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Summary:
Complications following primary ACLR using quadriceps tendon autograft were recorded in 10.5% of knees, with persistent knee pain being most common. No difference was reported in the overall incidence of complications with the use of the QT versus QTBP grafts, however persistent knee pain was 2.7x greater with use of a soft tissue quadriceps graft.

Data:
Background: Anterior cruciate ligament reconstruction (ACLR) surgery with use of a soft tissue quadriceps graft.

Purpose: To systematically review the incidence of postoperative complications following primary anterior cruciate ligament reconstruction (ACLR) with quadriceps tendon autograft, while comparing complication rates in patients undergoing all soft tissue quadriceps tendon (QT) grafts versus quadriceps tendon grafts with a patellar bone plug (QTBP).

Study Design: Systematic Review; Level of Evidence IV Methods: A literature search was performed by querying PubMed, Embase, and Scopus databases from database inception through August 2022 using the 2020 PRISMA guidelines. Inclusion criteria consisted of level I to IV human clinical studies in English or English-language translation reporting complications following primary ACLR using quadriceps tendon autograft.

The incidence of complications within the included studies was extracted. Differences in the incidence of postoperative complications between ACLR with quadriceps tendon with and without a patellar bone plug were calculated. Results: Twenty studies from 2004-2022, comprised of 2,381 patients (n=2,389 knees) with a mean age of 27 (mean range, 12-58) years, consisting of 68.8% males, were identified. The mean follow-up was 28.5 (mean range, 6-47) months. The total incidence of complications was 10.3%, with persistent post-operative knee pain being most common (10.8%). Patients who underwent ACLR with all-soft tissue QT grafts had a 2.7x increased incidence of persistent knee pain (23.3% versus 8.6%) and reoperations (5.9% versus 3.2%) when compared to QTBP grafts (both, p < 0.01).

There was no appreciable difference in total complications, graft failures, ACLR revisions, cyclops lesions, or range of motion deficit (all, p > 0.05). Patellar fractures occurred exclusively following QTBP (2.2%). Conclusion: Complications following primary ACLR using quadriceps tendon autograft were recorded in 10.5% of knees, with persistent knee pain being most common. No difference was reported in the overall incidence of complications with the use of the QT versus QTBP grafts, however persistent knee pain was 2.7x greater with use of a soft tissue quadriceps graft.

Category: Knee - ACL Graft Choice

Donor Site Morbidity Following Anterior Cruciate Ligament Reconstruction Using Quadriceps Tendon Versus Bone-Patellar Tendon-Bone Autograft: Results at 2-Year Follow-Up

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Summary:
High satisfaction rates and negligible major complications were observed with respect to donor site morbidity with both QT and BTB autograft ACL reconstruction.

Data:
INTRODUCTION: Bone-patellar tendon-bone (BTB) autograft has historically been regarded as the gold standard for anterior cruciate ligament reconstruction (ACLR). Despite widespread utilization of BTB autografts, multiple complications following BTB harvest have been reported, including anterior knee pain, difficulty kneeling, patellar tendon rupture, patella fracture, tendon contracture, and numbness. The quadriceps tendon (QT) autograft has been proposed as an alternative graft in young, high demand patients to achieve comparable clinical outcomes while avoiding complications associated with BTB autograft. Recently, a novel 10-question donor site morbidity (DSM) instrument was developed by Hacken et al that was used to evaluate DSM following BTB ACLR. However, to date, the instrument has not been used to evaluate DSM following QT harvest. Therefore, a retrospective evaluation of DSM following ACLR with QT versus BTB autograft was performed.

METHODS: All patients who underwent ACLR with QT autograft between January 2018 and February 2020 were identified in a single institution registry and matched to a control group of patients who underwent BTB autograft ACLR on the basis of age and sex. DSM was assessed using a 10-question DSM instrument and scores were compared to traditional patient-reported outcome measures including the IKDC, Marx Activity Scale, and SANE scores. Post-operative complications including quadriceps tendon rupture, patella fractures, and graft failure were assessed via registry query. Multivariate analysis was conducted to investigate factors associated with DSM.

RESULTS: Thirty-two QT patients (15M,17F) with a mean age of 23.0 years (range 13-45) were compared to 61 BTB patients (32M,29F) with a mean age 22.3 years (range 13-45) who responded at a minimum 24-months after surgery. DSM scores were rated good or excellent in 26/31 QT patients(81%) versus 44/61 BTB patients (72%) (P=0.45). Significant differences were noted between graft types with respect to presence of numbness, with 37/61 BTB patients (61%) versus 10/32 QT patients(31%) reporting mild, moderate, or diminished sensation to light touch (P=0.02). Differences were also noted in kneeling pain, with 30/61 BTB patients (49%) versus 6/32 QT patients(19%) reporting either mild pain with kneeling or inability to kneel on hard surfaces (P=0.01). Finally, differences were reported in patient-reported presence of quadriceps wasting, with 20/32 QT patients (38%) reporting atrophy versus 15/61 BTB patients(25%) (P=0.01). No differences were noted in pain at donor site, size of numbness, difficulty with stairs or prolonged sitting, anterior knee pain, or incisional cosmesis (P=0.05). Multivariate analysis demonstrated that graft type, sex, body mass index (BMI), operative age, and menisic integrity were not associated with DSM scores (P=0.05). Correlations between PROMS and DSM showed correlations with IKDC, Marx, and SANE (P<0.01). There were no instances of quad tendon rupture, patella fracture, or ACL graft failure in either group.

DISCUSSION: DSM following ACLR with QT and BTB autograft demonstrated good to excellent results in the majority of patients. Significantly more BTB patients experienced numbness at the harvest site and pain with kneeling compared to QT patients. However, more patients reported quadriceps atrophy following QT compared to BTB autograft. PROMS correlated with DSM scores, suggesting that these instruments may be impacted by DSM following ACLR.

Category: Knee - ACL Graft Choice

Tibial Tunnel Expansion And Correlation With 4-Strands Graft Maturation 2 Years After ACL Reconstruction Using Tibial and Femoral Adjustable Cortical Suspensions

Abstract ID# 21375
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Summary:
At 2 years of ACL reconstruction using a ST4 fixed by ASF, the average tibial tunnel enlargement was 13% and no correlation was found between graft maturation and tibial expansion.

Data:
Introduction Reconstruction of the anterior cruciate ligament (ACL) using a short quadruple semitendinosus (ST4) graft fixed with an adjustable suspensory fixation (ASF) has several advantages but is suspected to generate micromotion, tunnel widening and poor graft maturation. The aim of this study was to evaluate tibial tunnel expansion and graft maturation using a ST4 fixed at both tibial and femoral side with ASF. Methods We analyzed retrospectively 149 patients with data collected prospectively at 2 years of follow up with magnetic resonance imaging (MRI). Maturation was analyzed by the Signal-to-Noise Quotient (SNQ) and Howell score at the tibial and articular part of the graft (Ti and Ar Graft). The expansion, the bone-graft contact and the graft volume in the tibial tunnel were calculated by MRI measurement. Results At 25.6 months, MRI analysis showed 13% +/-17 expansion of the tibial tunnel, the mean SNQ was 3.75 +/- .71 for the Ti graft and 1.97 +/- .34 for the Ar graft, the Howell score of the Ti graft was...