

reflective markers that were used by high speed motion capture cameras (Vicon, Inc., Oxford, UK) to record kinematic data. All data was analyzed statistically using a MANOVA ($\alpha=0.05$).

RESULTS: Significance for the medial-lateral GRF was found when analyzed between gender ($F(1,14)=6.682, p=0.022$; Female mean = 0.043 BW (Body weight), Male mean=0.024 BW). Significance for the anterior-posterior GRF was found between times ($F=13.208, p=0.001$): start (0.214 BW) and end (0.248 BW; $p=0.002$). The vertical GRF showed significance between start (2.236 BW) when compared to end (2.499 BW; $p=0.034$). Lateral pelvic ROM significant differences were found between start (7.813 degrees) and end (9.267 degrees; $p=0.010$). Data analysis for pelvic rotation ROM showed significant differences between gender (Female=11.299 and Male=6.726; $p<0.001$) and time: start (8.153 degrees) and end (9.695 degrees; $p=0.026$).

CONCLUSIONS: Results showed significant changes in ground reaction forces between beginning of steady state running and a fatigued state during the selected running protocol, but no significant changes in hip joint moments. Thus, the data suggests fatigue influenced a change in form, as evidenced by the significant changes in ground reaction forces. However, the lack of significant changes in hip joint moments suggest that additional compensation is happening with the running form. Further research is needed to examine segmental kinematics and muscle EMG around the hip to fully understand the relationship between the compensation during fatigued running form and hip/pelvic kinematics and kinetics.

E-29 Free Communication/Poster - Performance

Friday, May 31, 2019, 7:30 AM - 12:30 PM
Room: CC-Hall WA2

**2337 Board #1 May 31 9:30 AM - 11:00 AM
Mild Dehydration Protocol Impairs Lightweight Rowing Performance: Exploring Differences in Dehydration Technique**

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(No relevant relationships reported)

Dehydration is an acute weight loss technique used by lightweight rowers to become eligible for competition. While rowing allows a two-hour window between weigh-ins and racing that athletes can use to rehydrate, it is unclear what effect this procedure may have on performance. **PURPOSE:** To determine whether mild dehydration with rehydration, as a weight reduction strategy for lightweight rowers, compromises rowing performance. **METHODS:** Experienced rowers ($N=14$) twice performed a 2000 m rowing ergometer time trial and visuomotor battery: once euhydrated and once after mild dehydration (mean $-1.68 \pm .23\%$ body mass reduction). Weight loss was achieved through a combination of 12-hour fluid restriction and subsequent sauna exposure. **RESULTS:** Participants were significantly slower on the 2000 m rowing trial in the dehydration condition than in the euhydrated condition (2.44 ± 4.5 s, $p<0.05$). Hierarchical linear regression analyses revealed that these rowing performance decrements were better explained by dehydration achieved through fluid restriction ($r^2=.504, p<0.01$) than by dehydration achieved in the sauna or total dehydration magnitude ($r^2=.025, n.s.$). Hierarchical regression revealed that dehydration-related changes in visuomotor function were also explained by dehydration by fluid abstinence but not sauna exposure and were predictive of dehydration-related rowing performance decrements ($r^2=.310, p<0.01$). **CONCLUSION:** These findings suggest that rowing time-trial performance can be negatively affected by relatively small changes in hydration status and that the technique by which dehydration is achieved is important. Performance losses were associated with fluid abstinence and not with sauna dehydration. Reduced motor control may explain resulting declines in performance following dehydration and rehydration.

**2338 Board #2 May 31 9:30 AM - 11:00 AM
Progression of World Records in Master Swimming**

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(No relevant relationships reported)

Master sports is increasingly popular and arguably becoming more competitive worldwide. Engagement in master sports has a positive impact on athlete's health &

fitness. Master swimming is a good proxy of overall master sports as it is deemed to have one of the highest number of competitive participants. Several fitness components are performance determinants in master swim. However, it is unknown the progression of World Records (WRs) in master swim over time. It can provide insight on the overall trend of master swimmers' fitness level and competitiveness over the past decades. **PURPOSE:** To analyze the progression of WRs in master swim in the past decades. **METHODS:** The WRs in all men's freestyle events (50m, 100m, 200m, 400m, 800m and 1500m) in all age-groups (from 25-29 to 100-104 years-old) between 1984 and 2016 were extracted from FINA database. To enable comparisons across events, WRs were converted into swim speed. For each event and age-group the percentage of change in the swim speed between Olympic cycles was calculated. Then, it was computed the relative variability within-cycle and within-event. Small, moderate and large worthwhile effects of time between Olympic cycles were calculated as well. Finally, the chance that time (i.e. Olympic cycle) and events had a substantial effect on the WRs progression was computed. **RESULTS:** The within-cycle variability was moderate-high ($15.98<CV<148.46\%$; 1996-2000 and 1984-1988, respectively); whereas the within-events variability was high ($33.93<CV<128.38\%$; 400m and 800m events, respectively). Small, moderate and large worthwhile effects between-cycles were 0.16%, 0.47% and 0.93%, respectively. Chances that time had a substantial effect on the WRs progression ranged between 97.5% (in the 50m events) and 100% (800m). Chances that event had a substantial effect ranged from 80.9% (in 2012-2016) and 100% (in 1984-1988 and 1992-1996). **CONCLUSIONS:** Master swim WRs showed largest progressions in the first Olympic cycles than recently. Middle- and long-distance events denoted higher percentage of change than sprints. Supported by: Portuguese Foundation for Science and Technology (UID/DTP/04045/2013); European Fund for regional development (FEDER)-COMPETE 2020 (POCI-01-0145-FEDER-006969).

2339 Board #3 May 31 9:30 AM - 11:00 AM

Are Changes in Physical Work Capacity Related to Changes in Associated Physiologic Measures?

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High intensity functional training (HIFT) is a novel exercise intervention that may test body systems in a balanced and integrated fashion through challenging individuals' abilities to complete mechanical work; however, research has not determined if work capacity (WC) is a unique measure of fitness. **PURPOSE:** To determine if change in WC is related to change in the underlying physiologic measures. **METHODS:** Twenty-five healthy men ($n=13$; age = 22.6 ± 3.5 ; body mass = 86.1 ± 13.9 kg; height = 182.8 ± 8.1 cm) and women ($n=12$; age = 21.0 ± 1.5 ; body mass = 70.5 ± 11.3 kg; height = 165.6 ± 5.7 cm) completed a six-week (5 days/week) HIFT intervention with WC and various physiologic measures of fitness assessed pre- and post-intervention. Physiologic variables assessed included aerobic capacity (VO_{2max}); one-repetition maximums for back squat, shoulder press, and deadlift exercises; peak power and fatigue index from a 30-second Wingate bout; and WC (i.e., the maximal amount of mechanical work performed in a given time domain). **RESULTS:** At baseline, all physiologic measures of fitness were significantly associated with WC and this relationship was even stronger at post-intervention assessment (all $p < 0.05$). Further, there were significant improvements across these measures in response to the HIFT intervention (all $p < 0.05$). However, a multiple regression model using the change in these measures did not significantly predict the change in WC induced by HIFT ($F = 0.330$; Sum of Squares = 637.3; $df = 5$; $p = 0.908$; $R^2 = 0.141$). In addition, no single measure of fitness was significantly associated with the change in WC (Table 1). **CONCLUSION:** HIFT may be a unique challenge to individuals' fitness beyond traditional exercise programs; as evidenced by the independence of changes in WC from changes in the associated physiologic components. Elucidating the translational impact of increasing WC via HIFT may be of great interest to health and fitness practitioners.

2340 Board #4 May 31 9:30 AM - 11:00 AM

Athletic Profile Of Elite Alpine Skier Racers: A Systematic Review And Meta-analysis

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ACSM Abstract
PURPOSE
The purpose of this study was to review all anthropometric and physical test results performed on alpine ski racers that were published in the scientific literature to build an athletic profile specific to the skier's sex and level as well as to quantify the effect size of presented factors on alpine ski racing performance.
METHODS