

Predictors and Functional Recovery of Hamstring Tendon Regeneration: A Prospective Observational Follow-Up Study

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Summary:

Hamstring tendon regeneration occurs less frequently in older patients that used to smoke, however absence of regenerated tendons does not seem to have clinical consequences nor does it affect knee stability.

Abstract:

Introduction – Semitendinosus and gracilis tendons have the capacity to regenerate after harvesting for ligament reconstruction procedures. However, whether hamstring tendon regeneration can be predicted and the extent of functional recovery remains unclear. Therefore, the current study aims to identify predictive factors for hamstring tendon regeneration and investigate functional recovery after hamstring tendon regeneration.

Methods – 154 adults with anterior cruciate ligament (ACL) rupture were included in an observational prospective follow-up study. At baseline, one and two years follow-up MRI data was acquired. Inclusion criteria were: (1) ACL rupture diagnosed by physical examination and MRI; (2) MRI within 6 months after trauma; (3) age between 18 and 45 years; and (4) two-years follow-up MRI data should be available. Of the 143 patients that met the inclusion criteria, 50 patients were treated non-operatively and hamstring autografts were used in 88 of the 93 the reconstructed patients. All patients were treated according to the Dutch guideline on ACL injury. If any sign of tendon regeneration proximal from joint line level could be identified on MRI, this was considered as hamstring tendon regeneration. Based on MRI regeneration status, patients were subdivided in different subgroups: regeneration of one tendon, regeneration of both tendons or no regeneration of both tendons. Patient characteristics, activity-level (pre-trauma Tegner score) and functional instability (one-leg hoptest) at baseline and two years follow-up were evaluated to determine predictive factors for tendon regeneration or to examine functional consequences of hamstring tendon regeneration.

Results – Patients showed regeneration of semitendinosus and gracilis tendons in 65.4% and 80.2%, respectively at two years follow-up. Regeneration of the semitendinosus tendon is significantly related with age (OR 0.92, 95% CI 0.86 to 1.0 $p=0.04$) and smoking status (OR 3.5, 95% CI 1.1 to 12.0, $p=0.04$). No predictive factor was found for gracilis tendon regeneration. Regeneration of both the semitendinosus and gracilis tendon is negatively related with smoking habits (OR 3.3, 95% CI 1.0 to 11, $p=0.05$). The circumference of the upper leg significantly decreased from 47.1 cm to 45.6 cm (95% CI of the difference 0.53 to 2.6, $p=.01$) in patients with no regeneration of the semitendinosus and gracilis, whereas patients with regeneration of at least one tendon did not show a decrease. Regardless the regeneration status, one-leg hop-test results significantly increased at two years follow-up. Furthermore, Lysholm scores were significantly higher in all patients at two-years follow-up.

Conclusions – Hamstring tendon regeneration occurs less frequently in older patients that used to smoke, however absence of regenerated tendons does not seem to have clinical consequences nor it affects knee stability.