EFFECT OF TIMING OF HEAT PRECONDITIONING ON MUSCLE DAMAGE AND MUSCLE SORENESS
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It was suggested that heat preconditioning at one day before eccentric exercise (ECC) could inhibit muscle damage and muscle soreness after ECC. The mechanisms are still unknown but the effect might be caused by an induction of heat shock proteins (HSPs). It has been reported that HSPs is immediately induced by the heat stress and reach the peak level within 72 hours in human skeletal muscle. However, there are few studies about the optimal timing of heat preconditioning for the prevention of muscle damage. The purpose of this study was to clarify the effect of timing of heat preconditioning with microwave equipment on muscle damage and muscle soreness.

Seventeen untrained male subjects (23 ± 2 yrs) volunteered for this study. They participated in one of three conditions; (1) with heat preconditioning at 2 day before ECC (Pre-2H; n=5), (2) immediately before ECC (Pre-IH; n=7) or (3) without heat preconditioning (CON; n=5). The heat treatment was done by using microwave equipment (150 W, 20 min). ECC was 30 maximal isokinetic eccentric contractions of elbow flexors at 30 deg/sec (10 reps, 3 sets), starting with the elbow flexed to 90 deg and ending at an angle of 180 deg. Maximal voluntary isometric contraction, range of motion of elbow flexion and upper arm circumferences (3, 5, 7, 9, 11 cm above the elbow joint) were measured as physiological makers of muscle damage for 4 days after eccentric contraction protocol. In addition, blood creatine kinase activity and muscle soreness using 100mm visual analog scale were evaluated as biochemical and subjective markers, respectively.

Blood creatine kinase activity of Pre-IH and Upper arm circumference of Pre-2H were significantly (p<0.05) lower than those of CON after ECC. However, there was no significant difference in all makers of muscle damage and muscle soreness between Pre-2H and Pre-IH conditions. It is suggested that the heat preconditioning used in this study could reduce the symptoms of muscle damage after ECC. However, the timing of heat preconditioning on muscle might not affect the extent of reduction in muscle damage and soreness.

Keywords: Eccentric Exercise, Muscle Damage, Muscle Soreness

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