

1-C-12 The effects of daily physical activity and sex on knee extension strength in middle aged humans

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[Purpose]

Sarcopenia is a gradual loss of skeletal muscle mass and strength associated with aging. To prevent sarcopenia is an important issue in prolonging a healthy life expectancy, although no effective method of controlling it exists. We investigated the effects of daily physical activity and sex differences on knee extension strength in middle-aged humans.

[Method]

Twenty-two middle-aged subjects (59 ± 6 year-old; male, 8; female, 14) participated. Daily physical activity was measured using the International Physical Activity Questionnaire (IPAQ). Knee extension strength measurement and a 30-s chair-stand test were also performed on each subject. The subjects were divided into higher and lower physical activity groups on the basis of sex and the amount of daily physical activity per body weight.

[Results and Discussion]

While daily physical activity did not influence the knee extension strength, sex-based differences were observed in the strength, with higher values seen in males. Both sex and daily physical activity level influenced knee extension strength only when the strength was expressed as kg per body weight. No sex difference existed in the 30-s chair-stand test and the better performance was observed in persons with higher daily physical activity level.

Key Words: physical activity level, knee extension strength, sarcopenia

1-C-13 Effect of the arm swing on the ground reaction force in vertical jump performance

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Purpose: The purpose of this study was to investigate the effect of an arm swing on the vertical ground reaction force (GRF) in vertical jump performance.

Methods: Healthy young men and women participated in this study. Vertical jump ability was assessed by using four style of vertical jump as follows: (i) a countermovement jump with using arm swings (CMJA); (ii) a countermovement jump without using arm swings (CMJ); (iii) a squat jump with using arm swings (SJA); and (iv) a squat jump without using arm swings (SJ). In CMJ and SJ, subjects placed their arms in front of their chest throughout the entire jump and kept their torso in an upright position in order to emphasize using the leg extensor muscles. Subjects attempted to jump as high as possible and performed three trials of each type of vertical jump with sufficient time for recovery between attempts. Height of vertical jump was calculated from the GRF measured with the force plate (Kistler, Switzerland). The highest trial of each type of vertical jump was used for further analysis.

Results and Discussion: The vertical jump height of CMJA was significantly higher than that of CMJ, SJA, and SJ, and the jump heights of CMJ and SJA were higher than that of SJ. These results indicate that the arm swing can increase jump height with larger vertical GRF.

Key Words: Leg power performance, inter-limb force facilitation, multi-joint movements