

## The effect of aerobic and anaerobic functional fatigue protocols on ground reaction force components during jump landing movement

Montazer, M. R.<sup>1</sup>, Hovanloo, F.<sup>2</sup>, Sadeghi, H. <sup>3</sup> and Abbasi, A.<sup>4</sup>

<sup>1</sup> Master of science, Corrective Exercise & Sport Injury, <sup>2</sup> Assistant of professor, Faculty of Physical Education & Sport Sciences, Shahid Beheshti University, <sup>3</sup> Associate Professor, Faculty of Physical Education & Sport Sciences, Tarbiat Moallem University of Tehran, <sup>4</sup> Master of Science, Sport Biomechanics

**OBJECTIVE** In most tasks, most of the loss of force occurs because of the changes within the muscle or central nervous system and or both of them. There appears to be a relationship between altered neuromuscular control and muscle fatigue. The purpose of this study was to examine the effect of aerobic and anaerobic functional fatigue protocols (AAFFP) on dynamic postural stability in nonelite young soccer players.

**METHODS** Twelve male young soccer players who were playing in league one (Tehran) (age:  $17.42 \pm 0.51$  y, weight:  $67.65 \pm 6.58$  kg, height:  $173.33 \pm 3.09$  cm) that all of them was health participated in this study. Before beginning the fatigue protocol, dynamic posture stability index (DPSI) evaluated following single leg jump-landing movement (athletic task that resulting injury) with sampling frequency of 200-HZ in 3 second recording. Stability indices analyzed in mediolateral (MLSI), anterior-posterior (APSI) and vertical (VSI) direction. Immediately following fatigue, post testing was performed. The data was analyzed with analyses of variance (ANOVA) with repeated measures ( $p < 0.05$ ).

**RESULTS** ANOVA revealed significant differences when comparing anaerobic fatigue pre test and post test values for MLSI, APSI, VSI, DPSI and RPE. Likewise aerobic fatigue revealed significant differences pre test and post test values for VSI and DPSI whereas no significant differences were revealed when comparing the aerobic fatigue protocols for pre test and post test of MLSI and APSI.

**DISCUSSION & CONCLUSION** In attention to this fatigue protocols probably eccentric contraction of hamstring muscles during the late swing phase to control forward motion of the thigh and leg segments, is case of altering in hamstring quadriceps muscle strength rate and decrease lower extremity stability. Also it seems that, subjects because of deceleration the body, s downward velocity for decrease the impact force, altered mechanical mechanism of landing skill. The results of this investigation suggest that aerobic and anaerobic functional fatigue protocols, specially aerobic fatigue have effect in dynamic postural stability. This matter can be used one of the main factors in determining of injury mechanism (in jumplanding movement).

**Key words** fatigue, dynamic postural stability, soccer players, jumplanding movement

## Electromiography in front crawl technique-case of study

Conceição, A. <sup>1,2</sup>, Silva, A. <sup>2,3</sup>, Marinho, D. <sup>2,4</sup>, Brito, J. <sup>1,2</sup>, Costa, A. <sup>2,4</sup> and Louro, H. <sup>1,2</sup>

<sup>1</sup> Sports Sciences School of Rio Maior, Polytechnic Institute of Santarém, Portugal, <sup>2</sup> Research Center for Sport, Health and Human Development (CIDESD), UTAD, Vila Real, Portugal, <sup>3</sup> Department of C. of Sport, Exercise and Health of University of Trás-os-Montes and Alto Douro; Vila Real, Portugal. <sup>4</sup> Departament of C. of Sport, University of Beira Interior, Covilhã, Portugal

**OBJECTIVE** The need to develop systems electromiographic (EMG) in quatic environment, has led several researchers to refine these instruments to ensure the credibility of the data provided by EMG. The aim of this study is to characterize the behavior of two muscle muscles involved in the crawl technique (biceps brachii and triceps brachii) over a test of 200m crawl.

**METHODS** A male swimmer trained was subjected to a test consisting of a maximum voluntary contraction (CVM) of the Biceps Brachii (BB) and Triceps Brachii (TB) for standardization. A protocol of 4 x 50m with an interval of 15 seconds at a swimming speed of pre-established, making each part to 95% of transit time for 200m crawl. The EMG were used with a Wireless signal of the BB and TB muscles of the right arm was removed throughout the test and then synchronized with the video image, and selected 5 cycles of swimming on all identical pathways.

**RESULTS** There is a gradual decrease of its average muscle activity. The BB was about 43% and TB was 26%. The largest variation on it, in the case of BB, between the third and fourth route (21%), and in the case of TB, between the second and third route (14%).

**DISCUSSION & CONCLUSION** The muscles studied demonstrated changes in the duration of swim cycles, indicating that, there is a decrease in muscle activity, this supposed to be due to limitations in production capacity under swimmer and the characteristics of the art of swimming which are changing as increasing fatigue.

**KEY WORDS** electromiography, kinematics analysis, crawl, swimming