

Editorial Commentary: Graft Choice for Anterior Cruciate Ligament Reconstruction: Will There Ever Be a Correct Answer? Probably Not



Kevin B. Freedman, M.D., M.S.C.E.

Abstract: Graft choice for anterior cruciate ligament reconstruction has been a great controversy in the sports medicine literature for the last 25 years. It has been well studied in the orthopaedic literature, with numerous randomized control trials and large database studies. There remain advantages and disadvantages to each autograft choice, primarily bone–patellar tendon–bone, quadrupled hamstring, as well as allograft. More recently, quadriceps autograft has also been studied as a suitable alternative. Most studies show nearly equivalent functional outcomes for autograft anterior cruciate ligament using bone–patellar tendon–bone and hamstring autografts in athletes younger than the age of 25 years, whereas allograft may be preferred for older athletes.

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Graft selection for anterior cruciate ligament (ACL) reconstruction has been one of the most frequently studied issues in sports medicine, it not all of the orthopaedic literature. There have been numerous level 1 randomized control trials and systematic reviews,¹⁻⁶ along with a multitude of other studies trying to help define the “best” graft choice for our patients.⁷⁻⁹ Overall, most of the studies show near equivalent outcomes between graft choices, but there are certain trends that are worth discussing.

In their article “All-Inside Quadrupled Semitendinosus Autograft Demonstrates Equivalent Stability to Patellar Tendon Autograft Anterior Cruciate Ligament Reconstruction: Randomized Controlled Trial in Athletes 24 Years or Younger,” Smith, Cook, and Bley¹⁰ performed a well-designed randomized control trial on quadrupled semitendinosus autograft versus patellar tendon autograft in athletes age 24 years and younger. Overall, the study shows equivalent stability and functional outcome for both grafts in this high-risk group. There

was slightly greater morbidity associated with bone–patellar tendon–bone (BPTB) autograft with greater rates of kneeling pain. The authors note that an all-inside suspensory fixation technique was used for hamstring autograft, which they believe leads to greater healing rates with better functional outcomes than alternative techniques for hamstring grafts.

Although most studies also demonstrate equivalent functional outcomes and failure rates between BPTB autografts and hamstring autografts, there have been several large database studies that have looked a revision ACL reconstruction as a “surrogate” for failure.^{8,9} These studies have found a greater rate of revision for hamstring autografts (4.2% vs 2.8%⁸ and 4.5% vs 3.0%⁹) compared with patellar tendon autografts. In addition, the Multicenter Orthopaedic Outcomes Network (MOON) group recently reported a 2.1 greater rate of revision in hamstring grafts versus BPTB grafts in high school and college athletes.⁷ However, there have also been several studies substantiating greater rates of kneeling pain in BPTB autografts,^{3,6,11} as well as greater risk of contralateral ACL injury.¹² In addition, long-term outcomes following ACL reconstruction must also be considered, as studies demonstrate a greater risk of osteoarthritis in the long-term literature with BPTB autografts than hamstring autografts.^{13,14}

One must always keep in mind the strengths and deficiencies in the literature. Individual randomized control trials may be plagued with small sample sizes,

Sidney Kimmel College of Medicine at Thomas Jefferson University
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introducing the potential for type II error. However, large database studies cannot account for variability in patient selection, technique, fixation, and rehabilitation, all of which have the potential to affect outcome. In addition, it's important to note that studies that look only at revision rates do not account for other sources of poor outcome in ACL reconstruction—pain, loss of motion, and other morbidity of the procedure.

The literature shows that overall outcome with both hamstring and BPTB autografts is nearly equivalent, once again shown by Smith et al.¹⁰ When selecting a graft for our patients, the decision should always be individualized. It includes age, sex, goals for return to sports, and fear or risk of future arthritis. Each of these factors can help guide our counseling for our patients. But remember, there is no perfect graft choice for everyone. If there was, there wouldn't be a choice!

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