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GENDER DIFFERENCES IN BODY MASS AND BODY FAT DURING THE SKELETON COAST EXPEDITION

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The coastline of Namibia is one of the most inhospitable and unexplored places on earth. No one has ever walked a 500 Km stretch of the Skeleton Coast totally unsupported. Fourteen explorers overcame this by carrying, along with all their other equipment, hand-held water pumps to desalinate sea water. The aim of this paper is to highlight the changes in body mass, waist circumference and body fat in the mixed group on this unique 20 day expedition.

Eight males (mean (SD) 42.3 (9.7) years, height 1.74 (0.043) m, weight 78.7 (8.6) kg, body mass index (BMI) 24.8 (2.0) kg/m2) and six females (mean (SD) 40.0 (5.3) years, height 1.63 (0.043) m, weight 63.2 (5.5) kg, BMI 23.8 (1.8) kg/m2) undertook the expedition. Height, body mass, waist circumference and skin-fold thickness at four regions of the body (which allowed % body fat to be calculated) were measured before and after the expedition. The approximate daily calorific intake for each team member was 2400 - 3000 kcal. Average pack weight at the start of the expedition was 32.5 kg (71.5 lbs) for men and 26.5 kg (58.3 lbs) for women. Most days the team walked for 8 - 10 hours then pumped water for a further 4 hours. A 2 factor ANOVA (gender, time) was performed using PASW v17 Statistics.

Significant gender Ð time interaction effects were found for body mass (p=0.028, Ðp2 = 0.343) and waist circumference (p=0.009, Ðp2 = 0.444) but not for overall body fat. The % decrease in body mass after the 20 day trek was 4.26% for females and 8.08% for males. Waist circumference decreased by 5.02% in females and 7.58% in males.

Body mass and waist circumference were significantly reduced for both males and females on this expedition, however these decreases were more pronounced in males.

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COMPUTATIONAL FLUID DYNAMICS: THE ANALYSIS OF DRAG COEFFICIENT DURING THE GLIDING PHASE -

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The aim of the current study was to analyse the effect of depth on hydrodynamic drag coefficient during the underwater gliding, using computational fluid dynamics.

A three-dimensional domain was created to simulate the fluid flow around a swimmer model, representing the geometry of a part of a lane in a swimming pool. The water depth of this domain was 3.0 m with a 3.0 m width and 10.0 m length. Computational fluid dynamics methodology was applied with the k-epsilon turbulent model (1). A prone hydrodynamic gliding position was analysed. During the gliding, the swimmer model's middle line was placed at three different water depths: at a water depth of 0.20 m (just under the surface), at a water depth of 1.50 m (middle of the pool), and at a water depth of 2.80 m (bottom of the pool). The drag coefficient was computed using a steady flow velocity of 2.0 m/s for the different depths.

The coefficient of drag was 0.36, 0.31 and 0.30 when the swimmer's model was placed at a water depth of 0.20 m, 1.50 m and 2.80m, respectively.

The hydrodynamic drag values during the gliding decreased with the increase in depth. This increase of drag values can be due to the effect of wave drag, representing this component an important role to total drag near the water surface (2). Reducing the drag experienced by swimmers during the glide off the wall can reduce start and turn times and improve overall performance. This work was supported by FCT (PTDC/DES/098532/2008).