CSM 2010 Platform and Poster Presentation Schedule

Friday February 19, 2009

Session I: 8:00-11:00 am

8:00-8:20 am
Inspiratory Muscle Strength Training Improves Weaning Outcome in Failure to Wean Patients
Martin, Danny; Smith, Barbara K.; Gonzalez-Rothi, Ricardo; Harman, Eloise; Deoghare, Harshavardhan; Huang, Tseng-Tien; Davenport, Paul; Gabrielli, Andrea.

8:20-8:40 am
Are Oxygen Saturation and Heart Rate Correlated with Perceived Fatigue and Dyspnea after the 6 Minute Walk Test in Survivors of Acute Respiratory Distress Syndrome/Acute Lung Injury?
Ciesla, Nancy; Dinglas, Victor; Vatwani, Archana; Barbe, Cynthia; Graham, Meagan; Needham, Dale.

8:40-9:00 am
Further Evidence of the Clinical Utility of the Supine to Stand Test in Heart Failure
Healey, Lauren J.; Knocke, Ann; Dreyer, Hazel; Rubenstein, Joel J.; Cahalin, Lawrence.

9:00-9:20 am
An Alternative Lymphedema Therapy Protocol for a Patient with Lower Extremity Lymphedema and Congestive Heart Failure
Greene, Revenda A.; Fowler, Rhonda B.; Karavatas, Spiridon.

9:20-9:40 am
The Influence of Cardiovascular Risk and Comorbidity on Physical Therapy Outcomes
Scherer, Susan; Bartlett, Rebecca; McMicken, Ashlee; Haugland, Deming; Berkshire, Sarah; Martina, Evan; Reyes, Katherine N.

9:40-10:00 am
A Novel Approach to a Typical Cardiac Rehabilitation Program: For Your Heart, an Exercise DVD
Cleary, Kimberly K.; LaPier, Tanya; Jamison, Ashley; Beadle, Christopher.

10:00-10:20 am
The Relationship between Physical Activity and Physical Function in Individuals Post-bariatric Surgery
Josbeno, Deborah; Jakicic, John; Kalarchian, Melissa; Sparto, Patrick J.; Otto, Amy.

10:20-10:40 am
Lipid and Fitness Profiles of Normal Weight, Overweight and Obese Rural Prehypertensive Women
Hageman, Patricia A.; Pullen, Carol H.; Boeckner, Linda S.; Walker, Susan N.

10:40-11:00 am
Training Adaptations in Women following a Nine Month Employee Wellness Program: A Summative Evaluation Study
Pepin, Marie-Eve; Davis, Amanda; Venglar, Brian; Brown, Todd; Padgett, Mila; Drouin, Jacqueline S.

Session II: 1:00-3:00 pm

1:00-1:20 pm
The Frequency and Use of Patient Simulators in U.S. Physical Therapy Schools
Stockert, Brad; Chevreaux, Laura; Sperry, Cristina; Wooden, Adam.

1:20-1:40 pm
Facilitating Perceived Competency in Clinical Decision Making
Sobush, Dennis C.; Kontney, Laurie; Parker, Danille; Haddenham, Kay; Kletch, Suzanne.

1:40-2:00 pm
Self Reported Frequency and Importance of Measuring Heart Rate and Blood Pressure at Physical Therapy Clinical Sites: A Descriptive Study
Arena, Sara K.

2:00-2:20 pm
Anaerobic Thresholds of Patients after Traumatic Brain Injury: Comparison to Healthy Sedentary Controls
Amonette, William; Mossberg, Kurt A.

2:20-2:40 pm
Reliability of an Armband Energy Expenditure Measurement Device: A Meta-Analysis
Ryde, Amanda M.; Bieniek, Michelle; Drouin, Jacqueline S.; Whittington, Tygre; Gellish, Ron.

2:40-3:00 pm
Agreement of Armband Energy Expenditure Measures to Indirect Calorimetry for Activities of Daily Living: A Reliability Study.
Bieniek, Michelle; Ryde, Amanda M.; Whittington, Tygre; Gellish, Ron; Drouin, Jacqueline S.

POSTER PRESENTATIONS

Poster 1
Cardiovascular Effects and Energy Expenditure in Healthy Normal Children during Horseback Riding: A Pilot Study
Leong, Joanne; Henderson, Roberta; Hunter, Diana; Frownfelter, Donna.

Poster 2
Examination of the Association Between a Child's Health Behavior and the Home Environment and their HR, BMI,

Flexibility and Strength Measures
Gorman, Ira; Birkenstock, Stephanie J.; Lorenzi, Kathleen A.; Price, Grace E.

Poster 3
The Use of Cardiopulmonary Objective Quality of Life Measures in Physical Therapy Practice: A Qualitative Study
Lefebvre, Kristin M.; Keirsey, Aliah; Anderson, Terri; Herbertson, Kim; Wnorowski, Heather.

Poster 4
Comparisons of Cardiovascular Endurance and Physical Activity Between Supervised and Home-Based 8-Week Exercise Training Programs in Individuals with Below-Knee Amputation – A Preliminary Report
Kanelakos, Brian J.; Lin, Suh-Jen; Shakja, Ujjwal.

Poster 5
A Non-traditional Approach to Cardiac Rehabilitation in the Dialysis Center for a Patient with End-stage Renal Disease following Coronary Artery Bypass Surgery: A Case Report
McVey, Lisa W.; Hillegass, Ellen.

Poster 6
Reliability and Validity of the End Tidal CO2 from the Capnotrainer
Coleman, Kim W.; Millar, A Lynn; Boothby, Michelle; Currier, Erin; Eno, Crystal; Monsma, Kelly.

Poster 7
Influence of Activity Levels versus Energy Intake on Percent Excess Weight Loss (%EWL) after Roux-en-Y Gastric Bypass Procedures (RYGBP)
Forbush, Steven W.; Nof, Leah; Echternach, Jack; Hill, Cheryl.

Poster 8
Developing a Clinical Prediction Rule for Screening Adolescent Females for Cardiovascular Disease Risk
Brahler, C. Jayne; Donahoe-Fillmore, Betsy

Poster 9
Changes in BMI and Blood Pressure Following a 10 Week Exercise and Nutrition Program for Children Who Are Overweight or Obese
Martino, Sharon A.; Morelli, Peter J.; Dixon, Denise.

Poster 10
Do Cardiac and Pulmonary Patients Enrolled in a Hospital-Based Rehabilitation Program Demonstrate Clinically Significant Improvements?
Smith, Christine; Brahler, C. Jayne; Glenn, Terri; Anloague, Phil.

Poster 11
Lower Extremity Strength Training Following Acute Lung Transplantation: Preliminary Analysis
Smith, Barbara K.; Franceschi, Amy; Huang, Tseng T.; Deoghare, Harshavardhan; Martin, Daniel.

Poster 12
Physical Function, Age, and Mental Status are Related to Physical Activity and Exercise Self-Efficacy 3, 6, and 12 months Following Coronary Artery Bypass Surgery
LaPier, Tanya; Cleary, Kimberly K.; Gefroh, Jesse; Graham, Ruthe; Hedgecock, Katlynn.

Poster 13
Iyengar Yoga vs. Enhanced Usual Care on Blood Pressure in Patients with Prehypertension to Stage I Hypertension: A Randomized Controlled Trial
Galantino, Mary Lou; Cohen, Debbie; Bloeden, Lee Ann; Rothman, R.; Farrar, John T; Volger, S.; Mayor, S.; Szapary, Phillipe; Townsend, Raymond.

Poster 14
Effects of an Intensive Task-Specific Rehabilitation Program on Cardiovascular Efficiency in Individuals With Chronic Stroke
Fruth, Stacie J.; Combs, Stephanie; Harmon, Jennifer A.; Downs, Anne M.

Poster 15
The Effects of Levodopa on Norepinephrine and Cardiovascular Responses During Maximal Exercise in Parkinson's Disease
DiFrancisco-Donoghue, Joanne; Lamberg, Eric M.; Bono, Nancy; Elokda, Ahmed; Werner, William G.

Poster 16
Exercise Training Adaptations in Women with Very Low Initial Aerobic Capacity Levels: A Comparison Study
Pepin, Marie-Eve; Venglar, Brian; Brown, Todd; Davis, Amanda; Padgett, Mila; Drouin, Jacqueline S.

Poster 17
Exercise Training Adaptations in Middle Aged Women Participating in a Worksite Wellness Program: A Cohort Comparison Study
Davis, Amanda; Pepin, Marie-Eve; Brown, Todd; Venglar, Brian; Padgett, Mila; Drouin, Jacqueline S.

Poster 18
The Effect of Body Position on Maximum Inspiratory and Expiratory Pressures and Forced Expiratory Flow
Nichols, Travis; Osborn, Amy; Tindall, Kelly; Hiebert, Jean M.

Poster 19
Endotracheal Suctioning and Saline Instillation: A Systematic Review of the Literature
Lowman, John D.; Green, Courtney; Joseph, Darren; Weeks, Aaron.

Poster 20
Blood Lactate Response during Maximal Exercise in Parkinson's Disease On and Off Medication
DiFrancisco-Donoghue, Joanne; Lamberg, Eric M.; Werner, William G.

Poster 21
Physiological Effects of Nordic Walking versus Regular Fast Walking on Healthy Adults: A Pilot Study
Henderson, Roberta J.; Gronner, Kristin; Laughlin, Michelle; O'Brien, Nicole; Pacquette, Kristy; York, Jennifer.

Poster 22
Cardiovascular Responses to Different Times of Walk using Standard Walker and/or Platform Walker with wheels in Non Weight Bearing Individuals
Adah, Felix; Greenwald, Neva F.; Kuebler, Joy C.; Pearson, Becca.

Platform Presentations

INSPIRATORY MUSCLE STRENGTH TRAINING IMPROVES WEANING OUTCOME IN FAILURE TO WEAN PATIENTS. *[1]Martin, Danny; [1]Smith, Barbara K.; [3]Gonzalez-Rothi, Ricardo; [3]Harman, Eloise; [1]Deoghare, Harshavardhan; [1]Huang, Tseng-Tien; [4]Davenport, Paul; [2]Gabrielli, Andrea. [1]Physical Therapy, University of Florida, Gainesville, FL; [2]Anesthesiology/Critical Care, University of Florida, Gainesville, FL; [3]Medicine/Pulmonary & Critical Care, University of Florida, Gainesville, FL; [4]Physiological Sciences, University of Florida, Gainesville, FL, USA.*

Purpose/Hypothesis: Failure to wean (FTW) from mechanical ventilation (MV) is a major clinical and economic problem. Numerous animal studies and limited human data have shown that MV use rapidly leads to ventilator induced diaphragm dysfunction, which includes diaphragm atrophy and weakness and is a likely contributor to FTW. Several uncontrolled trials examining the effect of specific inspiratory muscle strength training (IMST) on weaning outcome exist, but no controlled trials have been conducted. We tested whether IMST would improve weaning outcome in FTW patients in a controlled trial. **Number of Subjects:** 35 subjects were randomly assigned to the IMST condition and 34 to a SHAM treatment. **Materials/Methods:** Patients were recruited from the medical and surgical ICUs of an academic health center, and informed consent was obtained. All subjects had failed to wean with usual medical care. IMST was performed with a threshold inspiratory device, set at the highest inspiratory pressure tolerated. The SHAM device was a modified Pflex resistive inspiratory training device that provided a low (-2 to -3 cm H2O) inspiratory pressure load. Both groups completed 4 sets of 6-10 training breaths, 5 days per week. All subjects performed progressively longer unsupported breathing trials daily per protocol. The weaning criterion was 72 consecutive hours without ventilator support. Subjects were blinded to group assignment, and were treated until weaned or 28 days. **Results:** Groups were similar in age, gender, cause of respiratory failure, amount of MV support required, arterial blood gases, PaO2/FiO2 ratio, dynamic lung compliance, lung resistance, prealbumin, smoking history and SAPS II score upon starting treatment. 43% of IMST subjects required renal replacement therapy, compared to 29% of SHAM subjects, p=.24. The IMST and SHAM groups respectively received 40±25 vs 46±32 days of MV support prior to starting intervention, p =.39. The IMST group's training pressure increased from -7.2±2.6. cm H2O pre-training to - 12.3±3.6 at post-training, p < .0001. The IMST group improved maximal inspiratory pressure (MIP) from -44±19 cm H2O pretraining to -55±18 post-training, while the corresponding values for the SHAM group were -43±18 cm H2O and -45±20. The MIP change between groups was significant, p < .001. The IMST and SHAM groups were treated for 15±8 and 18±9 days respectively, p =.13. 25 of 35 (71%) IMST subjects weaned, while 16 of 34 (47%) SHAM subjects weaned, p = .04. The number of patients needed to be treated with IMST to prevent a single weaning failure with the SHAM condition was 4. **Conclusions:** The results show that an IMST rehabilitation program can rapidly increase MIP and lead to an improved weaning outcome in FTW patients compared to usual care. **Clinical Relevance:** This is the first controlled trial examining the effect of an IMST rehabilitation program on weaning outcome in FTW patients and demonstrates a practical, strong treatment effect in this difficult patient population. Funded by NIH RO1 HD042705 to DM

ARE OXYGEN SATURATION AND HEART RATE CORRELATED WITH PERCEIVED FATIGUE AND DYSPNEA AFTER THE 6 MINUTE WALK TEST IN SURVIVORS OF ACUTE RESPIRATORY DISTRESS SYNDROME/ACUTE LUNG INJURY?
[1]Ciesla, Nancy; [2]Dinglas, Victor; [1]Vatwani, Archana; [1]Barbe, Cynthia; [1]Graham, Meagan; [2]Needham, Dale. [1]Physical Medicine and Rehabilitation, Johns Hopkins Hospital, Baltimore, MD; [2]Division of Pulmonary and Critical Care Medicine, Johns Hopkins University, Baltimore, MD, USA.

Purpose/Hypothesis To determine the correlation between perceived fatigue (FATG) and dyspnea (DYSP) utilizing the Borg Criterion Ratio-10 (CR-10) with heart rate (HR) and oxygen saturation (SpO2) in survivors of acute lung injury (ALI) undergoing a 6 minute walk test (6MWT). **Number of Subjects:** This report is part of an ongoing multi-site, prospective cohort study of long-term outcomes after ALI (NIH Grant # P50 HL073994). Participants were initially mechanically ventilated and consented to 6MWT at 3 months after ALI diagnosis. Eligibility criteria included an exclusion for patients with a life expectancy <6 months due to pre-existing disease. The 6MWT was completed by 99 patients (54% male, median age 47) with 98 HR and 78 SpO2 measurements available. **Materials/Methods:** Patient's HR, SpO2 and Borg CR-10 for FATG and DYSP were recorded at the beginning and end of the 6MWT. Correlations between HR and Sp02 versus Borg scores were calculated. Paired and independent z tests based on the Fisher z-transformation were used for comparing the dependent and independent correlation coefficients (CC). **Results:** We compared the correlations of HR and SpO2 versus FATG and DYSP using: (1) measures obtained after completing 6MWT, and (2) the change in measures from

post-6MWT minus pre-6MWT. (1) Measures after 6MWT* HR vs. FATG: r=0.12; HR vs. DYSP: r=0.20 (p=0.15); SpO2 vs. FATG: r=-0.18; SpO2 vs. DYSP: r=-0.29 (p=0.11). (2) Change in measures pre-and post-6MWT* HR vs. FATG: r= 0.04; HR vs. DYSP: r= 0.10(p=0.28) SpO2 vs. FATG r=-0.03; SpO2 vs. DYSP r=-0.14 (p=0.15) *The p-values are for comparison of the 2 CC in each row. Comparisons of each matching CC in (1) versus (2) had p>0.32. **Conclusions:** 1.The correlations between the Borg CR-10 scales for DYSP and FATG versus HR and SpO2 physiological measurements are non-significantly greater when comparing the values after 6MWT rather than the change in these values between the start and end of 6MWT. 2. The Borg DYSP (vs. FATG) scale had a non-significantly stronger correlation with HR and SpO2. 3. The correlations of Borg DYSP and FATG scales with HR and Sp02 are not strong. The 6MWT may not provide an adequate exercise (EX) stimulus, or the Borg scale may not closely reflect these physiological measures after ALI. Multiple factors aside from HR and Sp02 may underlie these patients' perceived DYSP and FATG. 4. Larger studies are needed to confirm these conclusions and to investigate the factors associated with patient DYSP and FATG after exercise. **Clinical Relevance** Perceived exertion has been described as the single best indicator of physical strain. With improving ICU mortality for ALI, a growing number of survivors require physical therapy. Physical therapists frequently prescribe walking programs using the CR-10 scale. Although this scale is widely used based upon high correlations with HR in small studies of <20 normal subjects who cycled and performed arm EX, this larger-sized study demonstrated that HR and SpO2 may be better indicators for prescribing low intensity EX, such as a walking program, in patients recovering from ALI.

FURTHER EVIDENCE OF THE CLINICAL UTILITY OF THE SUPINE TO STAND TEST IN HEART FAILURE.

[1]Healey, Lauren J.; [1]Knocke, Ann; [1]Dreyer, Hazel; [1]Rubenstein, Joel J.; [2]Cahalin, Lawrence.
[1]Newton Wellesley Hospital, Newton, MA; [2]Northeastern University, Boston, MA, USA.

Purpose/Hypothesis: The cardiovascular response (CVR) to orthostatic stress (OS) has been extensively examined in health and disease, but its clinical utility in congestive heart failure (CHF) has not been fully appreciated. The CVR to OS in patients with CHF has been observed to be different from that in persons without CHF. In fact, patients with CHF have been observed to have increased tolerance to OS and demonstrate a decrease, rather than the normal increase, in diastolic blood pressure upon standing. We hypothesized that patients with stable CHF will have a CVR to OS which will be different than that of patients who have a diagnosis of coronary disease without CHF, and that of a control group. **Number of Subjects:** The CHF group (N=39) consisted of patients with stable CHF (59% men, mean age 76.5) and the cardiac rehabilitation group (CRP) contained 39 patients with cardiovascular disease, but without CHF (72% men, mean age 66). The control group (N=20) consisted of healthy age-matched subjects (45% men, mean age 66.6) without known cardiac disease and not taking anti-hypertensive medications. **Materials/Methods:** A prospective study using a convenience sample of CHF and CRP patients at a community hospital. Each subject performed 2 supine to stand trials. The first trial was preceded by a 5-minute supine rest, and the second trial was preceded by a 15-minute supine rest. The CVR was obtained with a Propaq monitor (Welch Allyn Inc, NY) and included heart rate (HR); systolic, diastolic, and mean arterial blood pressure (SBP, DBP, and MAP, respectively); ECG rhythm; and symptoms within one minute of standing. B-natriuretic peptide (BNP) was measured prior to OS testing. Statistical analyses included calculation of means and standard deviations, one-way and repeated measures ANOVA, and correlation analyses. **Results:** The mean age of the patients in the CHF group was significantly greater ($p<.05$) than that of the other groups. The change in the CVR from supine to standing during Trial 2 was significantly less than in Trial 1. A significant decrease in DBP and MAP was observed in the CHF group ($p<.05$). The change in HR was not significantly different among groups and no significant medication effect upon CVR was observed. Significant correlations were observed between change in DBP and BNP ($r=.64$, $p=.002$), and change in MAP and BNP ($r=.54$, $p=.01$). **Conclusions:** Patients with CHF were observed to have a significantly lower DBP during OS than patients without CHF and control subjects. The 15-minute supine rest period of Trial 2 was associated with less hemodynamic change than the 5-minute rest period of Trial 1. The significant correlations of BNP to CVR identify the potential role of examining the CVR to OS in patients with CHF. **Clinical Relevance:** The CVR to OS appears to be useful in distinguishing patients with CHF from individuals without CHF. Medications were not observed to significantly affect the CVR response enabling patients to continue their medical regimen during such testing. The CVR response of patients with CHF to OS is related to BNP levels and requires further investigation.

AN ALTERNATIVE LYMPHEDEMA THERAPY PROTOCOL FOR A PATIENT WITH LOWER EXTREMITY LYMPHEDEMA AND CONGESTIVE HEART FAILURE.

[1]Greene, Revenda A.; [2]Fowler, Rhonda B.; [1]Karavatas, Spiridon. [1]Physical Therapy, Howard University, Washington, DC; [2]Rehabilitation Services, Doctors Community Hospital, Lanham, MD, USA.

Background & Purpose: Lymphedema is a chronic condition characterized by the abnormal accumulation of interstitial fluid, due to insufficiency of the lymphatic system. The most common physical therapy interventions for lymphedema include a combination of skin care, isotonic exercise, manual lymph drainage, compression bandaging and intermittent compression therapy. Intermittent compression therapy is a valuable tool for the reduction and maintenance of lymphedema. However, use of that modality has several contraindications, among them congestive heart failure (CHF). The purpose of this case report is to illustrate the role of an alternative treatment protocol, without intermittent

compression therapy, in decreasing the (R) lower extremity (LE) circumference of a patient with lymphedema and CHF. **Case Description:** The patient was a 70 year old male, who had a quintuple coronary artery bypass graft approximately two years prior to physical therapy intervention. Subsequent to that surgery, he was diagnosed with CHF. Additionally the saphenous vein graft site in the (R) LE became infected. The patient developed venous insuffiency, which progressed to lymphedema in the (R) LE. At the time of the physical therapy examination, the patient was diagnosed with Stage II lymphedema in the (R) LE. The circumference of the (R) LE was a total of 91 cm greater than that of the (L) LE. The patient used a straight cane for ambulation, and his gait was characterized by a wide base of support with a lateral shift. The patient was seen as an outpatient for physical therapy, 3 x week for 7 weeks. The use of intermittent compression therapy was contraindicated due to the CHF comorbidity. The physical therapy interventions included skin care, manual lymph drainage, therapeutic exercise, compression bandaging, and patient/family education for lymphedema precautions, compression bandaging and a home exercise program. **Outcomes:** After seven weeks of therapy, the patient achieved an reduction in (R) LE circumference of 90.5 cm, thus making the total circumference of both LEs almost identical. His gait was normal, and he no longer required a cane for ambulation. This outcome represented an optimal reduction of lymphedema. The patient was able to maintain the reduction via the use of self bandaging, compression garments and a home exercise program. The patient was pleased with the outcome, and reported that he was able to perform all functional activities without difficulty. **Discussion:** The described intervention served the needs of this patient by promoting a significant reduction of the (R) LE edema. The functional recovery course of this patient was parallel to the ones outlined in the literature. This report is of descriptive nature, and the information provided is experiential. The intent of this case report is to provide fellow clinicians with an alternative lymphedema intervention in cases where the use of intermittent compression therapy is contraindicated.

THE INFLUENCE OF CARDIOVASCULAR RISK AND COMORBIDITY ON PHYSICAL THERAPY OUTCOMES.

[1]Scherer, Susan; [1]Bartlett, Rebecca; [1]McMicken, Ashlee; [1]Haugland, Deming; [1]Berkshire, Sarah; [1]Martina, Evan; [1]Reyes, Katherine N. [1]School of Physical Therapy, Regis University , Denver, CO, USA.

Purpose/Hypothesis: Physical therapists routinely treat patients with comorbid medical conditions as part of a plan of care to improve physical function and quality of life. Exercise increases the risk of cardiovascular events in patients with risk of cardiovascular disease, however cardiovascular risk status is not routinely performed as part of an initial screening. Few studies have examined the effect of comorbidities and cardiovascular risk status on functional outcomes in physical therapy practice. The objective of this study is to examine the influence of comorbid conditions on physical therapy specific outcomes and the association of cardiovascular risk stratification on successful versus non-successful outcomes. **Number of Subjects:** 244 clinical cases were analyzed. **Materials/Methods:** This is a retrospective analysis of the influence of comorbid conditions and cardiovascular risk status on physical therapy specific outcomes. Regis University physical therapy students while on clinical rotations from 2006 to 2009 collected data on routine physical therapy care using outcome measures for 5 different body regions. Patients were assigned to one of three cardiovascular risk strata identified by the American College of Sports Medicine (ACSM) based on the presence of comorbid risk factors. Physical therapy outcomes were defined as success if the minimal clinically important difference (MCID) was achieved on the outcome measure used for the body region treated. Outcomes were coded for success or no success based on the MCID achieved. The Chi-square statistical test was used to analyze differences in patient characteristics across the 5 body region groups. A logistic regression statistical analysis was used to examine whether cardiovascular risk status could predict success vs. no success. **Results:** The mean age of the subjects was 43.27 years (SD±18 years). Of the subjects, 43.8% were classified into the low cardiovascular risk strata, 37.50% in the moderate risk strata and 18.8 % into the high-risk strata. There was no difference between the body region groups in any characteristic except physical activity, ($p = 0.006$). There was no statistical relationship between ACSM risk classification and success/no success. Also, no statistical significance was found between the length of treatment time and success/no success. **Conclusions:** In younger adults patients with predominantly low cardiovascular risk, cardiovascular risk status was not associated with poor success in physical therapy outcomes. **Clinical Relevance:** Cardiovascular risk stratification by students and clinicians in the physical therapy setting is feasible. The majority of patients seen by students were in a low cardiovascular risk category, which may not accurately represent physical therapy practice. Larger sample sizes and alternative methods of classifying successful physical therapy outcomes are suggested for future analysis. Further investigation is also needed as to whether cardiovascular risk status changes the process of delivery of care rather than outcomes.

A NOVEL APPROACH TO A TYPICAL CARDIAC REHABILITATION PROGRAM: FOR YOUR HEART, AN EXERCISE DVD.

[1]Cleary, Kimberly K.; [1]LaPier, Tanya; [1]Jamison, Ashley; [1]Beadle,Christopher. [1]Eastern Washington University, Spokane, WA, USA.

Purpose: Participation in a cardiovascular exercise program is a key intervention for facilitating secondary prevention of cardiovascular disease (CVD). Although exercise is a powerful intervention, many barriers exist for patients to adopt and maintain exercise. Due to factors such as financial constraints, limited accessibility, and lack of physician referral, fewer than half of all patients who are eligible for outpatient cardiac rehabilitation (CR) programs actually

enroll after being discharged from acute care hospitals. Therefore, the inpatient hospital stay may be the only opportunity to provide education and exercise prescription to many patients with CVD. Due to factors such as shorter lengths of stay, effective and efficient methods of providing health education to hospitalized patients are essential. The purpose of this project was to create a comprehensive exercise program to allow patients to exercise safely in lieu of or in addition to participation in a formal CR program. **Description:** The For Your Heart Exercise DVD was created as a resource for patients with CVD to begin or continue exercising following hospital discharge. Media format and user preferences were determined based on results from a previous study on availability of and confidence using technology within this patient population. Based on those results, a digital video disc (DVD) program format was determined to be the most feasible. For Your Heart is divided into three main sections: Before You Begin, Stretch and Strengthen, and Aerobic Workout. The Before You Begin section provides an overview of how to use the DVD, and includes safety considerations before beginning exercise, signs and symptoms to report to the physician, what to do in an emergency, and safe exercise progression. The Stretch and Strengthen section provides three different levels of difficulty: beginner, intermediate, and advanced, with suggestions of where to start based on prior level of activity, medical diagnosis, and whether return to full activity without restrictions has been allowed. The Aerobic Workout section is comprised of five segments: warm-up, workout segments 1, 2 and 3, and cool-down. Sections can be used in different combinations to alter the length and/or variety of the aerobic workout, ranging from 10 to 45 minutes as the participant's endurance and tolerance for exercise improves. The aerobic workout also provides three options for the level of intensity by following specific participants identified by shirt color on the DVD. **Summary of Use:** The For Your Heart Exercise DVD will be distributed locally to patients hospitalized for CVD or participating in local outpatient cardiac rehabilitation programs. Local distribution will include product pilot testing, which will ideally lead to distribution on a national level. **Importance to Members:** For Your Heart will be a useful resource for physical therapists and patients with CVD to facilitate the development of exercise self-management skills and the transition to maintaining independent, lifelong exercise behaviors.

THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY AND PHYSICAL FUNCTION IN INDIVIDUALS POST-BARIATRIC SURGERY.

[1]Josbeno, Deborah; [2]Jakicic, John; [3]Kalarchian, Melissa; [1]Sparto, Patrick J.; [2]Otto, Amy. [1]Physical Therapy, University of Pittsburgh, Pittsburgh, PA; [2]Health and Physical Activity, University of Pittsburgh, Pittsburgh, PA; [3]Psychiatry, University of Pittsburgh, Pittsburgh, PA, USA.

Purpose/Hypothesis: This study characterizes the physical activity profile and physical function of subjects 2-5 years post bariatric surgery. Additionally, this study examines the association between physical activity, physical function and weight loss after bariatric surgery. **Number of Subjects:** Participants included 37 adults (34 female and 3 male) with a mean age of 50.8 ±1.0 years. All subjects were 2-5 years post bariatric surgery. **Materials/Methods:** Physical activity was assessed with an activity monitor (SenseWear® Armband) worn for 7 consecutive days. Physical function was assessed using the physical function subscale of the Medical Outcome Short Form-36 (SF-36PF). Standardized measures of height and weight were obtained on all subjects. **Results:** %EWL was 62.2 ±19.9. Objectively measured physical activity was 205.3 ±136.9 min/wk when activity was defined as ≥3METs/min for bouts ≥1 min in duration. When physical activity was defined as ≥3 METs/min for a duration of ≥10 minutes, the mean was 47.6 ± 69.8 min/wk. The physical function mean score was 85.3 ± 23.9 on SF- 36PF. %EWL was significantly associated with physical activity (r=0.47, p<0.01) and physical function (r=0.35, p=0.03). However, physical activity was not significantly associated with physical function (r=0.20, p=0.24). **Conclusions:** The magnitude of excess weight loss after bariatric surgery is related to higher levels of physical function and greater physical activity. The high physical function scores suggest that subjects are capable of performing most mobility activities. However, the lack of an association between physical function and physical activity may suggest that a higher level of physical function does not necessarily correspond to a higher level of physical activity participation in this patient population. Thus, further research is needed to understand the relationship between physical activity and physical function as it relates to surgical weight loss. **Clinical Relevance:** The lack of an association between physical activity and physical function suggests that barriers to the adoption of a more physically active lifestyle may not be fully explained by the subjects' physical limitations. Thus, more work is needed to design interventions which are specifically targeted at increasing physical activity participation in this population.

LIPID AND FITNESS PROFILES OF NORMAL WEIGHT, OVERWEIGHT AND OBESE RURAL PREHYPERTENSIVE WOMEN.

[1]Hageman, Patricia A.; [2]Pullen, Carol H.; [3]Boeckner, Linda S.; [2]Walker, Susan N. [1]Physical Therapy Education, University of Nebraska Medical Center, Omaha, NE; [2]College of Nursing, University of Nebraska Medical Center, Omaha, NE; [3]Extension, University of Nebraska-Lincoln, Scottsbluff, NE, USA.

Purpose/Hypothesis: The purpose of this study was to determine the differences in lipid profiles and fitness levels among normal weight (BMI<25 kg/m2), overweight (BMI=25-29.9 kg/m2)and obese (BMI≥30 kg/m2) midlife and older prehypertensive rural women. The literature suggests that women are unaware the threat to health that prehypertension may pose. We were interested in whether there were differences in markers of cardiovascular risk, both lipids and fitness, related to categories of body mass index as peri- and post-menopausal women are vulnerable to weight gain. **Number of Subjects:** Baseline data was analyzed from

a convenience sample of 289 prehypertensive (BP 120-139 mmHg Systolic or 80-89 mmHg Diastolic) rural women ages 40-69 who were enrolled in a clinical trial that focused on lifestyle changes of healthy eating and activity to reduce blood pressure. The women were predominately white (99%), aged 55.9±6.4 yrs, 83% married, 79% employed either full- or part-time, and 49% had a family income of $20,000- 59,000 with 44% having a family income of $60,000+. The majority of women were overweight (n=110;38%) or obese (n=125;43%). **Materials/Methods:** Women completed an extensive screening to confirm they met the strict inclusion criteria to participate in this study. There were numerous exclusion criteria and women were excluded if they were taking antihypertensive medication, diuretics or cortisone. Upon providing informed consent, baseline blood pressure was recorded as the average of 4 measures taken during 2 separate visits one week apart following the JNC 7 guidelines. Height and weight were measured for calculation of body mass index. Following appropriate fasting guidelines, blood samples were taken and analyzed for serum lipids (total cholesterol, HDL & LDL, and triglycerides). As an indicator of fitness, resting heart rate was measured following 5 minutes of quiet sitting. The 1-mile walk test was used to estimate VO2max based upon the woman's age, walking time, and 15-second heart rate upon completion of the walk. **Results:** Two separate MANOVAS with Bonferroni correction were conducted for lipid and fitness measures. Group differences were found for 2 serum lipids ($F=7.76$, $p<.001$) and for 1 fitness measure ($F=3.01$, $p<.001$). Post-hoc analyses revealed differences between all 3 BMI groups for triglycerides and estimated VO2max, and between normal and obese women for HDL cholesterol. **Conclusions:** Triglycerides, HDL cholesterol, and estimated VO2max differed significantly across BMI categories, with the healthiest values noted among women in the normal weight category. **Clinical Relevance:** While prehypertension was found among women in all 3 BMI categories, women classified as obese had lipid and fitness measures that were considered high risk for cardiovascular disease. Blood pressure screening and health promotion counseling for obesity and fitness appears warranted for peri- and post-menopausal women as part of regular clinician practice. Funded by NIH NINR 2 RO1 NR04861.

TRAINING ADAPTATIONS IN WOMEN FOLLOWING A NINE MONTH EMPLOYEE WELLNESS PROGRAM: A SUMMATIVE EVALUATION STUDY.

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Purpose/Hypothesis: Physical therapists were invited to critically appraise the effectiveness of a nine month voluntary worksite wellness program through evaluation of changes in participants' physiologic, anthropometric, and serum measures and qualitative information from the program director and staff. **Number of Subjects:** Following institutional board approval, 68 female employees (age 47.0 ± 9.9 years) signed informed consent and voluntarily participated in a University based worksite wellness program. **Materials/Methods:** The study design was a summative evaluation of pre and post test data and qualitative information from the wellness program director and staff. Subjects participated in a worksite program consisting of health promotion and wellness education, nutrition counseling, exercise training guidelines, and stress management opportunities. Participants had regular contact with health and wellness mentors for information, motivation and support. Prior to and following the nine month program, exercise science graduate students performed the physiologic and anthropometric measures, and two certified medical technicians at the University's Health Center performed blood draws and serum analysis. Statistical analysis using the Wilcoxon Sign Rank test examined differences between pre to post test measures with $p \leq .05$. **Results:** 54 women (46.87 ± 10.37 yrs) completed the program. The primary reason given by women who left the program was lack of time. Modest but significant improvements were found following participation for resting heart rate ($p<0.001$), systolic ($p=0.003$) and diastolic ($p=.017$) blood pressure, body mass index ($p<0.001$) and weight ($p<0.001$). No clinically or statistically significant improvements were found for aerobic fitness measures or serum measures such as cholesterol profiles, triglycerides, glucose levels or C-reactive proteins. Qualitative assessment suggested that program limitations included ineffective tracking of participatory attendance, individualized program choices leading to inconsistent training adaptations, and possible measurement errors from predictive level fitness tests. **Conclusions:** Study results suggest that the worksite program had positive effects on some measures of health and wellness for most participants. Summative evaluation revealed program improvements were required for tracking participatory attendance and intensity of training, for using standardized exercise tests and measures to reduce potential measurement errors, for consistent education on effective training parameters, and enhancing motivation to promote participation. **Clinical Relevance:** Data from this study suggests that onsite voluntary worksite programs are beneficial for promoting health and wellness in female employees; however, providing consistent exercise training guidelines and tracking participatory attendance including exercise duration and intensity are recommended to promote further improvements in employee health and wellness outcomes.

THE FREQUENCY AND USE OF PATIENT SIMULATORS IN U.S. PHYSICAL THERAPY SCHOOLS.

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Purpose/Hypothesis: A recent study at Wake Forest Medical Center demonstrated that Physical Therapy (PT) reduced the length of patients' hospital stay. Unfortunately there is a world wide shortage of physical therapists willing to work in acute/intensive care settings. Roskell showed that

the reasons physical therapists give for not working in these settings include: 1) fear-avoidance due to the high patient mortality rate; 2) dissatisfaction with professional skills related to working in this setting; and 3) dissatisfaction with professional skills related to responding to a medical emergency. Patient simulators come in many forms including life size mannequins connected to a computer and other electronic equipment that give the simulators the capacity to talk, have breath sounds, heart tones, etc. Simulation allows an instructor to recreate patient situations and emergencies that occur in acute/intensive care settings without compromising patient safety. The purpose of this study was to determine how many PT schools in the U.S. are currently using patient simulators and examine the manner in which they are being used.**Number of Subjects:** We contacted the 210 CAPTE accredited PT schools in the U.S. listed on the APTA website. **Materials/Methods:** We developed a 10 question survey regarding the use of patient simulators in PT schools. The survey was posted on the internet using "Flashlight" software. We contacted each school with an email that included a unique password and link to the survey. Schools that did not respond to the initial request for participation were sent a follow-up email request about 1 month later. **Results:** We received completed surveys from 140 PT schools (67% response rate). Sixty-one (43.7%) of the respondents reported using patient simulators. Forty-eight (79.0%) of the schools using simulators had a MD &/or RN program that utilized simulators. Of the PT schools that did not use simulators only 61.3% had a MD &/or RN program that used simulators. Simulators were used to train PT students to: take vital signs (35.5%); perform a cardiopulmonary exam (79.0%); perform an examination in an acute/intensive care setting (58.1%); &/or respond to a life-threatening medical emergency (46.8%). **Conclusions:** The results of this study demonstrate that the use of patient simulators is a common occurrence in PT schools in the U.S. Simulators are used most frequently for performing a cardiopulmonary exam but they are also being used to a significant degree to simulate acute/intensive care settings and life-threatening medical emergencies. **Clinical Relevance:** Most PT students never witness nor participate in recognizing and responding to a medical emergency during their clinical affiliations. As a result the first time most physical therapists witness a medical emergency is after they have completed their entry level training. We believe that we can use patient simulators in a safe environment that increases the skills and confidence of PT students/clinicians for work in acute/intensive care settings and for recognizing and responding to medical emergencies.

FACILITATING PERCEIVED COMPETENCE IN CLINICAL DECISION-MAKING.

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Purpose/Hypothesis: This project's purpose was to determine if a unique teaching method would improve student perceptions of competence in clinical decision-making. **Number of Subjects:** DPT students (n=58) in their final academic semester gave their informed consent to participate as part of a Cardiovascular and Pulmonary Physical Therapy course. **Materials/Methods:** Student were included if s/he completed: a baseline (week 3) and follow-up (week 12)rating of perceived level of competency according to 8 criterion, Clinical Reasoning being one, from the Physical Therapist Clinical Performance Instrument (PTCPI); a practice assignment during week 1; and, 5 subsequent worksheets. A deck of cards was modified to contain 5 suits, one for each of the 4 Preferred Practice Patterns (i.e. Hearts, Diamonds, Clubs, and Spades for Cardiovascular/Pulmonary, Integumentary, Neuromuscular, and Musculoskeletal, respectively) and a 5th equating to a personality/culture attribute. Within each suit (ex. Hearts) the severity of a comorbid condition decreases as the face value of the card increases (i.e. two of hearts - Heart Failure and Claudication as compared to Ace of hearts - no risk for CAD, CVA, or DM). One card from each suit is dealt to create a patient scenario. A predetermined physical therapy referral (i.e. "Evaluate & Treat") in an Acute Care practice setting was specified. The patient scenario was then examined and evaluated with a decision required to be made (ex. whether or not to treat).More cards (from 7 to 15)were dealt during subsequent weeks to increase the complexity of the patient profile. After a 20-minute discussion session, students turned in an assignment that addressed the following: 1) How did the cards dealt influence or alter each other? 2) How did each of the cards impact your physical therapy Examination and Evaluation? and, 3) How did the hand you were dealt alter your physical therapy Plan of Care? **Results:** At the baseline PTCPI assessment, 6 students (10.3%) rated themselves at or above entry-level competence as compared to 19 (32.8%) below in all 8 criterion. At follow-up, a percentage improvement in ratings at or above entry-level competence occurred in all 8 criterion (i.e. Evaluation (15.5%); Screening (17.2%); Plan of Care/Clinical Reasoning/Examination (19.0% for each); Procedural Interventions (22.4%); Cultural Competence (51.7%); and Safety (53.4%). Percentage increases in perceived competence occurred as follows: Plan of Care (46.5%), Safety (50%), Cultural Competence & Evaluation each (51.7%), Procedural Interventions (60.3%), Examination (63.8%), Screening (67.2%), and Clinical Reasoning (70.7%). **Conclusions:** This teaching method contributed to positive changes in student perceptions of competence in all 8 PTCPI criterion studied, especially in Clinical Reasoning. **Clinical Relevance:** A higher level of perceived competence is critical to success during DPT internships. This innovative teaching strategy challenges the physical therapy student to make appropriate clinical decisions within the context of the Guide for Physical Therapist Practice.

SELF REPORTED FREQUENCY AND IMPORTANCE OF MEASURING HEART RATE AND BLOOD PRESSURE AT PHYSI-

CAL THERAPY CLINICAL SITES: A DESCRIPTIVE STUDY.

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Purpose/Hypothesis: Cardiovascular disease is responsible for nearly two in five deaths in the United States. The impact this has on American health requires healthcare providers of varied backgrounds to screen and evaluate cardiac measures including heart rate (HR) and blood pressure (BP). The Guide to Physical Therapy Practice states a physical therapist (PT) is to perform a systems review, including HR and BP. The purposes of this study was to 1) assess clinical site instructors (CI's) and Doctorate of Physical Therapy (DPT) students current practice of assessing HR and BP in a variety of practice settings, and 2) to determine if there are correlations between the types of practice settings and assessment of HR and BP. **Number of Subjects:** A sample was recruited from 150 CI's affiliated with one university's physical therapy program, and 28 DPT students from the same university cohort. Total survey return rate was 43% (N=18 students, N=58 CIs). **Materials/Methods:** An 11-item survey and informed consent was obtained by subjects through mailings. Although reliability of the survey was not confirmed, content and face validity were reviewed. Survey questions asked respondent to categorize the frequency, perceived importance and reasons for omission of HR and BP assessment. **Results:** The results of this study showed that CI's in an outpatient setting never or seldom check HR (72%), compared to students in the same practice setting who never and seldom check HR (82%). CI's in an acute care with rehab setting responded to always and about half the time checking HR (67%), compared to students who responded to always and about half the time to checking HR (100%). CI's in an outpatient setting never and seldom check BP (85%), compared to students in outpatient settings who never and seldom (92%) check BP. CI's in an acute care with rehab setting responded they always or about half the time check BP (33%) compared with students who responded 67%. When asked if measuring HR and BP was important, 87% of students and 37% of CI's responded yes. Not required, checked by others, and lack of time were stated reasons for HR and BP omission. **Conclusions:** Students were more inclined than CI's to believe that checking HR and BP was important. In an outpatient setting only 6% of CI's always assess HR and BP, compared to an acute care with rehab setting where 33% of CI's and students equally reported always assessing HR and BP. Limitations to this study include survey reliability and type I and II errors. **Clinical Relevance:** National emphasis on the prevention of cardiovascular disease and its risk factors has been recognized through the United States health objectives. HR and BP assessment may identify potential cardiovascular risks during a physical therapy intervention and assists in determining a patients' plan of care. A PT's decision to include or omit these measures could impact a patient's overall health and wellness.

ANAEROBIC THRESHOLDS OF PATIENTS AFTER TRAUMATIC BRAIN INJURY: COMPARISON TO HEALTHY SEDENTARY CONTROLS.

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Purpose/Hypothesis: The purpose of this investigation was to compare the anaerobic thresholds (AT) of individuals with a traumatic brain injury to healthy sedentary controls. **Number of Subjects:** Twelve patients who had previously suffered a traumatic brain injury (TBI; 7 males and 5 females) were compared to 12 apparently healthy sedentary control subjects (CON; 6 males and 6 females) with no known history of brain injury. Participants with TBI were admitted to a post-acute residential treatment center and had no obvious physical impairments. They were admitted primarily for cognitive and behavioral therapy. All subjects gave informed written consent. **Materials/Methods:** All subjects performed a graded maximal treadmill test where ventilation and expired gases were measured continuously with an automated metabolic cart. Heart rate (HR) was measured with a three lead electrocardiogram. After testing, AT was determined using the combined V-Slope and ventilatory equivalent for oxygen (VE / VO2) increase methods that closely corresponds with the lactate threshold. Exercise time, relative VO2 (mL . kg-1 . min-1), percent of VO2 max at AT, respiratory exchange ratio (RER; VCO2 production / VO2 consumption), and HR at AT were recorded and compared (Bonferroni adjusted t-tests; alpha = 0.05). **Results:** For subjects with TBI, the AT occurred 2.9 minutes earlier than the CON subjects ($p = 0.04$). The VO2 at AT was 12.8 ± 4.6 and 20.4 ± 5.0 mL . kg-1 . min-1 in the TBI and CON, respectively ($p = 0.001$). AT occurred at 45.8 ± 9.6% (TBI) and 57.3 ± 7.9% (CON) of maximum VO2 ($p = 0.01$). There was no difference in the RER ($p = 0.81$) or HR ($p = 0.37$) at AT between groups. **Conclusions:** These data indicate that there is a marked difference in the AT of patients with a TBI compared to healthy sedentary individuals. While the onset of fatigue has multiple causes, these results suggest that the earlier onset of AT is likely a significant contributor to chronic fatigue experienced by individuals recovering from brain injury. **Clinical Relevance:** The AT values measured in this study for patients with a TBI are at or below the metabolic demands for many routine activities of daily living (e.g., sweeping, household laundry). When feasible, rehabilitation of patients with a TBI should include intense physical exercise as a primary intervention to improve aerobic capacity and delay the onset of significant anaerobic metabolism.

RELIABILITY OF AN ARMBAND ENERGY EXPENDITURE MEASUREMENT DEVICE: A META-ANALYSIS.

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Purpose/Hypothesis: Physical therapists require accurate energy expenditure measures to develop safe, effective exercise and weight management protocols. Current measures require sophisticated laboratory equipment. A lightweight, portable armband device is available, but reliability has not been evaluated through systematic review

and meta-analysis. This meta-analysis examined differences and agreement between the Sensewear Armband (SWA) and simultaneous gold standard measures using indirect calorimetry (IC). **Number of Subjects:** 19 studies (n=1299) containing 54 total trials (resting, exercising, and total daily calories) were found that provided means and standard deviations in kcal/min. **Materials/Methods:** Systematic review and random effects meta-analysis were performed using criterion studies that compared SWA to simultaneous IC using stationary or portable metabolic carts. **Results:** Analysis found the combined average overall difference was 0.057 kcal/min (95% CI=-0.079 to 0.194), (tau squared= 0.177) (d=0.042), the average resting measure difference from 10 trials (n=428) was 0.030 kcal/min (95% CI = -0.074 to 0.135), (d=0.027, tau squared=0.024), the average exercise difference from 35 trials (n=702) was 0.068 kcal/min (95% CI=-0.370 to 0.507), (d=0.074, tau-squared=1.588), and total daily measure difference from 9 trials (n=169) was 0.067 kcal/min (95% CI=-0.180 to 0.315), (d=-0.077, tau-squared=0.116). Five studies with 13 trials (n=316) presented only Pearson r-value terms. Average combined overall agreement was r=0.795 (95% CI=0.698 to 0.863) (tau squared=0.116), average rest agreement from 4 trials (n=106) was r=0.766 (95% CI=0.669 to 0.838), tau squared< 0.001), average exercise agreement from 7 trials (n=179) was r=0.770 (CI=0.596 to 0.875), (tau squared= 0.158), and average daily total measurement agreement for 2 trials (n=31) was r=0.915 (95% CI=0.693 to 0.979), (tau squared=0.154). **Conclusions:** Meta-analysis results suggest that mean SWA does not significantly differ from IC. Further, agreement between SWA and IC based on r-value correlations was good; therefore, SWA measures appear comparable to IC for the conditions examined. Further study is recommended to examine SWA reliability during low intensity activities and in individuals with health or movement limitations. **Clinical Relevance:** This study suggests that the SWA is an effective method for measuring energy expenditure during exercise activities.

AGREEMENT OF ARMBAND ENERGY EXPENDITURE MEASURES TO INDIRECT CALORIMETRY FOR ACTIVITIES OF DAILY LIVING: A RELIABILITY STUDY.

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Purpose/Hypothesis: Physical therapists require accurate measures of energy expenditure to develop safe and effective rehabilitation protocols. The Sensewear Armband (SWA) Kilocalorie (Kcal) measures appear comparable to indirect calorimetry (IC) for exercise activities; however, agreement between SWA and IC has not been determined for low intensity activities commonly used in rehabilitation. In addition, agreement between SWA measures obtained from the right arm (RA) compared to the left arm (LA) has not been assessed. This study examined agreement between SWA and IC for rest and five activities of daily living (ADLs) and then examined agreement between RA and LA measures. **Number of Subjects:** Following Institutional Review Board approval, ten female volunteers (26.4 ± 2.6 yrs) signed informed consent and participated in the study. **Materials/Methods:** A prospective methodological design assessed agreement between simultaneous IC using a Metabolic Cart and SWA RA and LA measures. Participants performed five ADLs, three times for three minutes (90 data points per activity), using standardized, timed movements. **Result :** Overall average Kcals for all activities were 2.18 ± 1.20 for IC, 2.02 ± 0.96 for RA, and 2.00 ± .91 for LA. Overall agreement between IC and RA (ICC=.570, p=.500) and IC and LA (ICC=.449, p=.500) was not significant; RA was 6.99% lower and LA 7.95% lower than IC. Overall agreement between RA and LA was significant (ICC=.870, p=<.001) with LA 1.04% lower than RA. RA was not in significant agreement with IC at rest (ICC=.331, p=.500)at 4.35% lower, or for supine-to-sit transfers (ICC=.254, p=.494) at 45.47% lower; sit-to-stand transfers (ICC=.538, p=.439) at 30.19% lower; donning a sock (ICC=.192, p=.500) at 16.85% higher; combing hair (ICC=.434, p=.491) at 24.07% higher; and donning a shirt (ICC=.457, p=.459) at 60.72% higher. **Conclusions:** Study results suggest that agreement between SWA and IC Kcal measures were not significant during low intensity ADLs. Further study is recommended to determine whether temperature variations during rest or low intensity activities are not sufficient for detection and interpretation. Study results suggest armband measures taken from the right or the left arms are comparable. **Clinical Relevance:** The SWA requires further development to provide reliable energy expenditure measures during rest or low intensity activities of daily living. Bilateral use of SWA is not contraindicated.

Poster Presentations

CARDIOVASCULAR EFFECTS AND ENERGY EXPENDITURE IN HEALTHY NORMAL CHILDREN DURING HORSEBACK RIDING: A PILOT STUDY.

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Purpose/Hypothesis: The purpose of this study was to investigate the effects of horseback riding on the heart rate (HR), blood pressure (BP), rating of perceived exertion (RPE), and caloric expenditure of normal healthy children. It was expected that HR, BP, RPE, and caloric expenditure would increase during horseback riding. **Number of Subjects:** Twelve healthy normal children (mean age = 10.333 years, SD=1.371 years). **Materials/Methods:** A parent of each volunteer participant completed the informed consent process. Participants completed a pretest survey and obtained pretest HR, BP, RPE, and caloric expenditure measurements. The participant rode in their usual horseback riding lesson and wore a portable heart monitor to measure the mean HR, maximum HR, and calories expended during the lesson. Posttest HR, BP, RPE, and caloric expenditure

measurements were obtained and participants completed a posttest survey. **Results:** There was a statistical difference between the maximum HR during the lesson and pretest HR, maximum HR and posttest HR, maximum HR and mean HR during the lesson, mean HR and pretest HR, mean HR and posttest HR, but not between the posttest HR and pretest HR. There was a statistical difference between calories expended and calories expended per minute at pretest and during the lesson and between the lesson and at posttest, but not between the calories expended and calories expended per minute at pretest and posttest. A high positive correlation existed between the participant's mean HR and calories expended per minute during the lesson. A moderate negative correlation existed between the length of the lesson and the calories expended per minute during the lesson. A moderate-high positive correlation existed between the participant's riding experience and the calories expended per minute during the lesson. A statistical difference was not found between pretest and posttest BP. Despite the increased HR and caloric expenditure during riding, approximately half of the participants reported horseback riding as physical exercise. This study supported the classification of horseback riding as a physical activity by the US Department of Health, ranging from moderate activity with general horseback riding activity and vigorous activity dUring horseback riding at higher speeds. The mean rate of calories expended per minute in this study is 3.174 calories per minute (SD = 1.150), or approximately 190 calories per hour. This is comparable to moderate speed walking. **Conclusions:** The results suggest an increased HR and caloric expenditure during horseback riding in healthy normal children. Further research is needed to assess what aspects of horseback riding – riding style, duration, speed, etc. – contribute to increased caloric expenditure, as well as whether similar or different cardiovascular changes and energy expenditure would be seen in children with pathology. **Clinical Relevance:** Although this pilot study demonstrates some physiological changes in healthy normal children during horseback riding, it may not necessarily be perceived as physical activity.

EXAMINATION OF THE ASSOCIATION BETWEEN A CHILD'S HEALTH BEHAVIOR AND THE HOME ENVIRONMENT AND THEIR HR, BMI, FLEXIBILITY AND STRENGTH MEASURES.

[1]Gorman, Ira; [1]Birkenstock, Stephanie J.; [1]Lorenzi, Kathleen A.; [1]Price, Grace E. [1]Physical Therapy, Regis University, Denver, CO, USA.

Purpose/Hypothesis: Determine the association between a child's health behavior and access to healthy living and their HR, BMI, flexibility and strength measures. Additionally, determine if an educational-based intervention for second and third graders would improve attitudes towards exercise, physiological measures and physical performance. **Number of Subjects:** Subjects were 54 2nd and 3rd grade students at The Odyssey School, an expeditionary learning charter school. **Materials/Methods:** A survey was distributed to the students that was completed at home with their parents. The survey consisted of questions regarding physical activity (PA) levels,attitudes about health, nutrition and the environment. Child's height and weight were collected for pre/post comparison. Various physical performance tests were also administered. Following the pretest measures educational segments were conducted to include: small group discussions about nutrition and physical activity, pro-section observation of human and cow hearts and lungs, and instruction on self monitoring of HR. Six months later, post-test measures were performed. Data analysis included descriptive statistics to define demographics, paired t-test to determine pre-and post test differences, and linear regression models to determine if certain behaviors or attitudes predicted the various outcome variables. **Results:** The cohort, with complete data sets, included 28 subjects. The cross-sectional group, with complete posttest data, included 42 subjects. Cohort data revealed a large variance in the percentile BMI (%BMI) with standard deviations of 27.64 and 24.34. Only two students fell in the category of overweight (%BMI>95), six students were underweight (%BMI<5) and 20 fell into a normal range. Students showed positive trends towards increased PA and better nutritional habits, as well as increased parental PA. Cohort data revealed a significant change in attitudes towards healthy behaviors. Cross-sectional data analysis revealed 20% of the variance in shuttle-run can be attributed to health attitudes. **Conclusions:** Health attitudes of students and parents can be affected by educational interventions with subsequent trends towards increased PA. Future research is vital to further examine if this intervention model can positively influence a child's attitude towards exercise, physiological status and physical performance. Further studies using a larger sample, greater age variance, diverse socioeconomic groups and specific educational/physical interventions are necessary to determine the generalizability of this research. **Clinical Relevance:** Rising levels of childhood obesity demonstrate a need for effective and relevant strategies to combat this epidemic. This research demonstrates the appropriateness of physical therapist lead educational intervention in a school based setting in relation to health and wellness attitudes. Emphasizing physical fitness and healthy lifestyles to children at a young age can positively affect their health attitudes as well as resonate to those around them.

THE USE OF CARDIOPULMONARY OBJECTIVE QUALITY OF LIFE MEASURES IN PHYSICAL THERAPY PRACTICE: A QUALITATIVE STUDY.

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Purpose/Hypothesis: The purpose of the study was to gather information regarding the use of objective cardiopulmonary quality of life measures among cardiopulmonary physical therapists, to determine their use in the clinical setting, as well as to determine any barriers which prevent their use. **Number of Subjects:** N = 11, all subjects were members of

the cardiovascular and pulmonary section and were recruited on the section's list serv. A majority of subjects were board certified CCS. **Materials/Methods:** This study consisted of three 45 minute conference style phone interviews. Subjects were provided with a copy of the consent form and list of semi-structured interview questions prior to phone call. The question list contained the following questions: 1) Describe the setting in which you work: 2) Describe the patients on your primary case load: 3) Are you familiar with Quality of Life Measures? If so, which ones? 4) Are you familiar with Quality of Life Measures specific to the cardiopulmonary patient? 5) Are you currently using any quality of life measures in your practice? If yes: How are they currently being used? How often? Do you feel the tool used in your clinic provide a measure and detailed account of cardiovascular status? If no: What are the barriers to the use of these tools? Explain? What would encourage you to use an objective quality of life measure in your practice? Following the interview, data transcription began immediately. Data analysis involved evaluating patterns in the responses among the participants. **Results:** The following themes were obtained: 1) PTs are not as familiar with disease specific scales. 2) Administrative and cost limitations interfere with access to measures. 3) Current measures are not appropriate for use in the acute care environment due to the length of stay and acuity/cognition of patients. 4) Function and quality of life are not correlating on currently available scales. 5) Measures do not take environment enough into consideration. 6) Trust in the subjective response of the patient/patient literacy and understanding of the tool is low. 7) A quality of life measure that more accurately measures depression and function would be of value. **Conclusions:** 1) Development of a quality of life tool for use with the short term or acute patient is necessary. 2) Administrative and cost barriers must be addressed. 3) Development of a quality of life measure that takes into account the relationship between function, environment and quality of life is necessary. 4) Education on disease specific quality of life measures is needed. 5) A tool in which depression and function's influence on quality of life can be quantified should be designed. 6) Literacy of the patient may be biasing outcomes on quality of life measures. **Clinical Relevance:** The use of objective measure to provide data on quality of cardiovascular and pulmonary intervention is essential. This study leads to many opportunities for future research.

COMPARISONS OF CARDIOVASCULAR ENDURANCE AND PHYSICAL ACTIVITY BETWEEN SUPERVISED AND HOME-BASED 8-WEEK EXERCISE TRAINING PROGRAMS IN INDIVIDUALS WITH BELOW-KNEE AMPUTATION – A PRELIMINARY REPORT.

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Purpose/Hypothesis: The purpose of this study is to examine the effects of 8-week exercise programs between a supervised group and a home-based group on cardiovascular endurance and physical activity in individuals with limb amputation. **Number of Subjects:** Eight sedentary individuals with stable medical conditions and who walked independently with a prosthesis enrolled in the study. They were randomly assigned to either supervised fitness training or home-based exercise group. Four subjects with below-knee amputation completed the study at this time with two in each group (age: 57±12 yr, BH: 175±12 cm, BW: 107±0.15 kg, Waist to hip ratio (WHR): 0.99± 0.15). Informed consent was obtained. **Materials/Methods:** Two trials of the six-minute walk test (6MWT) were conducted within a week before training, with test-retest reliability determined for the eight subjects (ICC=0.984). During the 6MWT, heart rate was monitored continuously by telemetry electrocardiogram. Blood pressure, oxygen saturation, and Rating of Perceived Exertion were recorded pre- and post-6MWT. 6MWT was conducted for all subjects again after training. The supervised training group received comprehensive aerobic, resistive (core, upper and lower body), and balance exercise training 3 times per week in our facility. The home-based group performed a walking program on their own and specific exercises according to a specially designed home exercise booklet, including balance and strengthening exercises with free weights. Free weights were provided at the initial session and upgraded in the 4th week. In addition, each subject was provided with a pedometer to record daily step counts during the 8 weeks. Descriptive statistics was used for analysis of the 6MWT, and linear regression was used to analyze the trend of step counts over the 8 weeks. **Results:** Slight improvement was observed for the 4 subjects: BW 105 ±30 kg, WHR: 0.96 ± 0.12. The 6MWT showed an increase in distance and a decrease in heart rate. Respectively, the supervised group showed increased distance by 3.76%, decreased heart rate by 12.2%; while home-based group had increased distance by 6.77% and increased heart rate by 0.66%. Step counts did not change much in the home-based group, but there was a moderately positive linear increase in the supervised training group. **Conclusions:** Both programs seemed to improve cardiovascular endurance in people with below-knee amputation, but the supervised training group seemed to show a slightly better metabolic efficiency and physical activity. No definite conclusions could be made at this time yet due to the small sample, and the study is still ongoing. **Clinical Relevance:** Effective and feasible fitness programs for sedentary individuals with amputation are important for health promotion. This study may provide some insights on viable options of fitness training programs for individuals with limb amputation. Acknowledgement: We appreciate the funding support from the Texas Physical Therapy Foundation for this project.

A NON-TRADITIONAL APPROACH TO CARDIAC REHABILITATION IN THE DIALYSIS CENTER FOR A PATIENT WITH END-STAGE RENAL DISEASE FOLLOWING CORONARY ARTERY BYPASS SURGERY: A CASE REPORT.

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Background & Purpose: Cardiac Rehabilitation promotes positive outcomes after coronary artery bypass grafting

(CABG) surgery. Patients with end-stage renal disease (ESRD) have an increase risk of cardiac mortality and morbidity. Cardiac rehabilitation for patients with ESRD after CABG also produces positive outcomes. However, participation in cardiac rehabilitation continues to be limited due to lack of physician referrals, patient compliance, accessibility and time constraints. Can a cardiac rehabilitation program be implemented safely and effectively following CABG in a patient during dialysis sessions? **Case Description:** The patient was a 43 year old male with a history of ESRD requiring hemodialysis, CABG, and hypertension (HTN). During dialysis treatments, the patient received cardiac rehabilitation which included aerobic exercise and education for 16 weeks under the direct supervision of a physical therapist. **Outcomes:** The patient gained improvements in: quality of life based on the SF-36 score, exercise time, 2 minute walk distance, and had a reduction in cardiac risk factors. No adverse effects occurred during the intervention. **Discussion:** A 16 week cardiac rehabilitation program may be implemented safely and effectively following CABG in a patient while undergoing concurrent dialysis. This patient demonstrated improved outcomes comparable to patients who received traditional cardiac rehabilitation following CABG.

RELIABILITY AND VALIDITY OF THE END TIDAL CO2 FROM THE CAPNOTRAINER.

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Purpose/Hypothesis: The purpose of this study was to establish the validity and reliability of end-tidal carbon dioxide (ETCO2) measurements as obtained by the Capnotrainer. We hypothesized that the measures from the Capnotrainer would be valid and reliable for the measurement of ETCO2. **Number of Subjects:** The sample consists of 29 subjects for the validity portion and 30 subjects in the reliability portion. **Materials/Methods:** This study was performed as 2 separate studies and is now combined for the purpose of presenting both reliability and validity of the Capnotrainer. Both included a sample of convenience of males and females over the age of 18, with no known respiratory disease. Subjects completed a health questionnaire prior to each testing session which included questions about stress levels and exercise habits. Subject's respiration rate and CO2 were measured and recorded via a nasal cannula using the CapnoTrainer capnograph, during a series of 7 challenges, which were developed by a clinician. These included sitting quietly, standing quietly, four deep breaths, reading, timed breathing, mental math, and lying quietly. Time to recovery from reading and the deep breaths was also recorded. Reliability: Subjects were tested on 2 occasions, 1 week a part. Vital signs were recorded prior to testing. The tester was blinded to the health questionnaire and vitals. Validity: Additional exclusions for the validity study included anxiety disorders, panic attacks or claustrophobia. In addition to testing with the Capnotrainer, each subject performed the same 7 challenges using the MedGraphics Cardiopulmonary Exercise System, which uses open circuit spirometry. ICC's were used to determine reliability and Pearson Correlations were used for validity. Relationships were considered significant if at the .05 level of probability. **Results:** ICC values ranged from .86 for recovery from deep breathing to a low of .56 during supine respiration. Values for correlation between the two devices ranged from r = .68 to .79. Follow-up t-tests showed significant differences between measures from each of the 7 breathing activities. **Conclusions:** While all 7 of the challenges were statistically reliable, none of the challenges were proven to be clinically reliable based on their interclass correlation coefficients. The ETCO2 results obtained by the Capnotrainer were found to be significantly different from those of the MedGraphics system for all seven challenges. Thus, the validity of the Capnotrainer for end tidal CO2, as compared to open circuit spirometry, is limited. **Clinical Relevance:** Emerging ideas propose that a capnograph could be used to detect CO2 levels that may result in inappropriate acid-base chemistry in the body. Inappropriate levels of ETCO2 might reflect the need for a behavioral intervention in addition to typical physical therapy. While our findings suggest that the validity and reliability of this instrument, with these tests is not high, other test methods or uses may be better. This tool could be used as a biofeedback tool, helping patients learn how to breathe properly and restore normal CO2 levels.

INFLUENCE OF ACTIVITY LEVELS VERSUS ENERGY INTAKE ON PERCENT EXCESS WEIGHT LOSS (%EWL) AFTER ROUX-EN-Y GASTRIC BYPASS PROCEDURES (RYGBP).

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Purpose/Hypothesis: Purpose: Obesity is epidemic in the industrial world's populations costing hundreds of billions of dollars to treat annually. The NIH has approved gastric bypass as the only predictable, medically acceptable, and successful intervention for loss of substantial weight in the morbidly obese. The RYGBP is accepted as the best procedural intervention to reduce and control weight in the morbidly obese population and numerous procedures are performed each year. To maximize outcomes from the surgery, most surgeons utilize the same interventions which are routinely used and deemed to be successful in the non-surgical obese population. Non-surgical success is greatest with dietary control with activity used to maintain weight loss. The purpose of this study was to define variables that improve success in %EWL in this post-surgical population. Hypothesis: Increased activity will improve %EWL after bariatric surgery. **Number of Subjects:** 265. Return rate was 33%. **Materials/Methods:**The Arizona Activity Frequency Questionnaire, the Arizona Food Frequency Questionnaire, and the SF-36 Health and Quality of Life survey were sent to all of the RYGBP patients who had surgery one to five years prior to the study and performed through the same "Center

of Excellence" bariatric surgery center (returned n=265 or 33%). Results of these tools, as well as demographic and medical follow-up data from this patient pool, were utilized to determine influences of activity and dietary behaviors on the outcomes of BMI. Analysis was performed on all of the pertinent data collected through individual ANOVA testing to determine relationships between selected behaviors and outcomes. **Results:** There was no significant relationship between energy intake (measured in kilojoules) and post-surgical % excess weight loss (%EWL). Significant differences were found in %EWL between patients participating in more energy expended in activity/day ($p < 0.05$), more hours of activity/day ($p < 0.02$), and those participating in more MET Level 3 activities/day ($p < 0.03$) than those with lower energy expended in activity/day, lower hours of activity/day and those with less MET Level 3 activities/day. **Conclusion:** Outcomes s/p RYGBP, when measured in %EWL, is improved when the patient expends more energy in activity/day, is more active in hours of activity/day or is more active with higher MET Level 3 activities and is not significantly improved with change in energy intake. **Clinical Relevance:** As physical therapist get more involved with the post bariatric surgery populations, emphasis on energy expended in activity/day, hours of activity/day, or higher MET level activity/day need to be incorporated in post RYGBP protocols to improve post surgical outcomes in %EWL.

DEVELOPING A CLINICAL PREDICTION RULE FOR SCREENING ADOLESCENT FEMALES FOR CARDIOVASCULAR DISEASE RISK.

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Purpose/Hypothesis: The purpose of the current study was to initiate development of a clinical prediction rule for identifying adolescent females at risk for developing cardiovascular disease using tests that can be conducted economically and efficiently in the school setting. **Number of Subjects:** 28 **Materials/Methods:** Six anthropometric indicators of body fatness, seven measures of physical fitness, and seven metabolic and hemodynamic CVD risk factors were measured in a convenience sample of 28 female high school students (15-18 years of age). A CVD risk score was calculated by adding the number of metabolic and hemodynamic prognostic factors for which each subject tested outside the normal reference range. Correlation analyses were completed to determine the association between the CVD risk score and other study variables. Stepwise linear regression analyses were completed to determine if anthropometric or fitness variables were significant predictors of the CVD risk score. **Results:** Sixteen girls had HDL cholesterol levels lower than 36 mg/dl, 16 had BMI greater than 25 kg/m2 (age and gender adjusted); 13 had TC values above 170 mg/dl; 11 had SBP above 124 mmHg; 8 had DBP above 81 mmHg; 6 had VLDL above 40mg/dl; 2 had TG above 168 mg/dl, and 2 had fasting blood glucose values above 100 mg/dl. None of the girls had LDL cholesterol levels above 110 mg/dl. All anthropometric indicators of fatness were highly significantly correlated with CVD risk ($P \leq 0.0001$) while only three fitness variables reached a lower level of significance ($P \leq 0.05$). Waist circumference (WC) was the single best anthropometric or fitness predictor of the variance in CVD risk factors (r2 0.742; p 0.004). According to the prediction equation generated by this linear regression analysis, CVD risk could be predicted as CVD Risk = (-4.48 + (WC * 0.209)). Systolic blood pressure (SBP) was the single best predictor of the variance in CVD risk when all study variables were considered (r2 0.932; p 0.0001). According to the prediction equation generated by this linear regression analysis, CVD risk could be predicted as CVD Risk = (-36.56 + (SBP * 0.334)). **Conclusions:** Non-invasive measures that are easily obtained in the school setting may be useful in identifying adolescent females at high risk for developing CVD. This study is novel in that it focused on using non-invasive, inexpensive, field-based measures to predict CVD risk in adolescent females. It is especially unique in that it included fitness tests as prognostic indicators for CVD risk. **Clinical Relevance:** The fact that anthropometric measures are significantly correlated with CVD risk in adolescents and WC and SBP are significantly predictive of CVD risk in adolescents means that such measures should be implemented as part of a critical pathway in identifying and targeting at-risk youth for early and accelerated intervention and referral for further testing. Further research using random sampling from additional populations is warranted for validating these prediction rules and for expanding the external validity of this study.

CHANGES IN BMI AND BLOOD PRESSURE FOLLOWING A 10 WEEK EXERCISE AND NUTRITION PROGRAM FOR CHILDREN WHO ARE OVERWEIGHT OR OBESE.

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Purpose/Hypothesis: Obesity and overweight constitute a health problem affecting an increasing number of children. Children who are overweight/obese are prone to other medical conditions such as high blood pressure, abnormal lipid profiles, insulin resistance, and type II diabetes mellitus. This study explored whether an exercise and nutrition program, for children with known cardiovascular risk factors, would decrease BMI and blood pressure. The purpose of this poster is to describe the Fit Kids for Life program and report the outcomes of a sample of overweight and obese children. Our hypothesis was that children who successfully completed the program would have a decrease in BMI and blood pressure. **Number of Subjects:** Children, aged 8-17(n=261)who had at least one cardiovascular risk factor (hypercholesterolemia, hypertension, or were overweight / obese as defined as ≥85th percentile BMI) participated in a 10 week exercise and nutrition, lifestyle modification program. **Materials/Methods:** Children were either referred to the program (Fit Kids for Life) by local

pediatricians or self referred. Baseline height, weight, BMI [weight in kilograms divided by the square of height in meters], and blood pressure were obtained. Children and their families participated bi-weekly, in the 10 week program which consisted of 1 hour of nutritional education, and 3 hours of structured exercise. The program was administered by a pediatric cardiologist, physical therapist, dietician, and utilized over 30 medical/ physical therapy students as mentors / trainers. The exercise component consisted of three "stations": 1)"cardiovascular corner"- where the child engaged in 15-20 minutes of cardiovascular exercise, 2)"core on the floor"- where stabilization and floor work using body weight were performed, and 3)"muscle mania"- where a circuit of weight machines was performed. In addition, a 1.5 mile walk/jog/run was performed weekly. Following completion of the program, blood pressure and BMI were obtained. **Results:** At baseline, BMI = 34.05 ± 0.45, systolic BP (mmHg) = 121.70, ± 1.14, and diastolic blood pressure = 70.36 ± 0.69 [all results, mean ± SEM]. Children who completed the program (n = 179; 68.9% retention) demonstrated improvement in BMI = 32.99 ± 0.51 ($p<.001$), systolic BP = 114.43 ± 1.08 ($p<.001$), and diastolic BP = 65.77 ± 0.81($p<.001$). **Conclusions:** Children enrolled in the Fit Kids for Life program demonstrated a decrease in BMI and blood pressure. This study supports that small changes in diet and exercise, as reinforced by a community based program, can improve cardiovascular risk factors in overweight and obese children. **Clinical Relevance:** Fit Kids for Life has been shown to improve cardiovascular health in overweight and obese children. Halting the progression of complications related to obesity is imperative for this generation of children who are anticipated to have shorter lifespans than their parents. The role of the physical therapist as expert in development and implementation of community based exercise program is perceivable.

DO CARDIAC AND PULMONARY PATIENTS ENROLLED IN A HOSPITAL-BASED REHABILITATION PROGRAM DEMONSTRATE CLINICALLY SIGNIFICANT IMPROVEMENTS?

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Purpose/Hypothesis: The primary purpose of the current study was to relate changes in six minute walking distance to changes in activities of daily living for cardiac and pulmonary patients upon completion of a 7-wk hospital-based rehabilitation program. **Number of Subjects:** 57. **Materials/Methods:** Participation in this study was voluntary and based on physician diagnosis. Participants completed a 20-hour, 7-wk Phase II OPCR. The 6MWT was conducted at baseline and again after completing the rehabilitation program. Oxygen saturation percentage (SPO2%), heart rate (HR), rating of perceived exertion (RPE), and shortness of breath (SOB) scores were recorded at baseline, at every minute mark during the 6MWT, and at one minute post-exercise (recovery). Repeated measures (RM) general linear model (GLM) tests were completed to determine if there were statistically significant within-subject differences between pre- and post 6 MW distances (6MWD) or between each of the six minutes of exercise for SPO2%, HR, RPE, and SOB. 6 MWD was converted to metabolic equivalent (MET) and activities of daily living (ADL) levels. **Results:** Both the cardiac and pulmonary groups showed statistically significant improvements in the 6MWD ($P \leq 00001$), but not in minute-by-minute changes for SPO2%, HR, RPE, or SOB ($p \geq 0.05$). 6 MWD, MET and ADL data are presented below.

Pre 6 MWT distance: Cardiac 566.49 m; Pulmonary 440.00 m
Post 6 MWT distance: Cardiac 697.00 m; Pulmonary 519.47 m
Gain in distance: Cardiac 130.50 m; Pulmonary 79.47 m
Pre MET: Cardiac 3.26; Pulmonary 2.75
Post MET: Cardiac 3.77; Pulmonary 3.10
MET gain: Cardiac 0.51; Pulmonary 0.35
Number who increased an ADL Level: Cardiac 22 out of 32; Pulmonary 11 out of 25

Conclusions: Previous researchers have reported that for increases in 6MWD to be significant they should be between 50 and 70 meters for pulmonary patients and closer to 170 meters for cardiac patients. The current study met these gains in pulmonary but not cardiac patients. However, a statistically significant mean increase in 6MWD does not necessarily equate to a clinically significant improvement for an individual patient. In the current study, 22 of the 32 cardiac patients increased one entire ADL level in response to the rehabilitation program which provides an alternative form of evidence for clinically-relevant patient improvement and program efficacy. Previous researchers have compared gains in 6 MWD to questionnaire-based indices of functional status, subjective improvements in quality of life and dyspnea, and clinical measures of peak oxygen uptake and FEV1. To our knowledge, the current study is the first to convert changes in 6 MWD to changes in MET and ADL levels. The current study provides evidence that converting the change in a 6 MWD to changes in MET and ADL levels can provide a clinically-relevant index of patient's improvement. **Clinical Relevance:** Converting changes in 6MWD to changes in MET and ADL levels provides a valuable metric for assessing the clinical significance of changes in 6MWD.

LOWER EXTREMITY STRENGTH TRAINING FOLLOWING ACUTE LUNG TRANSPLANTATION: PRELIMINARY ANALYSIS.

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Purpose/Hypothesis: Quadriceps weakness can account for a large proportion of exercise intolerance following lung transplantation (LT). However, optimal strength training doses have not been investigated for adults who have recently undergone LT. The purpose of this study was to identify changes in quadriceps strength in response to hospital-based rehabilitation following LT. We hypothesized

that high-volume strength training (HVST) would result in greater improvements in strength than low-volume strength training (LVST). **Number of Subjects:** Six male adults (42-64 years) consented to participate in this IRB-approved study. **Materials/Methods:** Participants underwent training consisting of stretching, education, treadmill walking and lower extremity strength training, scheduled 5 days per week for up to 4 weeks. Patients were randomly assigned to receive either LVST (N=3), consisting of 1 set of 8 repetitions of training, or HVST (N=3), consisting of 3 sets of 8 repetitions every day of therapy. Strength training consisted of leg press, knee extension and knee flexion exercises between 50% and 70% of 1-RM. Quadriceps strength was clinically analyzed before and immediately after the training period using 1-RM for leg press and knee extension. Peak isokinetic (60 deg/s and 120 deg/s) and isometric knee extension torque was assessed with a Biodex dynamometer. We tested six-minute walk distance (6MWD) to estimate functional mobility. Generalized strength was monitored using grip dynamometry. Variables were analyzed with Wilcoxon and Mann-Whitney U tests. To compare the effects of training volume on strength, data were normalized to body mass. Median values are reported, and significance was established at $p<0.05$. **Results:** Prior to training, BMI was significantly greater in the HVST group (26 vs 22, $p= 0.05$). Other demographic variables did not differ between the groups. Patients demonstrated significant quadriceps weakness (39% of age predicted) at the onset of rehabilitation. Patients began strength training a median 22 days following surgery, and completed 17 training sessions over 4 weeks. Leg press 1-RM increased 28% after training (135 to 173 lb, $p< 0.05$), while knee extension 1-RM increased 60% (113 to 190 lb, $p< 0.05$). Peak isokinetic torque increased at slow (Pre: 136%, Post: 165% of BM, $p< 0.05$) and fast (Pre: 109%, Post: 142% of BM, $p< 0.05$) speeds, in conjunction with improved isometric torque (Pre: 131%, Post: 154% of BM, $p< 0.05$). 6MWD increased significantly after training (400 to 1282 ft, $p< 0.05$). Grip strength did not significantly change (68.9 to 71.2 lb, $p> 0.05$). The degrees of improvement in 1-RM, torque and 6MWD did not differ between the training groups ($p> 0.05$), although post-training power tended to improve in the HVST group (60 deg/s, $p= 0.10$). **Conclusions:** The results suggest that quadriceps strength increases with training, but HVST may provide an added power benefit to patients. **Clinical Relevance:** This study may help therapists identify benefits and optimal doses for improving quadriceps strength and function in the early recovery period following LT.

PHYSICAL FUNCTION, AGE, AND MENTAL STATUS ARE RELATED TO PHYSICAL ACTIVITY AND EXERCISE SELF-EFFICACY 3, 6, AND 12 MONTHS FOLLOWING CORONARY ARTERY BYPASS SURGERY.

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Purpose/Hypothesis: Increased habitual physical activity is an important health-promoting behavior for patients to adopt following coronary bypass (CAB) surgery. The purpose of this study was to examine the relationship between patient functional status at the time of hospital discharge and physical activity level and exercise self-efficacy 3, 6, and 12 months following CAB surgery. **Number of Subjects:** This study included 28 patients hospitalized following CAB surgery. Study participants were 65 years of age or older, within two days of discharge, and able to understand English. Patients who had concurrent heart valve replacements, new onset of stroke, or significant cognitive deficits were excluded from the study. **Materials/Methods:** This prospective descriptive study used a sample of convenience recruited from a regional medical center. Baseline outcome measures obtained prior to hospital discharge included the Heart Surgery Symptom Inventory (HSSI), Telephone Interview of Cognitive Status (TICS), Timed-Up-and-Go (TUG), 2 Minute Walk Test (2MWT), hand grip strength (HG), and the Timed Sit-to-Stand (STS). Follow-up measurements of habitual physical activity level and exercise self-efficacy were obtained via telephone interview at 3, 6, and 12 months following CAB. Habitual physical activity level was measured using the Baecke Physical Activity (BPA) Questionnaire. The Self- Efficacy for Exercise Behaviors (SEB) Scale was used to quantify patient perceived confidence in exercise participation. Higher scores on the SEB Scale indicate better self-efficacy than lower scores. Data were analyzed using descriptive statistics and Pearson correlations. **Results:** Study participants were predominately Caucasian (100%) and men (82%), 73±7 years old with a BMI of 28.1±2.6 kg/m2 (mean ± SD). Baseline TUG and 2MWT scores were correlated with BPA scores at 3, 6, and 12 mo post-CAB surgery ($r = |0.40\text{-}0.61|$). In addition, baseline HSSI scores were correlated with follow-up SEB scores at 3 and 6 months. Scores on the TICS were correlated with 3 mo SEB scores ($r = 0.53$) and 6 and 12 month BPA scores ($r = 0.44$ and 0.60). Age was inversely correlated with 3 month SEB scores. **Conclusions:** Study results suggest that physical function at the time of hospital discharge is related to habitual physical activity level during the first year following CAB surgery. Symptom burden appears to be inversely associated with exercise self-efficacy 3-6 months post-CAB surgery. Additionally, patient cognitive function and age at the time of hospital discharge may influence habitual physical activity level after CAB surgery. **Clinical Relevance:** Patient functional status at the time of hospital discharge following CAB surgery may be an important predictor of habitual physical activity level. Physical therapists can identify and minimize exercise barriers related to functional limitations and thereby promote increased habitual physical activity level in this patient population.

IYENGAR YOGA VS. ENHANCED USUAL CARE ON BLOOD PRESSURE IN PATIENTS WITH PREHYPERTENSION TO STAGE I HYPERTENSION: A RANDOMIZED CONTROLLED TRIAL.

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Purpose/Hypothesis: The prevalence of prehypertension and Stage 1 hypertension continues to increase despite being amenable to non-pharmacologic interventions. Research has shown that yoga interventions are generally effective in reducing body weight, blood pressure, glucose level and high cholesterol. Iyengar Yoga (IY) has been purported to reduce blood pressure though evidence from randomized trials is lacking. **Number of Subject :** 26 and 31 subjects in the IY and EUC arms, respectively, completed the study. **Materials/Methods:** We conducted a randomized controlled trial to assess the effects of 12 weeks of IY vs. Enhanced Usual Care (EUC) (based on individual dietary adjustment) on 24 hour ambulatory blood pressure in yoga-naïve adults with untreated prehypertension or stage I hypertension. **Results:** There were no differences in blood pressure between the groups at 6 or 12 weeks. In the EUC group, 24 hr systolic blood pressure (SBP), diastolic blood pressure (DBP) and mean arterial pressure (MAP) significantly decreased by 5, 3, and 3 mm Hg, respectively from baseline at 6 weeks ($p<0.05$), but were no longer significant at 12 weeks .In the IY group, 24 hr SBP was reduced by 6 mm Hg at 12 weeks compared to baseline ($p=0.05$). 24 h DBP ($p<0.01$) and MAP ($p<0.05$) decreased significantly each by 5 mm Hg. No differences were observed in catecholamine or cortisol metabolism to explain the decrease in blood pressure in the IY group at 12 weeks. **Conclusions:** 12 weeks of IY produces clinically meaningful improvements in 24 hr SBP and DBP. Larger studies are needed to establish the long term efficacy, acceptability, utility, and potential mechanisms of IY to control blood pressure. **Clinical Relevance:** Yoga, a form of physical activity, is rapidly gaining in popularity and has many health benefits. Yet healthcare providers have been slow to recognize yoga for its ability to improve health conditions, and few interventions have been developed that take full advantage of its benefits. Physical therapists have the opportunity to incorporate yoga based programs for patients with prehypertension or stage 1 hypertension.

EFFECTS OF AN INTENSIVE TASK-SPECIFIC REHABILITATION PROGRAM ON CARDIOVASCULAR EFFICIENCY IN INDIVIDUALS WITH CHRONIC STROKE.

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Purpose/Hypothesis: Diminished peak exercise capacity and increased energy demands for ambulation after stroke have functional and cardiovascular consequences. Intensive, task-specific rehabilitation programs have shown effectiveness for improving metabolic efficiency in persons with chronic stroke. However, the duration of training and type of activities included in these rehabilitation programs lack consistency in the literature. Therefore, the purpose of this study was to investigate how the cardiovascular system in individuals with chronic stroke responded to a short term, intense and task-specific rehabilitation program that included a whole-body approach. It was hypothesized that the group of participants would show improvements in cardiovascular efficiency immediately following the intervention and that changes would be maintained for five-months. **Number of Subjects :** A group of participants (n=9) who were at least six months post stroke, ambulatory at the levels of unlimited household or limited community walker (Perry et al, 1995), with minimal arm and hand function completed all phases of the study. **Materials/Methods:** The intervention consisted of a 3.25-hour interdisciplinary program, five days per week for two weeks that included intensive, task-specific interventions for the whole body. Pre-testing, immediate post-testing and five-month retention-testing consisted of determining each participant's VO2, metabolic equivalents (METS), heart rate (HR), and rating of perceived exertion (RPE) values following a metabolic testing protocol. Participants were required to attain a faster walking speed on the final testing stage during post- and retention-testing. Repeated measures analysis of variance ($p\leq0.05$) compared mean changes in metabolic variables attained during the final testing stages across all measurement phases. **Results:** Participants were able to walk at faster treadmill speeds during the final testing stages of post- and retentiontesting with no statistically significant differences in VO2 ($p=0.321$), maximal HR achieved ($p=0.338$) or maximal METS ($p=0.417$) across the three measurement phases. A decrease in mean RPE was shown following the intervention, but the change was only statistically significant from pre-testing to five-month retention-testing. **Conclusions:** Following an intensive two-week rehabilitation program, participants with chronic stroke were able to walk on a treadmill at higher speeds without an increase in the metabolic values of VO2, HR, or METS and with a reduction in self-reported RPE. **Clinical Relevance:** The findings of this study indicate that a short-term, intensive, task-specific rehabilitation program that focuses on the whole body may lead to a more efficient cardiovascular response.

THE EFFECTS OF LEVODOPA ON NOREPINEPHRINE AND CARDIOVASCULAR RESPONSES DURING MAXIMAL EXERCISE IN PARKINSON'S DISEASE.

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Purpose/Hypothesis: Exercise is a common modality used when treating and maintaining quality of life in individuals with Parkinson disease (PD). However, people with PD do not display normal exercise responses during graded exercise testing. One possible source of the abnormal exercise responses is the sympathetic nervous system (SNS) and the production of norepinephrine (NE). Levodopa, the most common drug used to treat PD, has been known to lower NE levels at rest. The purpose of this study was to examine how PD medication affects the autonomic

responses of individuals with PD during an acute exercise stress test. **Number of Subjects:** Fourteen with PD (Hoehn and Yahr Stage 2) and 15 healthy controls (HC) without PD. **Materials/Methods:** Participants underwent an exercise treadmill stress test using a Modified Bruce Protocol. Subjects with PD performed the test once off medication (PD-Off med) and then one week later on medication (PD-On med). Heart rate (HR), systolic blood pressure (BP), VO2, and NE levels were taken at rest and at peak exercise. Mixed model 2 x 2 ANOVAs (Group x test time) were used to compare the PD group (either PD-Off med or PD-On med) with the HC group at pre-test and peak exercise. Repeated measures 2 x 2 ANOVAs (Group x test time) were used to compare the PD-On with the PD-Off group. Tukey's post hoc tests were used to compare means when the interaction effect was significant. **Results:** At rest, HR, BP, and VO2 were similar ($p>0.05$), while NE levels were lower for the PD-On med and PD-Off med group as compared to the HC ($p<0.05$). In response to exercise all measures increased from resting values ($p<0.05$). At peak exercise HR, BP and NE values for the PD-On med and PD-Off med group were all significantly lower ($p<0.05$) than HC while VO2 was similar ($p>0.05$). **Conclusions:** Despite comparable peak VO2 in the HC and PD groups, the exercise responses were lower in those with PD regardless of medication state. NE was lower at rest and at peak exercise in both PD conditions which can help explain why HR and BP are lower in this population. **Clinical Relevance:** Autonomic abnormalities during exercise in those with PD appear to be disease manifested and not impacted by medications used to treat PD. Understanding these abnormalities and whether they are caused by disease or drug therapy allow for educated choices regarding exercise testing, interpretation and prescription.

EXERCISE TRAINING ADAPTATIONS IN WOMEN WITH VERY LOW INITIAL AEROBIC CAPACITY LEVELS: A COMPARISON STUDY.

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Purpose/Hypothesis: This study evaluated aerobic training adaptations in physiologic, anthropometric, and serum measures in women with initial aerobic fitness levels (VO2) below the 30th percentile rank compared to women with initial VO2 levels above the 30th percentile rank. **Number of Subjects:** 14 females (46.4 ± 11.4 yrs.) with low VO2 (22.86 ± 4.33 ml/kg/min) and 8 females (45.2 ± 10.1 yrs.) with average VO2 levels (33.67 ± 4.98 ml/kg/min) participated in training. Institutional review board approval was received, the study was voluntary, data was confidential and participants signed informed consent. **Materials/Methods:** Retrospective analysis of data from a nine-month worksite wellness program consisting of exercise training guidelines with opportunities for health promotion and wellness education through nutrition counseling, stress management seminars, and regular contact with health and fitness mentors. Pre and post test physiologic and anthropometric measures were performed by exercise science graduate students. Serum analyses were performed by two certified medical technicians. The Rockport 1 mile walk/run test was used to predict VO2. Wilcoxon Sign Rank test examined differences between pre and post test measures and Mann-Whitney U examined differences between groups using SPSS 11.0 with $p \leq .05$. **Results:** Women in the low fitness group significantly improved measures of VO2 ($p=.001$), resting heart rate ($p=008$), mass ($p=.002$), body fat percent ($p=.048$), triglycerides ($p=0.020$), and very low density lipoproteins ($p=.020$). VO2 increased 3.03 ± 2.05 ml/kg/min in the low fitness group which was similar to improvements in the average fitness group of 2.62 ± 1.38 ml/kg/min ($p=.311$) Adaptations for other variable measures were not significantly different between groups. **Conclusions:** Study measures indicate that women with very low baseline aerobic fitness levels experienced improvements in physiologic, anthropometric, and serum measures following training. In addition, training adaptations were not significantly different from women with average VO2 levels at baseline. **Clinical Relevance:** Study results suggest that women with very low aerobic fitness levels can benefit from voluntary workplace wellness programs and that improvements are similar to those of women with average fitness levels. Further study is recommended using larger samples to confirm these findings.

EXERCISE TRAINING ADAPTATIONS IN MIDDLE AGED WOMEN PARTICIPATING IN A WORKSITE WELLNESS PROGRAM: A COHORT COMPARISON STUDY.

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Purpose/Hypothesis: This study examined physiologic, anthropometric, and serum adaptations in middle aged women participating in a 9 month voluntary worksite wellness program who regularly performed aerobic exercise. Results were compared to women in the same program, who did not regularly perform aerobic exercise. **Number of Subjects:** 16 females (51 ± 6.4 years) participated regularly in aerobic exercise training and 23 females (52.6 ± 6.07) comprised the non-training group. Institutional review board approval was received, the study was voluntary, data was confidential and participants signed informed consent. **Materials/Methods:** The study design was a retrospective analysis of data from an onsite worksite wellness and research program. The wellness program consisted of exercise training guidelines with opportunities for health promotion and wellness education through nutrition counseling and stress management seminars. Participants had regular contact with mentors for information, motivation and support. Pre and post test physiologic and anthropometric tests were administered by exercise science graduate students and two certified medical technicians at the University's Health Center performed the serum analyses. Wilcoxon Sign Rank test examined differences between pre and post test measures, and Mann-Whitney U examined between group differences using SPSS 11.00 ($p \leq .05$). **Results:** Women in the training group had significant improvements in aerobic

capacity (p=<.001), resting heart rate (p=.014), body mass (p=.002), and body mass index (BMI) (p=.003). Differences between groups were significant for aerobic fitness (p<.001), body mass (p=.037), and BMI (p=.048), but not for resting heart rate (p=.053). **Conclusions:** Middle aged women participating in regular aerobic exercise training demonstrated significant improvements in physiologic and anthropometric measures. As the sample size was small and serum measures had moderate to small effects sizes, a larger sample of 100 subjects in each group is required for further analysis of changes in serum measures. **Clinical Relevance:** Study results suggest that women who regularly performed aerobic exercise as part of a nine month worksite wellness program demonstrated significant improvements in physiological and anthropometric measures compared to non-exercising women. Further study is recommended using larger samples particularly for serum measures where effect sizes were small to moderate.

THE EFFECT OF BODY POSITION ON MAXIMUM INSPIRATORY AND EXPIRATORY PRESSURES AND FORCED EXPIRATORY FLOW.

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Purpose/Hypothesis: The lungs are free to move within the chest wall and, therefore, susceptible to internal and external forces. For example, the gravitational effects resulting from changes in body position modify the resting alignment of the diaphragm and abdominal contents, alter resistance imposed on muscles, and vary ventilation/perfusion relationships. The purpose of this study was to examine the effect of different body positions on the ability of the lungs to forcefully inhale and exhale. More specifically, the purpose of this study was to compare forced vital capacity (FVC), forced expiratory volume in one second as a percent of forced vital capacity (FEV1/FVC%), maximum inspiratory pressure (MIP), and maximum expiratory pressure (MEP) values obtained during standing, sitting, forward sitting, supine, and prone positions. **Number of Subjects:** Twenty healthy subjects (8 men and 12 women 25 ± 2.96 years of age) volunteered to participate in this study. Inclusion criteria consisted of: classification of low to moderate risk according to the American College of Sports Medicine ranking criteria, no history of past or present orthopedic injury or trunk scarring that prevented or limited chest movements, and no known neurological disease. **Materials/Methods:** Subjects' maximum inspiratory pressure (MIP) and maximum expiratory pressure (MEP) were measured using a Micro Direct MicroRPM Respiratory Pressure Meter (Lewiston, ME). Forced vital capacity (FVC) and forced expiratory volume in one second as a percent of forced vital capacity (FEV1/FVC%) were measured using the MedGraphics CPFS/DTM USB Spirometer (St. Paul, MN). Measurements were obtained in random order with subjects in standing, sitting, forward sitting, supine, and prone positions. **Results:** A repeated measures one-way ANOVA revealed no significant effect of position on MIP, MEP, and FEV1/FVC%. However, FVC was affected by position ($p \leq 0.05$). Follow up paired t-tests indicated the forced vital capacity in the supine position was significantly less than in the sitting, forward sitting, and standing positions and forced vital capacity in prone was less than in the sitting and standing positions ($p \leq 0.005$). **Conclusions:** Results indicate body position does not affect the ability to generate inspiratory and expiratory pressures. However, horizontal positions such as supine and prone do result in decreased forced vital capacities. It appears the gravitational effects on thoracic and abdominal structures as well as potential restrictions imposed by contact with the table surface impact this movement. **Clinical Relevance:** Patients with already decreased lung volumes secondary to pathology may experience increased ventilation problems when in supine and prone positions. Patients and health care workers should be educated and encouraged to utilize more upright positions to improve lung mechanics.

ENDOTRACHEAL SUCTIONING AND SALINE INSTILLATION: A SYSTEMATIC REVIEW OF THE LITERATURE.

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Purpose/Hypothesis: Physical therapists (PTs) in various settings (e.g., ICU, rehab, and home health) use endotracheal suctioning (ETS) as an airway clearance technique. Saline instillation into the endotracheal or tracheostomy tube prior to ETS is commonly used as it is thought to help loosen mucus from the tracheal wall so that more can be removed during the suctioning procedure. Despite the common usage of saline instillation during ETS by PTs, as well as nurses and respiratory therapists, some investigators have questioned its benefit and have even suggested that it is harmful. The purpose of this systematic review is to summarize the research related to saline instillation during ETS. **Number of Subjects:** A broad-based PubMed search ((“Intubation, Intratracheal”[Mesh] OR “Intubation, Intratracheal/methods”[Mesh]) AND (“Sodium Chloride”[Mesh] OR (“Sodium Chloride/administration and dosage”[Mesh] OR “Sodium Chloride/standards”[Mesh])) returned 108 citations related to endotracheal saline instillation. **Materials/Methods:** Two experienced clinicians reviewed the title and/or abstract (if present) of these 108 citations, and narrowed the list to 28 relevant human or animal studies. 12 of these were either reviews or letters to the editor, leaving 16 prospective experimental trials. Data that were extracted from the manuscripts conducted by several investigators included: human vs. animal, care setting, sample size, patient characteristics, study type, intervention details, and outcome measures. **Results:** Due to the lack of consistency in outcome measures, a meta-analysis could not be conducted. None of the relevant studies reported an increase in sputum quantity obtained from the use of saline instillation. Adverse outcomes included short-term

changes in oxygenation, heart rate, blood pressure, airway resistance and dyspnea, as well as the potential for lower airway contamination. **Conclusions:** There is insufficient evidence within the scientific literature to support the use of saline instillation prior to ETS. However, there is significant evidence of short-term detrimental effects without apparent long-term adverse consequences. **Clinical Relevance:** Use of saline instillation prior to ETS as an airway clearance adjunct should be discouraged.

BLOOD LACTATE RESPONSE DURING MAXIMAL EXERCISE IN PARKINSON'S DISEASE ON AND OFF MEDICATION.

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Purpose/Hypothesis: Plasma blood lactate concentrations (BL) during exercise reflect a balance between production and utilization. As V02 increases due to increasing exercise intensity, there is a corresponding increase in BL and norepinephrine (NE). BL is an indicator of anaerobic glycolysis and at the highest points of intense exercise there is a spike in blood lactate due to changes in ventilation and the shift to anaerobic metabolism. There is evidence that there is a relationship between NE and BL during exercise. NE levels rise as exercise intensity increases. Plasma catecholamines such as NE directly increase the BL concentration. Individuals with PD present with lower NE levels which may cause lower BL responses during exercise. The purpose of this study was to observe how lower NE levels affect BL responses during maximal exercise both on and off medication to see if medication influences this relationship. **Number of Subjects:** Fourteen with PD (Hoehn and Yahr Stage 2) and 15 healthy controls (HC) without PD. **Materials/Methods:** Participants underwent a maximal exercise treadmill test. Subjects with PD performed the test once off medication (PD-Off) and then one week later on medication (PD-On). VO2 and NE levels were taken at rest and at peak exercise. Mixed model 2 x 2 ANOVAs (Group x test time) were used to compare the PD group (either PD-Off or PD-On) with the HC group at rest and peak exercise. Repeated measures 2 x 2 ANOVAs (Group x test time) were used to compare the PD-On with the PD-Off group. Tukey's post hoc tests were used to compare means when the interaction effect was significant. **Results:** At rest, VO2 measures were similar ($p>0.05$), while BL and NE levels were lower for the PD-On-med and PD-Off-med group as compared to the HC ($p<0.05$). In response to exercise, all measures increased from resting values ($p<0.05$). At peak exercise BL and NE values for the PD-On-med and PD-Off-med group were all significantly lower than HC ($p<0.05$) while VO2 was similar ($p>0.05$). PD-On group exercised to the same time as the PD-off group, however both groups attained the same V02 in less time than HC. **Conclusions:** BL and NE levels were lower in those with PD both at rest and peak exercise regardless of medication state. Although a similar V02 was attained in all groups, maximum exercise was attained quicker in the PD groups. Whether or not lower BL was related to less exercise time, thus less skeletal muscle BL produced, is not able to be determined from this experiment. Lower NE levels seem to impact on BL concentrations in PD during acute exercise. The use of BL as a tool for assessing exercise thresholds in this population would not be appropriate. **Clinical Relevance:** As with heart rate and blood pressure, NE and BL response to exercise is suppressed. Recognition that this population does not fit normal guidelines for exercise responses regardless of medication state allows for educated choices regarding exercise testing, interpretation and prescription.

PHYSIOLOGICAL EFFECTS OF NORDIC WALKING VERSUS REGULAR FAST WALKING ON HEALTHY ADULTS: A PILOT STUDY.

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Purpose/Hypothesis: The purpose of this study was to compare the physiological effects of Nordic Walking versus Regular Fast Walking on healthy adults. The hypothesis was that Nordic Walking would increase heart rate (HR), blood pressure (BP), oxygen consumption, carbon dioxide production, respiratory rate (RR) and caloric expenditure, with no increase in rate of perceived exertion (RPE) when compared to Regular Fast Walking. **Number of Subjects:** The sample of convenience consisted of sixteen healthy men (12.5%) and women (87.5%) volunteer subjects. The mean age of subjects was 25.0 (s=4.5) years with a mean body mass index (BMI) of 23.0 (s=5.4). **Materials/Methods:** The research design was a Pretest-Posttest, non-randomized, two group design. Each subject served as their own match. Subjects completed two 12-minute walking trials on a controlled environment walking course; Trial 1, Regular Fast Walking and Trial 2, Nordic Walking. Subjects received standardized instructions. Each variable was measured by the same tester. A metabolic cart was used to measure physiological variables and Borg's Rating of Perceived Exertion Scale was used to assessed RPE. **Results:** Descriptive statistics summarized demographic characteristics of the sample and physiological variable data. Paired t-Tests were used to investigate differences between Trial 1 and Trial 2 pretest and posttest change scores for each physiological variable. The Wilcoxon Signed Rank test was used to compare RPE between the two trials. Statistically significant differences (alpha = 0.05) were found between trials for HR ($p=0.00009$) and RR ($p=-0.045$), the Nordic Walking group exhibiting higher values. No significant differences between groups were found for BP (systolic; $p=0.397$, diastolic; $p=0.146$), oxygen consumption ($p=0.149$), carbon dioxide production ($p=0.290$), caloric expenditure ($p=0.128$), or RPE ($p=0.550$). **Conclusions:** Nordic Walking compared to Regular Fast Walking effected a significant increase in HR and RR without a corresponding significant increase in RPE.

Although caloric expenditure was not significantly different between trials, the mean for the Nordic Walking group was greater than that of the Regular Fast Walking group. This suggests that as a form of aerobic exercise, Nordic Walking may be more beneficial than regular Fast Walking and that Nordic Walkers perceive less physical exertion than Regular Fast Walkers. Specifically, Nordic Walking appears to be an advantageous form of physical activity for young healthy persons and further research is warranted with other populations and outcome measures. **Clinical Relevance:** Physical Therapists, the acknowledged experts on exercise, increasingly consult and prescribe exercise for wellness and prevention. The health benefits of walking are well documented, however, there is a paucity of research on Nordic Walking. When compared to walking, Nordic Walking offers additional benefits of upper body muscle recruitment, reduced force through the lower extremities and assistance with balance, and thus may be a preferred form of exercise for some populations.

CARDIOVASCULAR RESPONSES TO DIFFERENT TIMES OF WALK USING STANDARD WALKER AND/OR PLATFORM WALKER WITH WHEELS IN NON WEIGHT BEARING INDIVIDUALS.

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Purpose/Hypothesis: The purpose of this study was to examine the cardiovascular responses to different times of walk using standard walker and/or platform walker with wheels in a non weight bearing individuals. **Number of Subjects:** The study consisted of two phases using male and female physical therapy students, n=16 for Phase I and n = 14 for Phase II. The ages of the subjects range from 22 to 32 years. **Materials/Methods:** Each phase consisted of two parts. Phase I part I consisted of the participants ambulating with a standard walker (SW) and a platform walker with wheels (PWW) for 2 minutes looking at the differences in heart rate (HR), respiratory rate (RR), and blood pressure (BP) (before and after walk). Part II consisted of the same participants and same vital sign measures but they ambulate for 4 minutes. Phase II part I consisted of the participants ambulating with a SW and a PWW for 6 minutes and part II of Phase II, the same participants ambulated for 12 minutes instead of 6 minutes. The vital signs measured in Phase I were also measured in both times of walk in Phase II. In each phase, the participants ambulated with non weight bearing on one foot and they ambulated at a self selected pace. Slide Write graphic software was used to produce graphical representations of the results. Analysis of variance was used to determine the statistical significance and a confidence interval of 95% or a p value <0.05 was considered significant. **Results:** Results indicated that Phase I ambulation for 2 or 4 minutes produced no statistically significant difference between before & after measurements of HR, SBP, and RR for SW and PWW. On the other hand, Phase II results indicated that ambulation for 6 or 12 minutes produced a statistically significant difference between before and after measurements of HR, SBP, and RR for SW and PWW and DBP for RW for 12 min ($p<0.05$). The remaining DBP differences were not significant ($p>0.05$). There were no significant differences in the DBP in the 6 and 12 minutes walks for SW & platform walker with wheels. **Conclusions:** In conclusion, our study suggests that ambulation using any of the gait devices in 2 or 4 minutes walks did not significantly increase the vital signs. On the other hand, there were extra cardiovascular demands on the subjects evidenced with the significant increase in the vital signs with any of the devices in 6 or 12 minutes walks. **Clinical Relevance:** Extra precaution is needed when a patient is ambulating for up to 6 or 12 minutes with either of the gait devices especially in patients with much co-morbidity or at acute stage of a trauma as these time periods increased cardiovascular vital signs. The result shows that titration of times of walk starting at 2 or 4 minutes may be safer for some patients who are at risk of cardiovascular disease.