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Publication date:
2022

Document Version
Early version, also known as pre-print

[Link to publication from Aalborg University](#)

Citation for published version (APA):

Klitgaard, K. K., Kristiansen, M. V., & de Zee, M. (2022). *The effect of increased maximal upper body strength on sprint kayak performance*. Abstract from VIII International Congress of Coaches of Sprint Canoeing 2022, Pontevedra, Spain.

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The effect of increased maximal upper body strength on sprint kayak performance

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Abstract

BACKGROUND AND AIM: Optimal performance in the 200m flat-water sprint kayak discipline is heavily dependent on the ability to generate anaerobic power. As anaerobic power in kayaking can be expressed as maximal power output per stroke, it is inherently limited by muscle strength, more specifically upper body strength. Therefore, the aim of the present study was to investigate whether an increase in maximal upper body strength would elicit a concomitant change in 200m kayak sprinting performance. **METHODS:** Twenty-six national elite junior A, U23, and senior kayak paddlers (16 men: age 18.6±4.1 years and 10 women: age 17.0±1.4 years) from three regional kayak centers participated in the study. Participants were stratified based on gender, kayak center and 1 repetition maximum (1RM) in bench press and thereafter randomly allocated into two groups, a training group (TRAIN), and a maintenance group (MAIN). Each group completed a six week strength training intervention. The purpose of TRAIN was to increase 1RM in bench press and maintain strength levels in all other exercises, while the purpose of MAIN was to maintain the strength in all exercises performed. Pre- and post-tests were carried out in 200m ergometer kayak sprint, 1RM bench press and 1RM bench pull. **RESULTS:** TRAIN significantly increased 1RM strength in bench press (pre: 87.3±21.2 kg, post: 93.9±21.3 kg, $p = 0.001$) and bench pull (pre: 85.0±15.0 kg, post: 87.0±15.0 kg, $p = 0.025$). No significant differences were observed in MAIN from pre-test to post-test in 1RM strength for bench press (pre: 93.3±26.5 kg, post: 94.6±28.7 kg, $p = 0.408$) or bench pull (pre: 85.4±21.2 kg, post: 86.6±20.2 kg, $p = 0.461$). In the 200m kayak ergometer sprint test, TRAIN significantly decreased the time to complete the test (pre: 44.7±4.1 s, post: 44.2±4.2 s, $p = 0.042$), while no significant difference in performance was observed in MAIN (pre: 45.7±4.4 s, post: 45.6±5.3 s, $p = 0.89$). **CONCLUSIONS:** This is the first study to show a causal relationship between a strength training-induced increase in upper body strength and a concomitant decrease in 200 m sprint kayak time. The increase in upper body strength most likely leads to an enhanced ability to generate anaerobic power, thus increasing sport-specific performance.