**Info for readme file to accompany *Applied Physiology, Nutrition, and Metabolism* data archive:**

Archived data pertaining to article: Chrzanowski-Smith, O. J., Edinburgh, R. M., Betts, J. A., Stokes, K. A., & Gonzalez, J. T. (2018). Evaluation of a graded exercise test to determine peak fat oxidation in individuals with low cardiorespiratory fitness: Estimating maximal capacity for fat oxidation. Applied Physiology Nutrition and Metabolism, 43(12), 1288-1297. <https://doi.org/10.1139/apnm-2018-0098>

As described in the manuscript, this study was a cross-over design where sixteen healthy adults first completed an incremental graded exercise test (GE) followed by three short continuous exercise (SCE) sessions all in an overnight fasted-state (11 ± 1 h). The GE was completed to determine rate of peak fat oxidation during exercise (PFO) and FATMAX i.e. the exercise intensity this occurred at (measured in absolute watts). In a randomised The three SCE sessions were completed in a randomised order and involved completion of the graded test to the stage: 1) preceding (SCEpre); 2) equal to (SCEequal); or 3) after (SCEpost), PFO was attained, where participants then continued to cycle for 10-minutes at that respective intensity. Expired gases were sampled at minutes 3-4, 5-6, 7-8 and 9-10 and substrate oxidation rates were assessed via indirect calorimetry.

**Body mass**

The weight of each participant was measured to the nearest 100 g using electronic scales (TANITA Inner Scan Body Composition Monitor-BC453, Tokyo) whilst they wore minimal clothing. Additionally, an estimate of body fat percentage was also obtained when participants were weighed.

**Body Stature**

Body stature was measured to the nearest 0.1 cm using a wall mounted/attached stadiometer (Holtain Ltd, UK) with participants head positioned in the Frankfort plane and after inhalation of a deep breath.

**Body mass index**

Body mass index was body mass (kilograms) divided by height (m) squared.

**Waist and Hip circumference**

Waist circumference was measured at the narrowest point between the 10th Rib and top of the iliac crest at the end of a ‘normal’ expiration. Hip circumference was measured at the point of greatest posterior protuberance of the buttocks. Waist to hip ratio was calculated by dividing waist circumference by hip circumference.

**Incremental graded exercise test**

Participants completed an incremental graded exercise test (GE) to volitional exhaustion on a mechanically braked cycle ergometer (Monark Peak Bike Ergomedic 894E, Varberg, Sweden). The GE comprised of: a) four-min stages for the first seven stages and b) two-min stages from the eighth stage onwards. Initial power output was set at ~40 W and increased by ~25 W over the next six stages and by ~50 W from stage seven onwards. Expired gas samples were collected in the final minute of the first seven stages and upon the participant’s signal of one-min remaining before volitional exhaustion.

**Peak power output (PPO)**

Peak power output was the work rate of the last completed stage, plus the fraction of time in the final non-completed stage, multiplied by the work rate increment.

V̇**o2peak**

Peak oxygen uptake (V̇O2peak) was measured as the recorded oxygen uptake value of the expired gas sample collected in the final min of the GE test.

**Peak fat oxidation**

Peak fat oxidation was measured in absolute rates of fat oxidation (g·min-1) and was determined by the measured values approach i.e. the stage in the GE test with the highest recorded fat oxidation value

**FATMAX**

FATMAX was expressed as absolute V̇O2, W and HR at the stage eliciting PFO and as a % of V̇O2peak, PPO and Heart rate (HR)MAX. The exercise intensity for the SCE sessions was determined by the corresponding absolute Watts for each respective stage.

**Metabolic measurements**

Expired gas samples were collected into 100-150 L Douglas bags (Cranlea and Hans Rudolph, Birmingham, UK) via a mouthpiece connected to a two-way, T shaped non-rebreathing valve (Model 2700, Hans Rudolph Inc, Kansas City, USA) and falconia tubing (Hans Rudolph Inc, Kansas City, USA). Concentrations of O2 and CO2 were measured in a known volume of each sample via paramagnetic and infrared transducers, respectively (Mini MP 5200, Servomex Group Ltd., Crowborough, East Sussex, UK) and until values were stable. The sensor was calibrated to a two-point low and high calibration of known gas concentrations (Low: 99.998 % Nitrogen, 0 % O2 and CO2; High: Balance nitrogen mix, 20.06 % O2, 8.11 % CO2) (BOC Industrial Gases, Linde AG, Munich, Germany). Concurrent measurements of inspired air composition were made during collection of each expired gas sample to adjust for changes in ambient O2 and CO2 concentrations (Betts and Thompson 2012). The ambient temperature, humidity and barometric pressure were recorded via a weather station (Technoline WS 6730, TechnoTrade Import-Export GmbH, Berlin, Germany) so that expired air volumes could be corrected to standard temperature and pressure for dry gases. The volume and temperature of expired air samples were measured on a dry gas meter (Harvard Apparatus) and using a digital thermistor, respectively (HI98509 Checktemp 1, Hanna Instruments Ltd, Bedford, UK). The Haldane transformation was applied to calculate inspired gas volumes and to determine V̇O2 (L·min-1), V̇CO2 (L·min-1), V̇E (L·min-1) and respiratory exchange ratio (RER). Indirect calorimetry was then used to determine rates of fat oxidation (g·min-1) estimated by stoichiometric equations (Frayn 1983) assuming urinary nitrogen excretion was negligible.