

Abstract

Title: Comparison of selected anthropometric predispositions of competitive short and long distance swimmers in the the Age Group division (11–14 years)

Objective: The aim of this thesis is to conduct research that will allow for a comparison of selected anthropometric parameters in swimmers aged 11–14, with respect to their specialization in short-distance (50–400 m) and long-distance (800–1500 m) events.

Methods: The research involved 29 competitive swimmers aged 11–14 from Prague swimming clubs who met the criterion of participation in a top-level competition in their age category (Czech National Championships or the Cup of Eleven-Year-Olds). Data collection took place during training sessions and included measurements of body height, weight, arm span, foot size, spirometric parameters (forced vital capacity – FVC and Peak expiratory flow – PEF), and body composition (body fat, lean mass, water). Calibrated instruments were used for measurements, including a digital scale, measuring tape, MIR Minispir spirometer, and the Bodystat Quadscan 4000 bioimpedance device. The sprint and endurance groups were defined using a combination of questionnaire responses and calculations of speed differences across the 50, 100, and 200-meter freestyle events. The measured data were recorded in Microsoft Excel version 16.91. and statistically processed using Welch's t-test and effect size calculations (Cohen's d).

Results: The results showed that there are differences in anthropometric and physiological parameters between sprinters and endurance swimmers, with these differences being more pronounced in boys than in girls. Among boys, sprinters demonstrated higher body weight (55,4 kg vs. 43,2 kg), height (167,2 cm vs. 156,1 cm), arm span (170,7 cm vs. 155,1 cm), and foot size (25,3 cm vs. 24,1 cm). The most significant parameter was the arm span-to-height ratio, which was 1,02 for sprinters compared to 0,99 for endurance swimmers ($p = 0,005$; $d = 1,62$). In girls, the differences were less pronounced and no parameter reached statistical significance. Endurance swimmers showed slightly greater body height (161,5 cm vs. 159,2 cm), vital lung capacity (4,1 l vs. 3,7 l), and peak expiratory flow (6,3 l/s vs. 5,7 l/s), while sprinters had a higher arm span-to-height ratio (1,0156 vs. 0,99; $d = 0,99$, $p = 0,136$). Overall, the the arm span-to-height ratio proved to be the most reliable indicator of specialization, displaying a consistent trend across both sexes. The findings thus confirm a specific somatotype for

sprinters, especially among boys, whereas among girls the differences are less noticeable and likely more influenced by individual development.

Conclusion: The objectives and tasks of this thesis were fulfilled in their entirety. The findings confirm that certain differences between sprinters and endurance swimmers are already observable at the age of 11–14, with more pronounced distinctions seen in boys. The greatest diagnostic potential was demonstrated by the arm span-to-body height ratio, which may serve as a practical tool for early swimmer profiling. Among girls, the differences were less noticeable, which may be related to differing rates of biological maturation and lower variability in body composition at this age. The results thus support the use of selected anthropometric indicators as a general guide for training orientation, while also highlighting the importance of an individual approach and caution when deciding on specialization at an early age.

Key words: Competitive swimming, anthropometric parameters, sprinters, endurance swimmers, youth categories, physiological prerequisites.