

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 (VO FTVS 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 jümar = **B**”, “using Garda knot = **G**”) at a constant speed of $3 \text{ m} \cdot \text{min}^{-1}$ 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 ($p \leq 0.05$) 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 ($\sim 85\% \text{ HR}_{\text{max}}$) for **P**, 150 ± 16 bpm ($\sim 79\% \text{ HR}_{\text{max}}$) for **B** and 165 ± 10 bpm ($\sim 87\% \text{ HR}_{\text{max}}$) for **G**. The average VO_2 was: $33.4 \pm 4.1 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ ($\sim 63\% \text{ VO}_{2\text{peak}}$) for **P**, $29.3 \pm 3.4 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ ($\sim 55\% \text{ VO}_{2\text{peak}}$) for **B** and $36.4 \pm 4.2 \text{ mL} \cdot \text{kg}^{-1} \cdot \text{min}^{-1}$ ($\sim 68\% \text{ VO}_{2\text{peak}}$) 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