

28th ECSS Anniversary Congress, Paris/France, 4-7 July 2023

Effects of dry-land strength training session on swimming performance the following day

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INTRODUCTION:

Strength endurance (SE) or maximum strength (MS) training may affect subsequent in-water performance of competitive swimmers. Any effect on performance may be dependent on the time available for recovery. The aim of the study was to examine the effect of dry-land SE and MS training sessions on the following day swimming performance.

METHODS:

Eight national level competitive swimmers (age 18.6 ± 2.9 years) performed in a random order: i) SE (2x15-20 repetitions, 50% of 1-repetition maximum), ii) MS training (2x5 repetitions, 85% of 1-repetition maximum), iii) a control condition (CON: no dry-land training) in an afternoon session (18:00 – 18:40 p.m.). Each dry-land session was followed by 90 minutes of in-water swimming training (19:00 – 20:30 p.m.). Upper body and lower body muscles performance was evaluated via a 3 kg medicine ball throw and countermovement jump (CMJ), free countermovement jump (FCMJ) and squat jump (SJ), before and after each dry-land training session and 12 hours later in the next morning, before a 100-m front crawl performance test at 8:30 a.m. Performance time, arm-stroke rate (SR), arm-stroke length (SL) were measured in the 100-m test. Blood lactate concentration (BL) was measured at the start and the end of the 100-m test and heart rate (HR) and rating of perceived exertion (RPE) were measured at the end of the test.

RESULTS:

Performance time and biomechanical variables (SR, SL) as well as physiological response (BL, HR) in the 100-m test were no different between conditions (time, MS: 64.70 ± 7.35 , SE: 63.81 ± 7.29 , CON: 64.52 ± 7.71 s, $p=0.57$). CMJ was higher in SE compared to MS, and SJ was higher in SE compared to CON condition ($p<0.05$). FCMJ was no different between conditions. Jump height in all types of jumps was not changed before and after dry-land sessions and before the 100-m test in all conditions ($p>0.05$). Medicine ball throw was lower in MS compared to CON before the 100-m test (MS: 4.44 ± 1.11 vs. CON: 4.66 ± 1.21 m, $p=0.01$).

CONCLUSION:

Performance time and biomechanical variables in a 100-m test, are not affected by dry-land maximum strength or strength endurance training performed 12 hours earlier. Upper but not lower body explosive power may be affected by dry-land MS training completed 12 hours earlier without affecting swimming performance. Swimmers may apply dry-land SE or MS training 12 hours prior to 100-m swimming race without any negative effect on performance.

Topic: Training and Testing

Presentation E-poster

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Supported by SporTools GmbH



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