

Differences in muscle activity between front crawl and head up crawl.

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The purpose of this study was to determine the differences in muscle activity between front crawl and head up crawl. Ten male surf lifesavers performed two 50m trials with 80% of their best performance velocity. Surface electromyogram (EMG) was collected from biceps brachii, triceps brachii, pectoralis major, and flexor carpi ulnaris muscles on right and left arms. Two underwater video cameras were used to capture the right and left hands at 200Hz. Four phases in one stroke were identified from the hand displacement (stretch, pull, push, recovery). The muscle activity was calculated by root mean square (RMS) values for each phase, and expressed in the percentage of EMG

during an isometric maximal voluntary contraction (%MVC).

Right triceps brachii showed different muscle activity between front crawl and head up crawl. During pull phase, right triceps brachii presented significantly higher RMS for head up crawl than front crawl ($p < 0.05$). This finding indicated that right triceps brachii on the head up crawl was used for extending elbow and making more powerful pulling movement than front crawl during the pull phase. There were no differences in other muscle activity between front crawl and head up crawl. This information provides a development of muscle conditioning program