

Andrews University

## Digital Commons @ Andrews University

---

Faculty Publications

---

5-29-2015

### An Innovative Approach to Decreasing Concussions in Adolescent Female Soccer Athletes: 2370 Board #117 May 29, 9

A. Lynn Millar  
*Andrews University*

Brent A. Harper  
*Radford University*

Jared Casazza  
*Radford University*

Cameron Lephew  
*Radford University*

Meredith Moore  
*Radford University*

*See next page for additional authors*

Follow this and additional works at: <https://digitalcommons.andrews.edu/pubs>



Part of the [Musculoskeletal System Commons](#), [Other Rehabilitation and Therapy Commons](#), and the [Sports Sciences Commons](#)

---

#### Recommended Citation

Millar, A. Lynn; Harper, Brent A.; Casazza, Jared; Lephew, Cameron; Moore, Meredith; and Schmidt, Timothy, "An Innovative Approach to Decreasing Concussions in Adolescent Female Soccer Athletes: 2370 Board #117 May 29, 9" (2015). *Faculty Publications*. 668.  
<https://digitalcommons.andrews.edu/pubs/668>

This Presentation is brought to you for free and open access by Digital Commons @ Andrews University. It has been accepted for inclusion in Faculty Publications by an authorized administrator of Digital Commons @ Andrews University. For more information, please contact [repository@andrews.edu](mailto:repository@andrews.edu).

---

**Authors**

A. Lynn Millar, Brent A. Harper, Jared Casazza, Cameron Lephew, Meredith Moore, and Timothy Schmidt

2368 Board #115 May 29, 11:00 AM - 12:30 PM

### Treadmill Walking with Load Carriage Does Not Change Arterial Stiffness in Patients With Resistant Hypertension

Fernando Ribeiro<sup>1</sup>, Nádia Almeida<sup>1</sup>, Raquel Ferreira<sup>2</sup>, Nórton L. Oliveira<sup>3</sup>, Fátima Gandarez<sup>2</sup>, Rui Costa<sup>1</sup>, José Nobre dos Santos<sup>2</sup>, José Oliveira<sup>3</sup>, José Mesquita-Bastos<sup>1</sup>. <sup>1</sup>University of Aveiro, Aveiro, Portugal. <sup>2</sup>Hospital Center Baixo Vouga, E.P.E., Aveiro, Portugal. <sup>3</sup>University of Porto, Faculty of Sport, CIAFEL, Porto, Portugal.

Email: fernando.silva.ribeiro@gmail.com

(No relationships reported)

Numerous tasks of daily living include isodynamic exercise, e.g. walking with hand load carriage, which combines dynamic and isometric muscle actions. The acute impact of such activities on arterial stiffness of patients with resistant hypertension is poorly understood.

**PURPOSE:** To assess the effects of walking with load carriage on arterial stiffness, derived measures of central pressure and augmentation index in patients with resistant hypertension.

**METHODS:** Twenty patients (age:  $58.6 \pm 8.8$  yrs; weight:  $85.5 \pm 10.3$  kg; height:  $166.5 \pm 7.2$  cm; 24h systolic and diastolic ambulatory blood pressure:  $135 \pm 33.2$  mmHg,  $81 \pm 19$  mmHg) were randomized to either walk 10 min on a treadmill at 3 km/h carrying no load (control session, CG) or a load of 10% of their weight on both upper limbs in two water carboys with handle (experimental session, EG). Carotid-femoral pulse wave velocity (cf-PWV) and pulse wave analysis in the radial artery were performed at rest and immediately after exercise by applanation tonometry. Student's independent t-test was used to compare groups at baseline. A repeated measures analysis of variance was used to compare the changes over time (session x time).

**RESULTS:** No significant differences were observed at baseline between groups, except for gender (EG: 3 vs CG: 6 women). At baseline, women presented higher augmentation index at 75bpm (AIx@75bpm) than men ( $31.3 \pm 7.8$  vs  $21.4 \pm 8.5\%$ ,  $p=0.015$ ); then, the subsequent analyses were performed controlling for gender. The main result indicates that none of the sessions changed significantly AIx@75bpm (EG:  $24.0 \pm 10.7$  to  $25.2 \pm 6.9$  vs. CG:  $27.7 \pm 8.3$  to  $28.8 \pm 7.6\%$ ,  $p>0.05$ ) or cf-PWV (EG:  $8.0 \pm 0.9$  to  $8.5 \pm 1.1$  vs. CG:  $8.8 \pm 1.3$  to  $9.2 \pm 1.8$  m/s,  $p>0.05$ ). Additionally, both sessions induced a significant and similar increase in peripheral and aortic systolic pressure, pulse pressures, and augmentation pressure; and induced a significant decrease in peripheral and aortic diastolic pressure.

**CONCLUSIONS:** An everyday activity such as walking while carrying a load on the upper limbs (aerobic exercise accompanied by upper limb isometric contraction) does not significantly increase arterial stiffness, augmentation index or derived measures of central pressure in patients with resistant hypertension.

## E-30 Free Communication/Poster - Concussion

Friday, May 29, 2015, 7:30 AM - 12:30 PM

Room: Exhibit Hall F

2369 Board #116 May 29, 9:30 AM - 11:00 AM

### Concussion Education Video Exposure Does Not Significantly Improve Youth Athlete Concussion Knowledge

Johna K. Register-Mihalik<sup>1</sup>, Tamara C. Valovich McLeod<sup>2</sup>, Richelle M. Williams<sup>3</sup>, Laura A. Linnan<sup>1</sup>, Jason P. Mihalik<sup>1</sup>, Stephen W. Marshall<sup>1</sup>, Kevin M. Guskiewicz, FACSM<sup>1</sup>. <sup>1</sup>The University of North Carolina at Chapel Hill, Chapel Hill, NC. <sup>2</sup>A.T. Still University, Mesa, AZ. <sup>3</sup>The University of Michigan, Ann Arbor, MI.

Email: johnakay@email.unc.edu

(No relationships reported)

Few studies have investigated the effects of publicly available educational materials and reinforcement strategies on improving concussion knowledge among youth athletes.

**PURPOSE:** This study examined knowledge differences before and after a concussion education video intervention with and without in-person reinforcement.

**METHODS:** Participants were North Carolina (NC) and Arizona (AZ) youth athletes ( $n=225$ ) that participated in football, boys/girls soccer, boys/girls ice hockey, and boys/girls lacrosse. Athletes were cluster-randomized by team to two study arms: 1) video with in-person reinforcement (RE) or 2) video with no in-person reinforcement (NoRE). Participants completed assent forms with parental consent prior to participation. A validated concussion survey was administered pre-post intervention. The outcome was concussion knowledge (max=29; higher score=more knowledge). A mixed model ANCOVA (controlling for state of residence) examined intervention effects (a priori  $\alpha=0.05$ ).

**RESULTS:** A total of 180/225 participants (104 NoRE; 76 RE) completed all pre-post knowledge score questions and were included in the analyses. There were no age, concussion history, or previous concussion education differences between intervention groups ( $p>0.05$ ). Arizona athletes' pre-test knowledge was lower than NC athletes' ( $p<0.001$ ). When controlling for state, there was no intervention group by time interaction ( $F(1,177)=14.1$ ;  $p=0.095$ ) as there was no difference in post-intervention improvement between study arms. Regardless of group, there was no significant improvement in knowledge following the intervention [ $F(1,177)=0.070$ ;  $p=0.792$ ; post= $25.1$  (95% CI: 24.7, 25.5) vs. pre= $23.0$  (95% CI: 22.5, 23.5)].

**CONCLUSIONS:** In-person reinforcement did not enhance concussion knowledge changes following educational videos for youth athletes. In addition, no overall improvement in knowledge was observed following the videos, suggesting these types of educational materials are likely not effective at increasing overall knowledge among youth sport athletes. These findings suggest that additional educational methods, such as those that are more interactive and culturally relevant, should be explored.

Funded by the National Operating Committee on Standards for Athletic Equipment.

2370 Board #117 May 29, 9:30 AM - 11:00 AM

### An Innovative Approach to Decreasing Concussions in Adolescent Female Soccer Athletes

Brent A. Harper<sup>1</sup>, Jared Casazza<sup>1</sup>, Cameron Lephew<sup>1</sup>, Meredith Moore<sup>1</sup>, Timothy Schmidt<sup>1</sup>, A. Lynn Millar, FACSM<sup>2</sup>. <sup>1</sup>Radford University, Roanoke, VA. <sup>2</sup>Winston-Salem State University, Winston-Salem, NC.

Email: bharper2@radford.edu

(No relationships reported)

Concussion is a public health issue, fundamental to health promotion and injury prevention. Concussions are prevalent in adolescent athletic competition, in high-collision and non-collision sports. A history of previous concussion increases risk by a factor of three, female gender increases it 1.5 to 2.5 times, and female middle-school soccer players have 22.9 times increased risk during games. Non-collision concussions (indirect) can be primed by altered movement patterns from previous injuries, disruption of cervical proprioception, or musculoskeletal pain. Assessment of dynamic balance and functional movement allows identification of poor movement patterns or control.

**PURPOSE:** To assess a preventative movement-based warm-up routine designed to re-set aberrant afferent information from various systems (vestibular, somatic, ocular) for a cohort of high school female soccer players with prior concussions.

**METHODS:** A retrospective cohort study of convenience consisting of 17 Virginian high school female soccer athletes ages 15 to 18 during 2013-2014 season. Three players had suffered a concussion within the last 6 to 8 months. Athletes were assessed pre-season using the Lower Quarter Y-balance test (LQ-YBT) and the Functional Movement Screen (FMS). Cohort was instructed in a general warm-up placing emphasis on normalizing movement patterns (identified via the YBT and FMS), vestibular ocular reflex, and ACL-prevention exercises, which was performed during the entire season before practices and games.

**RESULTS:** Sixteen varsity high school female soccer athletes, ages 14 to 18 years, participated. The average FMS composite score was  $15 \pm 2$ , with 2 athletes being below the injury risk score of 14, and another 3 scoring right at the cutoff. The difference from side to side for the composite LQ-YBT ranged from 5 - 8cm. A total of 10 athletes had differences, with 6 of the athletes had an anterior difference of  $\geq 4$ cm, and 6 had a posterior difference of  $\geq 6$ cm. These levels are predictive of a deficit in dynamic balance. There were no new, or repeat concussions during the soccer season.

**CONCLUSIONS:** The finding of no new or repeat concussions, suggests that the intervention may have helped and may indicate a new injury prevention paradigm.

---

2371 Board #118 May 29, 9:30 AM - 11:00 AM

### **The Development of a Sideline Screening Instrument for Concussion**

Douglas M. Kleiner, FACSM, Crystal M. Kleiner. *Center for Sports Concussion, Jacksonville Beach, FL.*

(No relationships reported)

Sports medicine practitioners continue to search for sideline assessment tools and neuropsychological tests to accurately identify concussion in athletes. Such an instrument should be brief, valid, reliable, and discriminating, as well as practical for the sidelines.

**PURPOSE:** The purpose of this study was to evaluate which questions most accurately detect neurological impairment in the form of cognitive disturbances.

**METHODS:** For the past 7 years we have evaluated many instruments for validity, specificity, and discriminating qualities of each task. From those data, we have combined, modified, and developed an equally-weighted 12-question cognitive assessment tool evaluating: simple orientation (SO), complex orientation (CO), immediate recall (IR), delayed recall (DR), concentration (C), and staged commands (SC). Subjects had their mental status assessed before and after competing in an amateur boxing bout. A convenience sample of 223 subjects (n=211 males/12 females, mean age=31.2 y, height=179.9 cm, mass=91.0 kg) were used. Descriptive data are presented as percentage (%) of responses.

**RESULTS:** The questions which were easiest to answer (greatest number of correct answers) to hardest to answer were as follows: SC, IR, CO, SO, SC, CO, C, C, DR, and DR. Subjects scored better on the post-test than pre-test for the two questions involving DR (59.8% correct pre to 65.6 correct post, and 71.0% correct pre to 75.0 correct post). One question from the "easiest category" (SO [day of the week]) also increased in mean percent correct from pre-test (96.0%) to post-test (98.2%).

**CONCLUSIONS:** The DR and SC questions involving; reading, comprehension, detailed concentration, memory, counting, reasoning, and motor skills were thought to be the more difficult questions, however both increased from pre- to post-test. We believe that they are more subject to a learning effect, and are confident that the subjects took those complex questions "more seriously" during the post-test after missing it on the pre-test. We found this instrument to quickly and accurately assess cognitive function in athletes, making it a reasonable alternative to other sideline assessment tools. This instrument, along with other modalities should be part of the standard protocol to assess concussion in athletes.

---

## **E-31 Free Communication/Poster - Energy Balance**

Friday, May 29, 2015, 7:30 AM - 12:30 PM

**Room:** Exhibit Hall F

---

2372 Board #119 May 29, 11:00 AM - 12:30 PM

### **Resistance Exercise Training And Nandrolone Decanoate Are Able To Alter mRNA Expression Of Orexigenic Neuropeptides**

Renan Pozzi, Leandro Fernandes, Vânia D'Almeida. *Universidade Federal de São Paulo, São Paulo, Brazil.*

(No relationships reported)

Nowadays, athletes and physical exercise's practitioners have been using anabolic androgenic steroids in order to improve performance or esthetic. However, the chronic supraphysiological use of these substances is associated with higher collateral effects and metabolism alterations.

**PURPOSE:** To evaluate the expression of central neuropeptides related to energy balance in rats submitted to resistance exercise training and exposed to supraphysiological doses of nandrolone decanoate (DECA).

**METHODS:** A total of 40 Wistar rats (10-week-old) were distributed into four groups: Group (CT): exposed to vehicle (subcutaneous administration 5mg/kg); Group (T): resistance exercise (8wk) and exposed to vehicle (subcutaneous administration 5mg/kg) three times per wk; Group (D): exposed to DECA (subcutaneous administration 5mg/kg) three times per wk; Group (T+D): submitted to resistance exercise (8wk) and exposed to DECA (subcutaneous administration 5mg/kg) three times per wk. After training and treatment, animals were euthanized, the gastrocnemius, total fat and hypothalamus was collected and mRNA expression analysed by qPCR. Prepro-orexin, NPY, POMC, ghrelin receptor, leptin receptor, AR and ER mRNA expressions in hypothalamus were analysed. One-way ANOVA and Fisher post-hoc tests were used.

**RESULTS:** The efficiency of the training was confirmed by cross-sectional area of the gastrocnemius muscle, which was higher in T and T + D groups compared to the CT ( $p=0.019$ ;  $p=0.044$ ) and D group ( $p=0.001$ ;  $p=0.001$ ), respectively. There was a reduction of body mass in T+D compared to CT group ( $p=0.042$ ) and a reduction of total fat of T+D ( $p=0.008$ ) and D ( $p=0.011$ ) groups compared to CT group. We found an increase in prepro-orexin and NPY mRNA expressions in T ( $p=0.005$ ;  $p=0.004$ ) and T+D ( $p=0.014$ ;  $p=0.038$ ) groups compared to CT group. There were no changes in POMC, ghrelin receptor, leptin receptor, AR and ER mRNA expressions in hypothalamus. All expressions were corrected by the beta actin and GAPDH housekeeping genes.

**CONCLUSION:** Our results showed that resistance training and resistance training associated to a supraphysiological DECA administration were able to alter mRNA expression of orexigenic neuropeptides including NPY and prepro-orexin.

Supported by: FAPESP (Fundação de à Pesquisa do Estado de São Paulo), CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior) and AFIP (Associação Fundo de Incentivo à Pesquisa).

---

2373 Board #120 May 29, 11:00 AM - 12:30 PM

### **Fruit and Vegetable Consumption and Diet Quality in Response to a Behavioral Weight Loss Intervention**

Anna Peluso, Bethany Barone Gibbs, John M. Jakicic, FACSM. *University of Pittsburgh, Pittsburgh, PA.* (Sponsor: John M. Jakicic, FACSM)

(No relationships reported)

**PURPOSE:** Fruit and vegetable consumption has been recommended as part of a healthy diet. The purpose of this analysis is to examine the change in fruit and vegetable consumption and measures of diet quality within the context of a 12 month behavioral weight loss intervention.

**METHODS:** Participants were 151 women classified as overweight or obese (age=38.0 $\pm$ 5.5 years; BMI=32.6 $\pm$ 4.2 kg/m<sup>2</sup>) who completed a 12-month behavioral weight loss intervention. Participants received weekly contact that included a combination of group sessions and brief telephone calls, prescribed calorie-restricted diet, and physical activity. The calorie-restricted diet was prescribed at 1200 or 1500 calories per day, with no specific recommendations related to fruit and vegetable intake. Assessments were conducted at baseline, 6, and 12 months. Daily servings of fruits and vegetables were assessed using a food frequency questionnaire. Calories consumed per serving of fruits and vegetables was computed as a measure of diet quality.

**RESULTS:** Weight loss was 8.4 $\pm$ 4.7 kg at 6 months and 8.1 $\pm$ 6.9 kg at 12 months ( $p<0.001$ ). Total daily energy intake decreased at 6 (-626 $\pm$ 1011 kcal/d) and 12 months (-656 $\pm$ 1015 kcal/d) ( $p<0.001$ ). Median [25th, 75th percentile] fruit and vegetable intake increased from 3.6 [2.5, 5.2] servings at baseline to 5.1 [3.3, 7.3] and 4.4 [3.2, 6.2] ( $p<0.001$ ) at 6 and 12 months, respectively. Median calories per serving of fruit and vegetables decreased from 577.9 [405.0, 775.8] at baseline to 288.2 [202.4, 417.4] and 332.4 [227.3, 490.4] ( $p<0.001$ ) at 6 and 12 months, respectively. Servings of and calories per fruits and vegetables, were not significantly correlated with weight change at either 6 or 12 months.