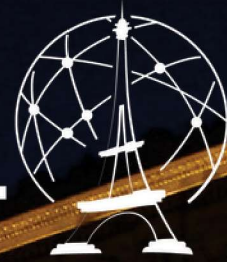




**SPORT  
& SCIENCE**  
ECSS ● PARIS 2023



**Explore • Enlighten • Perform**

28th Annual Congress of the  
**EUROPEAN COLLEGE OF SPORT SCIENCE**

4 - 7 July 2023, Paris, France

Hosted by: INSEP French Institute of Sport

**BOOK OF ABSTRACTS**

Edited by:

Guilhem, G., Rabita, G., Brocherie, F., Tsolakidis, E.,  
Ferrauti, A., Helge, J.W., Piacentini, M.F.

28<sup>th</sup> Annual Congress of the  
**EUROPEAN COLLEGE OF SPORT SCIENCE**  
4 – 7 July 2023  
**BOOK OF ABSTRACTS**

**Edited by:**

Guilhem, G., Rabita, G., Brocherie, F., Tsolakidis, E.,  
Ferrauti, A., Helge, J.W., Piacentini, M.F.

ISBN 978-3-9818414-6-6



ECSS Platinum Partner since 2012

**European College of Sport Science:**

Book of Abstracts of the 28<sup>th</sup> Annual Congress of the  
European College of Sport Science, 4 – 7 July 2023

Edited by Guilhem, G., Rabita, G., Brocherie, F., Tsolakidis, E., Ferrauti, A., Helge, J.W., Piacentini, M.F.

ISBN 978-3-9818414-6-6

Copyright by European College of Sport Science

Conception, DTP: SporTools GmbH – Data management in sports

Corrections: Patera, K., Tsolakidou, A., Tsolakidis, S.

supported by

**SPORTTOOLS**  
Data management in sports

Paul-Nießen-Str. 12, 50969 Cologne, Germany

[www.SporTools.de](http://www.SporTools.de)

**CONCLUSION:** Vagal withdrawal and sympathetic activation were observed in Sed but not in Fit after GXT. BRS was similarly attenuated in Sed and Fit after GXT even though different autonomic responses to GXT were observed between Sed and Fit.

### **ACUTE EFFECTS OF BLOOD FLOW RESTRICTION ON SPRINT INTERVAL EXERCISE IN COLLEGIATE ATHLETES**

CHENG, C.F., CHEN, C., PAN, C.H., CHAN, K.H., WU, K.C.

*NATIONAL TAIWAN NORMAL UNIVERSITY*

**INTRODUCTION:** Blood-flow restriction (BFR) training combined with low-intensity aerobic or resistance exercise could increase aerobic capacity and muscle mass [1]. Previous studies [2, 3] reported that 4-wk of sprint interval training (SIT) combined with BFR might be a potent stimulus to enhance maximal oxygen uptake ( $\text{VO}_{2\text{max}}$ ) in well-trained individuals. This study examined the acute effects of BFR with different arterial occlusion pressures (AOP) on the 6 sets of Wingate-based cycling sprint exercise (SIE) performance and physiological responses in athletes.

**METHODS:** Twelve male collegiate basketball players familiar with SIT program were recruited in this randomized crossover-designed study. After performing the incremental cycling test, participants were asked to respectively perform three treatments, including BFR40 (40% AOP), BFR80 (80%AOP), and CON (passive rest), at rest intervals during SIE. The performance, i.e., peak and mean power, and percentage decrement score, were recorded during SIE test. The muscular deoxygenation and pulmonary oxygen uptake during SIE were measured by near infrared spectroscopy and gas analysis system, respectively. The blood lactate and pH levels were measured before and after SIE. The norepinephrine (NE), growth hormone (GH), insulin-like growth factor-1 (IGF-1), testosterone, nitric oxide (NO) and vascular endothelial growth factor (VEGF), were evaluated before, and immediately, 5, 15, 30, and 60 min after SIE.

**RESULTS:** No significant differences were found on the peak and mean power outputs among treatments during SIE test. There were also no significant differences on the percentage decrement scores of peak (BFR80 vs. BFR40 vs. CON,  $7.8 \pm 6.7\%$  vs.  $6.4 \pm 2.8\%$  vs.  $6.7 \pm 4.8\%$ ,  $p > 0.05$ ) and mean (BFR80 vs. BFR40 vs. CON,  $15.1 \pm 5.9\%$  vs.  $13.7 \pm 6.1\%$  vs.  $15.9 \pm 6.9\%$ ,  $p > 0.05$ ) power during SIE among treatments. No significant differences were found in the accumulated exercise time at  $\geq 80\%$ ,  $90\%$ , and  $100\% \text{VO}_{2\text{max}}$  during SIE among treatments. There were non-significant interaction effects on tissue saturation index, total hemoglobin, and deoxyhemoglobin ( $\Delta\text{HHb}$ ) during sprints. However, the  $\Delta\text{HHb}$  at rest intervals in BFR40 (from the third to fifth rest interval) and BFR80 (from the second to fifth rest interval) were significantly higher than those in CON. No significant differences on blood lactate levels and pH after SIE among treatments. There were no significant interaction effects on the NE, GH, IGF-1, testosterone, NO and VEGF levels among treatments.

**CONCLUSION:** The BFR administrated at rest intervals might increase the oxygen extraction of muscles, however, different pressures of BFR might neither increase the SIE performance nor improve the muscle hypertrophic and angiogenic responses to SIE in collegiate athletes. Supported by grants from Ministry of Science and Technology, Taiwan (MOST 110-2410-H-003-126). References: [1] Patterson, S. D., et al. (2019) [2] Mitchell, E. A., et al. (2019) [3] Taylor, C. W., et al. (2016). Contact: andescheng@ntnu.edu.tw

### **VALIDATION OF A DOWNHILL RUNNING PROTOCOL TO STUDY THE EXERCISE-INDUCED MUSCLE DAMAGE (EIMD) AND DELAYED-ONSET MUSCLE SORENESS IN TRAINED ATHLETES.**

HODY, S., SCHWARTZ, C., BURY, T.

*UNIVERSITY OF LIEGE*

**INTRODUCTION:** Exercise-induced muscle damage (EIMD) has largely been studied in sedentary subjects and/or in the days following maximal eccentric exercise on isolated muscle. However, a better understanding of the EIMD occurrence, prevention or intersubject variability resulting from a functional exercise as downhill running (DR) appears necessary to address this problem in endurance athletes. The purpose of this study was to investigate whether a 30min downhill running (DR) bout cause significant changes in EIMD indirect markers in trained athletes.

**METHODS:** Healthy well-trained males ( $n=12$ ,  $25 \pm 4.89$  yrs) underwent a  $\text{VO}_{2\text{max}}$  test on a treadmill to determine their maximal aerobic speed (MAS). Then, they were submitted to a 30min DR protocol at  $90\%$  MAS ( $-15\%$  gradient). The rate of perceived exertion (RPE) was assessed using a Borg scale. Indirect markers of muscle damage (plasma creatine kinase, muscle function, muscle extensibility and DOMS in lower limbs) were assessed pre, 24h and 48h after the DR. We also compared the stride parameters (using a 3D motion system) during level and downhill running at the same speed.

**RESULTS:** The athletes ( $\text{VO}_{2\text{max}}$ :  $51.84 \pm 6.77$   $\text{mlO}_2 \cdot \text{min}^{-1} \cdot \text{kg}^{-1}$ ) completed 30min DR at a speed of  $15.53 \pm 0.97$  km/h. Blood lactate increased from the start ( $2.58 \pm 0.59$  mmol/l) to the end of the DR ( $5.06 \pm 1.76$  mmol/l). A higher RPE score was found for the cardiovascular demand ( $13 \pm 1.41$ ) than for the muscular effort ( $14.92 \pm 2.81$ ). Plasma CK activity significantly increased from pre ( $226.08 \pm 84.34$  UI/l) to 24h ( $1412.25 \pm 579.16$  UI/l) and 48h ( $869.17 \pm 573.11$  UI/l) post-exercise ( $p < 0.01$ ). A significant decrease in maximal isometric strength of the knee extensors was observed at 24h ( $-16.12 \pm 9.37\%$ ) and 48h ( $-11.61 \pm 8.67\%$ ) post-DR compared to pre ( $p < 0.05$ ). Countermovement jump performance was also decreased at 24h ( $-5.28 \pm 4.30\%$ ) and at 48h post ( $-3.18 \pm 5.15\%$ ) compared to pre ( $p < 0.05$ ). Significant DOMS was observed ensuing the DR with the highest values found for the quadriceps ( $5.36 \pm 2.27$  a.u) and the gluteal muscles ( $4.63 \pm 2.49$  a.u) 24h post-exercise ( $p < 0.01$ ). The knee extensors' extensibility was decreased at 24h ( $-3.13 \pm 4.03$  cm) and at 48h ( $-2.75 \pm 2.39$  cm) post-exercise. A Pearson correlation analysis demonstrated a significant correlation between muscle strength loss and plasma CK activity measured 24h post-exercise ( $r=0.71$ ;  $p < 0.01$ ). A lower stride frequency and a higher ground contact time was found during DR ( $-2.8\%$ ,  $p < 0.05$ ;  $-2.66\%$   $p < 0.001$ , respectively) compared to level running.