

DOES THE GRAFT USED FOR ACL RECONSTRUCTION AFFECT THE KNEE MUSCULAR STRENGTH RATIO AT SIX MONTHS POSTOPERATIVELY?

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ABSTRACT

Background: Restoring knee muscle strength after an anterior cruciate ligament (ACL) reconstruction remains challenging. Improvement of rehabilitation program specificity demands additional knowledge on knee muscle strength deficits associated with the graft used for ACL reconstruction.

Purpose: This study aimed to investigate the effects of graft used for ACL reconstruction on the knee muscle strength and balance assessed at six months postoperatively, based on comparisons of the isokinetic strength curves measured throughout knee extension.

Study design: Cross-sectional study

Methods: One-hundred-and-forty-four patients were assigned into three groups according to the graft used for a primary ACL reconstruction: semitendinosus (n = 47), semitendinosus + gracilis (n = 75) and patellar (n = 22) tendon graft. Normalized hamstring eccentric and quadriceps concentric torques, and hamstrings-to-quadriceps torque ratio (defined as the dynamic functional ratio) were bilaterally assessed during knee extension. Statistical parametric mapping was used to compare the curves of torques and ratio from 90° to 30° of knee flexion between groups.

Results: The uninvolved knees presented similar strength and ratio curves in the three groups. When compared involved to uninvolved knees, hamstring strength deficit was found in hamstring tendon groups throughout knee extension ($p < 0.001$), and quadriceps strength deficit in the three groups throughout knee extension ($p < 0.001$). Hamstrings-to-quadriceps torque ratio was unaltered when using hamstring tendon grafts, while increased ratio was observed up to knee mid-extension when using patellar tendon graft ($p < 0.001$).

Conclusions: These findings suggest exercises with specific range of motion and contraction type in relation to graft may be considered for implementation into postoperative rehabilitation program in order to eliminate the regional strength deficits observed after ACL reconstruction.

Level of evidence: 3

Keywords: Dynamic functional ratio, hamstring eccentric strength, Movement system, quadriceps concentric strength, statistical parametric mapping

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