THE IMPACT OF WARM UP ON THE RATE OF CARBOHYDRATE METABOLISM DURING PROLONGED RUNNING

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Carbohydrate (CHO) is a critical fuel for prolonged muscle contraction, however the body’s ability to store CHO, primarily in the form of liver and muscle glycogen is relatively limited. The amount of glycogen stored in muscle and liver whether a recreational athlete or elite competitor limited to 400-600g. Since the rate of CHO utilization ranges from 1.5-4g/min in prolonged submaximal (80-80%VO2max) effort it is evident that with the exhaustion of carbohydrate reserves performance decrements are inevitable. In the search for strategies to enhance athletic performance, recent investigations have focused on training and nutritional techniques which may theoretically slow rates of CHO depletion and promote fat oxidation, thereby improving submaximal exercise capacity. Such interventions include: prolonged submaximal training, ingestion of caffeine and L-carnitine, fat ingestion during exercise and exposure to high fat low CHO diets. There are however no systematically collected data regarding the effect of warm up on the rate of CHO metabolism during low intensity prolonged exercise.

Purpose: The aim of this study was to investigate the effect of warm up on the rate of CHO usage during prolonged submaximal running.

Method: Nine trained subjects (age 25±5.5, weight 71.8±7.1, %fat 12.2±6.2 and VO2max 54.91±5.51) performed an incremental test to determine VO2max. Two days after VO2max trial three continuous submaximal (80%VO2max) runs, preceded by no warm up (WWU), normal (10min 50%VO2max) warm up (NWU) and high intensity (4X30sec 120%VO2max) anaerobic warm up (AWU), performed within 15 days in random order. At least three days recovery period allowed between prolonged trials. Oxygen consumption and respiratory exchange ratio (RER) were monitored in 15 minutes intervals during the exercise test.

Results: Repeated measures ANOVA showed that mean total CHO metabolism during prolonged running trials WWU (136.25±25.07g), NWA (140.87±37.59g) and AWA (144.47±35.24g) was not significantly different (p>0.05). Total fat oxidation was also not influenced by the mode of warm up (p>0.05) 28.66±13.74g (WWU), 29.13±11.01g (NWU) and 25.03±17.49g (AWU).

Conclusions: The results of this study indicate that if a prolonged submaximal effort follows a sort lasting warm up the rate of CHO and fat use during prolonged effort is independent of the intensity of warm up.

Keywords: Running, Warm-Up, Carbohydrate Metabolism

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