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### Relationship Between Land-Based Performance Assessments and Swimming Force During Combat Swim Flutterkick

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Combat swimming (CS) requires military personnel dressed in full combat gear to swim while holding or towing additional weight (i.e. ammunition, rucksack, etc.). Reportedly, additional gear can amount to over 40 kg and increases the demand on muscle force production to overcome water resistance. Limited research has explored relationships between limb length, strength, and power performance assessments and CS flutterkick anaerobic performance during a 30-second maximal effort tethered swim test (TST). **PURPOSE:** To examine relationships between limb length, strength, and power performance assessments and maximum effort CS force production. **METHODS:** Six female ( $26 \pm 9.2$  years,  $169.7 \pm 3.9$  cm,  $67.5 \pm 9.4$  kg) and six male ( $30 \pm 8.0$  years,  $179.4 \pm 7.6$  cm,  $80.8 \pm 15.4$  kg) skilled swimmers participated in isometric muscular hip strength (HS) testing using a handheld dynamometer, and a 30-second Wingate cycle ergometer anaerobic test (WAnT). Limb length (LL) was measured from the Anterior Superior Iliac Spine to the medial malleolus. For TST, subjects wore full military gear weighing approximately 12 kg, including combat boots and fins, and performed a maximal effort flutterkick in a prone position holding a flotation device for 30 seconds. After testing for normality, correlations between HS, LL, WAnT, and TST were determined using Pearson's correlation ( $p < 0.05$ ). **RESULTS:** Absolute Wingate mean power was significantly correlated to TST mean force ( $TST_{mf}$ ) ( $0.883$ ,  $p < 0.001$ ). Correlations were identified between LL and TST peak force ( $TST_{pf}$ ) (right:  $0.653$ ,  $p = 0.021$ ; left:  $0.659$ ,  $p = 0.020$ ). There was no significant correlation between isometric peak HS and  $TST_{pf}$ . **CONCLUSIONS:** LL and absolute WAnT mean power are associated with CS anaerobic kicking performance more so than isometric HS. Findings should not dismiss the relevance of strength, but promote specificity of the assessment. Identifying significant relationships between power and strength assessments and swimming force during CS flutterkick is important to help to improve training for optimal CS anaerobic performance.

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