Adequate position sense is required for capable and safe human movement. Disturbed position sense (particularly of the lower limbs) is normally expected after muscle-damaging exercise which may lead to perturbations in daily activities (such as walking) and ultimately to injuries. Unaccustomed exercise of the upper limbs disturbs position sense in the exercised arm (Brockett et al, 1997; Miles et al, 1997). In two studies, muscle damaging exercise of the upper limbs produced contrasting results in muscle reaction time to an external stimulus (light) (Dedrick and Clarkson, 1990; Miles et al, 1997). In the present investigation, a new test was developed that measures the reaction angle of the lower limb in response to a stimulus (free fall) originating from the muscle itself. Therefore, the purpose of the present study was to examine whether position sense and joint reaction angle to release can be affected by eccentric exercise-induced muscle damage. Twelve women underwent an isokinetic exercise session of the lower limb. Isometric peak torque, delayed-onset muscle soreness, serum creatine kinase, position sense at 45o and knee joint reaction angle to release (at 0o, 15o, 30o, 45o, measured through a new test) were examined before, immediately after, and 24, 48 and 72 h post-exercise. Muscle damage indicators changed significantly compared to the baseline data indicating that muscle damage did occur. Subjects, due to the effect of eccentric exercise, persistently placed their lower limb at a more extended position, representing a shorter knee extensor muscle. Eccentric exercise increased the knee reaction angle of the lower limb after release from 0o and 15o but not from 30o and 45o. Position sense and joint reaction to release were similarly affected by eccentric exercise and independently of the visual feedback. Position sense was impaired only immediately post-exercise (probably due to muscle fatigue) whereas impairment of the reaction angle to release persisted up to 3 days post-exercise (probably due to muscle damage). Attenuation of position sense and joint reaction angle of the lower limbs after damaging activities is a serious functional limitation that may lead to an increase risk of injury, particularly in older populations.

References