

Abstract

Zhaoyan Lu

Charles University, Faculty of Physical Education and Sport, José Martího 31, Prague 6, 162 52, Czech Republic.

Title: Exploring Heart Rate Recovery as an Aerobic Fitness Indicator in Elite Athletes.

Aim: The purpose of this study was to determine the relationship between HRR and aerobic fitness in elite youth and adult elite athletes.

Methods: A total of eighty-two (n=82) participants volunteered to participate in the study with seventy-six well-trained soccer players (n=76) and six well-trained triathletes (n=6) according to age and type of sports divided into Group Youth soccer players (15.6±0.8 yrs) n=19 (Group Y); Group Adult soccer players (23.8±2.8yrs) n=57 (Group A) and Group Triathletes (16.6±1.2 yrs) n=6 (Group T). Soccer players were all from the Czech First League and triathletes are performing in top-level competition. All participants underwent anthropometric measurements and performed a maximal cardiopulmonary exercise test on a treadmill to determine maximal oxygen uptake (VO₂max), oxygen consumption at the second ventilatory threshold (VO₂VT₂), percentage of VO₂max at the second ventilatory threshold (%VO₂maxVT₂), maximum heart rate (HRmax), Heart rate recovery after 1st, 2nd, 3rd minute, respectively (HRR 1min, HRR 2min, HRR 3min).

Results: The youth soccer group showed significantly higher HRR 1min (P<0.05) and VO₂max in relative value (P<0.05) compared to the adult soccer group. The triathlete group showed a significantly lower %VO₂maxVT₂ (P<0.01) than both soccer groups. The correlation between HRR 2min, HRR 3min and VO₂VT₂ only could be found in the youth soccer group (r=-0.517, P<0.05; r=-0.552, P<0.05). The correlation between HRR 3min and %VO₂maxVT₂ could be found both in the youth soccer group (r=-0.508, P<0.05) and the triathlete group (r=-0.845, P<0.05).

Conclusions: The results of this study do not support HRR as a significant indicator of aerobic fitness in elite soccer players and triathletes. However, HRR may be considered in an individual's aerobic fitness diagnostics as a unique indicator related to cardiovascular fitness and recovery.

Keywords: Ventilatory threshold, Maximal Oxygen Uptake, Triathlon, Soccer, Football