

Shoulder rotator water training program effects on strength and muscular balance. Comparison with a conventional dry-land program: a pilot study.

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INTRODUCTION

Some studies (Wanivenhaus et al., 2012) have documented that the swimming propulsive forces responsible for total body displacement are mainly produced by the upper limbs, through arm adduction and shoulder internal rotation, which may lead to an agonist–antagonist muscular imbalance, resulting in an injury process. Regarding this issue, some researchers (Swanik et al. 2002) looked for ways to prevent injuries with dry-land strength training programs. However, from our knowledge, there are no studies with water specific strength training programs. This pilot study aims to compare the effects of two training programs on shoulder rotator cuff muscles strength and balance in young swimmers.

METHODS

A total of 21 male swimmers were assessed and randomly divided in two groups: the land group (n=11; 13.18 ± 0.98 years old; 49.85 ± 5.77 Kg; 163.18 ± 9.46 cm of height; 5.70 ± 0.67 sessions per week) that performed only a dry-land training program, and the water group (n=10; 13.00 ± 1.05 years old; 49.82 ± 8.03 Kg; 160.11 ± 5.88 cm of height; 6.09 ± 0.30 sessions per week) which performed a training program with exercises exclusively in the water. Both groups were evaluated in the beginning of the season and after 10 weeks. The *peak torque* of the shoulder internal rotator (IR), external rotator (ER) and

unilateral ratios (ER/IR) were evaluated in concentric actions at 60°/s and at 180°/s, performing 3 and 20 repetitions respectively, on an isokinetic dynamometer (Biodex System 3 - Biodex Corp., Shirley, NY, USA).

RESULTS

Intra-group analysis showed significant increases in strength only for the shoulder IR of the land group. For the protocol at 60°/s, there was a trend to increase strength on the shoulder ER of the land group. Regarding the IR values, differences arose between groups, with higher strength gains with the dry-land training. The land group increased the unilateral ratios significantly when compared to the water group.

CONCLUSIONS

The dry-land training program proved to be more effective than the one conducted in the water, reducing the shoulder rotator muscle imbalances and increasing the IR strength in young swimmers.

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