REFERENCES

ASSESSMENT OF TIME LIMIT AT LOWEST SPEED CORRESPONDING TO MAXIMAL OXYGEN CONSUMPTION IN THE FOUR COMPETITIVE SWIMMING STROKES.
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INTRODUCTION
Time limit at the minimum velocity that elicits maximal oxygen consumption (Tlim-VO2max) was studied both in flume (Billat et al., 1996) and in normal swimming conditions (Fernandes et al., 2003). While no studies have been carried out based on other swimming techniques than freestyle, the purpose of this experiment was to characterize, and compare, Tlim-VO2max in the four competitive strokes, as well as to observe its relationships with two major performance determinants: VO2max and anaerobic threshold (AnT).

METHODS
Twenty-three elite swimmers (15 males of 19.4±2.1 y, 178.1±6.2 cm and 71.8±7.4 kg, and 8 females of 17.2±1.4 y, 166.0±3.7 cm and 59.7±4.3 kg) performed, in their best technique, an intermittent incremental protocol for VO2max assessment (Fernandes et al., 2003). Forty-eight hours later, subjects swam until exhaustion at their pre-determined velocity, to assess Tlim-VO2max. O2 was measured breath by breath by a portable gas analyzer (K4 b 2, Cosmed, Italy) connected to the swimmers by a respiratory snorkel. AnT was assessed individually (YSI 1500L Sport, USA) from the [La-]/O2 curve (Machado et al., this vol.).

RESULTS
Mean ± SD values for Tlim-VO2max were 238.8±39.0, 246.1±51.9, 277.6±85.6 and 331.4±82.7 sec in crawl, backstroke, butterfly, and breaststroke, respectively. While no significant differences were observed between strokes in Tlim-VO2max (One-way Anova, p<0.05), pooled data were correlated with AnT. Non-significant interrelationships were found between Tlim-VO2max and VO2max (ml/kg/min) and AnT (mmol/l). However, moderate inverse interrelationships were observed between Tlim-VO2max and v@AnT (r=-0.63, p=0.001) and v@AnT (r=-0.52, p=0.012, Figure 1).

DISCUSSION
The inverse interrelationship between the parameters confirms previous findings obtained in national level freestyle swimmers (Fernandes et al., 2003), and point out that the higher the swimming velocities commonly related to aerobic proficiency, the lower the Tlim-VO2max. Moreover, this latter variable did not differ between swimming strokes, pointing out that the phenomenon is similar in all four strokes.

REFERENCES

LACTATE AND HEART RATE RESPONSES DURING SWIMMING AT 95% AND 100% OF THE CRITICAL VELOCITY IN CHILDREN AND YOUNG SWIMMERS.
Filipatou E, Toubekis A, Douda H, Pilianidis T, Tokmakidis S
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INTRODUCTION
Metabolic responses during swimming at critical velocity (CV) have been previously reported (2). However, CV may represent a different exercise domain for children and young swimmers compared to adults (1). The purpose of the present study was to compare the metabolic responses of children and young swimmers when swimming at 95% and 100% of the CV.

METHODS
Seven young swimmers and eight children (x±SD, age:16.0±1.7 vs. 11.5±0.6 years, height:177±6 vs. 149±5 cm,