

Abstract

Title: Rest and stress diagnostics to determine performance limitation in triathlon

Objectives: The main objective of this thesis is to analyze the results from the rest and stress test, where I used the analysis to define the state of the organism of the examined athlete from the Betri sports club. Another aim is to design an intervention program for 8 weeks in collaboration with an experienced coach Radek Holinka. Based on the evaluation of the input and control parameters I will define the limitations of the performance and compare it percentage wise. Through this type of research I will investigate the changes in the biochemical parameters of the body and the intervention program will increase the potential for better sports performance for the upcoming competition season at amateur level.

Methods: The research was carried out using a quantitative method based on expert analysis of the current state of the organism using rest and stress diagnostics in the Betri Lab movement centre. First, resting caloric expenditure was measured using a modern PNOÉ (metabolic analyzer) device, and then a bicycle ergometer stress test was applied to the athletes to determine energy expenditure to determine thresholds and define any performance limitations. During the exercise stress test, the athletes completed tests using instruments on a Moxymonitor, lactate analyzer, PNOÉ metabolic analyzer, hemoglobin analyzer, Core Body Temperature, MIR Spirobank OXI, and Polar chest belt.

Results: The results of the control test characterized the performance limitations based on the interpretation of selected biochemical parameters. For resting measurements, (Hb) and (Hct) values were almost all at normal values, but in probands M2, M4, M6 and M11 the Hb value was above 16 g/dL. For resting spirometry, there was a significant percentage improvement in probands M6 (FVC +11.5 %, FVE1 +4.5 %) and M12 (FVC +5 %, FVE1 +14.4 %). The majority of the triathletes tested had FVC values ranging from 4-7 L and FEV1 values ranging from 3-5 L. In conclusion, 14 triathletes demonstrated above average FVC (L) values than the general population. For the stress diagnosis, there was a significant increase in proband M4 (15.8 %), whose FTP power was equal to 330 W. Furthermore, there were visible changes in the

trend of SmO₂ and THb curves due to the intervention program. In 11 triathletes (Ž1, M1, M2, M4, M6, M7, M9, M10, M11, M12, M13) there was an improvement in the initial muscle SmO₂ saturation. Fat (FAT) and sugar (CHO) metabolism assessments were highly significant in terms of progression, with 12 triathletes showing significant improvement. When there was a significant involvement of the work of fat metabolism, which is crucial for long distance triathlon.

Keywords: triathlon, metabolic analysis, exercise physiology, anaerobic and aerobic threshold