

# Revision Anterior Cruciate Ligament Reconstruction With Patellar Tendon Allograft

## *Surgical Technique*

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**Abstract:** Despite the marked advances in treatment and highly predictable success of anterior cruciate ligament (ACL) reconstruction, an approximate 10% to 15% failure rate is noted in the literature. The mechanism of failure is often difficult to ascertain and is often multifactorial. A strong patient-physician relationship must be established to proceed with revision ACL reconstruction. After the decision has been made to proceed with revision ACL reconstruction extensive preoperative planning is warranted. Revision ACL reconstructions are a "salvage" procedure to allow the patient to perform activities of daily living. A return to sports is a possibility, but the patient's expectations should be realistic and individualized. This article focuses on the surgical technique of revision anterior cruciate ligament reconstruction with patellar tendon allograft.

**Key Words:** revision ACL, reconstruction, technique, patellar tendon allograft

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Reconstruction of the anterior cruciate ligament (ACL) is the sixth most common procedure performed by orthopedists, with more than 100,000 ACL reconstructions being performed annually in the United States.<sup>1,2</sup> Despite the success of this procedure with good and excellent results ranging between 75% and 90%, there are failures.<sup>1-8</sup> The definition of ACL failure in simple terms includes symptomatic instability, pain, extensor dysfunction, and arthrofibrosis.<sup>7,9-11</sup> The purpose of this discussion is to focus on graft failure and recurrent instability. The mechanism of failure is often difficult to ascertain and can be multifactorial. Failures that occur within 6 months of reconstruction can be due to surgical technique, incomplete graft incorporation, and excessive rehabilitation or premature return to athletic competition. If the failure occurs after 1 year, then it is most likely due to trauma. Following primary ACL reconstruction, 8% of the time recurrent instability is caused by graft failure.<sup>12,13</sup> These are the patients in which revision ACL reconstruction would benefit to eliminate symptomatic instability and may improve quality of life. A strong

patient-physician relationship must be established to proceed with revision ACL reconstruction. Revision ACL reconstructions are a "salvage" procedure to allow the patient to perform activities of daily living.<sup>14,15</sup> Noyes<sup>16</sup> reported a 27% failure rate with autograft and a 33% failure rate with allografts in revision ACL reconstruction. A return to sports is a possibility, but the patient's expectations should be realistic and individualized. Uribe<sup>17</sup> reported that only 54% returned to their preinjury level of activity.

After the decision has been made to proceed with revision ACL reconstruction extensive preoperative planning is warranted. Previous operative reports are obtained, patient expectations are reviewed, and discussion of a staged procedure is recommended. A staged procedure is recommended if tunnel expansion is greater than 1.5 cm, loss of motion is more than 10° of extension or 20° of flexion, or there is significant varus or valgus requiring an osteotomy.<sup>1</sup> Knee incisions should be meticulously planned, preferably using the previous incisions, and always maintaining a skin bridge of 7 cm.<sup>11</sup>

Allografts or autografts can be used for revision ACL reconstruction. It is acceptable to use either, and the choice of the graft should be individualized. It is our preference at Rush University Medical Center to use non-irradiated patellar tendon allograft for revision ACL surgery.<sup>18,19</sup> The advantages of allograft material are well documented. Allografts eliminate donor site morbidity, use smaller incisions, decrease operative time, reduce postoperative pain, and avoid the risk of patella fracture or additional anterior knee symptoms. Allografts provide the ability to customize bone blocks to fill expanded tunnels, and are available in many types and sizes.<sup>1,5,20-22</sup> The disadvantages of allografts are possible disease transmission, slower biologic remodeling time, potential for a low level immune response, limited availability, and increased cost. The risk of disease transmission is most concerning for the patient and the surgeon and must be discussed in the informed consent. The estimated risk of disease transmission with allografts is approximately 1 in 1.6 million.<sup>2</sup> This risk has been reduced by improved standards and monitoring of the American Association of Tissue Banks (AATB) and the FDA. There has been one HIV case in 1985 and two cases of Hepatitis C, but there have been no reported cases of viral transmission since 1993 with the current guidelines.<sup>18,23</sup> Improved procurement, including screening of the donor, harvesting within 24 hours, and quarantine of these tissues up to 4 months, is most likely responsible for the decreased risk of disease transmission. With

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