

SCHOLAR Day Posters 2024

Poster 1

Victoria Obenrader

Physician Assistant Studies

Prof. Vanessa Worley

Preventing Postpartum Hemorrhage and Associated Maternal Death: A Systematic Review Comparing Carbetocin and Oxytocin

According to the American College of Obstetrics and Gynecology (ACOG), postpartum hemorrhage (PPH) is the leading cause of maternal mortality today. Following delivery, the uterus must contract to control bleeding, but failure of uterine contraction (uterine atony) is the typical etiology of PPH. To prevent this, women are given prophylactic uterotonic drugs immediately following delivery to stimulate uterine contraction. Current ACOG recommendations do not specify which uterotonic drug to use; the decision is based on the medical provider's discretion. Oxytocin use is most prevalent, but existing research suggests that carbetocin may be more effective in the prevention of PPH. This systematic review of literature compares the effects of these drugs in the prevention of PPH specifically for women having vaginal deliveries. The results of this review suggest no significant difference in the effects of carbetocin and oxytocin. This research still aids in clinical decision-making because equal efficacy means that obstetric providers can base their choice on preference, cost, and availability.

Poster 2

Ian Black

Biology and French

Dr. Kim Risley

Analyzing Soil Bacteria Around Native and Invasive Plants at the HBNC

The goal of this project was to analyze soil bacteria populations surrounding native and invasive plants. The selected native plants are mayapples (*Podophyllum peltatum*) and spicebush (*Lindera benzoin*), and the selected invasive plants are multiflora rose bush (*Rosa multiflora*) and garlic mustard (*Alliaria petiolate*). These were chosen due to their similar structures, ideal habitat, and size. Spicebush, mayapple, and garlic mustard, have known antimicrobial properties. Eighty soil samples were taken at the Huston-Brumbaugh Nature Center and brought to a lab to undergo DNA isolation, PCR amplification and cloning of the 16s rRNA gene, then sent off-site to be sequenced. The sequenced samples were compared to a library of known bacterial DNA sequences. The species of each sample was determined through accuracy of the sample sequence to the indexed sequence. There was three groups of distinctly related bacteria, but species of plant each sample originated from did not have any obvious pattern.

Poster 3

Brianna Schutz

Biomedical Engineering

Dr. Loay Al-Zube

Emily Borroni

Biomedical Engineering

Alexis Murphy

Biomedical Engineering

Neuro-Robotics Synergy: Amplifying EEG Signals with MyDAQ for MyCOBOT PRO Control and Mimicking Human Arm Movements

Our primary goal is to develop an EEG measurement system using the National Instruments MyDAQ to assess human brain function and enhance EEG amplitudes. The system's effectiveness in controlling a robotic haptic arm (MyCOBOT PRO) is tested in two stages. In the first stage, we focus on capturing EEG signals during relaxed and alert states, employing advanced filtering techniques. The second stage involves using a human subject's amplified and filtered EEG waves to enable the MyCOBOT to mimic arm extension and flexion. Despite potential limitations due to small EEG signals requiring significant amplification, this research explores the synergy between EEG signals and robotic arm control. By understanding how cortical brain activity influences the physical actions of a robotic arm, this study holds promise for advancements in neuro-robotics and human-machine interaction.

Poster 4

Sydney Lewis

Physician Assistant Studies

Prof. Vanessa Worley

Could Preoperative Pharmacological Therapy with Glucagon-Like Peptide 1 Medication Predict Bariatric Surgery Success in Obese Adults with Type 2 Diabetes?

A medication used to predict the future? With the boom that followed the US Food and Drug Administration's approval of glucagon-like peptide 1 (GLP-1) agonists for weight loss, medications like Wegovy, Ozempic, and Mounjaro began to change lives. However, weight often comes back on after discontinuation of the medication and is considered a short-term solution. Bariatric surgery is considered the gold standard for weight loss, but it can be a big step for patients to take. Could healthcare providers predict how a patient will do before they go "under the knife?" This systematic review analyzed obese individuals with type 2 diabetes who were treated with GLP-1 agonists preoperatively and their associated outcomes following bariatric surgery including weight regain, complications, remission rates, and hemoglobin A1C levels. Results suggest that these medications can be utilized to look into the future and help patients achieve the best long-term weight loss outcomes with minimized risks.

Poster 5

Kaitlyn Pasko

Exercise Science

Dr. Ronald Mendel

Michaela Folks

Exercise Science

Randy Tawiah

Exercise Science

Which Coaching Styles are Most Beneficial in Max Strength Testing Between Male and Female Athletes?

Coaches impact the lives, sport enjoyment, and performance of their athletes. The coaching style used may impact the success or following of the athletes. Coaching style preference of athletes has been studied in the past through surveys utilizing Likert scales. Studies identify that men prefer autocratic coaching while women preferred democratic coaching (Beam et al., 2004; Bebetos et al., 2017; Saarinen et al., 2023; Terry, 1985). These studies identify athletes' perceived preference instead of measured

preference based on performance. The purpose of this study was to determine whether different coaching styles affect performance between genders in division III athletes. Fourteen participants (softball=7; baseball=7) completed 1-RM testing for bench press, back squat, and latissimus pulldowns. Following max testing, each participant was tested once a week for maximum reps at 75% of their 1-RM for each movement using a different coaching style (democratic, autocratic, mindset, authoritative, and no coaching). Data collection was not complete at the time of abstract submission.

Poster 6

Halle Ignacio

Media

Dr. Abigail Reed

Elayna Johnson

Graphic Design

Chloe Bird

Media

How Social Media Influences Sports Betting on College Students and Young Adults

According to an ESPN study, “67% of students living on campus are betters and tend to bet at a high frequency...” (Purdum, 2023, para. 4). As students on campus, we want to answer the question: What role does social media play in shaping conversations around sports betting and how do social media apps contribute to spreading betting-related information and betting culture of college students and young adults? We will interview willing participants at FAN EXPO Cleveland, to find young adult sports betters, and create a survey for students at Mount Union. We hope our research will discover a connection, if any, between social media effects and young adult/college student culture. With this research, we expand the existing research on sports betting to an audience of college students and young adults, which is an uncommon audience. Thus, enabling more research to be built off our findings.

Poster 7

Brittany Bober

Physician Assistant Studies

Prof. Vanessa Worley

From Fork to Fertility: The Association of Healthy Dietary Patterns and Male Fertility

A Big Mac a day keeps future children away. While that’s not quite how the saying goes, could it be something worth considering? It is evident that the Western diet has been linked to a higher risk of several chronic diseases including obesity, diabetes, and cardiovascular disease. Yet, a potential negative impact on fertility is often overlooked. This research aims to investigate if there is a relationship between diet and male fertility. A systematic review of literature was performed with careful searches of medical literature databases, application of inclusion and exclusion criteria, and critique of articles collected. Various studies explored dietary patterns and sperm health in male participants. Findings suggest a positive association between sperm health and healthy dietary patterns such as plant-based diets and the Mediterranean diet. This provides valuable insight for medical providers seeking to recommend lifestyle modifications that may improve sperm health, as well as for men who hope to avoid fertility issues in their future.

Poster 8

Katie Miller

Studio Arts

Prof. Margo Miller

Katie's P.O.V Photography

I have been passionate about photography for many years now. Once I transferred to Mount Union I realized I wanted to focus more on sports photography. I have been taking photos for most of the sports teams here at Mount since January 2022. I have been taking anywhere from 500-1500 photos per game. I go through them all edit about 100-400 photos and give the link for free for parents and the athletes. The equipment I use is very limited, I have been using a Nikon D3500 this year which was made in 2014. I want to show how much work I put into these photos. I edit for hours and hours all for free. It would be nice to show all the work I have been doing behind the scenes. Everyone usually sees the finished project or just a few posts with my photos on social media. However, most of the athletes and even non-athletes don't know the full process of how these photos became a successful product.

Poster 9

Jordan Stancovich

Biology

Dr. Philip LaScola

Sami Swartz

Biology

Kenzie Chine

Biology

Physiological responses to change in diet, exercise, and light cycles in mus musculus

Chronic diseases are among the most prevalent and costly health conditions across the United States. (Raghupathi, 2018). Poor nutrition, physical inactivity, and inadequate sleep all are some of the most common linkages that contribute to developing these conditions. Our research conducts an experiment on Mus musculus (laboratory mice) that manipulates the variables of a 24-hour light cycle, a high fat diet, and a voluntary exercise wheel. With alterations in these variables, we should be able to identify the negative physiological responses that develop within the mice while also observing to see if exercise potentially limits these effects. Blood glucose levels, white blood cell counts, and body weight are all recorded biweekly to monitor these responses. We hypothesized that the experimental groups exposed to the different variables will all have abnormalities within those tests. With understood limitations in sample size and species selection, this experiment may be related to human populations.

Poster 10

Alyssa Yungwirth

Physician Assistant Studies

Prof. Vanessa Worley

The Use of Psychotherapy for Children and Adolescents with Attention-Deficit/Hyperactivity Disorder

While not every individual may experience attention-deficit/hyperactivity disorder (ADHD) first-hand, it is one of the most common neurodevelopmental disorders diagnosed in children and adolescents according to Centers for Disease Control and Prevention. Stimulant medications are commonly prescribed as a first line treatment because of their ability to reduce symptoms by 70-80%. Mental health providers can also build insight and teach skills that can help. This systematic review of literature evaluated studies published within the last ten years to determine if psychotherapy options, such as cognitive behavioral therapy (CBT)

and mindfulness-based interventions (MBI), should be used alone or alongside medications as an effective treatment option, specifically for children and adolescents with ADHD. The evidence that psychotherapies should be used in conjunction with medications will allow psychotherapists to effectively care for these young people and reduce their symptoms long term. Healthcare providers will feel more confident referring patients and their parents so that treatments can work together for even better results.

Poster 11

Christopher Greiner

Electrical Engineering

Dr. Glauco Fontgolland

Derek Manos

Electrical Engineering

Jayden Herhold

Electrical Engineering

Battery Powered Golf Push Cart

This project aims to take a manually operated golf pushcart and transform it into a remote-controlled battery powered cart. This design allows the cart to be controlled via a remote using Bluetooth while also having autonomous following capabilities in which the cart will follow the user using GPS to navigate between the remote and the cart. This project implements all facets of the engineering design process from start to finish while also bringing a cheaper and reliable alternative to similar remote-controlled carts on the market. From initial research conducted prior to our design on existing products, the most important design aspects were identified and implemented to ensure that the cart not only functions reliably but also has a place in the battery powered golf pushcart market.

Poster 12

Eric Caldwell

Physics and Data Science & Analytics

Dr. Julie Butler

Alexander Carrothers **Physics and Data Science & Analytics**

Spam Email Classification

Spam emails are not only annoying but can present a significant cybersecurity threat. Criminals will often try to initiate identity theft through fraudulent emails. Additionally, spam emails can also contain malware/viruses. Scammers can use personal information to apply for loans, steal from bank accounts, and generally perform fraudulent activities. The main goal of this project was to apply machine learning algorithms to create an effective spam email filter. The dataset was taken from online data science community platform Kaggle and contained character/word frequency information from 4600 emails pre-classified as spam or non-spam. Algorithms were applied to the data and then optimized with various techniques including hyperparameter tuning. The best models were Decision Trees, Random Forests, and Neural Networks. By customizing our parameters and applying more advanced models, predictive accuracy exceeded 90%.

Poster 13

Megan Reihl

Physician Assistant Studies

Prof. Vanessa Worley

3-Dimensional Photography and Artificial Intelligence: A New Era for the Detection of Skin Cancer?

The greatest risk factor for skin cancer is exposure to ultraviolet light from the sun. Regular skin examinations by a trained medical professional are needed to look for signs of skin cancer and to reduce the risk of cancer development and progression. Sometimes, physical examination is combined with dermoscopy (skin surface microscopy), but newer and potentially more accurate methods are emerging. A systematic review was performed to identify whether innovative technologies, 3-dimensional (3D) total-body photography (TBP) and artificial intelligence (AI), should be utilized alongside or in place of current practices for more accurate and efficient skin cancer detection. This review included 5 studies that analyzed skin cancer detection (non-melanoma skin cancers and melanoma) using physical examination and dermoscopy compared to 3D TBP with or without AI. With skin cancer being one of the most frequently diagnosed forms of cancer in the United States, these results could significantly benefit many patients and could make the work of clinicians easier as well.

Poster 14

Samantha Skerbec

Biomedical Engineering

Dr. Loay Al-Zube

Alyssa Wilson

Biomedical Engineering

Sex-Related Differences in Knee Kinematics During Execution of Vertical Jump

The United States reports more than 150,000 ACL injuries annually. When comparing male and female athletes, the likelihood of females sustaining an ACL injury is two to eight more likely. This research will statistically establish the differences between males and females when performing vertical jumping movements. Position and velocity kinematic values from vertical jumps were gathered through video analysis of different subjects using Kinovea™ and further analyzed using statistical testing. According to analyzed data, there is statistical significance in the knee's angle between male and female subjects when beginning the jump ($p < 0.05$), the landing angle ($p < 0.001$), the maximum angular velocity achieved ($p < 0.001$), and the angular velocities ($p < 0.001$) when initiating and executing the jump. This research will serve to determine the specific differences in movement that could lead to higher incidence of ACL injury in females when compared to males and will be applied to prevent injury in vulnerable populations.

Poster 15

Kayla McAdams

Exercise Science

Dr. Ronald Mendel

Patrick Hartup

Exercise Science

Josh Yoder

Exercise Science

Effects of HMB Supplementation on Strength and Body Composition on Division III Men's Soccer Players

Supplementation of the leucine metabolite, HMB, has shown to have ergogenic aid properties by eliciting improved metabolism and protein synthesis. Improvements such as decreased fat mass and increased fat-

free mass will improve body composition and perhaps muscular strength potentially leading to improved performance. Fourteen Division III men's soccer players were randomly selected into two groups, HMB and placebo, for a 6-week supplementation period. Players performed their regular off-season team lifts. Muscular strength was assessed using 1-RM measurements in both back squat and bench press. Body composition testing was conducted using air displacement plethysmography via BodPod. HMB supplementation showed no differences between groups in any measurement; body fat percentage ($p < 0.842$), 1-RM bench ($p < 0.676$), 1-RM squat ($p < 0.701$), fat mass ($p < 0.822$), and fat-free mass ($p < 0.075$). Although no statistical significance was found, with further investigation, use of HMB may play a role in other physiological parameters that were not measured.

Poster 16

Regina Cetnarowski

Physician Assistant Studies

Prof. Vanessa Worley

Fertility Preservation in Pediatric and Adolescent Cancer Patients: Is Ovarian Tissue Cryopreservation Safe and Effective?

Cancer survival rates have significantly increased among pediatric and adolescent patients. However, many of these survivors will experience ovarian failure and infertility because of treatments such as chemotherapy and radiation. Ovarian tissue cryopreservation (OTC) is currently the only option available to attempt preservation of fertility in prepubertal girls who are undergoing gonadotoxic cancer treatments (those that are damaging to reproductive tissues), due to the inability to undergo oocyte (egg) freezing. A systematic review of literature was conducted to assess the safety and efficacy of OTC in this population. After inclusion and exclusion criteria were applied to the database search results, 9 studies were selected and evaluated. Overall, it was found that OTC is a safe and effective method of fertility preservation in these patients. This information can be helpful when counseling children/adolescents who are facing important cancer treatments and their parents. More research is needed to optimize outcomes, but OTC can be provided as a viable option.

Poster 17

Abigail Stack

Biology and Exercise Science

Dr. Kim Risley

Effects of Multi-ingredient Cetylpyridinium Chloride Mouthwash Treatment on the Persistence of Established Streptococcus mutans Biofilms

Consumers perceive natural products as a means of disease prevention, yet there remains a dearth of literature supporting their effectiveness in oral care. Biofilms, formed microbial communities, are responsible for diseases such as periodontal disease and dental caries. The aim of this study was to determine if a 'natural' mouthwash (HPOP), inhibits the growth of Streptococcus mutans biofilms. Biofilms were cultured for 24 hours. They underwent either partial-strength (PS) overnight treatment, full-strength (FS) overnight treatment, a 30-second HPOP treatment (30s), or a control rinse (Ctrl). After 24 hours of growth, biofilms were stained and pooled for absorbance measurements. Both FS (0.489 ± 0.329) and PS (0.713 ± 0.107) treatments mirrored neg ctrl (0.237 ± 0.055) absorbances over pos ctrl (2.571 ± 0.788).

30s HPOP treatments were tested to parallel product instructions. Time exposure did not impact the outcome. Optimal rinsing duration needs to be further investigated.

Poster 18

Natalie Owens '24

Communication Studies

Dr. Abigail Reed

Estella Woodworth '26

Media

Ally Ivey '25

Sport Business

Diet Culture on Social Media and the Influence of College Women's Body Image Satisfaction

This study compares college-aged women's body satisfaction and toxic diet culture on social media. By becoming more mindful of toxic diet culture on social media, young women can better understand the harmful effects of exposure to this media, causing poor body satisfaction. We will conduct 30 interviews to establish participants' social media usage and understand the nature of participants' body image satisfaction by showing examples of toxic diet culture on social media and documenting participants' reactions. This study seeks to illustrate that toxic diet culture can be harmful to young adult women's body image satisfaction and that this culture can set women up for failure with their social media interactions and body image satisfaction. This ongoing study is occurring under the Applied Media Research course taught by Dr. Abigail Reed and will include students, Natalie Owens, Ally Ivey, and Estella Woodworth.

Poster 19

Jessica Knicely

Physician Assistant Studies

Prof. Vanessa Worley

Post-Market Surveillance: Optimizing Obstructive Sleep Apnea Outcomes with Inspire, the Implanted Hypoglossal Nerve Stimulation Device

Obstructive sleep apnea (OSA), characterized by collapse of the airway during sleep, is an independent risk factor of cardiovascular disease (e.g., high blood pressure, stroke, heart attack). Intermittent episodes of oxygen desaturation, increased levels of carbon dioxide, and recurrent arousals result in excessive daytime sleepiness and metabolic dysfunction due to dysregulation of cortisol. Continuous positive airway pressure (CPAP) via mask use remains the primary treatment for OSA and while effective, its compliance rate is only 30-60%. Alternative surgical treatment is now available and has been deemed equally effective; it involves placement of an internal device that stimulates the hypoglossal nerve (Inspire). A systematic review of literature was conducted to address the research question: Which patients with OSA are the best candidates for Inspire therapy? Can pre-operative patient factors predict successful outcomes with Inspire? Findings suggest that aspects of the baseline polysomnography results, anatomical features, and body mass index should be used to guide treatment decisions for this exciting new option.

Poster 20

Cooper Timmons Mechanical Engineering and Mathematics Dr. Yanping Zhu

Using Ultrasonic Sensors to Estimate the Buoyancy and Stability Characteristics of a Small Floating Platform with an Unknown Hull Shape

The purpose of this study was to determine the accuracy and reliability of using distance measurements obtained from an ultrasonic sensor framework to predict the buoyancy and stability characteristics of a small floating platform as a means of assessing said platform's performance under various loading conditions. Using the relationship between the sensor's accuracy and the distance being measured, both obtained through preliminary calibration testing, the change in depth and orientation of a fabricated floating platform, between applied loads of 0.0, 5.0, 7.0, or 9.0 lbs, could be found via the sensor framework. These measurements were then compared to their respective theoretical and analog (manual) values to determine the efficacy of the ultrasonic sensor framework within a dynamic system as well as to quantify the impact that cumulative fabrication error can have on a floating platform's performance. Data collection has not been completed at the time of abstract submission.

Poster 21

Meghan Hughes Nursing Prof. Karen Towne
Dillon Cox Nursing
Leah Fox Nursing

Use of chlorhexidine gluconate coated dressings on central line catheters: A review of the literature for evidence-based practice

Central line catheters are catheters inserted in a large vein surgically to get medicine to the heart faster. These catheters are important in providing quality and efficient patient care; however, these lines can become infected which can lead to higher mortality rates. A review and critical appraisal of the literature for EBP was conducted to determine if the use of chlorhexidine gluconate dressings on central line decreases the infection and mortality rates of central lines. Recent studies demonstrated chlorhexidine dressings decrease the number of pathogens and infections in central lines. In addition to decreasing the number of pathogens, it had better adherence to protocol from staff members showing promise as an alternative form of dressings for central lines. Moreover, chlorhexidine gluconate dressings are more cost effective due to having to be changed less frequently. These findings offer external evidence to support nurses' use of an alternative form of intravenous care.

Poster 22

Kenadee Wayt Physician Assistant Studies Prof. Vanessa Worley

The Do's and Don'ts of Using Glucagon-Like Peptide 1 Agonists to Achieve Weight Loss

According to the Centers for Disease Control and Prevention, 41% of Americans are obese. Taking that into consideration, what would you say if there was a shot you could take to drastically improve weight loss? Lifestyle changes are essential factors, but pharmacological therapy is also implemented in the treatment of obesity. More patients are being prescribed glucagon-like peptide 1 (GLP-1) agonists, the results are impressive, and their use for weight loss has taken off. This research was conducted through a systematic review of literature, assessing studies published in the last 15 years. The literature was found using MEDLINE, as well as reference lists of pertinent existing systematic reviews and meta-analyses. The overarching goal of this study is to identify optimal clinical practices for prescribing GLP-1 agonists that are grounded in evidence. The results apply to healthcare practitioners and individuals experiencing obesity. The impact is significant because safe acquisition and sustained maintenance of healthy weight can dramatically improve health and well-being.

Poster 23

Chessie Misja **Biology** **Dr. Kim Risley**

Determining the Presence of Antibiotic Resistance Genes at the Huston-Brumbaugh Nature Center

Antibiotic resistance is posing a serious global health issue that could have lasting effects on humanity. Due to the overuse and misuse of antibiotics, their residues ultimately end up in soil environments which become a reservoir of antibiotic-resistance genes (ARGs). Studying them at a molecular level is essential. To better understand the diversity of antibiotic resistance genes naturally found in microbial communities, soil samples from various locations at the Huston-Brumbaugh Nature Center (HBNC) were analyzed. Sixty soil samples from four different areas were collected and total microbial deoxyribonucleic acid (DNA) was extracted from each sample. Erythromycin, sulfonamide, and tetracycline ARGs were amplified using polymerase chain reaction (PCR) with each grouped sample and analyzed using gel electrophoresis. Samples with the most ARGs were located at the Huston Barnyard and the Brumbaugh Trail. Current research is underway to determine the diversity of these ARGs.

Poster 24

Becca Santom **Biomedical Engineering** **Dr. Loay Al-Zube**

Haden Gibson **Biomedical Engineering**

Ethan Fletcher **Biomedical Engineering**

Annika Stankowski **Biomedical Engineering**

The Impact of KT Tape on Reducing Knee Moments during Dynamic Sports Movements

ACL injuries are common in sports that are characterized by rapid changes in direction. The purpose of this study is to determine the effectiveness of KT tape in reducing knee moments during dynamic sports movements in males and females, with a particular focus on soccer, basketball, football, and track athletes. Maximum knee force is also measured. Six collegiate athletes participated in the study. Phase I involved the athletes performing standardized sports movements including maximum vertical jump to

single leg, single leg lateral hop, and directional pivot without KT tape to establish control data. In Phase II, the same movements were repeated with KT tape. Biomechanical data, including force and moment in 3-dimensions is recorded using force plates. A two-sample t-test compares the biomechanical parameters between the KT tape and control conditions to identify any significant differences in knee joint kinetics during sports movements. The findings of this research could offer valuable insights into the potential benefits of KT tape in reducing knee joint stresses and enhancing athletic performance.

Poster 25

Katelynn Pennington

Physician Assistant Studies

Prof. Vanessa Worley

Cuts Like a Knife: Scalpel Versus Electrocautery for Abdominal Surgical Incisions

The scalpel has been the mainstream instrument used for surgical incisions despite electrocautery being invented in the early 1900s and having this capability. Why is the scalpel utilized more? Does electrocautery have worse outcomes when used to make a surgical incision? This systematic review was performed to compare the outcomes of abdominal surgical incisions made with electrocautery versus scalpel focusing on incision time, blood loss, postoperative pain, and wound complications. An online database search for peer-reviewed journal publications utilized specific inclusion and exclusion criteria and identified six studies. All studies concluded electrocautery had less blood loss with the majority reporting shorter incision time compared to incisions made with a scalpel. The studies reported comparable outcomes for postoperative pain and wound complications between the two groups. Additional studies evaluating cosmesis demonstrated cosmetic equivalence between electrocautery and scalpel, even on the head/neck. Surgical personnel can feel confident using electrocautery as a method for initial abdominal incision with equal efficacy as a scalpel.

Poster 26

Justin Curl

Exercise Science

Dr. Ronald Mendel

Nathan Heater

Exercise Science

Lydia Wacker

Exercise Science

The Effects of Time Under Tension Eccentric Training with Untrained Men and Women at Different Timed Variables of a Bench Press and Squat

The purpose of this review is to determine which eccentric time variable elicits the best muscular strength and hypertrophy increases in men and women when performing a squat and bench exercise. To test which eccentric time variable is the best for hypertrophy and muscular strength increases, an analysis of intensity, repetitions, and sets were determined to show discrepancies between groups. 20-subjects met the inclusion criteria, but three subjects had to drop out of the study due to availability issues or work-related problems. Eccentric resistance training is known to cause an increase in hypertrophy, and muscular strength. Eccentric training is popular to many practitioners because of the diverse improvements it allows a wide range of populations over a short period of time. Evidence suggests that eccentric training is more resistant to muscle deterioration and contributes to greater post-exercise

metabolic and hormonal stimuli that aide in acute protein synthesis (Crewther, Cronin, Keogh, & Cook, 2008; Hakkinen & Pakarinen, 1993; Kraemer et al. 1990; McCaulley et al. 2009; Smilios, Pilianidis, Karamouzis, & Tokmakidis, 2003; Uchida et al. 2009). These hormonal and metabolic responses include testosterone, lactate, creatine kinase; and these responses have shown to increase acute protein synthesis and chronic muscle growth; so, manipulating the eccentric cadences may prove to be advantageous for the science community (Crewther, Cronin, Keogh, & Cook, 2008; Hakkinen & Pakarinen, 1993; Kraemer et al. 1990; McCaulley et al. 2009; Smilios, Pilianidis, Karamouzis, & Tokmakidis, 2003; Uchida et al. 2009). Results have not been concluded yet, but it seems that the nervous system adaptations that were made between all subjects in the first four-weeks of the study have allowed them to have similar increases in muscular strength for all groups.

Poster 27

Travis DuBois

Electrical Engineering

Dr. Glauco Fontgalland

Sam Snyder

Electrical Engineering

Energy Harvesting from an Exercise Bike

The exponential rise in energy demand and the urgent need for sustainable energy solutions have prompted innovative approaches towards harnessing renewable energy sources. This project proposes the integration of a motorized system with a conventional exercise bike to generate renewable and green energy that can be used in emergency situations. Through retrofitting a direct current (DC) motor onto a platform that attaches to an exercise bike, kinetic energy that was previously wasted can be converted to electrical energy to charge batteries, power small devices, or in large scale contribute to the energy grid. Through research and testing, the project explores ways to quantify power generation based on workout intensities to empower individuals to generate clean energy through daily exercise routines as well as helping the individuals with a cost-effective generator that can be used anywhere.

Poster 28

Shawn Powers

Physics and Mathematics

Dr. Julie Butler

The Double Pendulum: Simulating a Chaotic System using Python

The double pendulum is an example of a system that exhibits chaotic behavior, or behavior that is dramatically affected by slight changes in its initial conditions. The goal of the project was to verify that the double pendulum is a chaotic system and gain insight into similar systems. A theoretical model was made in Python by solving the equations of motion for a double pendulum and animating the generated data. Data was also collected by recording a double pendulum and importing the data into Python. As predicted, both the experimental and theoretical models demonstrated similarly dramatic deviations in their paths for slight changes in their initial conditions, verifying that it is a chaotic system. Chaotic systems are interesting because they can be found everywhere in nature. The ability to model these systems is crucial when studying planetary motion, the evolution of ecosystems, and other complex systems described by differential equations.

Poster 29

Maddie Mitchell

Physician Assistant Studies

Prof. Vanessa Worley

Intermittent Fasting: A Dietary Pattern to Improve the Health Status of Adult Patients with Nonalcoholic Fatty Liver Disease

Liver disease is commonly associated with chronic alcohol consumption, yet a growing concern is non-alcoholic fatty liver disease (NAFLD). The Journal of Clinical and Translational Hepatology predicts that NAFLD will increase 21% from 2015 to 2030 in the USA, totaling 33.5% prevalence in the population. NAFLD worsens underlying conditions and increases the risk of liver failure and death. The burden of NAFLD needs to be recognized and understood universally. Currently, no pharmaceutical therapy has proven effective for NAFLD. This systematic review evaluated intermittent fasting (IF) as a potential no-cost treatment option and identified six studies that included patients with NAFLD who were following an IF diet. Findings include the improvement of liver enzymes, fibrosis, and fatty infiltration. Further research must be conducted; however, there is significant promise that IF could benefit people with NAFLD. This review suggests that those who are concerned about liver health should be thinking about when they eat their calories as well as what they drink.

Poster 30

Josh Tovar

Media

Dr. Abigail Reed

Kristopher Jacoby

Media

Ramsey Reith

Sports Business

Jojo Moore

Media

Consumer Spending Habits and Video Game Company Profit

Live streaming and video games have grown in popularity over the years and have become a profitable market in which live streamers, live streaming platforms, and video game companies can profit. Video game companies use in-game purchases like cosmetics, boosters, battle passes, time savers, and many more to make a profit, along with the selling of the video game itself. To find out how consumers are buying into video game companies and money grabs, audience research will be conducted. Participants surveyed will describe how they spend their money when it comes to video games and what draws them to make that decision, whether it be purely cosmetic or for a booster in-game. This then will show how certain companies use different tactics to make a greater profit off of their consumer base.

Poster 31

Adriana Russell

Biology

Dr. Lin Wu

The Effectiveness of Herbal Materials versus Common Antibiotics in Controlling Bacterial Growth

Overtime the misuse and overuse of antibiotics has been causing antibiotic resistance in bacteria to increase. One alternative to this is using herbal materials. The objective of this research was to compare the antimicrobial activity of an herbal material clove essential oil with two commonly used pharmaceutical antibiotics, Ampicillin and Streptomycin. Two bacterial species used were Escherichia coli (E. coli) and Kocuria rhizophila (K. rhizophila). Broth dilution method was used to determine minimum inhibitory concentration (MIC). Disk diffusion method was used to determine inhibition zones. The MIC of clove oil on E. coli was 1:64 and the MIC of clove oil on K. rhizophila was 1:32. This suggests that the concentration of clove oil necessary to inhibit growth of both bacteria is similar. Clove essential oil, Ampicillin and Streptomycin showed similar sizes of inhibition zones, suggesting that clove was just as effective as pharmaceutical antibiotics in inhibiting bacterial growth.

Poster 32

Keirsten Daugherty

Physician Assistant Studies

Prof. Vanessa Worley

Should Regular Consumption of Flaxseed Be Recommended as a Safe and Effective Way to Reduce the Risk of Breast Cancer?

Breast cancer is one of the most common forms of cancer in women, and men can get it too. If you knew there was something in the grocery store that you could eat to reduce your risk of breast cancer, would you buy it? According to the Academy of Nutrition and Dietetics, flaxseed is the richest dietary source of lignans, a type of phytoestrogen. Some medical professionals wonder if this would potentially hurt an individual with breast cancer, but flaxseeds are also high in fiber and antioxidants which are widely believed to have numerous health benefits including reduced risk of cancer. This systematic review of literature evaluates studies that explore flaxseed and breast cancer. An association between flaxseed consumption and lower risk of breast cancer and possible protective effects have been seen. More research is needed, but for those looking to reduce the risk of breast cancer, eating whole flaxseeds can be one of the many healthy choices to make.

Poster 33

Sydni McQuilkin

Biomedical Engineering

Lynn Dudash

Axel Magarrell

Biomedical Engineering

Matthew McBride

Biomedical Engineering

Combination Biomaterial for Accelerating Burn Wound Healing

Each year, about 450,000 Americans suffer from burn-related injuries so severe that they require medical care and about 3,500 of those are fatal. Many individuals with severe burns require skin grafts, either from themselves or a donor. However, these grafts are often unsuitable due to too much of the body being covered by burns, or unavailable because of a lack of donors. Our solution to this problem is to produce a patch that combines a sodium alginate and collagen hydrogel material with Polydimethylsiloxane (PDMS). This combination biomaterial will protect the patient from infection, prevent dehydration, and provide a structure for skin cells to repopulate the burn. So far, we have been

successful in 3D printing with our material and are currently working on attaching it to a PDMS surface. The next steps include analyzing cell migration on the 3D printed material as well as mechanical testing of the final product.

Poster 34

Katlyn Zurbrugg

Chemistry

Dr. Robert Woodward

Synthesis of N-Methyl Bacillithiol: An Initial Step to Disrupting Antibiotic Resistance Mechanisms

Many illnesses are known to be caused by bacterial infections, such as pneumonia or urinary tract infections (UTI). Fortunately, there are antibiotics that can be readily used to remedy these infections. However, what if bacteria were able to develop defense mechanisms against treatment? This phenomenon is known as antibiotic resistance, which in the case of UTIs renders Fosfomycin, an antibiotic that compromises the protective cell wall of bacteria, ineffective. This is thought to be a process facilitated by a molecule known as N-Methyl Bacillithiol. This research aims to synthesize N-Methyl Bacillithiol to better understand this pathway, which in later research can be used to disrupt the interactions between antibiotics and compounds that compromise their effectiveness. During synthesis of the product, Thin-Layer Chromatography was used to determine the compound's purity and Nuclear Magnetic Resonance to determine the structure. Purification was achieved by using Column Chromatography, a technique used to separate compounds.

Poster 35

Hannah Greene

Physician Assistant Studies

Prof. Vanessa Worley

Identifying the Specific Challenges of Breastfeeding Infants with Neonatal Abstinence Syndrome and Reducing Barriers to a Key Component of Care

Does milk cure opioid withdrawal? Well, breastfeeding is known to significantly help infants who are withdrawing. According to the Centers for Disease Control and Prevention, approximately one newborn is diagnosed with neonatal abstinence syndrome (NAS) every 24 minutes. NAS is a spectrum of clinical manifestations seen in neonates caused by withdrawal from drug exposure while in the womb. Crucial ways to shorten hospital stay and treatment duration for these babies include their mother's breastmilk and the skin-to-skin contact associated with providing milk. The purpose of this systematic review of literature was to pinpoint breastfeeding challenges that this specific population of women face. We must understand obstacles these women encounter and strive to eliminate them. It is not about fixing every, single challenge that a woman may face while breastfeeding their baby; rather, it is about looking at the healthcare system as a whole, utilizing medical bundles, and employing systematic approaches to prevent barriers from going up in the first place.

Poster 36

Jarrett Lukacsko **Exercise Science** **Dr. Ron Mendel**
Aidan McFerren **Exercise Science**
Elianna Seaman **Exercise Science**

The Effects of Yoga-Based Intervention on Heart Rate Variability and Perceived Stress in Collegiate Athletes

This report will summarize the effects of yoga-based intervention on heart rate variability (HRV) and perceived stress (PSS-4, PSS-10) on in-season collegiate athletes. Collegiate athletes are faced with balancing athletics and academics over the school year. Using the evidence that has been gathered from the review of literature, it has been determined that yoga may be beneficial to reduce both perceived stress and increase heart rate variability (HRV) on in-season athletes, but more research is needed to confidently make these claims. Participants in this study will complete eight sessions of asana yoga over four weeks, where their heart rate variability (HRV) and perceived stress (PSS-4) will be taken each session, as well as their perceived stress (PSS-10) before and after the study. These measurements will be compared to measurements taken from the control group, and then analyzed using IBM SPSS Statistics to determine if there is a difference between groups.

Poster 37

Ava Fornara **Environmental Science** **Dr. Chris Marks**

Behavioral Adaptations of the Common Raven (*Corvus corax*) Related to Foraging in Urbanized Habitats

The purpose of this project is to analyze how visual and auditory distractions affect foraging abilities in ravens, and how easily they can ignore distractions when presented with enrichment that encourages foraging behaviors. The habitats of ravens have become urbanized, meaning they must adapt to living and finding food alongside humans. This experiment simulated an urbanized foraging area and was conducted at Raptor Hallow Sanctuary in Alliance, OH. The hypothesis for this experiment was that when human distractions were implemented, it would take the test subject raven longer to locate the hidden food. This experiment was conducted using a juvenile common raven, Kodiak. Four cardboard tubes were wrapped in paper (three with white paper, one with red paper) and set in a box. Kodiak was timed on how long it took him to select the red tube. Over 48 trials, his average time decreased significantly.

Poster 38

Amanda Wire **Physician Assistant Studies** **Prof. Vanessa Worley**

Psilocybin-Assisted Psychotherapy for Treatment-Resistant Major Depressive Disorder

According to the Cleveland Clinic, anywhere from five to seventeen percent of people will experience major depressive disorder in their lifetime. Of these people, thirty percent will be treated with at least two appropriate forms of treatment and not improve. Having treatment-resistant depression (TRD) can

feel hopeless, frustrating, and isolating. While there are options for treating TRD, many come with greater risk of side effects than first-line agents and may be deterring. This study is a systematic review that investigated whether psilocybin, a hallucinogenic compound isolated from “magic mushrooms”, can be safe and effective in treating TRD. The results show promise for the therapeutic potential of psilocybin with psychological support as one to two sessions led to reductions in both physician and participant reported depression scores with the most common side effects being transient anxiety at time of drug onset as well as transient nausea and/or headache.