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Relationship Between Tethered Swimming in a Flume and Swimming Performance

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Abstract

Purpose: To study the relationship between tethered swimming in a flume at different speeds and swimming performance.

Methods: Sixteen regional-level swimmers performed 25-, 50-, and 100-m front-crawl trials and four 30-s tethered-swimming tests at 0, 0.926, 1.124, and 1.389 m·s-1 water-flow velocities. Average and maximum force, average and maximum impulse, and intracyclic force variation (dF) were estimated for each tethered-swimming trial. Swimming velocity and intracyclic velocity variation (dv) were obtained for each free-swimming trial. Stroke rate and rating of perceived exertion (RPE) were registered for all trials.

Results: Tethered-swimming variables, both at 1.124 m·s-1 and at 1.389 m·s-1 water-flow velocities, were positively associated with 25-m swimming velocity ($P < .05$). Average force and maximum impulse in stationary swimming were significantly associated with 25-m swimming velocity ($P < .05$). A positive relationship between water-flow velocities with dF was observed. Swimming performance was not related to dF or dv. Neither stroke rate nor RPE differed between the 4 tethered conditions and mean 50-m free-swimming velocity ($P > .05$).

Conclusions: Measuring force in a swimming flume at higher water-flow velocities is a better indicator of performance than stationary tethered swimming. It enables assessment of the ability to effectively apply force in the water.

Keywords: exercise testing; force assessment; strength; tethered forces; training.