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Association Between Aerobic Combat Swimming Performance and Anaerobic Kicking Power in Adult Fitness Swimmers

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The Combat Swimmer is trained to endure fin swimming of distances up to 11km to travel to an assigned mission location and maintain stealth status. They are expected to complete locomotion while reserving the ability to produce immense power and maintain composure for the designated Special Forces operation upon landfall. To date there lacks investigations on the associations between aerobic Combat swimming (CS) and anaerobic Combat kicking performance. PURPOSE: To examine associations between force production during an anaerobic Tethered Kicking Test (TKT) at baseline (BTKT) and immediately post 500m aerobic CS fatigue TKT (PTKT). A secondary aim examined relationships between TKT force and CS 500m fatigue swim performance. METHODS: Eleven male and female competitive swimmers (27.7 ± 8.8years; 173.7 ± 8.6cm; 73.5 ± 14.5kg) completed two sessions. The TKT consisted of a 30s maximal effort flutter kicking against a fixed line connected to the Futek™ submersible S-Beam load cell force transducer measuring force differences (peak force (Fpk;N), mean force (Fmn; N/sec) and fatigue index (FI; N/sec)). The BTKT occurred following the Combat Swim 500m fatigue Swim (CSFS) orientation trial. The CSFS was performed wearing full combat gear including helmet, fatigues, webbing, training rifle, boots and fins. A second TKT was performed immediately following a CSFS (PTKT). Fpk and Fmn were collected for all TKT trials. Pearson correlations were conducted for Fpk, Fmn, and FI for both BTKT and PTKT trials, and correlated to CSFS performance time. RESULTS: There was no significant correlation between CSFS time and BTKT or PTKT force measures. BTKT was significantly correlated to PTKT for Fpeak ($r=0.784$, $p<.001$), Fmean ($r=0.856$, $p<.001$) and FI ($r=0.758$, $p<.001$). CONCLUSIONS: The series of anatomical and environmental constraints in the CS task raises questions regarding energy system reliance throughout a BTKT or PTKT test. As a CS completes a CSFS test, it is possible that the level of fatigue may impair the CS to a degree that they would be unable to maintain a high intensity throughout a PTKT. Future studies should continue to explore how combat swimming tasks impact energy system pathways and reliance as well as neuromuscular patterns related to the skill demands of combat swimming.