Knee Extensor Mechanism Morbidity following Allograft Harvest in Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-Analysis
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INTRODUCTION:
Extensor mechanism autografts for anterior cruciate ligament (ACL) reconstruction include bone-patellar tendon-bone (BTB) and quadriceps tendon (QT) grafts. Graft harvest exposes the patient to the risk of donor site morbidity in the form of patella fractures, patellar tendon ruptures, or quadriceps tendon ruptures. The purpose of this study was to estimate the proportion of patella fractures, patellar tendon ruptures, and quadriceps tendon ruptures associated with BTB or QT autograft harvest during ACL reconstruction using pooled proportions of published data. We hypothesized that BTB and QT autografts would result in similar proportion of extensor mechanism complications.

METHODS: A systematic review and meta-analysis was conducted using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Peer-reviewed articles in English reporting on extensor mechanism complications associated with graft harvest in patients undergoing ACL reconstruction were included. Pooled proportions of patellar fractures, patellar tendon ruptures, and quadriceps tendon ruptures were calculated for each graft type (BTB, QT) using random effects model.

RESULTS: Thirty studies were analyzed. The pooled proportion of patellar fractures was 0.82% (95% CI: 0.44% to 1.32%) for BTB and 2.37% (95% CI:1.04% to 4.24%) for QT. The proportion of patellar tendon ruptures after BTB harvest was 0.22% (95% CI:0.14% to 0.33%) and the proportion of quadriceps tendon ruptures after QT harvest was 0.52% (95% CI: 0.06% to 1.91%). Put differently, in 1000 BTB ACL reconstructions, one could expect 8.2 patella fractures and 2.2 patellar tendon ruptures; in 1000 QT ACL reconstructions, one could expect 23.7 patella fractures and 5.2 quadriceps tendon ruptures.

DISCUSSION AND CONCLUSION: Based on current literature, the proportion of extensor mechanism complications after ACL reconstruction using either BTB or QT autograft is low, indicating that extensor mechanism harvest remains a safe option. A higher proportion of patellar fractures was noted for QT-bone grafts versus BTB grafts. A higher proportion of donor tendon ruptures was noted for QT grafts versus BTB grafts. Surgeons can use these data to better advise their patients on the relative morbidity of autograft options in ACL reconstruction.