

657.9±312.1mOsm/l respectively). The mean (±SE) difference was 20.67±48.83mOsm/l with CI of 75.72 and 117.72 for lower and higher levels respectively. TE was 0.24 and LoA were ±156.6 mOsm/l. Storage at -80 degrees C significantly reduced the mean osmolality of urine samples for both the FPD (629.7±338.7 pre and 618.9±331.4mOsm/l post storage, $p=0.002$, CI=3.69 and 17.86 for lower and higher respectively) and the RI methods (611.3±322.5 pre and 620.0±326.2mOsm/l post storage, $p=0.017$, CI =-18.80 and 1.45 for lower and higher respectively). Despite these effects of storage, samples were still highly related to their pre-freezing values ($r=0.996$, $p<0.001$, $\alpha=0.998$, TE=0.06 and $r=0.992$, $p<0.001$, $\alpha=0.996$, TE=0.09 for the FPD and RI methods respectively). Conclusion: Despite mean differences between methods and as a result of storage, the small differences observed although statistically significant, are physiologically trivial and therefore the use of RI appears to be a valid measurement tool to determine urine osmolality.

THE EFFECTS OF ISCHEMIC PRECONDITIONING ON SKELETAL MUSCLE DEOXYGENATION DURING AN EXHAUSTIVE CYCLING TEST.

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Introduction Ischemic preconditioning (IPC) is a physiological phenomenon whereby non-lethal intermittent ischemia induces protection against lethal ischemic episodes. IPC also improves tolerance to intense exercise resulting in improved power output and increased VO₂ max (de Groot et al. 2010). Based on the potential of IPC to modulate blood vessel and skeletal muscle function, we aimed to study whether IPC improves muscle oxygenation during incremental exercise in well-trained individuals. **Methods** Thirteen well-trained male club cyclists (aged 33±6 years, height 180±6cm, weight 78.5±4.0kg, [mean±s.d.]) were randomised to IPC or sham IPC using a crossover design. IPC was induced using three 5-minute cycles of inflation and deflation of a blood pressure cuff on the thighs to suprasystolic blood pressure. Sham IPC was induced using a subdiastolic cuff pressure, and the crossover interval was 7 days. The inflations were followed by an incremental exercise test on a cycle ergometer; 4 minutes of warm-up at 150W followed by 50W/min increases at a constant cadence until exhaustion. Muscle oxygenation was assessed in-vivo by means of near-infrared spectroscopy (NIRS - InSpectraTM 650, Hutchinson Technology). From the NIRS signal, the ratio of oxygenated haemoglobin to total haemoglobin in the micro-circulation was calculated and used for analysis (StO₂). Repeated measures ANOVA was used to analyse the data ($P<0.05$ deemed significant). Results IPC reduced StO₂ to a higher degree than sham during cuff inflations ($P=0.001$). StO₂ was significantly reduced during exercise in both treatment groups ($P<0.0001$). There was a trend for IPC to preserve muscle oxygenation during exercise compared with the sham intervention, which was observed in 11 of the 13 subjects ($P=0.07$). **Discussion** The IPC protocol employed in this study was effective in producing ischemia and reperfusion in the vastus lateralis muscle. Despite not reaching statistical significance, IPC showed potential to ameliorate the reduction in StO₂ during exercise in an incremental cycle ergometry exercise compared with sham. Whether IPC improves oxygen delivery to skeletal muscle or increases metabolic efficiency remains to be determined. Further work aims to identify whether IPC can influence additional outcomes of sporting performance. **Reference** de Groot PCE, Thijssen DHJ, Sanchez M, Ellenkamp R, Hopman MTE. (2010). Eur J App Phys, 108(1), 141-146

A CONCENTRIC/ECCENTRIC KNEE EXTENSION/FLEXION PROTOCOL UNTIL EXHAUSTION – PILOT STUDY

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Introduction The aim of this study was to test if a protocol until exhaustion on an isokinetic dynamometer is intense enough to induce alterations in muscle functional and biochemical variables and monitor these alterations for 24 h. **Methods** Six trained male participants (25.2±7.0 years; 176.2±6.8 cm; 70.0 kg, 65-94 kg) completed 3 maximal eccentric repetitions at a constant angular velocity of 60°/s to determine the maximal peak torque of the knee extensors (PTE). Afterwards, a exhaustion protocol was conducted which consisted of 3 bouts of a concentric/eccentric knee extension/flexion exercise at 60°/s with a 200-sec rest time between sets. The 1st and 2nd sets were composed by 100 repetitions; in the 3rd set, subjects performed n repetitions until the PTE of 3 consecutive repetitions fall below 25% of the initial value. The range of motion was from 50° to 110° flexion in the knee (0° = full knee extension). Maximal eccentric PTE was also determined after the exhaustion protocol to evaluate force decrease. Blood samples were collected before (moment 1), 2 h (moment 2) and 24 h (moment 3) after the exhaustion protocol and analysed for lactate dehydrogenase (LDH), creatine kinase (CK), C-reactive protein (CRP) and aspartate aminotransferase (AST). A visual analogue scale (VAS; 0-100) was used to determine the delayed onset muscle soreness (DOMS) before the exercise, immediately after, and 2 and 24 h after the protocol. Data were analyzed by one-way repeated-measures ANOVA and by paired sample t-test. One participant was excluded from data analysis due to high initial value of CK (622 U/L). **Results** There were significant changes in LDH levels with the exercise protocol ($p=0.010$), being the differences between moments 1 and 2 (165.8±14.7 vs. 193.4±16.1 U/L; $p=0.009$). There was no significant changes in serum CK activity ($p=0.077$). No differences were found for AST ($p=0.063$), and for CRP ($p=0.173$). There was a significant decrease of the eccentric PTE after the protocol (352.0±57.1 vs. 181.1±61.4 N m; $p=0.007$). For DOMS ($p<0.001$), differences were found between the reported values before and immediately after the protocol (2.0±4.5 vs. 64.4±22.6; $p=0.039$) and before the protocol and 24 h after (2.0±4.5 vs. 48.8±12.3; $p=0.003$). **Discussion** Taking into account that there were significant changes in LDH, DOMS and eccentric PTE, it can be concluded that this exhaustion protocol is capable of inducing muscle damage. It is known that CK has a high biologic range of response; therefore, the CK non-significant result may be due to the small number of subjects. As no differences were found for AST, liver damage can be excluded. Regarding the results for CRP, probably there is a need for a more specific inflammatory biomarker.

2-MINUTES BOUTS OF PHYSICAL ACTIVITY ARE BETTER ASSOCIATED WITH CARDIORESPIRATORY FITNESS THAN LARGER IN CHILDREN AND ADOLESCENTS

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Background A high cardiorespiratory fitness (CF) is an important determinant of health for children and adolescents. Physical activity (PA) is the main stimulus to promote an increase of CF. Although, there is some PA specific recommendations for children and adolescents, mainly regarding the volume of moderate-vigorous PA (MVPA); there are not guidelines focused on patterns (bout time) and optimal doses of PA to improve CF. Accelerometers (ACL) can assess all parameters of external load of PA, so they are useful tools to analyze the relationship between patterns and doses of PA and CF. The primary purpose of this study was to explore the relationship between CF and patterns of PA assess with ACLs. **Methods** Ninety-three children and adolescents were included in this cross-sectional analysis (age,