

Adolescent Patients Experience Significantly Lower Anterior Cruciate Ligament (ACL) Graft Rupture Rates when ACL Reconstruction is Combined with Lateral Extra-Articular Tenodesis: A Comparison Against Outcomes of Isolated ACL Reconstruction

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INTRODUCTION:

Young patients undergoing anterior cruciate ligament reconstruction (ACLR) are at particularly high risk of graft rupture when compared to adults. Recent studies have demonstrated significant reductions in anterior cruciate ligament (ACL) graft rupture rates in high-risk adult populations when a lateral extra-articular procedure is performed, but comparative studies in pediatric and adolescent populations are currently lacking in the literature.

The purpose of this study was to compare the clinical outcomes of isolated ACLR versus combined ACLR+lateral extraarticular tenodesis (LET) when using the Arnold-Coker modification of the MacIntosh procedure in early adolescent patients. The hypothesis was that combined procedures would be associated with a significantly reduced risk of graft rupture.

METHODS:

A retrospective analysis of consecutive early adolescent patients who underwent ACLR by hamstrings tendons autograft with or without the Arnold Coker modification of the MacIntosh procedure was conducted. Patients with the presence of one or more specific additional risk factors for graft rupture were offered a LET in addition to ACLR. Clinical outcomes including graft rupture rates, patient-reported outcome measures (KOOS and subjective IKDC), knee stability, return to sport rates, reoperation rates, and complications were assessed. Comparisons between variables were assessed with Chi-square or the Fisher exact test for categorical variables and the Student test or Wilcoxon test for quantitative variables. Multivariate analyses were undertaken to evaluate risk factors for graft rupture.

RESULTS:

A total of 122 patients with a mean follow up of 44.8 ± 18.1 (range, 24-95 months) were included in the study. Forty-one patients underwent isolated ACLRs and 81 underwent ACLR+LET. The mean age in the Isolated ACLR group was 16.1 (range, 13.9-17.6) and was 16.2 in the ACLR+LET group (range, 13-17.6). Female patients were 37.6% and 38.4% respectively in the Isolated ACLR group and in the ACLR+LET group. Some 41% and 49% patients were defined as Tanner 5 stage respectively in the Isolated ACLR group and in the ACLR+LET group.

The addition of an LET to ACLR was associated with a significantly lower graft rupture rate when compared to isolated ACLR (15% vs. 1.23%, OR=15.91; 95% C.I.= 1.81-139.44; **P=.012**). It was also associated with significantly better knee stability (rate of grade 3 pivot shift, 1.23% ACLR+ LET, 11% ACLR, **P=.041**; side-to-side AP laxity difference >5mm 1.23% ACLR+LET, 17.2%, **P=.03**) and Tegner activity level (isolated ACLR, 6; ACLR+LET 7 **P=.01**). There were no significant differences exceeding known minimal clinically important difference (MCID) thresholds with respect to any of the other outcome measures evaluated, and no differences in the rate of non-graft rupture related reoperations or complications between groups.

DISCUSSION AND CONCLUSION: In a retrospective comparative cohort study of adolescents, combined ACLR+LET was associated with a significantly lower graft rupture rate and no difference in non-graft rupture-related reoperations or complications, when compared with isolated ACLR.