**Abstract**

Introduction: The biological response of the muscles around the knee in chronic ligamentous instability was investigated in an animal study. Materials and methods. There were four groups of 6- to 9-month-old adult New Zealand albino rabbits (2500-3300 g). The animals were divided into groups according to the ligament that was surgically sectioned: group A anterior cruciate ligament (ACL), group B medial collateral ligament (MCL), group C both ACL and MCL, and group D served as the control group undergoing no surgical intervention. Three months after surgery, biopsy specimens of the vastus lateralis, rectus femoris, biceps femoris, extensor digitorum longus, and gastrocnemius muscles of the rabbits were obtained. Electron-microscopic cross-sections of the biopsy specimens were evaluated using the new predetermined atrophy parameters. Results: Atrophy was found in the biopsy specimens of the quadriceps muscles in groups A and C (p<0.005). Unimportant changes were seen in the hamstrings, extensor digitorum longus, and gastrocnemius muscles (p>0.05). Only in the group undergoing MCL dissection were no changes observed in the muscles (p>0.05). Conclusion: It is concluded that ACL lesions affect the biomechanics of the knee negatively and this situation causes atrophy, especially in the quadriceps muscle. An MCL lesion alone does not cause an important problem in the surrounding musculature, probably because of its spontaneous healing capacity. New criteria for assessment of atrophy in the muscles employing electron-microscopic evaluation are suggested.