

Abstract

Title: The effects of extreme physical and mental stress on the human body

Goals: The main goal of this work was to evaluate the effect of physical stress load in a five-kilometer-long race in cross-country skiing on physical and mental functions of high school students.

Methods: The investigated group consisted of 10 boys of the average age of 16 years. To evaluate their level of physical fitness and circulatory responses during cross-country stress, the maximal treadmill stress test was used. Circulatory response before, during, and after the race was monitored by a Sport-tester.

To evaluate the mental background and the actual condition under the stress load, standardized questionnaires on ability to cross-country skiing, stress management strategy, degree of physical discomfort and current mental state were used.

Results: The reference file tested by a stress test up to the maximum proved an above-average aerobic fitness. The extreme stress situation was a five-kilometer-long race in cross-country skiing. The results were processed and evaluated with a statistical and factual relevance. A number of correlations were made. The average SF values, which were achieved during the race, were getting near the maximum values (96% of SF max.). Even the evaluation by a Borg RPE scale attested to the difficulty of the race. The pre-start conditions, expressed by the average SF value of 136 [min⁻¹] (with SF min. of 106 and SF max of 170[min⁻¹]) did correlate neither to the results of the race nor to the psychological resistance tested by a questionnaire S8Q, though. Most of the hypotheses were managed to be proven. The dependence between maximal aerobic power and the success in the race had a strong correlation. Some of negative results were discussed.

Key words: physically demanding performance, fitness, psychological stress, motivation