCOMES: This project was created due to a gap in the current curriculum and will serve as "positive risk taking" to enhance the PA curriculum. By completing these assignments, students are able to gain experience using proper medical documentation to become better prepared for patient encounters during the clinical year. Initial student feedback will become the first control group for future adaptations.

Analysis of Electromyographic Activity of Ankle Muscles on Unstable Surface with Eyes Open and Closed When Barefoot, Wearing Tennis Shoes, and Vibram Shoe Wear

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INTRODUCTION: Footwear affects the body's ability to maintain balance on an unstable surface. Vibram FiveFingers (VFFs) claim to be a method of transition between athletic tennis shoes and barefoot style running. However, no research has been done using this footwear under dynamic balance conditions.

PURPOSE: The research study's purpose was to analyze the electromyographic (EMG) activity of selected ankle and hip musculature in response to perturbations during bipedal stance with eyes closed and single leg stance with eyes open while barefoot, wearing tennis shoes, and VFFs.

METHODS: Twenty participants (18-35 years), without lower extremity injury or vestibular pathologies were tested for reactive balance conditions on the Posturomed® with eyes closed during bipedal stance, and eyes opened during single leg stance while wearing VFFs, tennis shoes, or barefoot. Three trials of 10 seconds in two directions of perturbation for each type of footwear were completed. Four repeated measures of variance with Bonferroni's correction were used to analyze the EMG muscle activity.

RESULTS: No differences in EMG activity were found between the three types of footwear in any condition.

CONCLUSION: The results did not confirm the hypothesis that participants who are mechanically perturbed will reveal greater ankle and hip musculature activation via EMG recordings when they are barefoot, followed by VFFs, and lastly tennis shoes. Since there were no significant differences between any of the footwear conditions, this study suggests that during reactive balance activities the type of footwear has no effect on the ankle and hip muscle activation in this demographic.

Mission Possible: Diversity of Diseases for International Healthcare Workers

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The diversity of communicable illnesses across the globe spans a wide range of organisms including bacteria, parasites, and viruses. Learning the multifarious and complicated paths of transmission, presentation, and treatment can be quite difficult to manage for the new international healthcare worker, especially while attempting to learn about regional differences and needs in foreign healthcare. The purpose of this research is to consolidate and concisely represent the most prevalent and deleterious conditions affecting people across the globe. The top five worldwide communicable diseases creating a major health burden will be covered, as well as two diseases in each of several select regions that would be commonly seen during medical mission work. These regions were chosen as the most frequently labored-in areas for international healthcare workers and include: Latin America, South America, Africa, and Southeast Asia. The combined areas represent the countries most visited and in need of healthcare aid. The most prevalent diseases and conditions in these areas are detailed as an introductory reference for the international healthcare worker.

Changes in Bilateral Coordination in Males and Females 8-21 Years With Intellectual Disabilities

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In typically developing youth (TDY) there is a clear developmental acquisition of bilateral coordination proficiency (BLC; i.e., synchronized arm and leg movements) from ages 4 to 21 yrs. That is, BLC capacities reach 88% proficiency by age 10, then gradually increase to full capacity by age 21. The purpose of this study was to determine if this trend is true for male and female youth with intellectual disability (ID). The Bruininks-Oseretsky Test of Motor Proficiency (BOT-2) is widely used for evaluating motor proficiency in children and adolescents. Participants (135 males, 85 females) with ID were divided into five age groups: 8-10 yrs; 11-12 yrs; 13-14 yrs; 15-16 yrs; and 17-21 yrs. Six test items for BLC from the BOT-2 were used to measure BLC capacities: BLC-1, touching nose with fingers, eyes closed; BLC-2, jumping jacks; BLC-3 and BLC-4, jumping in place, same sides and opposite sides synchronized, respectively; BLC-6 and BLC-7, tapping feet and fingers, same sides and opposite sides synchronized, respectively. To normalize subtest items scores for comparative purposes, all raw scores (jumps, touches, and taps) were converted to percent of test score ceiling (% of expected score). For males, the younger groups (8-10 yrs, 11-12 yrs) scored significantly lower than the three older groups. Similar results were seen for females. For both sexes, mean scores for each age group ranged from 15-35% below that expected for TDY. Results indicate that although %Ceiling scores were lower than TDY, youth with ID display a similar developmental acquisition of motor proficiency.

PROPOSED METHOD FOR CLEAN WATER BY ADDRESSING NITROGEN CONTRBUTION TO SURFACE WATER CONTAMINATION

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Kansas has serious issues as the result of bio-waste generated by livestock feedlots. The Environmental Protection Agency (EPA) has documented the situation as early as 2004. Action on these issues has languished due to a lack of potential economical solutions. The EPA reports that antibiotics used as growth stimulants and for improved health have the potential of creating superbugs. Large numbers of livestock amassed in a single location produce an enormous amount of waste daily. The stockpiles of manure harbor nitrogen in the form of ammonia that can pollute surface and ground waters before the dried manure is spread on crop lands. The liquid waste ammonia can potentially enter the water shed and stimulate algae growth in surface water. Ammonia that seeps into ground water causes issues with nitrogen pollution of the ground water supply. The proposed solution is economical and will eliminate multiple EPA concerns of surface water and ground water pollution. Eliminating the ammonia migration would improve Kansas State Water quality (both surface and ground). This proposed solution would be to treat the waste via a two-step process. First the ammonia is isolated and then the remainder of the biosolid would be converted into crude oil via hydrothermal liquification (HTL). The HTL process would sterilize all biological components in the waste. The ammonia would provide power for the HTL process with possible excess power that would be considered carbon free electricity. The bio crude would also be considered Zero Carbon fuel since it is produced from recycled carbon.

Development of a Corrosion Protection System for Aluminum Alloys and Evaluation of System's Effectiveness

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Even with advances in the prevention of corrosion the cost of corrosion to the US economy is over a \$1 trillion in today's dollars. Research into new more effective corrosion control methods is imperative. Of the different types of corrosion, galvanic corrosion is the most common and the most destructive. This research investigates the superhydrophobic coating to provide mitigation of the galvanic corrosion mechanism in aluminum alloys. A superhydrophobic coating was developed by creating a micro-nanostructure hierarchical morphology using micro-sized and nano-sized metallic particles with a silicone component. Then the coating was shown to have an average water contact angle (WCA) of 158° with a hysteresis of 4.05° with a 7.6% hysteresis. Durability of the coating was tested with acetone, and an acid solution which had no effect on WCA and but a base lowered the WCA considerably. The corrosion mitigation of the coating was determined by comparing electrochemical testing of coated specimens and with testing of the bare aluminum materials. The coating was effective in significantly lowering the corrosion rates of the coated specimens compared to the bare aluminum as shown in Figure 1(a). The corrosion current shifted significantly more anodic as seen in Figure 1(b). The corrosion properties for the coated aluminum as well as the weld material were significantly improved over the bare material.

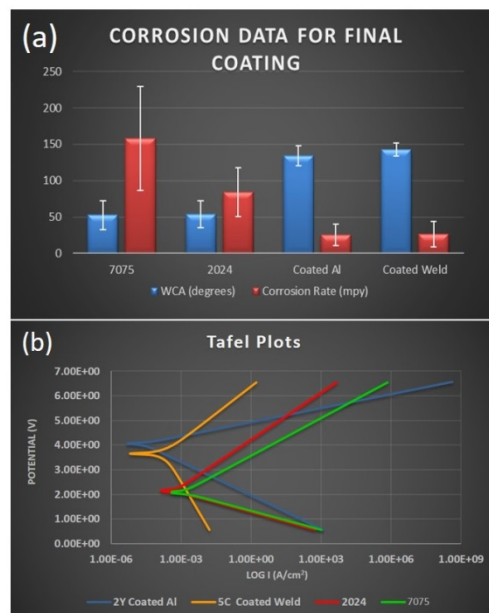


Figure 1(a) Corrosion rate data for final coating (b) Tafel plots of polarization data from corrosion testing.

The Importance of Aphasia Therapy: A Retrospective Study

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INTRODUCTION: Stroke or cerebrovascular accident (CVA) is the third most common cause of death in the United States. 30-35% of these stroke survivors have aphasia. Aphasia is an acquired language disorder, which has a neurological cause, affects reception and expression of language across modalities. Global aphasia is associated with multiple areas of the frontal, parietal, and temporal lobes of the brain. Persons with global aphasia exhibit a combination of expressive and receptive language deficits in all modalities.

PURPOSE: The purpose of this study was to explore the progress of a small group of persons with global aphasia after a year of therapy at WSU's Evelyn Henderson Cassat Speech-Language-Hearing Clinic.

METHODS: The data for this study were collected from the Cassat Clinic. Four clients diagnosed with global aphasia were selected randomly. Initial and final measurements in expressive, receptive, and functional communication skills were collected from each client's file. Personal information about the clients included age, sex, marital status, and family support to analyze the data. The baseline data were compared to the data or progress after a year or two semesters of therapy at the clinic.

RESULTS: The collected data showed the progress of clients in particular goals. New goals were added if client achieved progress or the cuing was reduced depending on progress.

CONCLUSION: Explorations like this one can increase public awareness about global aphasia and the importance of aphasia therapy.

Living Loud: Is Nickelodeon's "The Loud House" the Next Cartoon for Young Feminists?

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Children's programming has gone through some drastic changes over the years as animation technology has improved and as cultural norms have shifted. Female cartoon characters are portrayed in roles today that they were not in the early years. The purpose of this pilot project is to examine how female characters are portrayed in the currently popular children's cartoon, *The Loud House*. Using feminist theory as a foundation, this content analysis looks at twelve segments from two different seasons of the show to explore ways in which gender roles are illustrated among the thirteen main characters. This project examines ways in which certain characters do breakdown gender stereotypes but at the same time uphold them. With a cast that is heavily dominated by females, it might be easy to think that *The Loud House* could be the next cartoon for young feminists, but the findings here dispute that idea.

A Multidisciplinary Fall Prevention Program for Community-Dwelling Older Adults: A Pilot Study

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INTRODUCTION: Falls in older adults are a costly, common, yet preventable public health concern. Falls are the leading reason for injury among for older adults, and each fall threatens physical and emotional health and independence. This study questioned the effects of a fall prevention program utilizing an Advanced Practice Registered Nurse (APRN) and paramedic in Newton, Kansas.

PURPOSE: The purpose of this study was to evaluate the impact of a multidisciplinary fall prevention program for older adults who fell or were at risk of falling.

METHODS: Informational flyers were posted; 20 seniors were recruited. Baseline characteristics were collected. Participants completed several fall-related assessments, received education on a home exercise routine, and permitted a home safety inspection by the paramedic. The APRN followed-up in 4 weeks.

RESULTS: Fifteen females enrolled, and the mean age was 80. Eleven fell before enrollment. One fell during follow-up. Those who fell had more illnesses $t(18) = 3.015, p = .007, d = 1.348, CI 95\% [.267, 3.663]$; took more medications $t(18) = 2.449, p = .025, d = 1.095, CI 95\% [.609, 7.956]$; and used acute healthcare services more often $t(12) = 3.808, p = .002, d = 1.794, CI 95\% [1.078, 3.932]$. The number of home safety modifications was significant, $t(19) = 3.603, p = .002, d = .806, CI 95\% [.524, 1.976]$. While not significant, those who fell before enrolling also exercised more and reported increased quality of life.

CONCLUSION: Multidisciplinary collaboration resulted in increased intervention opportunities while utilizing existing resources. Fall risk assessments can easily be incorporated across the healthcare continuum. Future multidisciplinary efforts should be targeted towards those who have fallen, have multiple chronic illnesses, have modifiable home-safety factors, and tend to use healthcare services more frequently.

Exploring the Role of Linker Region and Ig4 on the Activity of Palladin Ig34 Tandem Domain

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The protein palladin is a known regulator of the actin cytoskeleton and acts as an actin scaffold due to its ability to bind multiple actin-binding proteins. This grants palladin a key role in regulating actin rearrangement—a key step in cancer metastasis. While the Ig3 domain of palladin confers its actin-binding activity, previous studies have shown that the tandem Ig34 domain has increased actin binding and bundling activity compared to Ig3 alone. While Ig3's activity is known, there is little information on the role of the 34linker region and Ig4 on this enhanced activity. Since other sarcomeric proteins' function have been linked with their linker region length, we created several Ig34 constructs with shortened 34 linker sequences. We also made mutants where the Ig34 linker region or the Ig4 domain was replaced with the Ig45 linker region or Ig5 domain, respectively, to probe the function of both. Our results show that shortening the 34linker region decreases the binding affinity to actin but improves its bundling activity. Also, preliminary results show that replacing the Ig4 domain with Ig5 severely depleted Ig3's ability to bind actin. We hypothesize that Ig5 binds to Ig3 and blocks its actin-binding function, which we hope to prove in future assays. These results will improve our understanding of the role of palladin in actin cytoskeleton dynamics and eventually lead into developing inhibitors of this key step in cancer metastasis.

Comparison of the Machining Behavior of Additively Manufactured IN 625 and Cast Wrought IN 625

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Additive manufacturing has recently gained momentum as new technologies have made possible three-dimensional (3D) printing of functional parts; especially in the aerospace sector, where intricate parts fabricated from superalloys are demanded. The strength of the additive materials may be larger than the strength of conventional counterparts. Ductility and resistance to fracture tend to be lower in additive materials compared to conventional materials. Furthermore, surface finish and dimensional accuracy are difficult to control directly from 3D printing. For these reasons, hybrid-processing involving finishing by machining are required; but the behavior of the additive materials during machining is not known. This research aims at closing this knowledge gap by initiating comparisons between the machining behavior of additively manufactured (AM) and cast-wrought (CW) superalloy IN 625. An experimental study of the velocity field that develops within the primary shear zone (PSZ), and the resulting machining force and chip morphology has been carried out to compare the machinability of these two materials. An ultra-high speed imaging system was used to capture 8 sequential images at a frame rate of 200 KHz. The velocity field was obtained by digital image correlation (DIC). Forces were recorded using a piezoelectric dynamometer. Chips were observed by 3D profilometry. While differences in forces were not resolvable, there were substantial differences in strain rate and chip morphology. The strain rate from AM IN 625 was lower than that from CW IN 625. In the case of CW IN 625 full serration across the width of the chips indicated adiabatic shear banding. In the case of AM IN 625, partial the serration patterns indicated that material failure was still operative, but it did not result from adiabatic shear banding. The implications of these mechanistic effects are being correlated to economically relevant outputs such as machine tool vibrations, and tool temperature and wear.

Early Mobility in the Intensive Care Unit: Evaluation of a Mobility Protocol and the Effect on Patient Outcomes

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INTRODUCTION: Intensive care unit (ICU) interventions for early rehabilitation are linked with decreased length of stay (LOS) and days on mechanical ventilation (MV), as much as 47%, and is safe and well-tolerated by patients. Early mobility protocols focus on rehabilitation from the onset of critical illness, yet protocol adoption is inconsistent.

PURPOSE: This project evaluated the implementation of an early mobility protocol to increase mobility in ICU patients, and to decrease ICU LOS, hospital LOS, and days on MV.

METHODS: A descriptive, retrospective design was used, 6-weeks before and after protocol implementation, using aggregate medical record data for LOS, MV, and mobility activities. The protocol was an evidence-based tool to transition patients from supine to an upright ambulating position. Data was analyzed using descriptive statistics and independent t-tests.

RESULTS: The sample included 50 individuals before (mean age 65 ± 15) and 32 after protocol implementation (67.1 ± 12.53). Hospital LOS was greater before protocol implementation (11.42 ± 13.10) compared to afterwards (8.75 ± 5.86), and similar for other variables. Two outlying cases were removed for hospital LOS and data reanalyzed. There were non-significant differences for decreased hospital ($t=0.301$, $p=0.76$) and ICU LOS ($t=0.642$, $p=0.52$), and days on MV ($t=0.351$, $p=0.727$). The number of active mobility activities improved slightly from 2 activities pre- to 4 activities post-protocol.

CONCLUSION: Use of a mobility protocol is an important intervention, but staff support is key to a successful practice change. Recommendations for future projects include a longer timeframe for key variables, and further education and support of nurses for the practice change.

The Reliability and Validity of a Luggage Scale for Gluteal Strength Measurements

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BACKGROUND: The most commonly used clinical method for measuring gluteal muscle strength is manual muscle testing (MMT). This method is subjective and lacks reliability and specificity. An alternative, objective tool to measure muscle force is a handheld dynamometer (HHD), but its cost limits its use in the clinical setting. No research has been done on cost-efficient alternatives for measuring gluteal strength.

PURPOSE: To determine the reliability and validity of a luggage scale compared to a HHD for measuring gluteal muscle strength.

METHODS: Hip extension and abduction strength of thirty-one healthy males and females aged 18-35 years was tested using a HHD and luggage scale. Subjects performed three repetitions of maximal voluntary isometric contractions for each muscle group using each measurement tool. Testing procedures were repeated after fifteen minutes of rest by a second examiner.

RESULTS: The luggage scale exhibited similarly high intrarater and interrater reliability compared to the HHD. Intrarater reliability was 0.97 and 0.97 using the luggage scale and 0.95 and 0.98 using the HHD for hip extension and abduction strength, respectively. Interrater reliability was 0.83 and 0.96 using the luggage scale and 0.85 and 0.95 using the HHD for hip extension and abduction strength, respectively. Moderate correlation between the luggage scale and HHD was found for hip extension strength (0.68), while high correlation was found for hip abduction strength (0.93).

CONCLUSION: The luggage scale is a reliable, valid, and cost-efficient clinical tool for measuring hip extension and abduction strength.

Analysis of 1-Methyl-4-Phenylpyridinium Derivatives in *Caenorhabditis elegans*

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Parkinson's disease (PD) is a neurodegenerative disease that affects more than 10 million people worldwide and costs 25 billion dollars in the United States alone. Despite its notoriety, the etiology of PD not fully understood. Parkinson's is characterized by the loss of dopaminergic neurons in the substantia nigra and results in disrupted motor movements such as trembling and shaking. Currently, there is no cure for the disease and current treatments are mostly used to reduce the symptoms. The rate of PD seems to be on the rise and currently the disease is believed to be associated with environmental factors. A synthetic chemical 1-methyl-4-phenylpyridium (MPP⁺), has been extensively used as a model for environmental/chemical causes of PD. Chemicals structurally similar to MPP⁺ were tested in our lab and have been shown to be selectively toxic to dopaminergic cells within *in vitro* models. Additionally, they also seem to utilize a similar mechanism of action. To validate the physiological significance of these *in vitro* model findings, parallel sets of experiments should be done in an *in vivo* system. *Caenorhabditis elegans* has been used as an *in vivo* or live animal model for a variety of diseases due to its ease of use and genetic malleability. In the present study we show that these chemicals cause similar damage to dopaminergic neurons parallel to MPP⁺. The structures of these chemicals will lead to new insights on how the disease is progressed as well as development of preventative and treatment strategies of PD.

Waste Water Treatment using Food Waste, Clothes and Algae Briquettes after Activation and Carbonization Processes

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Clean drinking water is one of the biggest issues in the world, and will be the most studied subject along with food in the near future. Some of the fresh water sources are contaminated with Sulfur, Nitrogen, Phosphorous and other organic and inorganic contaminants. Desalination is a solution to this waste water problem, but it is costly and time consuming process. Objective of this study is to develop a cheaper and sustainable process for cleaning lake and other drinking water sources. In this study, algae, clothes, waste papers and fruit wastes, such as date and olive seeds were used to produce activated carbons. These materials were briquetted under high pressure using different amount of molasses as binder. Date and olive seeds were crushed, sieved and dried prior to the briquetting process. Chemical activation of the briquettes and seeds were performed using zinc chloride ($ZnCl_2$) and calcium hydroxide ($Ca(OH)_2$). After the chemical activation, carbonization in inert atmosphere was performed to prepare the proper samples. The pH adjustments were applied after the chemical activation and carbonization processes. Additional, Brunauer-Emmett-Teller (BET) and scanning electron microscopy (SEM) tests were performed to determine the surface area, morphology and porosity of the produced activated carbon. This technique is a promising technique to clean waste water. Activated carbons are expected to remove nitrogen, phosphorus, sulfur and other contaminates from the waste water.

The Effectiveness of Thoracic Spine Manipulation Therapy on Shoulder Pain, Range of Motion, and Muscle Strength.

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Faculty: Robert Manske

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Thoracic spinal vertebra have recently been thought to be a potential cause of shoulder pain. The purpose of this study was to determine the effects of thoracic spine manipulation on shoulder pain, range of motion (ROM), and muscle strength. Measures were assessed using a visual analog scale, standard goniometer and Lafayette Manual Muscle Testing System. Participants were divided into two groups; those with and those without shoulder pain. Each group was further subdivided into either a manipulation or sham manipulation group using simple random sampling without replacement. Measurements were taken pre-manipulation, immediate post-manipulation, and one-week post manipulation. Thirty subjects (21 females, nine males) with an average age of 24.9 (\pm 5.3) years participated in the study. Eleven subjects reported pain in one or both shoulders while 19 subjects reported no pain. No individuals reporting pain had pre-existing shoulder pathologies. The reduction of pain, change in ROM, and change in strength were all shown to be insignificant ($p > .05$) both immediately and one week following the manipulation or sham manipulation. Although the results did not statistically prove the value of a thoracic manipulation, further research is needed to determine if specific shoulder pathologies might respond to a thoracic manipulation.

Influencing Organizational Policy to Address Gender and Sexual Minority Health Disparities and Inclusivity Within the Healthcare Delivery System

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PURPOSE: According to the Health Equity Index (Human Rights, 2016), only 3 hospitals in Kansas were determined as leaders for health care equity. All 3 facilities are in the north area of Kansas, closer to Kansas City and therefore inaccessible for many gender and sexual minorities residing in Wichita, KS. The recent index has motivated the LGBT Health Coalition to ensure that other facilities are determined as healthcare equality leaders; however, it has been difficult to create broader positive changes that ensure safe spaces for LGBT patients.

METHODS: In a collaborative effort with the Wichita LGBT Health Coalition, Human Rights Campaign, George Washington University, and Wichita State University, the study consisted of interviews with medical students and physician assistant ($n=8$) and medical administrators ($n=9$) to identify what barriers exist for healthcare facilities in the Wichita area to become health equality leaders. In addition, interviews will be conducted with sexual minority women and gender minorities ($n=13$) to gain insight into their experiences in healthcare within Wichita. The study used an iterative analysis; The research team will alternate between finding emerging themes of the data similarly to grounded theory (Glaser & Strauss, 1967), but in addition, using the etic of existing theories (Srivastava & Hopwood, 2009). In this case, the minority stress model (Meyer, 1995) and the ecological model (Eliason, & Fogel, 2015) and the cultural competence model (Betancourt, Green, & Carrillo, 2002).

RESULTS: Findings include lack of healthcare access that caters to gender and sexual minorities, how the gender and sexual minority community disseminates resources and advice related to health, and a lack of LGBT health related support for medical administrators and health professional students.

CONCLUSION: Although there have been strong efforts in creating a safety net for gender and sexual minorities, there is room for improvement, especially when the community distrusts religious based healthcare services. In addition, medical administrators want to do more for this population but has not found support or data to justify investing in improved inclusive-related policies and practices. Recommendations for policies and initiatives for the City of Wichita will also be discussed.

Supplier Assessment Process for a Manufacturing Firm

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In the global supply chain, appropriate and sustainable suppliers play a vital role in supply chain development and feasibility. In any big organization with many suppliers, it is necessary to divide suppliers based on their track-record for supplier development program and new product development. Since the performance of any organization to a large extent depends on their suppliers' performance, well evaluated selection criteria and, decision-making models which lead to improved supplier assessment and development is necessary. In this paper, SCOR[®] performance evaluation approach and ISO standards are used to determine selection criteria for better utilization of supplier assessment by using a hybrid model of Analytic Hierarchy Problem (AHP) and Techniques for Order Preference by Similarity to Ideal Solution (TOPSIS). AHP has been used to determine the global weightage of criteria that helps TOPSIS to get the suppliers' performance score. The qualitative criteria are taken into consideration for supplier assessment process. The hybrid model and solution approach are tested with the case study of five suppliers for a manufacturing firm. The detailed analysis shows the superiority of proposed model over other solutions which considered individual decision-making models.

Disability Scores in High-Risk Pregnant Women

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INTRODUCTION: Currently, minimal research exists that demonstrates how pregnancy is related to level of disability.

PURPOSE: Because of the common practice to prescribe bed rest to pregnancies classified as high-risk and the known effects of prolonged bed rest, this study aims to determine if there is a significant difference in disability scores between high-risk and non-high-risk pregnancies.

METHODS: Pregnant women (n= 70) with a mean age 29.9 years and 26.1 weeks gestation completed a survey pertaining to neck and back pain, the Neck Disability Index (NDI), and the Modified Oswestry (MO) during regular obstetric check-ups.

RESULTS: 17.1% of participants reported as high-risk and 82.9% reported non-complicated pregnancies. Results of a Kruskal-Wallis test revealed no significant difference in MO scores between the high-risk group (n=12, mean 19.6) and non-high-risk group (n=58, mean 15.4), (F=.092, p=.761), or in NDI scores with high-risk group (n=12, mean 24.6) and non-high-risk group (n=58, mean 16.6), (F=1.168, p=.280).

CONCLUSION: There appears to be some difference in the levels of disability measured by both neck and back pain for women who are classified as high-risk compared to those who were not; however, the limited sample size prevented the study from showing a statistically significant difference between the two groups. In conclusion, further research is needed to better determine if high-risk pregnancies cause increased pain and/or disability than non-high-risk pregnancies and to suggest appropriate interventions to address disability.

Cryptogenic Stroke due to Undiagnosed Paroxysmal Atrial Fibrillation Implementation of a Discharge Plan

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Introduction: Strokes with an underlying cause of atrial fibrillation (AF) are more likely to be more detrimental due to its risk for recurrence, disability and mortality (January et al., 2014; Miller, Andersson, Kalra, 2005, Kannel et al., 1998). Ischemic strokes occurring due to undetermined origin are diagnosed cryptogenic per The Trial of Organization 10172 in Acute Stroke Treatment (TOAST) criteria (Adams et al., 1993). Recently, the term cryptogenic stroke has changed to Embolic Stroke of Unknown Source (ESUS) (Hart et al., 2014).

Purpose: The purpose of this project was to evaluate current discharge practices of cryptogenic stroke patients in the Midwest.

Methods: Data regarding discharge was retrospectively collected from a Comprehensive Stroke Center in the Midwest using the 2016 Get with Guidelines Stroke Registry and electronic health record. Specific information captured included patient demographics and discharge information from eligible patients.

Results: There were 24 patients that met the cryptogenic stroke criteria and received proper stroke workup. The majority of patients were male, less than 64 years, white, not Hispanic, and frequently discharged without additional monitoring recommended. CHA₂DS₂-VASc scores were not computed and recorded in any of the patients EHRs' and many were found to have a CHA₂DS₂-VASc score ≥ 2 .

Conclusion: The authors developed an Ischemic Stroke Flowchart to assist practitioners in ensuring that guideline based stroke care is provided and to improve outcomes of cryptogenic patients.

Health Literacy and Medication Adherence: A Quality Improvement Project for Heart Failure Patients

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INTRODUCTION: Low health literacy results in worse outcomes and underutilization of preventative health care. In the United States 5,800,000 people have been diagnosed with heart failure (HF), with \$20.9 billion spent in 2012, and 80% on hospitalizations. Studies show that low health literacy in HF resulted in a 34% greater risk of death, and addressing health literacy as important.

PURPOSE: The purpose of the project was to identify HF patients with low health literacy, and to evaluate the effectiveness of printed educational materials and a short educational session tailored to the patient's specific medication regimen to increase medication knowledge.

METHODS: A descriptive, pre- post-test design was used with HF patients referred to a Transitional Care Clinic. At baseline, health literacy and HF knowledge were assessed, followed by tailored HF medication education, using teach-back to clarify misunderstandings and reinforce education, and printed materials. Those with low health literacy received a pictorial pill card. A 2-week, post-intervention follow-up evaluated medication adherence and HF knowledge.

RESULTS: Two of 17 participants had low health literacy. Knowledge significantly improved post-intervention, although it was unclear if education affected medication adherence. Significant barriers to medication adherence were: remembering to take medications (n=5), forgetting medications when traveling (n=2), inconvenience (n=3), and cut back/stopped due to feeling worse (n=1).

CONCLUSION: Face-to-face education and teach back increased knowledge, although the impact on adherence was unclear. Literacy assessment, face-to-face education with teach-back, and interventions to decrease barriers to medication taking are clearly important for nurses to address with HF patients.

Learning Robotic Grasping Strategy Based on Natural-Language Object Descriptions

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Given the description of an object's physical attributes, humans can determine a proper strategy and grasp an object. Accomplishing a similar feat with robotic hands is considerably challenging despite significant progress in robotics technology. Most objects of daily use are designed for human manipulation. It follows then that, humanoid robotic hands need to emulate human grasps and use a learning-based approach to learn to grasp and manipulate such objects.

This paper proposes an approach to determine grasping strategy for an anthropomorphic robotic hand simply based on natural-language descriptions of an object. An artificial neural network(ANN) based learning-based approach is proposed to help a robotic hand learn suitable grasp poses starting from the natural language description of the object. Object features such as shape, size, rigidity and mass are parsed from natural-language descriptions of everyday objects using a customized natural-language processing(NLP) technique. Based on the parsed features, the most likely human-like grasp type for the given object is learned from the human grasping taxonomy using a neural network classifier. The grasping strategy generated by the proposed artificial intelligence model is evaluated both by simulation study and execution of the grasps on an AR10 robotic hand.

Effects of Spinal Deviations From Frontpack or Backpack Loading

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INTRODUCTION: Humans use backpacks in everyday life for reasons including carrying school supplies, military or work-related uses. Carrying loads on the back can cause changes in posture and muscle activation resulting in pain or long-term spinal deviations. Awareness of the effect of frontpack loading compared to backpack loading is important to understand the effect they have on spinal deviations in college-aged individuals.

PURPOSE: The purpose of this study was to investigate the effect that backpacks cause on spinal deviations and compare it to frontpack loading in college-aged (students who are 18-30 years old) individuals.

METHODS: A randomized controlled trial (RCT) using a sample of convenience was conducted to determine the influence of spinal deviations due to backpack loading compared to frontpack loading among 24 healthy college-aged individuals. A timed trial of the subjects walking on a treadmill with frontpack and backpack loading was completed using the Owl Digital RealTime System which records and calibrates motions of the subjects in real time. Data regarding spinal deviations was captured by digital cameras with 640 x 480 resolution recording reflective markers placed on the subjects. In addition to spinal deviations, muscle activity was also recorded during the study using a 16-channel electromyography (Trigno™ Wireless EMG System Delsys, Inc., in Natick, MA.).

RESULTS: There was no significant difference found between spinal deviations of cervical angles during controlled frontpack and backpack ambulation. A significant difference in spinal deviations was however found between thoracic angles during controlled frontpack and backpack ambulation. While a difference of 9 degrees in thoracic spinal angle variance was observed, a 9 degree difference is not clinically relevant.

CONCLUSION: While no clinical difference was observed between spinal angles of the thoracic spine during loaded ambulation, further research should be done to investigate the effect heavier loads would have, given the spinal angles.

Gun or Wallet: The Role of Perceptual-cognitive Skill in Use-of-force Decisions

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Police use-of-force decisions are a hot topic that saturates the media, however little is known about the nature of these decisions. Officers go through use-of-force simulations as part of their training, however these training programs are typically created on a department-by-department basis using the intuition of local police officers. Most importantly, these programs have not been empirically tested to reveal whether they improve police use-of-force decision accuracy. Cognitive psychology offers a principled way to study decision making, specifically through perceptual-cognitive expertise. This expertise is the ability to identify relevant information from a scenario and integrate it with existing knowledge so that an accurate response can be performed, and has been studied extensively in sport for over 25 years.

The current study proposes to use the temporal occlusion paradigm from sports psychology to test a basic assumption: do people have the ability to discriminate between a gun and a wallet in a video simulation? Participants watched a series of video clips in which the actor begins to draw an object out of their pocket. The video was then temporally occluded (i.e., replaced with a black screen) at intervals just before the object is revealed. Participants indicated if the object is going to be a weapon (e.g., gun) or non-weapon (e.g., wallet). This study reveals that more information about a scene does not necessarily lead to more accurate decisions. These results allow for further informed study of the perceptual and cognitive mechanisms behind use-of-force decisions.

Clinical Outcomes of Intermediate Length Cephalomedullary Nails for Intertrochanteric Femur Fracture Repair in Older Adults: A Case Series

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BACKGROUND: Hip fracture is a major cause of morbidity and mortality in older adults. Due to the rising number of older adults in the United States, the prevalence of hip fractures is expected to increase dramatically in the coming decades. Therefore, it is important to identify safe, effective and cost-efficient methods to treat hip fractures. A common surgical repair for an intertrochanteric hip fractures utilizes a surgical nail implanted across the fracture site (intertrochanteric) for stabilization. Several lengths of intertrochanteric nails are manufactured; short and long length nails are most commonly utilized nationwide, however, intermediate length nails are more commonly used in local surgeon practice. There is a wealth of literature documenting surgical and patient outcomes of short and long length nails, but a paucity of literature exists documenting outcomes for intermediate length nail. This retrospective case series documents outcomes for a series of patients undergoing fracture fixation utilizing the less commonly used intermediate length nail. It was anticipated that surgical and patient outcomes utilizing intermediate length nails would be similar to published outcomes data for short length nails.

METHOD: The purpose of this descriptive case series was to determine and describe surgical and post-operative outcomes for a total of 77 patients identified as having had intertrochanteric hip fracture with surgical repair by two local physicians at one local hospital during the calendar year 2015. Surgical outcome data were collected during the hospital inpatient stay and for the outpatient, post-operative period of 16 months. Inpatient, surgical outcome data included estimated blood loss during surgery, operative time, blood transfusion, superficial wound infection and length of hospital stay. Of the initial 77 patients, 33 were lost to follow-up following hospital discharge. As a result, post-operative outcomes were included for 44 subjects. Outpatient post-operative complications included deep infection, non-union, femoral head osteonecrosis, periprosthetic fracture, and hardware failure. Data were summarized using means and/or percentages as appropriate for descriptive data.

RESULTS: Comparison of results to available published literature suggest that intermediate length nails are comparable to short length nails with regard to operative time and estimated surgical blood loss. In this study the rate of blood transfusion was lower and length of hospital stay was shorter than in comparable studies of different length nails. Inference of a difference related to nail length is difficult as multiple other healthcare system factors may be involved. There were no post-operative periprosthetic fractures in the studied population which is lower than the rate seen in other studies, however, the fracture rate has been noted to increase over time. The hardware failure rate (6.8%) of intermediate length nails in this study appeared slightly higher than that seen in published studies however comparison is difficult since there is a wide variation of the definition of “hardware failure” by different researchers.

STUDY LIMITATIONS: Study limitations include a retrospective study design, small sample size, study population limited to one hospital in the Midwest and a shorter follow-up period after surgery.

CONCLUSION: Analysis of results of this case series suggest that post-operative outcomes for intermediate length nails are subjectively similar to outcomes of the shorter length nails. Results also suggest that utilization of the intermediate length nail is an effective treatment option for surgical repair of intertrochanteric femur fractures. Further study is needed with a larger sample size to determine statistical significance.

Online Reactions to a new Discipline Policy

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At the beginning of the 2017 school year, Superintendent Dr. Alicia Thompson sought to fix the behavior problem that had begun to spiral out of control within the Wichita Public School system. To counteract this problem, Dr. Thompson sought to introduce a new discipline policy for the district. These new policies would focus on encouraging students to use soft skills to understand their behavior, cut back on rulings of detention and out of school suspension, and provide teachers with training that promoted cultural inclusion to create a safe space for students from all backgrounds. 40 comments in total were collected from two local online news sources, and were coded to fit into categories based on the content within the comment. This research looks at how comments on local online news sources address the changing policies, and how they propose to fix the discipline problems within the Wichita Public Schools. The themes and implications from the comments will be discussed throughout this study.

Concurrent Validity of Heart Rate Measures Using a Wrist Worn Activity Tracker During Treadmill Walking

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Introduction: Wearable technology devices are becoming increasingly popular. Many of these devices offer features allowing users to monitor health related biometric information. One biometric variable commonly measured is heart rate (HR). However, different types of wearable devices may use different technologies to measure HR. Therefore, it is important for end-users to be informed and understand if these devices report accurate information.

Purpose: The purpose of this study was to determine the concurrent validity of HR measures using the IP65 activity monitor compared to a validated HR monitor.

Method: Eighteen subjects (25.2±3.8 years) volunteered to participate in this study. After collecting subject anthropometric data (height, weight), each subject was fitted with a validated HR monitor (Polar T31) and the IP65 activity monitor. Subjects then completed a 5-minute warm-up on the treadmill, walking at a self-selected pace. For the testing protocol, subjects were instructed to walk on the treadmill at a self-selected moderate pace for 5-minutes. HR data from both devices were sampled at 12Hz during the final 3-minutes of the protocol.

Results: Mean HR recorded from the IP65 activity monitor and Polar T31 was 97.6±11.92 and 105.3±9.16, respectively. Pearson correlation coefficient indicates that there was no statistically significant correlation between the IP65 activity monitor and the validated Polar T31 HR Monitor ($p = 0.279$), $r = -0.05$.

Conclusion: The IP65 activity tracker does not demonstrate concurrent validity when compared to a validated HR monitor. Such findings warrant continued investigation of each biometric variable provided by the IP65 and other wearable devices.

Quantifying Population Growth Rates of an Invasive Weed: Responses to Soil Fertility and Cattle Management

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Sericea (Lespedeza cuneata) is an invasive, perennial legume that suppresses native plant species and threatens native grasslands in the Great Plains. Although much is known about *Sericea*, population demographics (survival, growth, reproduction, and population growth rates) have never been assessed over realistic temporal and spatial scales. For two growing seasons, we quantified *Sericea* vital rates across eight, large-scale ranching operations representing four cattle management regimes and three soil fertility types. Though soil fertility had no effect on *Sericea* vital rates, seedling survivorship was significantly higher in pastures with stocker than cow-calf cattle. Survivorship was lower among juvenile (~ 69%) relative to mature plants (~ 93%). All plant stages exposed to herbicide experienced a 67% reduction in survivorship on average. Reproduction was variable but high and on average comprised of 25 chasmogamous (outcross-pollinated) and 235 cleistogamous (self-pollinated) seeds/stem. The proportion of chasmogamous seeds produced/plant increased with increasing soil fertility. Preliminary models revealed a population growth rate (λ) of 2.3, suggesting a rapidly growing population. Given low juvenile survivorship, preliminary results suggest control efforts focus on mature plants regardless of soil fertility type or cattle management. However, these responses need to be verified over additional years to better predict bioeconomic impacts and guide weed management decisions.

We're All Belchers: Finding a new American Family in the Animated World of *Bob's Burgers*

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Bob's Burgers, an animated television show airing on FOX, tells the story of the Belcher family. The Belcher's own a burger restaurant and the show explores all of the day-to-day mishaps that tend to occur. While the show often features absurd plot points, at its base it is a show about an average, loving family. *Bob's Burgers* pushes back against the typical sitcom expectations of a working-class family and instead shows a family that is deeply connected and caring. This content analysis of ten episodes from the first seven seasons explores the healthy family dynamics represented. This research explores the importance of positive media representations of working-class families and the positive representation of a working-class father.

The Effects of Gluteal Squeezes Compared to Bilateral Bridges on Hip Strength, Power, and Endurance

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BACKGROUND: Hip extension weakness is correlated with low back, hip, and knee pathology. Bilateral gluteal bridges are common clinical exercises used to increase hip extension strength. There is little research regarding the effect of isometric gluteal squeezes, a more convenient hip exercise, on strength and functional outcomes.

PURPOSE: The purpose of this study was to identify the effects of gluteal squeezes on hip extension strength, gluteal girth, vertical jump, broad jump, and single-leg bridge endurance compared to bilateral gluteal bridging.

METHODS: Thirty-two healthy university students aged 18-35 years were randomly assigned to either gluteal squeezes or bilateral bridges. Subjects were tested at baseline and after eight weeks of training. Participants' hip extension strength, gluteal girth, vertical jump, broad jump, and single-leg bridge endurance were tested.

RESULTS: No statistical significance differences were found between the bridge and squeeze groups after eight weeks of training. Both groups significantly improved hip extension strength ($p < 0.05$) and approached statistical significance for the endurance task. The squeeze group significantly increased gluteal girth at the level of the greater trochanter ($p < 0.05$). No change occurred for either jump task in either group.

CONCLUSION: Gluteal squeezes proved to be as effective as bilateral bridges for the increasing hip extension strength. Gluteal squeezes significantly increased girth at the level of the greater trochanter. While not statistically significant, both groups improved single-leg bridge endurance. These results provide clinicians with reason to prescribe gluteal squeezes to increase hip extension strength instead of the less convenient bilateral bridge exercise.

Effects of Precipitation, Grazing and Initial Planting Practice on CRP Plant Diversity Across Kansas

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The Conservation Reserve Program (CRP) is a federally funded program that has converted marginal cropland to native plant communities over the past 30 years with the goal of preventing erosion, improving water quality, and reducing loss of wildlife habitat and biodiversity. Nationwide, 23.5 million acres are currently enrolled in CRP, yet few studies have examined plant communities on CRP lands at a large scale. As part of a larger three-year study, we collected vegetation data from 108 CRP sites across the precipitation gradient in Kansas to determine the effects of planting practices (CP2 and CP25) and periodic grazing on plant communities. In 2017, plant species richness increased linearly with the precipitation gradient from an average of 5 species per m² in the west to 10 species per m² in eastern Kansas. Across sites, 88 plant species were identified in the western region, 125 in the central, and 143 in the eastern region. Collectively, 237 species were found across the 108 sites, representing over 11% of all plant species that occur in Kansas. Neither grazing nor planting practice had a detectable effect on plant species richness or evenness in the first year of the study.

Native American Women: Searching for Representation Amid Cultural Appropriation, Sexual Objectification and Modern Invisibility on Social Media

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Contemporary views and definitions about what constitutes a Native American woman are elusive. Websites like Pinterest, Facebook, and Google allow users to search using the criteria Native American women, but what criteria authenticates the results as being representative of the lives and experiences of Native American women? This grounded theory content analysis examines the first 20 search results for Native American women using Google, Facebook, and Pinterest to code for thematic consistencies and clusters (n=60). Emergent themes of cultural appropriation, sexual objectification, and modern invisibility are discussed, as well as the implications of these stereotypes on the public perception of Native American women.

Rapid Determination of Free Prolyl Dipeptides and 4-hydroxyproline in Urine Using Flow-gated Capillary Electrophoresis

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4-hydroxyproline (Hyp) and prolyl dipeptides such as prolyl hydroxyproline (Pro-Hyp) have been found as disease biomarkers in the diagnosis of bone turnover and osteoporosis. To determine these compounds in human urine samples, we report a rapid and accurate method for the selective detection of free prolyl dipeptides and 4-hydroxyproline (secondary amines) by using flow-gated capillary electrophoresis coupled with laser-induced fluorescence (CE-LIF) detection method. To do that, primary amines in urine samples were first converted to tertiary amines thus got blocked with o-phthalaldehyde, and then the secondary amines were derivatized selectively by using 4-fluoro-7-nitro-2,1,3-benzoxadiazole (NBD-F) at room temperature. The derivatized mixture was analyzed and quantified by a flow-gated CE-LIF system. Analytical conditions were optimized to have the background electrolyte (BGE) solution composed of tetraborate (pH 9.2), cholate and deoxycholate at 40 mM each, respectively. We were able to separate and detect six prolyl compounds, namely Pro-Hyp, Pro-Pro, Pro-Gly, Pro-Leu, Hyp and Pro in unhydrolyzed urine samples, and the overall separation time (30 s) was 60 folds shorter than the reported HPLC method. The detection limits (LOD) were around 20 nM for dipeptides, and were around 60 nM for Hyp and Pro. The concentrations of these prolyl compounds in fresh urine samples were determined by using one-point standard addition method for which nipecotic acid was chosen as the internal standard. Compared with other reported methods, this technique was not only significantly simplified, but it could also greatly shorten the separation time while ensuring the accuracy of measurements. This method can also be applied to detecting prolyl dipeptides and Hyp in other biological fluids such as blood plasma.

A Comparison Between Cervical Spine Manipulation to Cervical Spine Exercise and Their Effects on Headaches

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PURPOSE: The purpose for this research study was to evaluate the effects of an upper cervical spine manipulation versus cervical spine exercises for tension type headaches in a young adult population.

METHODS: Our study consisted of a four-week program containing three groups: A – cervical manipulation, B – cervical spine exercises, and C – control group. Each participant filled out a Headache Disability Index (HDI) weekly. Group A returned weekly for cervical manipulation, Group B returned three times to ensure exercises were performed correctly, and group C returned once at the end of the study.

RESULTS: The study found no significant differences between each experimental and control group. Although insignificant statistically, intensity and duration of each headache decreased when looked at among the groups, although the frequency of the headaches overall increased.

CONCLUSION: Even though we did not find statistically significant data, all three groups' HDI scores declined. With our current research and findings, we hope this study can be improved and end with more powerful results in the future.