Motricidade
2017, vol. **13**, n. **1**, pp. **99-236**

http://dx.doi.org/10.6063/motricidade.12079

Proceedings of the International Congress of the Research Center in Sports Sciences, Health Sciences & Human Development (2016)

UNIVERSIDADE DE ÉVORA
ESCOLA DE CIÊNCIAS E TECNOLOGIA
DEPARTAMENTO DE DESPORTO E SAÚDE

cidesd
creative
GerOn
cidesd STRONG
NanoStima

warm-up protocols in performance of the 100m-sprint.

METHODS

The sample consisted of 11 physically active male subjects (age: 27.18±9.67years; height: 175.67±8,32cm; weight: 78.21±8,59kg). The subjects underwent two warming protocols: typical warm-up (TW) and warm-up with post-activation potentiation (PAP). After warming-up, the subjects performed a 100m sprint and the time was registered by Brower equipment (Wireless System, US Sprint).

RESULTS

The results showed that the sprint times were identical for both protocols (TW: 14.74±1.19s; PAP: 14.66±1.52s) and there were no significant differences (p=0.792).

CONCLUSIONS

Although the use of PAP in warm-up has been suggested to provide improvements on explosive efforts (Sale, 2002), there were no differences between the two warm-ups performed. Hence, we suggest that either the used PAP stimulation protocol did not meet the requirements for sufficient power to stimulate the desired neuromuscular effect (Sale, 2002), or the interval after PAP warm-up was not suitable for the optimization of this effect (Requena, Gapeyeva, García & Pääsuke, 2008). More research is needed.

REFERENCES:

Garber, C.E, Blissmer, B., Deschenes, M.R, Franklin, B.A., Lamonte, M.J, Lee, I.M., … Swain, D.P. (2011). American College of Sports Medicine position stand. Quantity and quality of exercise for developing and maintaining cardiorespiratory, musculoskeletal, and neuromotor fitness in apparently healthy adults: guidance for prescribing exercise. *Medicine and Science in Sport and Exercise, 43*(7), 1334-1359.

Requena, B, Gapeyeva, H, García, I, Ereline, J. & Pääsuke, M. (2008). Twitch potentiation after voluntary versus electrically induced isometric contractions in human knee extensor muscles. *European Journal of Applied Physiology, 104*(3), 463-472.

Sale, D.G. (2002). Postactivation potentiation: role in human performance. *Exercise Sport Sciences Reviews, 30*(3), 138-143.

Swanson, J. (2006). A functional approach to warm-up and flexibility. *Strength and Conditioning Journal, 28*(5), 30-36.

Net heart rate as estimating mean of the energy expenditure in walking/running and stationary bike

José Bragada[1,3], Raúl Bartolomeu[2], Eric Macias São Pedro[1]

1. Polytechnic Institute of Bragança, Portugal; jbragada@ipb.pt; 2. University of Trás-os-Montes and Alto Douro, Vila Real, Portugal; 3. Research Centre in Sports, Health and Human Development, CIDESD, Portugal.

INTRODUCTION

Net heart rate (HRnet) is known as the variation of the heart rate (HR) above the resting value, as a result of physical activity (PA). The positive association between HRnet, the level of PA and respective energy expenditure (EE) has been previously reported (Bragada et al., 2009; São Pedro et al., 2015). However, a useful and practical way of objectively calculates EE from HRnet is still needed. Thus, the aim of this study was to find an EE calculation formula based on HRnet measurement, in walking/running and stationary bike.

METHODS

One hundred and thirty subjects, 77 men and 53 women, aging between 18 and 81 years old, 79 in a treadmill and 53 in a stationary bike underwent an intermittent and progressive protocol of

N x 6 minutes. The VO_2 and HR were measured continuously throughout the protocol. An independent sample T-test was used to test the between-group differences, and a Hierarchical Linear Modeling (HLM) was computed to measure the influence of each variable in the HRnet variation magnitude.

RESULTS

The HRnet mean values, across all the exercise intensities, revealed significant differences when compared by age (-0.58, p= 0.005), gender (t= -3.383, p= 0.001) and exercise type (t= -5.543, p=0.000). However, the modeling of the HRnet response revealed that the magnitude of its variation, as the exercise intensity increased, was not influenced by any of those factors. Additionally, the relationship between the HRnet and the EE showed a very high coefficient of determination (R^2=0.897).

CONCLUSION

HRnet is an easy and non-invasive method to estimate EE at different PA intensities either in walking/running or stationary bike. Despite the mean values significantly differed from each other when compared by age, gender and exercise type, while the exercise intensity increased, the HRnet increased in the same magnitude for every participant, independently of any variable in study. This novelty provides practitioners of recreational and health-related physical activity with an easy and feasible way of calculating a training session EE, simply by using the formula: EE (kcal/kg/min) = 0.0016 x HRnet + 0.0148.

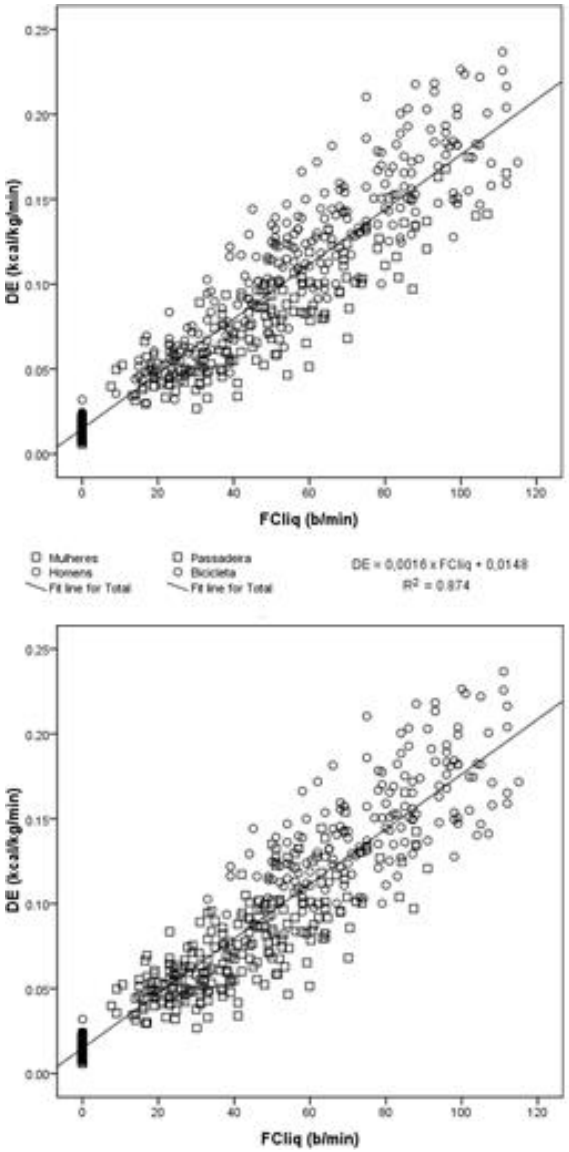

Figure 1. Relationship between the HRnet (FClíq) and the EE (DE), by gender and type of activity.

REFERENCES

Bragada, J. A., Pedro, P. M., Vasques, C. S., Tiago, M. B., & Vítor, P. L. (2009). Net Heart Rate to Prescribe Physical Activity in Middle-Aged to Older Active Adults. *Journal of Sports Science & Medicine*, *8*(4), 616–621.

São Pedro, E. M. (2015). *Validação da frequência cardíaca líquida na estimativa do gasto energético e na prescrição da intensidade do exercício em cicloergómetro, em jovens adultos masculinos* (Dissertação de Mestrado em Mestrado em Exercício e Saúde). Instituto Politécnico de Bragança, Bragança.