Editorial Commentary: Anterior Cruciate Ligament Hamstring Autografts Should Be Avoided in Patients Younger Than 25 Years Old: Autograft–Allograft Hybrids Remain Controversial

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Abstract: Some studies have reported no difference between autograft and hybrid anterior cruciate ligament reconstructions. However, other studies have shown a significantly greater revision rate. Consequently, surgeons are reluctant to perform hybrid reconstructions in younger patients with diminutive hamstring autografts and have turned to other autograft graft sources (e.g., quadriceps tendon, patellar tendon). Until we can perform high-quality prospective studies that can definitively answer this question, we should consider avoiding autograft hamstring reconstructions in patients younger than 25 years old so that we are not faced with the dilemma of implanting an undersized autograft or a hybrid graft, as both may be at increased risk for failure.

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Hybridization in farming has been shown to improve crops by increasing yield, providing disease resistance, and eliminating undesirable traits. However, hybrid grafts in anterior cruciate ligament (ACL) reconstruction have had mixed results. Some studies have reported no difference between autograft and hybrid reconstructions,[1-4] whereas other studies have shown a significantly greater revision rate.[5,6] Closer analysis of these studies shows that hybrid grafts seem to behave similar to autografts in older patients but fare much worse, with a greater re-rupture rate and with lower patient-reported outcomes, in younger (age <25 years) patients. Consequently, surgeons are reluctant to perform hybrid reconstructions in younger patients with diminutive hamstring autografts and have turned to other autograft graft sources (e.g., quadriceps tendon, patellar tendon).

However, Rao, Macknet, Stuhlman, Yeatts, Trofa, Odum, Slatzman, and Fleishli with their study, "Allograft Augmentation of Hamstring Autograft in Anterior Cruciate Ligament Reconstruction Results in Equivalent Outcomes to Autograft Alone," have reignited the hybrid ACL reconstruction debate in younger patients.[7] By performing a retrospective case control comparative analysis with median follow-up of 4.4 years, the authors were able to show that there was no significant difference in revision or patient-reported outcomes between those patients who underwent allograft-augmented hamstring ACL reconstruction with preaugmentation graft size <8 mm to those patients who underwent autograft hamstring ACL reconstruction alone with graft diameter >8 mm. More importantly, when the results were stratified by patient age <25 years old to those patients >25 years old, there was still no difference in failure rate or patient-reported outcomes. All allografts were sterilized by low-dose gamma irradiation, which was thought not to affect structural integrity. However, donor age was not reported.

So why are the results of this study so dramatically different than previous studies regarding hybrid reconstruction in younger patients? Could it be the age of the donor grafts? Surgical technique? Postoperative rehabilitation? There doesn't appear to be anything reported that is significantly different from previous studies to easily explain the improved results. However, the

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decision regarding allograft augmentation was made on a case-by case basis based on surgeon preference, and surgical technique varied regarding femoral drilling technique, femoral fixation, and tibial fixation. Thus, there are still too many unknown variables and biases in this retrospective study to embrace single-bundle hybrid ACL reconstruction in younger patients at this time. There have been 5 (and now 6) editorial commentaries in this journal in the last 5 years to try and decipher whether hybrid grafts are a viable option for diminutive hamstring grafts in young patients, and we still don't have the answer.[8-12] Until we can perform high-quality reproducible prospective studies that can resolve this question, maybe we should avoid performing autograft hamstring reconstructions in patients younger than 25 years old so that we are not faced with the dilemma of implanting an undersized autograft or a hybrid graft, as both options may be at increased risk for failure.

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