Abstract

Title: Comparison of the physiological response rate of the organism using different one-rope ascent techniques

Objectives: The aim of this study was to compare the rate of the physiological response of the organism using 3 different one-rope ascent techniques during constant speed.

Methods: It was an empirically based study of experimental character (quasi-experiment). The measured research group (n = 12) consisted of the military students (21 ± 1.1 years; 183 ± 4.9 cm; 80.6 ± 7.8 kg) of full-time study at the Faculty of Physical Education and Sport of Charles University (VOFTVS UK). The physiological response rate was measured with the Cortex Metamax 3b and Polar sporttester during one-rope ascending techniques (“using Prusik knot” = P”, “using jümaring = B”, “using Garda knot = G”) at a constant speed of 3 m·min⁻¹ for 7 minutes. The rating of the perceived exertion was also recorded on the Borg RPE scale. The data were comparatively analyzed in the SPSS statistic program, furthermore the analysis of variance (ANOVA) was also employed.

Results: The study demonstrated statistical differences (p ≤ 0.05) between techniques: while B is the easiest, the greatest differences were observed between technique B, P and G. The G technique appeared to be the most difficult. The average HR was: 162 ± 9 bpm (~85% HRmax) for P, 150 ± 16 bpm (~79% HRmax) for B and 165 ± 10 bpm (~87% HRmax) for G. The average VO₂ was: 33.4 ± 4.1 mL·kg⁻¹·min⁻¹ (~63% VO₂peak) for P, 29.3 ± 3.4 mL·kg⁻¹·min⁻¹ (~55% VO₂peak) for B and 36.4 ± 4.2 mL·kg⁻¹·min⁻¹ (~68% VO₂peak) for G. The average RPE was 11.5 ± 1.2 for P, 10.7 ± 1.7 for B and 13.0 ± 1.3 for G.

Keywords: Military climbing, load on organism, heart rate, oxygen consumption, rating of perceived exertion, prusik knot, jümaring, garda knot