METHOD: A two-trial, double-blind, crossover, repeated measures design, eight physically males inhaled HO gas (67 % of hydrogen and 32 % of oxygen) or Placebo gas (ambient air) during 60-min recovery after completion of oxidative stress-inducing exercise protocol consisting of 30-min treadmill running at 75 % of participant’s maximal oxygen uptake (VO₂max) and 5 x 10 repetitions of squat jump exercise. Before oxidative stress-inducing exercise and 10-min after post exercise gas inhalation, blood and urine samples were obtained and exercise performance (jumping ability, pedaling power output, muscle strength) were evaluated.

RESULTS: post-exercise HO gas inhalation attenuated the increase 8-OHdG excretion rate (p < 0.05), known as one of DNA oxidation markers, and the reduction in the jumping ability evaluated by the height of countermovement jump (p < 0.05) compared with Placebo gas inhalation. Moreover, the increase in urinary 8-OHdG excretion rate was significantly associated with the reduction in countermovement jump performance (r = −0.78, p < 0.01).

DISCUSSION: These suggested that HO gas inhalation during post exercise recovery might, at least in part, improve exercise performance via reducing systemic oxidative damage.

3752 Board #69 May 30 8:00 AM - 9:30 AM
Comparison Of Interval Exercise And Continuous Exercise On Excess Post-exercise Oxygen Consumption: Matched For Duration
Eliott Arroyo1, Tricia L. Hart2, Brandon A. Miller1, Emily C. Tagesen1, Adam R. Jajtner1. Kent State University, Kent, OH. Lipscomb University, Nashville, TN. (Sponsor: Ellen L. Glickman, FACSM)
(No relationships reported)

PURPOSE: To compare the excess post-exercise oxygen consumption (EPOC) during duration-matched bouts of high-intensity (HIIT) and sprint interval (SIT) exercise to moderate-intensity continuous (MCT) exercise.

METHODS: Recreationally active men (n=7; 22±3 yrs; 180±4±7 cm; 77.8±9.3; 13.4±3.4 %BF; 44.7±2.6 ml·kg⁻¹·min⁻¹) completed a maximal graded exercise test (VO₂max) and three exercise trials (HIIT, SIT, and MCT) in a randomized, counterbalanced fashion on a cycle ergometer. HIIT consisted of 15 x 90-second bouts at 85 % VO₂max and 90-second active recovery periods. SIT consisted of 15 x 20-second bouts at 130% maximum wattage and 160-second active recovery periods. MCT was continuous bout at 65% VO₂max. Each trial lasted 53 min, including a 5-min warm-up and a 3-min cool-down. Oxygen consumption (VO₂; ml·kg⁻¹·min⁻¹) was measured after bouts 1 (B1), 5 (B5), 10 (B10), 15 (B15), and cool-down (CD) which corresponded with min 0-3, 12-15, 27-30, and 42-45 of MCT, respectively. VO₂ was also measured for 30 min prior to exercise (PRE) and during 1 h of recovery. EPOC (L of O₂) was measured by the area under the curve with respect to increase (AUCi) from PRE VO₂ during the first 20 min of recovery. Trial effects were assessed via one-way analyses of variance.

RESULTS: VO₂ was lower in SIT compared to MCT after B1 (p = 0.002; 17.6 ± 4.6 ml·kg⁻¹·min⁻¹, 24.2 ± 1.8 ml·kg⁻¹·min⁻¹, respectively), B5 (p = 0.007; 21.8 ± 4.8 ml·kg⁻¹·min⁻¹, 29.1 ± 3.4 ml·kg⁻¹·min⁻¹, respectively), B10 (p < 0.001; 21.8 ± 2.6 ml·kg⁻¹·min⁻¹, 30.0 ± 2.5 ml·kg⁻¹·min⁻¹, respectively) and B15 (p < 0.001; 21.8 ± 2.6 ml·kg⁻¹·min⁻¹, 29.3 ± 3.3 ml·kg⁻¹·min⁻¹, respectively). SIT was also lower than HIIT at B15 (27.5 ± 3.4 ml·kg⁻¹·min⁻¹; p = 0.021), B10 (28.2 ± 2.9 ml·kg⁻¹·min⁻¹; p = 0.001) and B15 (28.8 ± 3.7 ml·kg⁻¹·min⁻¹; p = 0.001), while MCT was higher than HIIT at B10. After CD, VO₂ was higher in MCT (19.0 ± 2.9 ml·kg⁻¹·min⁻¹) compared to SIT (16.4 ± 2.6 ml·kg⁻¹·min⁻¹; p = 0.015) and HIIT (15.5 ± 2.0 ml·kg⁻¹·min⁻¹; p = 0.007). EPOC was lower following SIT (5.5 ± 1.1 L) compared to MCT (7.4 ± 1.6 L; p = 0.005) and HIIT (6.7 ± 0.8 L; p = 0.006).

CONCLUSION: EPOC was similar following both HIIT and MCT, but not SIT, when matched for duration. Of note, despite identical duration, the MCT protocol involved more total work when compared to both HIIT and SIT.

G-33 Free Communication/Poster - Monitoring
Saturday, May 30, 2020, 8:00 AM - 10:30 AM
Room: CC-Exhibit Hall

3753 Board #70 May 30 8:00 AM - 9:30 AM
Global Positioning System Analysis Of Positional Locomotive Training Demands In Women’s Varsity Rugby Union
Danielle L. E. Nyman, Lawrence L. Spriet, FACSM. University of Guelph, Guelph, ON, Canada.
(No relationships reported)

Rugby union is a full contact, intermittent-intensity sport that requires a combination of power, agility, speed and endurance. In positional gameplay, forwards compete in high force-plays (scrum, ruck, mauls), while backs typically execute sprint and agility focused activities.

PURPOSE: To determine the locomotive demands of female varsity rugby union athletes in regular season training, and to assess positional dissimilarities in these demands, using global positioning system (GPS) technology.

METHODS: Wearable GPS technology was used to collect spatial and temporal data of female varsity rugby athletes (20.2 ± 2.4 yr) during 2-week, each ~2 hr in length. Sessions were categorized as endurance training (ET), skill training (ST) or game-based training (GBT). Movements were catalogued into 5 speed zones. Player positions were classified as forward (n=14) or back (n=15).

RESULTS: Backs traveled greater total distances on all practice days than forwards, and in ET backs traveled greater distances per minute than forwards (50.07 ± 6.67 m; 47.95 ± 16.64 m, p < 0.01). Positional work-to-rest ratio was higher in forwards vs. backs in ET only (0.244 ± 0.138; 0.320 ± 0.051, p < 0.05). Backs traveled greater total distances in high-intensity zones than forwards (7.23 ± 4.34 %; 3.42 ± 2.50 %, p < 0.05) during GBT. In all practice sessions, significant differences between positions were observed in time spent and distance traveled within the 5 speed zones.

CONCLUSION: Locomotive training demands for back positions are of higher intensity in BT, and greater volume on all practice days, compared to forward positions. ET was the only session that exhibited a significantly higher work-to-rest ratio for forwards. Though GPS technology is effective for quantifying linear movements, it is not capable of quantifying athlete exertion in low-speed, high-power movements, performed by forwards in rugby union. Research funded by a grant from NSERC, Canada.

3754 Board #71 May 30 8:00 AM - 9:30 AM
Associations Between Two Athlete Monitoring Systems Used To Quantify External Training Loads In Basketball Players
Keldon Peak, Aaron Heishman, Ryan Miller, Eduardo Freitas, Brady Brown, Michael Bemben, FACSM. University of Oklahoma, Norman, OK. (Sponsor: Michael G. Bemben, FACSM)
(No relationships reported)

Quantifying external training load (eTL), referred to as the biomechanical load during training, is becoming increasingly popular for team sport in an effort to manage fatigue, optimize performance, and guide return-to-play protocols following injury. During indoor team sport play, eTL can be measured via Inertial Measurement Units (IMUs) which incorporate accelerometers, gyroscopes, and a magnetometer to characterize an athlete’s movement signature, while Indoor Positioning Systems (IPS) are also common, which use Ultra-wideband (UWB) to detect player positioning and their subsequent movements.

PURPOSE: The purpose of this study was to assess the association between a commercially available IMU and IPS used to monitor eTL in team sport.

METHODS: A retrospective analysis was performed on 13 elite male NCAA Division I basketball players from three practices during the off-season training phase. A Pearson’s correlation was used to examine the association between the Distance traveled during practice captured by IPS system compared to PlayerLoad (PL), PlayerLoad per Minute (PL/Min), 2-Dimensional PlayerLoad (PL2D), 1-Dimensional PlayerLoad Forward (PL1DF), Side (PL1DS), and Up (PL1DU) captured from the Catapult Sport IMU.