Comparison of Remnant-Preserving Augmentation and Double-Bundle Reconstruction for Partial Anterior Cruciate Ligament Tears

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Purpose: *The most effective method for the surgical treatment of partial anterior cruciate ligament tears has not been definitively established. Two commonly used techniques are remnant-preserving augmentation and double-bundle reconstruction. This retrospective study was conducted to test the hypothesis that clinical outcomes are similar with the two methods.*

Methods: *A total of 43 patients who had been treated for partial anterior cruciate ligament tears by either remnant-preserving augmentation or double-bundle reconstruction were included. Twenty-one patients were treated with remnant-preserving augmentation and 22 were treated with double-bundle reconstruction. Patient data collected included preoperative and postoperative range of motion, visual analog scale, Lysholm Knee Scoring, International Knee Documentation Committee Knee Evaluation Form scores, anterior drawer test, Lachman test and pivot-shift test.*

Results: *There were no significant differences in postoperative range of motion, visual analog scale score, Lysholm score or International Knee Documentation Committee knee evaluation form score between the two groups (P > .05). The pivot-shift test was significantly better in the remnant-preserving augmentation group than the double-bundle reconstruction group (P = .040); however, there was no significant difference between the two groups in either the anterior drawer test or the Lachman test (P > .05).*

Conclusions: *The effectiveness of remnant-preserving augmentation is comparable to double-bundle reconstruction in the treatment of partial anterior cruciate ligament tears in terms of anterior and rotary stability and clinical scores.*

Keywords: *remnant-preserving augmentation, double-bundle reconstruction, partial anterior cruciate ligament tears*

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Introduction

A partial tear of the anterior cruciate ligament is a common injury, representing 10-35% of anterior cruciate ligament tears[1], although 5-10% of cases are asymptomatic[2]. Anatomical and biomechanical studies[3,4] consider remnant-preserving augmentation, which has shown excellent outcomes[5,6], to be the treatment of choice for a partial tear of the anterior cruciate ligament. Advantages of this technique include: enhanced revascularization and ligamentization of the graft, preservation of proprioceptive cells, prevention of synovial fluid leaking into the bone tunnel, enhanced bone-tendon healing and early rehabilitation. Additionally, accurate tunnel placement is easier to achieve with this technique than with other standard techniques. However, the surgical technique is more technically demanding, and has been associated with increased impingement and a greater incidence of Cyclops.

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Purpose

The purpose of this study was to retrospectively compare the clinical outcomes of two surgical techniques, remnant-preserving augmentation and double-bundle reconstruction, and to determine if preservation of the remnant bundle during reconstruction of a partial ACL rupture improves the anterior stability of the knee joint.

Patients and Methods

A case-control retrospective review was conducted between 2007 and 2017 of patients diagnosed with partial anterior cruciate ligament tears based on physical examination and magnetic resonance imaging (MRI). Inclusion criteria included attachment of the remnant bundle between the femur and tibia, thickness of the anterior cruciate ligament exceeding more than 50% of the anteromedial (AM) or posterolateral (PL) bundle, laxity of less than 5 mm when drawn by a probe[7] (Fig. 1), associated meniscal tears, associated chondral defect, normal alignment, normal contralateral knee and willingness to participate in the prescribed physical therapy program. Exclusion

criteria included the presence of fractures, associated collateral ligament injuries, overall erosion of the cartilage and having undergone revision. During follow-up, 5 cases were lost, leaving 43 cases enrolled in our study. The cases were purposive sampling but not randomized.

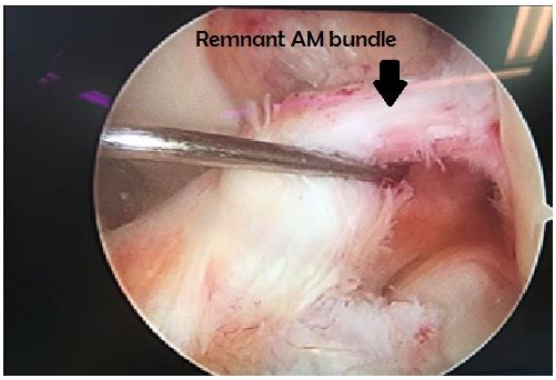

Fig. 1 Intraoperative image of the Lt knee.

Surgical Technique

Each surgical procedure was performed by a single surgeon. In all cases, autologous hamstring tendon was harvested from the ipsilateral side of the knee joint. For remnant-preserving augmentation, the semitendinosus tendon was harvested. For a double-bundle reconstruction, both the semitendinosus and gracilis tendons were harvested. In an AM augmentation, the femoral tunnel was located at the 11:00 o'clock position for a right knee joint (13:00 for a left knee joint). In a PL augmentation, the tunnel was located at the 10:00 position for a right knee joint (14:00 for a left knee joint) (Fig. 2).

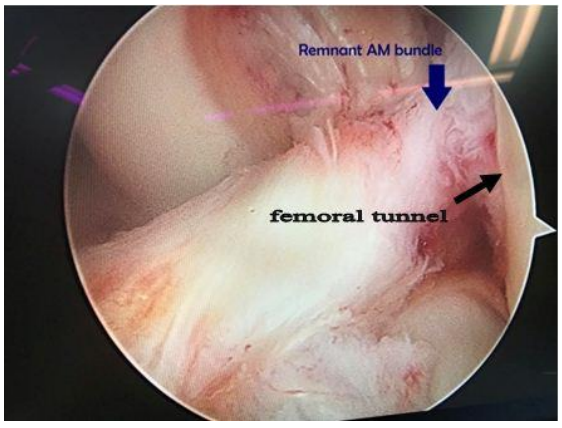

Fig. 2 Location of the femoral tunnel in a PL augmentation.

In a double-bundle reconstruction, two locations were used for a remnant-preserving augmentation. The femoral insertion site around the remnant ACL was carefully cleaned. The drill pin for the femoral tunnel was placed between the insertion points of the AM and PL bundles (Fig. 3).

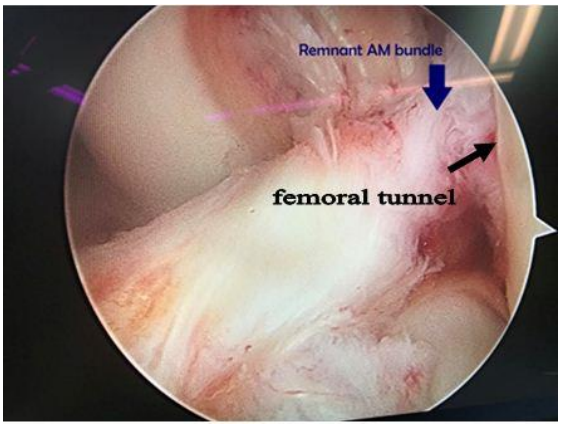

Fig. 3 Location of the femoral tunnel in a reconstruction.

After that, the remnant ACL was pulled to the AM side with a probe, the femur drill was passed near the remnant bundle, preserving the femoral attachment point of the AM part of the remnant bundle. The graft tendon was fixed on the femoral side with an Endobutton loop. The ACL tibial guide, set at an angle of 45°, was used to pass the guide pin. The tibial tunnel was located just posterior to the anterior margin in an AM augmentation. In a PL augmentation, it was located just anterior to the posterior margin of the ACL or the region between the tibial attachments of the anterior and posterior horns of the lateral meniscus. In a double-bundle reconstruction, two augmentation locations were used. Impingement between the grafted tendon and the intercondylar notch was checked with the knee in extension. Then, the graft tendon was fixed in place using bioabsorbable interference screws (Fig. 4).

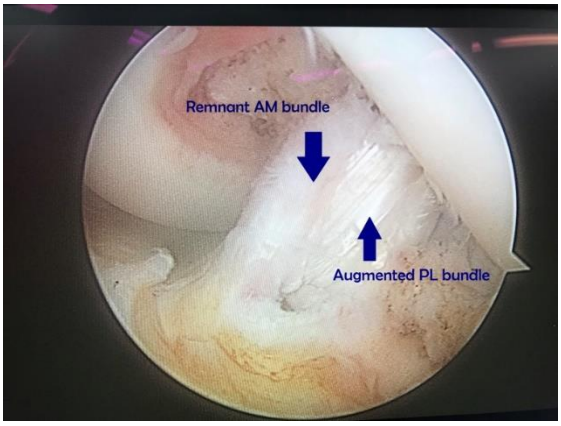

Fig. 4 Augmented PL bundle, Lt knee.

All the isolated ACL injury patients received the same postoperative physical therapy program. For the first 3 weeks postoperatively,

patients were limited to partial weight bearing with a crutch. After 3 months patients could start jogging. Six months postoperatively, patients were allowed to participate freely in sporting activities. In the cases with a meniscal or cartilage injury, ROM exercise was restricted for 3 weeks and weight bearing restricted for 6 weeks.

All tests were administered by the same person. All the preoperative assessments were performed on the day before surgery. MRI was used when the indications for surgery were uncertain. Postoperative assessment was performed at the two years after surgery. Preoperative and postoperative results were compared. The objective evaluation measured the mean values of the range of motion (ROM) of the knee joint. Subjective evaluation consisted of visual analog scale (VAS) score, Lysholm score, and International Knee Documentation Committee (IKDC) Knee Evaluation Form score. For measurement of anterior tibial-femoral translation, the anterior drawer test, Lachman test, and pivot-shift test were performed.

Descriptive statistics were calculated for all data categories. Chi-square was used to compare categorical variables. Independent sample Student's t-test was used to compare continuous variables between groups. *P*-values less than 0.05 were considered statistically significant.

Results

The 43 patients in the study had an average age of 25.2 years (range 16-41 years). Patients were divided into two groups based on the method of treatment, a remnant-preserving augmentation group of 21 patients (12 cases of AM bundle augmentation and 9 cases of PL bundle augmentation) and a double-bundle reconstruction group of 22 patients. All patients were followed up for more than two years after discharge from the hospital. The average follow-up was 26.9 months (range 24 months to 38 months). Demographic data are shown in Table 1.

Preoperatively, the mean ROM was 130.2°±17.6° in the remnant-preserving augmentation group and 132.2°±18.7° in the double-bundle reconstruction group. Postoperatively, the ROM values were 142.6°±9.7° and 144.0°±7.4°, respectively; the difference was not statistically different (P=0.753). There were no cases of limitation of ROM at the final follow-up.

Preoperatively, the VAS scores were 4.5±1.8 in the remnant-preserving augmentation group and 4.6±1.9 in the double-bundle reconstruction group. Postoperatively, the figures were 1.8±0.9 and 1.9±1.0, respectively, with no significant difference between the groups. Preoperatively, the Lysholm scores were 68.6±8.7 in the remnant-preserving augmentation group and 69.7±8.9 in the double-bundle reconstruction group. Postoperatively, they were 85.3±5.9 and 86.3±5.4, respectively, again with no significant difference between the groups. Finally, preoperatively, the IKDC Subjective Knee Evaluation Form scores were 67.1±6.3 in the remnant-preserving augmentation group and 68.8±7.4 in the double-bundle reconstruction group, and postoperatively, they were 84.4±7.4 and 83.7±5.4, respectively, with no significant difference (Table 2).

Table 1 Patient demographics.

	Remnant-preserving augmentation group (n=21)	**Double-bundle reconstruction group (n=22)**	***P*- value**
Gender (M/F)	19:2	19:3	0.674
Age (years) (SD)	24.7 (3.1)	25.8 (3.2)	0.258
Injury time to operation (months) (SD)	9.2 (2.5)	10.2 (3.1)	0.250
Follow-up (months) (SD)	26.7 (3.1)	27.8 (3.3)	0.146

Table 2 Clinical Scores.

	Remnant-preserving augmentation group (n=21)	**Double-bundle reconstruction group (n=22)**	***P*- value**
VAS score			
Preoperative	4.5 ± 1.8	4.6 ± 1.9	0.862
Last follow-up	1.8 ± 0.9	1.9 ± 1.0	0.736
Lysholm score			
Preoperative	68.6 ± 8.7	69.7 ± 8.9	0.688
Last follow-up	85.3 ± 5.9	86.3 ± 5.4	0.569
IKDC Subjective Knee Evaluation Form score			
Preoperative	67.1 ± 6.3	68.8 ± 7.4	0.429
Last follow-up	84.4 ±7.4	83.7 ± 5.4	0.726

Preoperatively, the anterior drawer test was positive in 12 cases (57.1%) in the remnant-preserving augmentation group and 14 cases (63.6%) in the double-bundle reconstruction group, but the difference was not significant. Postoperatively, the anterior drawer test was negative in 20 cases (95.2%) and 19 cases (86.3%), respectively. There were no cases of 2+ or worse and no significant differences between the groups. Preoperatively, the Lachman test was positive in 11 cases (52.3%) in the remnant-preserving augmentation group and 13 cases (59%) in the double-bundle reconstruction group, a nonsignificant difference. Postoperatively, the Lachman test was negative in 20 cases (95.2%) and 20 cases (90.9%), respectively. There were no cases of 2+ or worse. There were no significant differences between the groups. Preoperatively, the pivot-shift test was positive in 9 cases (42.8%) in the remnant-preserving augmentation group and 11 cases (50%) in the double-bundle reconstruction group. There was no significant difference between the groups. Postoperatively, the pivot-shift test was negative in 21 cases (100%) and 18 cases (81.8%), respectively. Improvement in the remnant-preserving augmentation group was significantly better than in the double-bundle reconstruction group (P = 0 .040). (Table 3)

Table 3 Results of Anterior Stability Test.

	Remnant-preserving augmentation (n=21)		**Double-bundle reconstruction (n=22)**		***P*- value (Distribution at final follow-up)**
Test	Preoperative	final follow-up	Preoperative	final follow-up	
Anterior drawer					0.316
—	9	20	8	19	
1+	6	1	7	3	
2+	4	0	5	0	
3+	2	0	2	0	
Lachman					0.577
—	10	20	9	20	
1+	8	1	7	2	
2+	2	0	4	0	
3+	1	0	2	0	
Pivot shift					0.040
—	12	21	11	18	
1+	3	0	7	4	
2+	4	0	3	0	
3+	2	0	1	0	

There were a total of 22 cases (51.16%) of medial meniscal tear: 7 (33.33%) in the remnant-preserving augmentation group and 15 (68.18%) in the double-bundle reconstruction group. The incidence of medial meniscal tear was significantly higher in the double-bundle reconstruction group than in the remnant-preserving augmentation group (P = 0.048). There were a total of 21 cases (48.83%) of lateral meniscal tear: 10 (47.61%) in the remnant-preserving augmentation group and 11 (50%) in the double-bundle reconstruction group, but there were no significant differences between the groups. There were a total of 10 cases (23.25%) of cartilage injury: 2 (9.52%) in the remnant-preserving augmentation group and 8 (36.36%) in the double-bundle reconstruction group. The incidence of cartilage injury was significantly higher in the double-bundle reconstruction group than in the remnant-preserving augmentation group (P = 0.037) (Table 4). There were no significant differences between the patterns of meniscal tears between the groups (Table 5). In cases with meniscal tear, a meniscectomy or meniscal repair was performed. Injuries of Cartilage injury of International Cartilage Repair Society grade IV with an area of more than 1 cm2 surrounded by normal cartilage were treated by microfracture; cases with overall erosion of the cartilage were excluded from the study. A meniscectomy was performed in 2 (9.52%) of the 7 cases of medial meniscal tear in the remnant-preserving augmentation group, and meniscal repair was performed in the remaining 5 (23.80%). Meniscectomy was also performed in 8 (36.36%) of the 15 cases of medial meniscal tear in the double-bundle reconstruction group, and meniscal repair was performed in the remaining 7 cases (31.81%). The incidence of meniscectomy in cases with a medial meniscal tear was significantly higher in the double-bundle reconstruction group compared with the remnant-preserving augmentation group (P = 0.037). (Table 6)

Table 4 Combined Injuries.

	Remnant-preserving augmentation (n=21)	Double-bundle reconstruction (n=22)	*P*- value
Medial meniscus	7 (33.33%)	15 (68.18%)	0.048
Lateral meniscus	10 (47.61%)	11 (50%)	0.875
Chondral defect	2 (9.52%)	8 (36.36%)	0.037

Table 5 Patterns of meniscal tears.

	Remnant-preserving augmentation (n=17)	Double-bundle reconstruction (n=26)	*P*- value
Vertical	3	6	0.836
Oblique	2	5	
Radial	4	3	
Horizontal	3	4	
Complex	5	8	

Table 6 Treatment of Combined Injuries.

	Remnant-preserving augmentation (n=21)	Double-bundle reconstruction (n=22)	*P*- value
Medial meniscus			
Meniscectomy	2 (9.52%)	8 (36.36%)	0.037
Repair	5 (23.80%)	7 (31.81%)	0.558
Lateral meniscus			
Meniscectomy	4 (19.04%)	5 (22.72%)	0.766
Repair	6 (28.57%)	6 (27.27%)	0.924
Chondral defect			
Microfracture	1 (4.76%)	5 (22.72%)	0.089
Observation	1 (4.76%)	3 (13.63%))	0.312

There were 3 cases with limited ROM of the joint post-surgery, one patient in the remnant-preserving augmentation group and two in the double-bundle reconstruction group. In these 3 cases, physical therapy was performed postoperatively for 3 months. At the two years after surgery, there were no cases with limited ROM and no cases with infection at the two years after surgery.

Discussion

In this study, we comparatively analyzed the clinical outcomes of remnant-preserving augmentation and double-bundle reconstruction in patients with partial anterior cruciate ligament rupture. No significant differences were found in the clinical outcomes between the groups with the exception of the pivot shift test which was significantly better in the remnant-preserving augmentation group.

Recent studies have shown that preserving the remnant bundle contributes to the biological healing of tendons in anterior cruciate ligament injuries, helps maintain proprioception, and has a biomechanical effect that helps inhibit the anterior translation of the knee joint which also helps preserve the remnant bundle[8-11] Adachi et al.[12] compared anterior cruciate ligament augmentation with reconstruction, although the thickness of the graft tendon used in the remnant-preserving augmentation was less than that used for reconstruction. Evaluation based on the stability of the knee joint found results were significantly better with remnant-preserving augmentation than with reconstruction. The authors also noted that the remnant bundle of the anterior cruciate ligament might contribute to the stability of the knee joint. Ochi et al.[10] performed a selective bundle reconstruction in approximately 10% of patients who underwent anterior cruciate ligament reconstruction. They found remnant-preserving augmentation is advantageous in that the remnant bundle contributes to the biological healing of the graft tendon, preserves the remaining mechanoreceptors in the tibial insertion, reduces the anterior instability of the remnant bundle, and prevents enlargement of the tibial tunnel.

Disadvantages of remnant preservation include the technical skills required of the physician and the increased risk of malposition due to poor visualization[13].

Yoon et al.[7] compared anterior cruciate ligament reconstruction with remnant-preserving augmentation. In that study, there was a higher proportion of patients in the AM augmentation group with a direct injury, a medial meniscal tear was more prevalent in the reconstruction group, and MCL injury was more prevalent in the AM augmentation group. They described the differences in the pathophysiology, the frequency and the pattern of injuries. In our study there were 7 cases (33.33%) of medial meniscal tear in the remnant-preserving augmentation group and 15 cases (68.18%) in the double-bundle reconstruction group, a statistically significant difference (P = 0.048). In cases of an anterior cruciate ligament injury, the posterior horn of the medial meniscus played a wedge-like role, acting as a secondary restraint structure that contributed to stability by restricting the anterior translation of the knee joint.

Levy et al.[14] reported that the medial meniscus is a secondary restraint structure that prevents anterior translation of the tibia in the knee joint in an anterior cruciate ligament injury. They noted that excision of the medial meniscus allows a significantly greater increase in anterior displacement after a medial meniscectomy. In addition, Cho et al.[15] conducted a study analyzing the effects of a meniscectomy during an anterior cruciate ligament reconstruction. Anterior instability was increased when either a medial meniscectomy or both a medial meniscectomy and a lateral meniscectomy were performed concomitantly compared to anterior cruciate ligament reconstruction alone. In our study, 2 patients (9.52%) in the remnant-preserving augmentation group had a meniscectomy for a medial meniscal tear as did 8 patients (36.36%) in the double-bundle reconstruction group, a statistically significant difference (P = 0.037).

Many studies have reported that the PL bundle support augments rotational stability of the knee joint at low flexion angles and that both bundles increase anterior stability[16-17]. Because of the different tensioning patterns of the 2 bundles, different injury mechanisms may result in instability, various rupture patterns and combined injuries. Zantop et al.[18] reported that different injury mechanisms are involved in the injury patterns of the 2 bundles of the ACL. They reported that a more severe trauma was responsible for an AM bundle injury, and a less severe pivoting injury was the mechanism for a PL bundle injury. Patients with a symptomatic AM bundle tear described anterior instability, but patients with a symptomatic PL bundle tear complained of rotational instability with pivoting sports rather than anterior instability[11]. In this study, the PL augmentation group presented with more positive grade 2 or 3 pivot-shift test results.

There has been controversy regarding the appropriate immobilization period and time before beginning weight-bearing after meniscal repair. Many older studies support an immobilization and weight-bearing limitation of at least 4 weeks[19]. In contrast, more recent reports recommend a shorter immobilization period and allowing immediate weight bearing[20]. However, weight bearing concurrent with tibiofemoral rotation during knee flexion can produce excessive shear forces on the meniscal repair site[21]. As the follow-up period for accelerated rehabilitation after meniscal repair is relatively short, it is difficult to make a declaration that shorter immobilization and immediate weight bearing is superior to a more conservative progression. In this study, we used a traditional rehabilitation protocol which is different from that of isolated ACL reconstruction or augmentation although we recognize that may introduce a bias in the clinical results.

At the final follow-up, the pivot shift test was significantly better in the remnant-preserving augmentation group compared with the double-bundle reconstruction group (P = 0.040). However, the anterior drawer and Lachman test showed no significant difference between the two groups. The pivot shift test is a dynamic but passive test of knee stability which identifies the dysregulation between rolling and gliding in the knee joint. Remnant-preserving augmentation, where the remnant bundle is preserved, allows the knee to work more naturally, enhances bone-tendon healing and accelerates rehabilitation.

This study has a few limitations. It was a retrospective rather than randomized study, so there was potential for selection bias. In some cases, detailed information was not available; in those cases, we recorded total clinical scores rather than scores for individual factors. The size of the study was small; for a power of the test > 80%, we should have included 40 patients in each group. Finally, the follow-up period of two years may be too short to draw conclusions about long-term outcomes.

Conclusions

Remnant-preserving augmentation is comparable in effectiveness to double-bundle reconstruction for treatment of partial anterior cruciate ligament tears in terms of anterior and rotary stability as well as clinical scores.

References

1. Borbon CA, Mouzopoulos G, Siebold R. Why perform an ACL augmentation?. Knee Surg Sports Traumatol Arthrosc. 2012; 20(2): 245-51.
2. Perelli S, Ibañez F, Gelber PE, Erquicia JI, Pelfort X, Monllau JC. Selective bundle

reconstruction in partial ACL tears leads to excellent long-term functional outcomes and a low percentage of failures. Knee. 2019; 26(6): 1262-70.
3. Shohat N, Lindner D, Tamir E, Beer Y, Agar G. Prospective comparison between remnant-preserving augmentation and double-bundle reconstruction in anterior cruciate ligament Tears. Isr Med Assoc J. 2017; 19(6): 355-9.
4. Yoo YS, Song SY, Yang CJ, Ha JM, Kim YS, Seo YJ. A comparison between clinical results of selective bundle and double bundle anterior cruciate ligament reconstruction. Yonsei Med J. 2016; 57(5): 1199-208.
5. Choi S, Kim MK, Kwon YS, Kang H. Clinical and arthroscopic outcome of single bundle anterior cruciate ligament reconstruction: comparison of remnant preservation versus conventional technique. Knee. 2017; 24(5): 1025-32.
6. Sonnery-Cottet B, Lavoie F, Ogassawara R, Scussiato RG, Kidder JF, Chambat P. Selective anteromedial bundle reconstruction in partial ACL tear: a series of 36 patients with mean 24 months follow-up. Knee Surg Sports Traumatol Arthrosc. 2010; 18(1): 47-51.
7. Yoon KH, Bae DK, Cho SM, Park SY, Lee JH. Standard anterior cruciate ligament reconstruction versus isolated single-bundle augmentation with hamstring autograft. Arthroscopy. 2009; 25(11): 1265-74.
8. Ahn JH, Lee YS, Ha HC. Anterior cruciate ligament reconstruction with preservation of remnant bundle using hamstring autograft: technical note. Arch Orthop Trauma Surg. 2009; 129(8): 1011-5.
9. Lee BI, Kwon SW, Kim JB, Choi HS, Min KD. Comparison of clinical results according to amount of preserved remnant in arthroscopic anterior cruciate ligament reconstruction using quadrupled hamstring graft. Arthroscopy. 2008; 24(5): 560-8.
10. Ochi M, Adachi N, Uchio Y, Deie M, Kumahashi N, Ishikawa M, et al. A minimum 2-year follow-up after selective anteromedial or posterolateral bundle anterior cruciate ligament reconstruction. Arthroscopy. 2009; 25(2): 117-22.
11. Siebold R, Fu FH. Assessment and augmentation of symptomatic anteromedial or posterolateral bundle tears of the anterior cruciate ligament. Arthroscopy. 2008; 24(11): 1289-98.
12. Adachi N, Ochi M, Uchio Y, Sumen Y. Anterior cruciate ligament augmentation under arthroscopy. Arch Orthop Trauma Surg. 2000; 120(3-4): 128-33.
13. Ahn JH, Wang JH, Lee YS, Kim IG, Kang JH, Koh KH. Anterior cruciate ligament reconstruction using remnant preservation and a femoral tensioning technique: clinical and magnetic resonance imaging result. Arthroscopy. 2011; 21(8): 1079-89.
14. Levy IM, Torzilli PA, Warren RF. The effect of medial meniscectomy on anteroposterior knee motion. J Bone Joint Surg Am. 1982; 64(6): 883-8.
15. Cho HJ, Lee JH, Bae DK, Song SJ, Yoon KH. The effect of meniscectomy on clinical result after ACL reconstruction. J Korean Arthrosc Soc. 2010; 14: 7-12.
16. Gabriel MT, Wong EK, Woo SL, Yagi M, Debski RE. Distribution of in situ forces in the anterior cruciate ligament in response to rotatory loads. J Orthop Res. 2004; 22(1): 85-9.
17. Yagi M, Wong EK, Kanamori A, Debski RE, Fu FH, Woo SL. Biomechanical analysis of an anatomic anterior cruciate ligament reconstruction. Am J Sports Med. 2002; 30(5): 660-6.
18. Zantop T, Brucker PU, Vidal A, Zelle BA, Fu FH. Intraarticular rupture pattern of the ACL. Clin Orthop Relat Res. 2007; 454: 48-53.
19. Ryu RK, Dunbar WH 4th. Arthroscopic meniscal repair with two year follow-up: A clinical review. Arthroscopy. 1998; 4(3): 168-73.
20. Barber FA, Click SD. Meniscus repair rehabilitation with concurrent anterior cruciate reconstruction. Arthroscopy. 1997; 13(4): 433-7.
21. Irrgang JJ, Pezzullo D. Rehabilitation following surgical procedures to address articular cartilage lesions in the knee. J Orthop Sports Phys Ther. 1998; 28(4): 232-40.

การศึกษาเปรียบเทียบระหว่าง Remnant-Preserving Augmentation และ Double-Bundle Reconstruction ในการรักษาผู้ป่วยที่มีเอ็นไขว้หน้าข้อเข่าขาดบางส่วน

สมบูรณ์ วุฒิพิริยะอังกูร, พบ

วัตถุประสงค์: เพื่อศึกษาเปรียบเทียบผลการรักษาระหว่าง Remnant-Preserving Augmentation และ Double-Bundle Reconstruction ในการรักษาผู้ป่วยที่มีเอ็นไขว้หน้าข้อเข่าขาดบางส่วน

วิธีการศึกษา: ผู้ป่วยจำนวน 43 ราย แบ่งเป็น 2 กลุ่ม ได้แก่กลุ่ม Remnant-Preserving Augmentation จำนวน 21 รายและกลุ่ม Double-Bundle Reconstruction จำนวน 22 ราย เป็นการศึกษาวิจัยแบบย้อนหลังโดยดูองศาการเคลื่อนไหวของข้อเข่า, ระดับความเจ็บปวดหลังการผ่าตัด, Lysholm score, International Knee Documentation Committee Knee Evaluation Form score, ผลการตรวจ anterior drawer test, Lachman test และ pivot-shift test

ผลการศึกษา: ผลการศึกษาไม่แตกต่างกันอย่างมีนัยสำคัญในองศาการเคลื่อนไหวของข้อเข่า, ระดับความเจ็บปวดหลังการผ่าตัด, Lysholm score, International Knee Documentation Committee Knee Evaluation Form score, ผลการตรวจ anterior drawer test และ Lachman test กลุ่ม Remnant-Preserving Augmentation มีผลการตรวจ pivot-shift test หลังการผ่าตัดที่ดีกว่าอย่างมีนัยสำคัญ ($P = 0.040$)

สรุป: Remnant-Preserving Augmentation มีประสิทธิภาพเทียบเคียงกับ Double-Bundle Reconstruction ในการรักษาผู้ป่วยที่มีเอ็นไขว้หน้าข้อเข่าขาดบางส่วน ทั้งในด้านความมั่นคงของด้านหน้าและการหมุน รวมทั้งคะแนนทางคลินิกของข้อเข่า