

## THE EFFECT OF EXERCISE ON CARDIOVASCULAR RESPONSE AND CHOLESTEROL LEVELS IN THREE AGE GROUPS OF WOMEN.

Nuzzo NA

Clearlock DM

McKinley JW

Knopp HL

School of Allied Health Professions, Northern Illinois University, DeKalb, IL. Funded by a Northern Illinois University Summer Research and Artistry Grant.

**PURPOSE:** The incidence of heart disease increases as women approach menopause. Reports have suggested that regular exercise decreases these risks; yet little is known as to when during aging positive benefits of exercise may occur. Additionally, it is difficult to compare these studies because each study used different exercise models. The purpose of this study was to compare the effects of regular moderate exercise on cardiovascular and cholesterol values in pre-, peri-, and post-menopausal women using the same exercise model.

**SUBJECTS:** A convenience sample of five pre-menopausal (20-30 years of age), 11 peri-menopausal (40-50 years of age), and 11 post-menopausal (60-85 years of age) women participated in a four-week exercise study. All subjects were medically stable and gave informed consent to participate in this study.

**MATERIALS & METHODS:** All subjects participated in a three times a week aerobic moderate intensity exercise session for four weeks. Each age group used a commercially available exercise video designed for its age level. Cardiovascular values (blood pressure, heart rate, and oxygen saturation) were measured before and after each 20 minute exercise session and one week post-exercise. Blood samples for cholesterol determination were collected from each subject once a week for six weeks: pre-, during, and one week post-exercise. **ANALYSIS:** Week 0 (pre-exercise) and week 4 (last exercise session) cardiovascular data was plotted on scatter graphs and descriptively analyzed. Student's t-tests were used to analyze cholesterol from week 0 (pre-exercise), week 4 (last exercise), week 5 (1 week post-exercise).

**RESULTS:** Cardiovascular and cholesterol values from pre-menopausal women remained stable throughout the study. 55% of the peri-menopausal women experience a lower resting heart rate during the last week of exercise with all other cardiovascular values stable throughout the study. No significant change was found in the cardiovascular values of post-menopausal women over the course of the study. A significant ( $p < 0.05$ ) decrease in cholesterol values were observed in peri-menopausal women when comparing week 0 (pre-exercise) to week 4 (last exercise session), but not when comparing week 0 to week 5 (1 week post-exercise). Cholesterol values from post-menopausal women are currently being analyzed.

**CONCLUSIONS:** Cardiovascular and cholesterol values in peri-menopausal women are more amenable to positive changes resulting from exercise than those of pre-menopausal women. Cardiovascular values in post-menopausal women may be variable due to medications and complications during the aging process (i.e., rheumatoid arthritis, hypertension, coronary artery disease).

**RELEVANCE:** The incidence of cardiovascular disease is known to increase once women reach menopause, however the cardiovascular changes in women during aging have not been well studied. While there is a great deal of

cardiovascular and cholesterol research in the literature, there is not much pertaining to women, especially perimenopausal women. The results of this study indicate that exercise may have different effects on the cardiovascular system of women at different ages.

## THE EFFECT OF VMT ON POST-CVA PULMONARY FUNCTION & FUNCTIONAL MOBILITY.

Bronson LA

Nuzzo NA

McCarthy TM

Massery MP

School of Allied Health Professions, Northern Illinois University, DeKalb, IL, and Comprehensive Rehabilitation Unit, Oak Forest Hospital of Cook County, Oak Forest, IL.

**PURPOSE:** Each year in the United States, nearly 550,000 adults are diagnosed with a cerebrovascular accident (CVA). Respiratory dysfunction occurs in one-third of these individuals and may contribute to the development of pneumonia, the third major cause of death within one month of a stroke. While most of these persons receive rehabilitation services to maximize their functional independence, 25-50% continue to require varying degrees of assistance to perform their activities of daily living. Despite a large body of literature related to stroke rehabilitation, few reports address pulmonary rehabilitation following a CVA. The respiratory system plays a critical role in the supply of oxygen to all tissues of the body including those which support movement for the performance of functional activities. If the respiratory system cannot supply enough oxygen to the musculoskeletal system, progress in a rehabilitation program may be impaired or delayed. The purpose of this pilot study was to determine if ventilatory muscle training (VMT) affects respiratory function and/or functional mobility following an initial CVA. **SUBJECTS/MATERIALS & METHODS:** Twelve individuals (men and women), 40 to 60 years of age, admitted to the comprehensive rehabilitation unit within three weeks of having an initial CVA were randomly assigned to a control group or a test group. All subjects were able to either propel wheelchairs or ambulate with no more than moderate assistance, had no severe thoracic cage disorders, were determined to be medically stable by a physician and were able to give informed consent to participate in this pilot study. Test and control subjects participated in five weekly pulmonary function tests (PFT) which consisted of negative inspiratory force (NIF)/respiratory muscle strength, maximum voluntary ventilation (MVV)/respiratory muscle endurance, and forced vital capacity (FVC)/maximal volume output using a Respiradyne II Plus Pulmonary Function/Ventilator Monitor (Sherwood-Davis & Geck, St. Louis, MO). In addition to weekly testing, the test group participated five days a week in a 15 minute PFLEX (Health Scan Products, Inc., Cedar Grove, NJ) VMT session. For PFT and VMT, subjects were in Fowler's position (knees not flexed). Vital signs and oxygen saturation were monitored throughout all procedures. Test and control subjects also participated in five weekly functional mobility tests which were assessed by the time and assistance required for sit to supine and supine to sit. **ANALYSIS:** Descriptive analysis using scatter graphs of PFTs and functional mobility using weekly group means for each test were used to show trends between control and experimental groups. **RESULTS:** Test group weekly means tended to be greater than control group

weekly means. Test group means tended to show greater improvement from week one to week five than the control group means. **CONCLUSIONS:** VMT appeared to positively effect the pulmonary function of adults following their first CVA. Functional mobility may have indirectly been improved by VMT. **RELEVANCE:** Rehabilitation of the respiratory system should routinely be included in rehabilitation management of individuals following a CVA. Although further testing is warranted, VMT appears to be a potential tool for managing post-CVA respiratory dysfunction.

### **EFFECTS OF EXERCISE TRAINING ON BLOOD GLUCOSE AND FREE FATTY ACID CONCENTRATIONS IN SPONTANEOUSLY HYPERTENSIVE RATS (SHRs).**

*Kinney LaPier T*

Swislocki A

Rodnick K

Departments of Physical Therapy and Biological Sciences, Idaho State University, Pocatello, ID and Department of Medicine, University of California, Davis, CA.

**PURPOSE:** Our objective was to evaluate the effects of exercise training on blood glucose (BG) and free fatty acid (FFA) concentrations in SHRs. **SUBJECTS:** We used 24 female SHRs and 8 Wistar-Kyoto rats (WKY). **METHODS:** The study included 1 sedentary normotensive WKY group and 3 SHR groups: i) sedentary (sedSHR), ii) 8 week exercise trained (8runSHR), and iii) 16 week exercise trained (16runSHR). The exercise trained SHRs were housed in voluntary running wheels. We performed oral glucose tolerance testing on all 22 week old animals. Blood was obtained from the tail prior to and 30 and 60 min after administration of a glucose bolus (1.75 g/kg). Blood serum was isolated, frozen, and later analyzed for concentrations of BG and FFAs. **ANALYSIS:** We evaluated the data using an ANOVA followed by Tukey's Tests. **RESULTS:** The exercise trained SHRs ran an average of 7 km per day. Fasting BG was greater in the sedSHR group than in all other groups. Following glucose administration, BG was similar among all groups at 30 min but greater in the sedSHR group than the WKY group at 60 min. Fasting FFAs were lower in the WKY group in comparison to all SHR groups. In response to the glucose stimulus, FFAs in the 16run SHR and 8runSHR groups dropped to a greater extent than in the WKY group after 30 min and in the sedSHR group after 60 min. **CONCLUSIONS & REVELANCE:** Exercise training lowers fasting BG and improves glucose tolerance in SHRs. Furthermore, exercise training appears to enhance glucose stimulated suppression of FFAs in SHRs. Clinically, this suggests that preventative exercise training may attenuate some of the metabolic disorders associated with primary hypertension.

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### **ATTITUDES AND PERCEIVED BARRIERS OF ACUTE CARE PHYSICAL THERAPISTS TOWARD PHASE I CARDIAC REHABILITATION.**

Matayo RE

Ishee J

Irion GL

Department of Physical Therapy, University of Central Arkansas, Conway, AR. Funded by UCA Graduate Student Research Fund.

**PURPOSE:** Examine how attitudes, training, personal experiences and demographics may impact perceived barriers of acute care physical therapists to involvement in phase I cardiac rehabilitation.

**METHODS:** Surveys were distributed to physical therapy departments in fifty acute care hospitals in our state and the six contiguous states (total of 350). Two copies were sent to the department head with the request to distribute these to two physical therapists in the department, preferably one male and one female. Questions used as independent variables involved the respondent's gender, years of experience, quality of cardiac rehab clinical internship and the format of cardiopulmonary PT education. Questions used as dependent variables involved perceived barriers to participation in phase I cardiac rehab. An open-ended question was available at the end of the survey form.

**ANALYSIS:** Chi-squared was used to assess whether a difference existed in the answers with regard to the independent variables listed above; alpha level was set at .001.

**RESULTS:** No significant differences existed between genders, years of experience or clinical affiliation experience. A significant of experience was found between physical therapists with different formats of classroom cardiopulmonary education; those who had cardiopulmonary PT education as part of one class rated lack of training as a greater deterrent to performing phase I cardiac rehabilitation than physical therapists who had an entire semester course of cardiopulmonary education. A post-hoc study, utilizing contingency coefficient revealed a strong correlation between those who stated that lack of training was a personal deterrent to performing phase I cardiac rehab and those who felt that failure to maintain knowledge was a personal deterrent to performing phase I cardiac rehab. **CONCLUSION:** A full semester classroom experience in cardiopulmonary PT may be necessary to reduce the barrier of a perception of lack of training to participation of acute care physical therapists in phase I cardiac rehab.

### **IDENTIFYING THE PARAMETERS OF THE CLINICAL PRACTICE OF HEALTH PROMOTION AND PRIMARY DISEASE PREVENTION: A SURVEY OF CERTIFIED CARDIOPULMONARY CLINICAL SPECIALISTS.**

*Hardisty MS*

*Wiggin DE*

Riordan ME

Figurers CC

Duke University, Durham, NC.

**PURPOSE.** The purpose of this study was to identify parameters of the clinical practice of health promotion and primary disease prevention (HP/PDP) within the clinical specialty of cardiopulmonary physical therapy and to learn which factors influence this practice. **SUBJECTS.** Participants in this study were 54 physical therapists certified as Cardiopulmonary Certified Specialists (CCSs) as of February, 1996. **METHODS.** A questionnaire was sent to participants which contained 19 items in four categories: demographics/professional profile, clinical practice of HP/PDP, factors influencing the practice of HP/PDP, and definition of HP/PDP. **ANALYSIS.** Descriptive statistics were presented for demographic/professional profile items and all multiple choice items. Responses to open-ended questions were sorted into general thematic categories. Each individual's overall frequency of participation in HP/PDP activities was