

## Can 8 Weeks of Training in Female Swimmers Affect Active Drag?

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**Abstract:** Hydrodynamic drag is the force that a swimmer has to overcome in order to maintain his movement through water and is influenced by velocity, shape, size and the frontal surface area. Thus, the aim of this study was to assess the effects of 8 weeks of training on active drag in young female swimmers. 8 female age group swimmers belonging to the same swimming club participated in this study. Active drag measurements were conducted in two different trials: at the beginning of the season and after 8 weeks of training. The velocity perturbation method was used to determine active drag in front crawl swimming. After 8 weeks of training, mean active drag decreased, although no significant differences were found between the two trials. No significant differences were observed in swimming velocity between the two trials. It seems that 8 weeks of swimming training were not enough to allow significant improvements on swimming technique. One can recommend that specific training sets concerning technique correction and improvement in young swimmers should be a main aim during training planning.

**Keywords:** Young swimmers, technique, drag, training effects.

### INTRODUCTION

Hydrodynamic drag is the force that a swimmer has to overcome in order to maintain his movement through water and is influenced by velocity, shape, size and the frontal surface area [1]. The velocity perturbation method [2] was one of the methods developed to assess the drag of a person who is actively swimming. Further, active drag is dependent on swimming technique. Swimming with lower drag at any given velocity reduces the energy cost of swimming, and the movements do not contribute to excessive or unnecessary drag. Thus, the aim of this study was to assess the effects of 8 weeks of training on active drag in young female swimmers.

### METHODS

8 females age group swimmers belonging to the same swimming club participated in this study (11.63±0.52 years old, 1.52±0.08 m and 40.50±8.98 kg). All participants have been trained by the same coach and for the same club for the previous two years.

Active drag measurements were conducted in two different trials: at the beginning of the season and after 8 weeks of training (48 training units, 3.50±0.23 km per training unit). The velocity perturbation method [2] was used to determine

active drag in front crawl swimming. Both trials were conducted in a 25 m swimming pool and in-water starts were used.

### RESULTS

After 8 weeks of training, mean active drag (drag force and drag coefficient) decreased, although no significant differences were found between the two trials (29.18±15.24 N vs. 27.50±10.36 N; 0.35±0.23 vs. 0.30±0.09;  $p>0.05$ ). No significant differences were observed in swimming velocity between the two trials (1.23±0.13 N vs. 1.25±0.15 N;  $p>0.05$ ).

### DISCUSSION

Drag force values of the current study were very similar to values found in other experiments conducted with children [1,3]. These values were quite lower than the values presented by adults, as expected [4]. Regarding drag coefficient, some controversy still remains. Kjendlie and Stallman [1] found drag coefficient values higher than the values found in the current study (0.66±0.14) using a similar sample. However, Kolmogorov and Duplisheva [2] found similar values for this variable (drag coefficient: 0.28±0.09). Thus, additional research is required regarding this issue.

It seems that 8 weeks of swimming training were not enough to allow significant improvements on swimming technique. One can recommend that specific training sets concerning technique correction and improvement in young swimmers should be a main aim during training planning.

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