EDITORIAL COMMENTARY

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Editorial Commentary: Focus on Quadrupled Grafts With a Thick Anteromedial Bundle in Double-Bundle Anterior Cruciate Ligament Reconstruction Using Hamstring Tendon Autografts to Improve Graft Survival: Could We Define a Target Graft Diameter?

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Abstract: The aim of double-bundle anterior cruciate ligament reconstructions (DB ACLRs) is the reconstruction of anteromedial and posterolateral bundles of the ACL in order to achieve better rotational stability and improved functional results compared with single-bundle ACLR techniques. Several studies described a considerable failure rate of DB ACLRs. Therefore, it is essential to analyze the risk factors for graft failure after DB ACLR. Previous studies reported an increased graft failure rate for single-bundle ACLR using hamstring tendon autograft with too small diameters. Recent literature shows benefits using quadrupled hamstring tendon autografts compared with tripled grafts in DB ACLR with regard to the graft survival. Additionally, it is reported that a larger graft diameter, especially of the anteromedial bundle, is associated with improved graft survival. An exact cutoff value for graft diameter influencing graft survival in DB ACLR is still lacking and has to be defined by further research.

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The aim of double-bundle anterior cruciate ligament reconstructions (DB ACLRs) is the reconstruction of anteromedial (AM) and posterolateral bundles of the ACL in order to achieve better rotational stability and improved functional results compared with single-bundle ACLR techniques.[1-3] But previous studies reported inconsistent clinical outcomes and a considerable failure rate of DB ACLRs.[4,5] Therefore, it is crucial to find out the risk factors for graft failure after DB ACLR. Hamstring tendon (HT) is still a commonly used autograft in ACLR. Several studies reported an increased graft failure rate for single-bundle ACLR using HT autograft with too small diameters.[6,7] Different HT graft preparation and folding techniques were described to optimize HT graft diameter.[8]

The present retrospective study entitled "Increased Graft Diameter and Quadrupled Versus Tripled Hamstring Tendon Autograft are Associated With Improved Graft Survival in Double-Bundle Anterior Cruciate Ligament Reconstruction"[9] by Kim, Kim, Chi, Jang, Lee, Wazuddin, and Wang aimed to compare clinical outcomes and graft failure rates following quadrupled HT autografts compared with tripled grafts in DB ACLR. A total of 135 patients were included and divided into 2 groups by propensity score matching (1:2 ratio): primary DB ACLR with a quadruple HT

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autograft (group Q, n = 45) and with a triple HT autograft (group T, n = 90). Graft diameter and length of the AM and posterolateral bundles were compared between the groups. One patient (2.2%) in group Q had a graft failure. In group T, the graft failure rate was 15.6%. The graft diameter for AM and posterolateral bundles was higher in group Q. The tripled HT group had more than a 7-fold increased risk of graft failure compared with group Q. A larger AM bundle graft diameter was associated with improved graft survival.

The study enriches the current literature by new and relevant data. In addition to the primary outcome of graft failure rate, the authors analyzed the short-term clinical outcomes by patient-reported outcomes, assessment of the knee stability, and magnetic resonance imaging examinations. Therefore, they compared pre- and postoperative data. Both study groups were comparable regarding relevant patient demographics and clinical characteristics. Nevertheless, the strength of the study was limited by its retrospective study design without randomization, the small sample size of 135 included patients (45 pairs), and the short follow-up time period (especially for the magnetic resonance imaging evaluation). The propensity score matching could not focus on all relevant patient characteristics. Concomitant meniscal tears and additional surgical procedures might have influenced the results of the study in an unknown manner.

From my point of view, the present clinical results indicate to focus on quadrupled grafts with a thick AM bundle while performing DB ACLR with HT autografts to increase the graft survival. The importance of a thick AM bundle might be due to its more isometric and mechanically relevant features,[10] as already discussed by Kim et al.[9] Interestingly, the significantly shorter graft lengths of the AM bundle and the resulting significantly reduced intratunnel graft engagement lengths in the Q group compared with the T group seem not to influence the graft survival. Noteworthy is that both study groups had a significant improvement in the patient-reported outcome scores postoperatively with comparable group results, except for the Lysholm score. Additionally, there were no significant differences between the 2 groups with regard to the postoperative joint laxity.

Further clinical studies were needed to define an exact cutoff value for graft diameter influencing graft survival in DB ACLR. In this context, it is also relevant to determine an upper limit value in order to avoid an overstuffing of the intercondylar notch depending on its individual volume and to reduce the risk of tunnel merging and blowout due to limited space at the ACL insertion site.[11,12]

DISCLOSURES

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