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Clinical and arthroscopic outcome of single bundle anterior cruciate ligament reconstruction: Comparison of remnant preservation versus conventional technique

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ABSTRACT

Background: The purpose of this study was to compare the clinical outcomes and second-look arthroscopic findings of remnant preservation technique with those of conventional anterior cruciate ligament (ACL) reconstruction in single bundle ACL reconstructions.
Methods: One hundred sixty two consecutive patients underwent ACL reconstruction by one surgeon, with 93 patients receiving remnant preservation technique (Group A) and 69 patients receiving conventional ACL reconstruction (Group B). The mean follow-up was 15 months. Clinical outcomes were assessed using Lysholm scores and the International Knee Documentation Committee form (IKDC form) evaluation. Post-operative knee stability was evaluated through manual knee laxity evaluation, pivot-shift test, and a Telos device.
Results: Differences in post-operative stability (manual knee laxity, pivot shift test and Telos device) were not significant between the groups ($p = 0.681$, $p = 0.610$, $p = 0.696$). And also no significant differences were noted with respect to the IKDC form and the latest Lysholm scores. But in the second-look arthroscopic findings, synovial coverage was confirmed to be excellent in 36% (22/61) of Group A patients and 23% (7/30) of Group B patients.
Conclusions: ACL reconstruction with both techniques was found to result in acceptable stability, clinical outcomes and second-look arthroscopic findings. With regard to synovial coverage, the remnant reservation techniques were found to be superior to conventional ACL reconstruction.
Level of evidence: Level III, retrospective comparative study.

1. Introduction

Anterior cruciate ligament (ACL) reconstruction using the remnant preservation technique is performed widely with excellent outcomes for patients. Many surgeons believe that preserving the remnant promotes revascularization and synovial coverage of the ACL graft, thereby improving the post-operative stability and function of the knee [8–10,13,14]. However, in reviewing other literature, some studies show no significant difference in improvement of symptoms and functional outcomes when comparing remnant preservation technique with conventional ACL reconstruction [12,16,17]. Thus, in this study, patients who underwent ACL reconstruction surgery were divided into two groups depending on the surgical method: remnant preservation

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and conventional type. Then, the groups were evaluated using clinical outcomes, knee stability, and morphological results from second-look arthroscopy and identified for any statistically significant differences.

2. Material and methods

Retrospective data collected from 197 consecutive patients who underwent ACL reconstruction at our hospital between February 2008 to December 2013 were reviewed. Thirty-five patients whom were considered to have concurrent injuries that may significantly affect clinical outcomes were excluded, and data from 162 patients were thus analyzed for the study. Ninety-three (57%) patients received ACL reconstruction using the remnant preservation technique (Group A), and 69 (43%) patients received conventional ACL reconstruction (Group B) (Figure 1). The decision to carry out ACL remnant procedure was made during the initial arthroscopic examination. We tried to preserve the remnant as much as possible. Preservation of the remnant was considered possible if the ACL remnant tissue conditions were that coverage of more than 75% of the graft from the tibial attachment and had abundant blood vessels with synovial tissues.

2.1. Patient demographics

We studied a total of 162 patients; 80 males and 13 females in Group A and 59 males and 10 females in Group B. The mean age at the time of ACL reconstruction was 29.1 years (range, 15–54 years) in Group A and 27.6 years (range, 17–51 years) in Group B. Injury site proportion in regard to right or left was similar in both groups. Individual cases accompanying meniscus or medial collateral ligament damage was included in this study. In cases where meniscus injury was accompanied, there were 36 patients (39%) in Group A and 29 patients (42%) in Group B. Medial collateral ligament injury was accompanied in nine patients (nine percent) and six patients (nine percent), respectively. The proportion of associated injury did not have a significant effect on the results (Table 1).

2.2. Exclusion and inclusion criteria

Exclusion criteria included concurrent posterior cruciate ligament injury, total meniscectomy and loss to follow-up after one year. Medial collateral ligament injuries, partial meniscectomies, meniscus repairs or microfractures for chondral lesions were not excluded from the study.

2.3. Tendon graft

In Group A, 54% (50/93) of ACL reconstruction surgeries used an autograft to reconstruct the ligament, whereas 46% (43/93) used an allograft. In Group B, 58% (40/69) used an autograft, and 42% (29/69) used an allograft ($p = 0.594$). Gracilis tendons and semitendinosus tendons were used for autografts, and eight to nine millimeters two-strand Achilles tendons were used for allografts in this study.

2.4. Surgical technique

All operations were performed by a single surgeon. First, before ACL reconstruction, routine diagnostic arthroscopy was performed through the anterolateral and anteromedial portal with a 30° oblique arthroscope. The status of each ACL remnant was assessed, and the surgeon decided whether ACL reconstruction, and after retracting the remnant ACL to the side, the footprint was carefully selected. Although using the far anteromedial portal drilling technique has recently become more popular, the

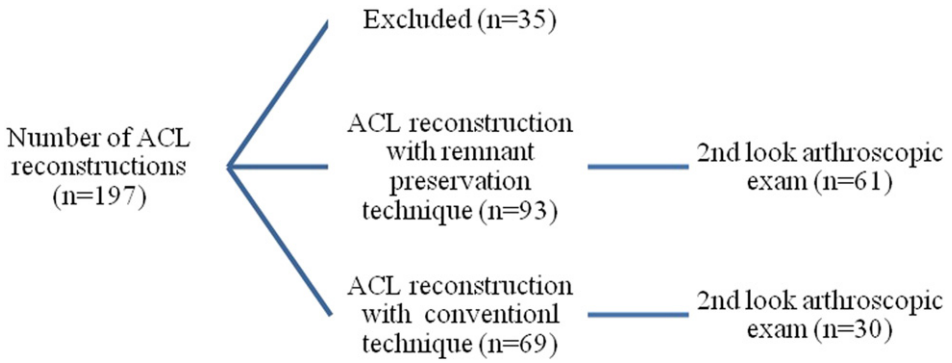

Figure 1. Flowchart of experimental design.