Effect of Paddling Cadence on Time to Exhaustion and VO2 Kinetics

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The infiuence of paddling cadence on the time to exhaustion (t.limj and VO2 kinetics at the intensity associated with V02max (IV02max) was examined in seven highly-trained white water kayakers. All subjects were engaged in national or international competitions. Subjects took part in three constant-load tests at IV02max, each test performed at a different paddling cadence (50, 60 or 70 cycles • min-'). The VO2 kinetics recorded during these constant-load tests at IV02max were fitted with a mono-exponential equation. A significant increase in t.lim fP < .05) was observed as the paddling cadence increased from 50 to 70 cycles • min". No effect was found either on values ofVO2peak, post-exercise blood lactate concentration, or on the time at which VO2p,ak was attained (TAVOipeak). Our results suggest that experienced kayakers may choose a high paddling cadence during physiological assessments at IVO2 max.
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Optimal cadence selection during cycling

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Cadence or pedal rate is widely accepted as an important factor influencing economy of motion, power output, perceived exertion and the development of fatigue during cycling. As a result, the cadence selected by a cyclist’s could have a significant influence on their performance. Despite this, the cadence that optimises performance during an individual cycling task is currently unclear. The purpose of this review therefore was to examine the relevant literature surrounding cycling cadence in order provide a greater understanding of how different cadences might optimise cycling performance. Based on research to date, it would appear that relatively high pedal rates (100-120rpm) improve sprint cycling performance, since muscle force and neuromuscular fatigue are reduced, and cycling power output maximised at such pedal rates. However, extremely high cadences increase the metabolic cost of cycling. Therefore prolonged cycling (i.e. road time trials) may benefit from a slightly reduced cadence (~90-100rpm). During ultra-endurance cycling (i.e. >4h), performance might be improved through the use of a relatively low cadence (70-90rpm), since lower cadences have been shown to improve cycling economy and lower energy demands. However, such low cadences are known to increase the pedal forces necessary to maintain a given power output. Future research is needed to examine the multitude of factors known to influence optimal cycling cadence (i.e. economy, power output and fatigue development) in order to confirm the range of cadences that are optimal during specific cycling tasks.
http://www.ismj.com/pages/311417173/ISMJ/journals/articles/Vol.10-No.1-2009/optimal-cadence-selection-during-cycling.asp

Estimation of Biomechanical Parameters and Propulsive Efficiency of Flat-water Kayak Single (K1) at Race Pace

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Flat-water Kayaking is an Olympic discipline in which the boats race are held on calm water in separate lanes delineated with ropes and buoys over the distance of 500 m and 1000m. A new Sprint 200 m race will make its Olympic debut at London 2012. Few are the experimental data in literature on this particular type of race in which the athlete exerts his maximum effort on a very short distance. This paper presents the analysis of the paddling performance of elite athletes in single K1 training session keeping up a typical stroke race cadence (over 100 spm). In order to reproduce the regatta conditions the tests were performed at Idroscalo water basin (Milan, Italy) with kayaker at the top of the training preparation. The on purpose experimental device, successfully tried out in previous on-water kayaking and canoeing researches was integrated with cardiopulmonary testing portable system. By means of experimental acquisitions including stroke forces, estimated position of the blade propulsion centre (EPPC), boat speed and the movements around the three main axes of the hull it is possible to evaluate the athletes performance during the different phases of the race. Particular attention was devoted to refine the efficiency of stroke through the analysis of the exertion of the force in the active part of paddling (drive phase) related to the metabolic cost of the stroke cycle. The main goal of the research was to implement a low cost stand-alone instrumentation and acquisition system for the on-the-water measurement of biomechanical and dynamical parameters during race paddling of elite athletes to quantify performance and improve technique.
http://www.lamc.ing.unibo.it/aimeta2011/dati/phf9r5jlgn4njnnhpkei/MEM-250-0.pdf