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The influence of aerobic and anaerobic characteristics of children of different age on achievement of VO₂ plateau

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VO₂max is a measurement of the maximal rate at which energy can be derived from oxidative processes. The plateau criterion has been considered the most important criterion when defining a VO₂max value. The purpose of this research was to compare subjects who achieve a plateau with those who do not and to determine which anthropometric and physiological factors and endurance performance influence the achievement of VO₂ plateau, and to find, whether the two groups differ in gender and age. The sample comprised 27 children (age 11.8±2.0 yrs, weight 49.7±14.0 kg, height 159.7±14.0 cm), 14 of them were boys and 13 were girls. The children exhibited average VO₂max values of 45.4±7.7 ml·min⁻¹·kg⁻¹ during the exercise. The criteria for achieving the plateau were respiratory exchange rate greater or equal 1.0, heart rate greater or equal 90% of predicted age-adjusted maximal heart rate and the change in VO₂ in the last minute of exercise less or equal 2 ml·min⁻¹·kg⁻¹ with an increase in workload. 56% of children met all three criteria for achieving the plateau in VO₂. Statistically significant differences between plateau achievers and non-achievers were found for gender, VO₂max, velocity at VO₂max, duration of the treadmill test, results on 2400 m and fat mass. In the other explanatory variables subjects showed no significant differences. This study demonstrates the plateau achievers are mostly girls, have worse results in tests of maximal aerobic power and endurance performance (velocity at VO₂max, duration of the treadmill, 2400 m run) and have more fat mass than non-achievers.

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