



/kg ). The general physical fitness were measured and contractile properties of quadriceps muscle included maximum voluntary contraction (MVC), Integrated electromyography response (IEMG) of MVC , IEMG of submaximal isometric contraction (SIC) against various loads ; 0, 2, 4, 6, and 8 kg, Speed of submaximal concentric contraction against various loads (as SIC) and also soreness perception and tenderness were evaluated. Post-exercise values at any time were used to compare with that of pre-exercise.

The present study was found that there was a linear relationship with significant correlation between body weight and MVC of lt and rt knee extensor ( $r=0.91, 0.75$  respectively). Moreover there was also a linear relationship with significant correlation between lt or rt thigh volume and lt or rt MVC ( $r=0.79, 0.77$  respectively). The IEMG responses appeared to increase linearly with the exerted submaximal isometric force.

During step-exercise of bout 1 and bout 2, steady heart rate was estimated about 66-68% of maximum heart rate. Rating perceived exertion (RPE) was in the range of 7-11 indicated "fairly light". Soreness perception was ranged between 0-3 , indicated " little sore or uncomfortable". There was no significant difference of any changes between bout 1 and bout 2 .

After 1 hr of step-exercise of bout 1 and bout 2 ; the significant change was IEMG responses of MVC and SIC

after eccentric contraction ( $p < 0.05$ ,  $p < 0.005$  respectively) in both legs. Soreness perception of both legs was  $2.18 \pm 0.06$ . There was no significant difference between left and right leg. Neither MVC nor speed of SCC did change.

When followed up to 24 and 48 hr post-exercise, it was found that soreness perception was most pronounced at 24 hr after exercise and slightly declined at 48 hr after exercise. Most pronounced tenderness occurred at 24 hr after exercise as well. The similar pattern was occurred in the change of serum Creatine-phosphokinase (CPK). It highly elevated at 24 hr and 48 hr post exercise ( $p < 0.05$ ). By contrast, the change of IEMG responses did not associated with that of soreness perception, since they reached the peak at post 1 hr of exercise then gradually declined to pre exercise level at 48 hr post exercise, except IEMG/force ratio of the left knee extensor was still elevated until 24 hr after exercise. The present study was able to demonstrate a significant correlation between magnitude of soreness perception and the change of serum CPK ( $r = 0.64$ ,  $p < 0.05$ ). The phenomenon was likely to result from high tension developed during eccentric contraction, leading to mechanical loading on muscle and tendon or connective tissue around the muscle.