

Histological Evaluation of Regenerated Semitendinosus Tendon Minimum 6 Years After Harvest for ACL Reconstruction

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Summary:

The ST tendon regenerates and regains a histological appearance similar to the non-harvested contralateral tendon as seen in this study median 8.4 years after harvest.

Abstract:

Background:

The semitendinosus (ST) and/or gracilis (G) autografts are the most used grafts for anterior cruciate ligament (ACL) surgery. The tendons have been shown to be able to regenerate but with focal areas of scar tissue in the short-term. There are no long-term histological studies of the regenerated tendons.

Hypotheses:

In the long-term the regenerated ST tendon normalizes and has a similar histology as the contralateral non-harvested tendon.

Study Design:

Case-control study, level III

Methods:

18 patients (8 female, 10 male) who underwent ACL surgery using ipsilateral ST/G tendon autografts were included in the study. Percutaneous specimens were obtained from the regenerated ST tendon and the contralateral non-harvested ST tendon under ultrasonographic guidance at a median of 8.4 years (100.5, 77-129 months) after the harvest procedure. Specimens from the non-operated side served as controls. The histology and the presence of glycosaminoglycans (GAGs) were assessed using a light microscope.

Results:

In total 36 biopsies were obtained (2 biopsies from each patient). In 5 of them the amount of tissue was too small to analyze in the light microscope and one patient had been operated bilaterally and was therefore excluded. Overall there were no significant differences between the regenerated and non-harvested ST tendon in terms of fiber structure, cellularity, vascularity and level of GAGs minimum 6 years after harvest of the ST tendon. However, three of the regenerated tendons displayed a grade 3 classification in terms of fiber structure. The corresponding was found for one regenerated tendon in terms of cellularity.

Conclusion:

The ST tendon regenerates and regains a histological appearance similar to the non-harvested contralateral tendon as seen in this study median 8.4 years after harvest. Since the ST tendon regeneration is unpredictable in terms of focal scarring and until studies have been done with long-term biomechanical testing in humans, it is our opinion that

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regenerated ST tendon can not be recommended for ACL revision surgery.

Keywords:

ACL, tendon regeneration, biopsy, histology, semitendinosus,