OBJECTIVES: The purpose of this study was to investigate the contributions of functional and morphological factors in the recovery of the quadriceps muscle after anterior cruciate ligament (ACL) reconstruction. METHODS: Nine subjects (31.3±5.8 years) underwent eccentric exercise sessions twice a week for 12 weeks. Quadriceps muscle function was evaluated using an isokinetic dynamometer (isometric and eccentric peak torque) and electromyography (RMS). Morphological changes were measured using magnetic resonance imaging. RESULTS: The initial evaluation showed a significant deficit in knee extensor torque in the involved limb and significant muscle atrophy along the length of the quadriceps. EMG activity was lower in all tested situations. Eccentric training significantly increased isokinetic torque (from 199±51 to 240±63, p<0.05, respectively) and quadriceps area, with the greatest hypertrophy in the proximal thigh region (from 169±27 to 189±25.8 cm², p<0.01). The EMG activity of vastus medialis increased after the first six weeks of eccentric training. The increased extensor torque was correlated with quadriceps cross-sectional area (r=0.81, p<0.01) and EMG activity (r=0.69, p<0.05). After twelve weeks of training, there was a correlation only between torque and cross-sectional area (r=0.78, p<0.01). CONCLUSIONS: 1) eccentric training proved to be a potent resource for the quadriceps recovery, both morphologically and functionally, 2) the contributions of functional and morphological factors varied according to the length of training.

Keywords
Anterior cruciate ligament, electromyography, magnetic resonance, quadriceps muscle.