



# Proceedings

8<sup>th</sup> Joint Congress..  
Asia-Pacific Conference on Exercise  
and Sports Science 2017  
&  
7<sup>th</sup> International Conference on Sport  
and Exercise Science

June 14-16, 2017

The Twin Towers Hotel Bangkok, Thailand





## Reliability of Wearable Heart Rate Measurement in a Specific Swimming-Pool Test for Bodyboarders

Victor Reis<sup>1\*</sup>, Pedro Ribeiro<sup>1,4</sup>, Aldo Costa<sup>1,2</sup>, Daniel Marinho<sup>1,2</sup>, Mário Costa<sup>1,3</sup>, Afonso Guerra<sup>3</sup>, António Silva<sup>1</sup>, Nuno Garrido<sup>1</sup>

<sup>1</sup>Research Center in Sports Sciences, Health Sciences & Human Development, CIDESD, PO box 1013, 5001-801 Vila Real, Portugal, E-mail: vmreis@utad.pt, pedro.r@kvis.ac.th, amcosta@ubi.pt, dmarinho@ubi.pt, mario.costa@ipg.pt, ajsilva@utad.pt, ndgarrido@gmail.com

<sup>2</sup>University of Beira Interior, UBI, 6201-001, Covilhã, Portugal, E-mail: amcosta@ubi.pt, dmarinho@ubi.pt

<sup>3</sup>Polytechnic Institute of Guarda, IPG, 6300-559, Guarda, Portugal, E-mail: mario.costa@ipg.pt, afonso\_guerra@hotmail.com

<sup>4</sup>Kamnoetvidya Science Academy, KVIS, 21210, Rayong, Thailand, E-mail: pedro.r@kvis.ac.th

**Objectives:** A PubMed search has revealed a mere 4 papers published on bodyboard science, from 1995 to date. Moreover, modern wearable technology enabled to accurately assess heart rate during aquatic activities. The aims of the present study were to assess the reliability of a specific swimming-pool test for bodyboarders by measuring: i) aerobic response through heart rate; ii) anaerobic response through post-exercise peak blood lactate; and, iii) performance through mean velocity.

**Methods:** Ten experienced male bodyboarders (more than 4 years of training) volunteered for the study. The mean ( $\pm$ standard deviation) age, body mass and height of the subjects were, respectively: 21.3 $\pm$ 5.0 years, 64.7 $\pm$ 8.6 kg and 1.72 $\pm$ 0.06 m. The subjects performed a specific swimming-pool test. Testing was performed in a 50-m indoor heated swimming pool (26-27°) and consisted of a 400-m individual time trial. The subjects paddled on a standard bodyboard using bodyboard swim fins. The test was repeated 72-h after. During both tests heart rate was continuously assessed with a Polar® device (RCX5 with H2 sensor). After testing ear-lobe capillary blood lactate was measured every minute until levelling-off with a Accutrend Plus® device. Reliability of repeated measurements was assessed with the coefficient of variation and significance level was set at  $p \leq 0.05$ .

**Results and Discussion:** To the best of our knowledge this was the first study to assess the reliability of heart rate, blood lactate and velocity during a swimming-pool specific test for bodyboarders. Due to weather and tide constraints during natural bodyboarding it is difficult to have a reliable physiological response under field conditions. Hence, we propose herein a swimming-pool specific test based on a surfing specific swimming-pool test. In the present study, coefficients of variation were: 0.3% for peak heart rate, 1.8% for mean heart rate, 14.7% for post-exercise peak blood lactate and 1.7% for mean paddling velocity. Average measures with the two test were: 182.2 $\pm$ 13.9 bpm peak heart rate, 170.3 $\pm$ 15.4 bpm for mean heart rate, 9.7 $\pm$ 2.6 mmol/L for post-exercise peak blood lactate and for 1.27 $\pm$ 0.09 m/s mean paddling velocity.

**Conclusion:** We conclude that the 400-m bodyboard paddling specific swimming-pool test seems to be a reliable measure of performance (mean velocity) and aerobic response (heart rate). Anaerobic response during this test (post-exercise peak blood lactate) presented a less reliable profile.

**Acknowledgements:** This work was supported by NanoSTIMA: Macro-to-Nano Human Sensing: Towards Integrated Multimodal Health Monitoring and Analytics (NORTE-01-0145-FEDER-000016), co-financed by the Fundo Europeu de Desenvolvimento Regional (FEDER) through NORTE 2020.

**Keywords:** Wearable technology, Heart rate, Bodyboard, Reliability