

Skeletal Muscle Oxygenation during the Nagewaza Kakari Exercise in Judo

(柔道の投げ技の懸かり稽古中の骨格筋酸化レベルに関する研究)

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ABSTRACT

Many studies have examined oxygen metabolism in skeletal muscle during exercise. The purpose of the present study was to analyze skeletal muscle oxygenation during Nagewaza Kakari exercises in Judo, and to compare the maximal oxygen uptake of this type of exercise with that recorded during heel-raiser exercises and exhaustive aerobic exercises during treadmill running. The subjects were 6 male Judo athletes (mean: 23 years old) who each possessed more than 10 years of Judo experience. Maximal oxygen uptake was measured using a breath-by-breath technique. The Nagewaza Kakari exercises and the heel-raiser exercises were performed for 5 minutes. Muscle oxygenation was measured by near-infrared spectroscopy (NIRS) using an electrode with a detector attached to the middle position of the calf during each exercise. Mean $\dot{V}O_2\text{max}$ values were 46.7 ± 2.2 ml/kg/min. The muscle oxygenation levels during the Kakari exercise decreased to the same levels as those at $\dot{V}O_2\text{max}$ in exhaustion, and sometimes attained -100 ~ -130% (the muscle oxygenation levels at $\dot{V}O_2\text{max}$ were set at -100%), which was slightly lower than that during the heel-raiser exercise. These results suggest that oxygenation levels of skeletal muscle during the Nagewaza Kakari exercise were lower than levels measured during the heel-raiser exercise.

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