Swimming researchers are, on regular basis, trying to identify and understand the factors that can predict swimming performance. For such aim most of the research designs adopted are cross sectional in nature. There are few longitudinal researches in swimming science. Moreover, most of these longitudinal studies dedicate their data analysis for a short time period, i.e., less than one season (e.g., Stewart & Hopkins, 2000) or, for a time period between one and five seasons (e.g., Pyne, et al., 2004; Costa, et al., 2010b). On the other hand, the number of longitudinal designs analyzing swimming performance for a longer time period, e.g., more than five consecutive seasons still scarce. Some interesting conclusions were verified when adopting those longer time frames. Regarding the national level breaststrokers performances in the 100-m event for seven consecutive seasons, the age of 16 was considered a milestone, as the stability increased strongly starting in that age (Costa, et al., 2010a). Analysing the overall trends and individual trajectories of swimming performance for a decade, Hopkins, et al. (2010) reported that the New Zealand swimmer’s age for best performance was 18.9 ± 1.5 years and 18.7 ± 2.5 years for boys and girls respectively. So, it appears to exist a lack of consistent or measurable knowledge from the stability and variation of the swimming performance during a long period mainly from children to adult age. The purpose of this study was to track and analyze the freestyle performance stability throughout the elite swimmer’s career from 12 to 18 years old.

SUBJECTS: Portuguese elite male swimmers where chosen to be the main focus of our study. It was considered as inclusion criteria to be a Portuguese male top-50 swimmer, for short course during the 2006-2007 season in the 50-m, 100-m, 200-m freestyle events. On the contrary, an exclusion criteria was considered: (i) to be a swimmer from the Portuguese top-50 but, addicts did not have access to season best performance in some of the chronological ages; (ii) to be a swimmer from the Portuguese top-50 but not having swum the event at least one time per season from 12 to 18 years for some season; (iii) to be a swimmer from the Portuguese top-50 but not being at least 18 years-old. So, an overall of 124 elite male swimmers and 888 race times were analyzed.

RESULTS AND DISCUSSION

Figure 1 presents the performance variation throughout the seven consecutive seasons in the freestyle events analysed. ANOVA revealed significant variations in the swimming performance in the 50-m (F₁₆, ₅₈₉ = 769.88; P < 0.01, power = 1.00), 100-m (F₁₆, ₅₈₉ = 3326.19; P < 0.01, power > 1.00) and 200-m (F₁₆, ₅₈₉ = 16727.81; P < 0.01, power > 1.00). Bonferroni post-hoc tests verified significant differences (P < 0.01) between all ages for all events, except between the 17 and the 18 years. The overall stability based on K value was low in all events analysed: 50-m (K = 0.22 ± 0.05), 100-m (K = 0.27 ± 0.05) and 200-m (K = 0.23 ± 0.05). So, based on overall tracking performance stability and prediction can be considered. Table 1 presents the Pearson Correlation Coefficients for pair wise seasons between 12 and 18 years old. Doing an analysis based on the adult performance season (i.e., 18 years old), there is a trend to stability become high from 15 to 16 years in the 50-m (r = 0.72) and 100-m (r = 0.68), from 16 to 17 in the 200-m (r = 0.78).

Several authors reported for world level swimmers, that the age interval between 15 and 16 is determinant to achieve the best individual performance in long distance events (Malina & Bouchard, 1991; Sokolovas, 1998). The results pointed out a performance enhancement from children to adult age in all Freestyle events. The performance stability and prediction based on overall career period was low. However, coaches should start the age of 16 years-old as a determinant chronological point, were the ability to predict the adult performance level increases strongly.

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