

ABSTRACT

Title: Metabolic response of indoor rock climbing and treadwall climbing

Objectives: The goal of this work is to compare the differences between an indoor rock climbing and treadwall climbing in terms of the metabolic response of the organism.

Methods: Forty-two climbers of three different performance levels participated in the research, who during seven days underwent in random order, separate measurements on an indoor wall and a climbing simulator at a speed of $4 \text{ m}\cdot\text{min}^{-1}$ to a height of 19.5 meters with a slope of 90° . The values of the metabolic response of the organism were monitored, specifically oxygen consumption (VO_2), minute ventilation (VE), respiratory rate (DF), respiratory exchange ratio (RER), heart rate (HF), energy consumption (ES) and rating of perceived exertion (RPE).

Results: Climbers of lower performance level were reaching average values of VO_2 , VE, DF, RER and ES higher than advanced climbers, both on the indoor wall and the an treadwall. In terms of average EC values, the indoor wall is more demanding for all groups (lower performance: treadwall $0.59 \pm 0.07 \text{ kcal}\cdot\text{kg}^{-1}$, indoor wall $0.69 \pm 0.08 \text{ kcal}\cdot\text{kg}^{-1}$; intermediate: treadwall $0.57 \pm 0.09 \text{ kcal}\cdot\text{kg}^{-1}$, indoor wall $0.64 \pm 0.11 \text{ kcal}\cdot\text{kg}^{-1}$, advanced: treadwall $0.56 \pm 0.08 \text{ kcal}\cdot\text{kg}^{-1}$, indoor wall $0.62 \pm 0.06 \text{ kcal}\cdot\text{kg}^{-1}$).

Conclusion: The results confirmed the proposed hypothesis, ie climbing the same path high above the ground compared to climbing at a low altitude causes greater functional response for climbers with lower performance compared to climbers of higher performance level.

Keywords: Sport climbing, oxygen consumption, metabolic response, climbing simulator, artificial wall