ORIGINAL ARTICLE

Return to sport rate following sports trauma-related delayed bucket-handle meniscus repair with concomitant ACL reconstruction

Özgür Başal, M.D.,[1] Talip Teoman Aslan, M.D.,[2] Hande Güney Deniz, M.D.,[3] Onur Bilge, M.D.,[4] Mahmut Nedim Doral, M.D.[5]

[1]Department of Orthopaedics and Traumatology, Emsey International Hospital, İstanbul-*Türkiye*
[2]Department of Orthopaedics and Traumatology, University of Health Science, Darıca Farabi Training and Research Hospital, Kocaeli -*Türkiye*
[3]Department of Physiotherapy and Rehabilitation, Hacettepe University Faculty of Health Science, Ankara-*Türkiye*
[4]Department of Orthopedics and Traumatology, Necmettin Erbakan University Meram Faculty of Medicine, Konya-*Türkiye*
[5]Department of Orthopedics and Traumatology, Hacettepe University Faculty of Medicine, Ankara-*Türkiye*

ABSTRACT

BACKGROUND: Return to sports rate of chronic meniscus repair concurrent with Anterior Cruciate Ligament (ACL) reconstruction remains unclear, especially there is no well-defined return to sports criteria for evaluation. The purpose of this retrospective study was to determine the success rate of chronic locked bucket-handle meniscal tear (BHMT) repair with concomitant ACL reconstruction.

METHODS: This study includes 51 chronic ACL injury patients with a locked meniscal tear of at least 6 weeks who underwent surgery. All cases were treated with arthroscopic BHMT repair and ACL reconstruction between 2017 and 2020. Patient demographics, chronicity, pre-operative, and intraoperative surgical variables which associated with return to sports were defined. BHMT was repaired with an all-in-side meniscus repair and/or combined repair procedure first, then an anatomic outside-in ACL reconstruction using a suspension device for femoral fixation was performed. Patients underwent same rehabilitation program with the goal of returning to sport at approximately 4–8 months. A modified return-to-sport criterion was performed in this study.

RESULTS: Fifty-one patients with an average age of 27.4 (range 18–48) years were included in the study. The average time elapsed from the occurrence of locked knee symptoms to surgery was 10.5±4.4 weeks. The mean follow-up time was 25.3±4.5 months. Significant improvement was observed in all patient-reported outcomes from baseline to the final follow-up. The mean modified Lysholm knee score increased from 45.5 points to 91.5 at the final follow-up ($p<0.001$). The 43 out of 51 patients (84.3%) were return to their recreational activities (amateur sports). The mean time to return to sport was 5.9±0.8 (5–8) months.

CONCLUSION: Majority of the patients who underwent ACL reconstruction with BHMT repair return to their pre-operative activity levels in 8 months. All neglected BHMTs with concomitant chronic ACL rupture should be repaired in a single-stage surgery if the half plane-concave shape of the menisci has been preserved regardless of the delay in time to surgery.

Keywords: Bucked-handle; knee trauma; locked knee; meniscal tear; return to sports.

INTRODUCTION

The treatment of neglected bucket-handle meniscal tears (BHMT) in knees with chronic anterior cruciate ligament (ACL) deficiency is still controversy.[1–4] Together with the understanding of the protective effect of meniscus tissue against osteoarthritis, repair or meniscus transfer has come into use.[5] The majority of meniscus tears accompanying cruciate ligament rupture are seen as a result of acute knee injuries. Several studies have reported the success rate of

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Address for correspondence: Özgür Başal, M.D.
Emsey Uluslararası Hastanesi, Ortopedi ve Travmatoloji Bölümü, İstanbul, Türkiye
Tel: +90 246 - 211 23 25 E-mail: dr.ozgurb@gmail.com

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meniscus repair in the acute period to be 70–90%.[1,2,6] As the time from injury to surgery (TFIS) increases, the meniscus tissue loses its natural shape. The success rate of meniscus repair performed in delayed cases decreases over time. Although the delay time and the possibility of meniscus healing seem to be inversely proportional, a definite time limit has not been described.[7]

The gold standard treatment of the meniscus is repair for R-R and R-W (R: red, W: white) zone meniscus tear.[2,8,9] However, in several cases with locked knee who present late, the correct treatment option is still not clear. In cases treated in the late period, although there are several factors affecting success, the most frequently mentioned subjects are the zone, in which the tear has occurred, the length of the tear, age of the patient, the TFIS, concomitant knee injuries, rehabilitation process, and other accompanying pathologies.[6,10–13] The application of single or 2-stage surgery in these cases, the decision for repair or reconstruction, the choice of graft for reconstruction, and rehabilitation phases and processes is still subjecting of debate for these patients.[14] Although the definition of chronic and subchronic periods are not clear, some authors defined it 6 weeks to 12 months as the subchronic period after an initial ACL injury.[15,16] As the chronicity increases, accompanying injuries such as ramp and root lesion and chondral damage may be seen more often.[17]

Surgical treatment of locked knee injuries in acute stage provides successful results but what results the same treatment protocols will give in chronic cases that cannot be predicted. Although many protocols have been described to make the decision to return to sports after ACL reconstruction and meniscus repair, there is no general consensus.[18–20] In this study, we evaluated the treatment approach and treatment results of cases that presented with neglected BHMTs accompanied by chronic ACL injuries. The time of return to daily activities and sports were examined in these patients following standardized rehabilitation.

The purpose of this study is to determine the success rate of delayed locked bucket-handle tear repair with concomitant ACL reconstruction. We hypothesized that delayed BHMT repair with the concurrent ACL reconstruction up to 24 weeks provides satisfying results and all BHMT cases must be repaired if the half plane-concave shape is preserved.

MATERIALS AND METHODS

The study was carried out with the permission of Suleyman Demirel University Hospital, Clinical Ethics Committee (Decision No:72867572-050-01.04-225899). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Written informed consent was obtained from all participants who participated in this study.

Patients

Between January 2017 and January 2020, a total of 114 patients who presented at our clinic with chronic ACL injuries were treated surgically. Fifty-one of 114 patients underwent arthroscopic repair of chronic BHMT concurrent ACL reconstruction. An informed consent was obtained from all the study participants. In the context of the study design, we included patients with BHMT ongoing for at least 6 weeks accompanied by chronic ACL rupture. We described the first 6-week period after the initial ACL injury as the acute, 6 weeks to 12 months as the subchronic, and 12 months or longer as the chronic period. All BHMT cases were determined with clinically true locked knee symptoms and met inclusion criteria. In addition to physical examination, all the patients diagnosed with BHMT were applied with magnetic resonance imaging (MRI) (Fig. 1).

Patients were excluded from the study if they had a history of knee surgery or presented with septic arthritis. A total of 51 adult patients (seven females and 44 males) met these criteria (Table 1). Other exclusion criteria were defined as multiple ligament injuries other than ACL, previous knee surgeries, tears in the white-white (W-W) zone. Thirty of the patients were doing recreational sports, 19 were amateur football enthusiasts (contact sports), and two were professional athletes, and all patients engaged in physically demanding jobs (Table 2).

Surgical Procedure for ACL and Meniscus Repair

Arthroscopic meniscus repair and ACL reconstruction were applied in a single session by the same surgeon to all patients under spinal anesthesia. In all cases, arthroscopic all-inside or outside-in meniscus repair was applied first, then ACL reconstructed using four stranded hamstring tendons harvested from the same side. In the all-inside repair, a FasT-Fix meniscal repair device was used (Smith and Nephew Endoscopy, Andover, MA, USA).

To describe the localization of tear (s), we used the three circumferential zone classification system (Red-white zones) and three-part anatomical zone (anterior-corpus-posterior). Ramp lesions which extended from posterior horn of the medial meniscus to the middle or anterior, forming a bucket-handle tear were noted. For tears in the anterior third, combined repair was applied appropriate to the outside-in technique, in which No. 0 polypropylene non-absorbable sutures were used. Following the meniscus repair, ACL reconstruction was applied using hamstring autograft in all cases. Single bundle ACL reconstruction appropriate to the Endobutton technique was applied. All procedures were performed by two surgeons with at least 7 years of experience in sports traumatology in the same clinic.

Post-operative Rehabilitation Protocol

The operated knee was immobilized in a full extension knee brace, and crutches were used for 3–6 weeks postopera-

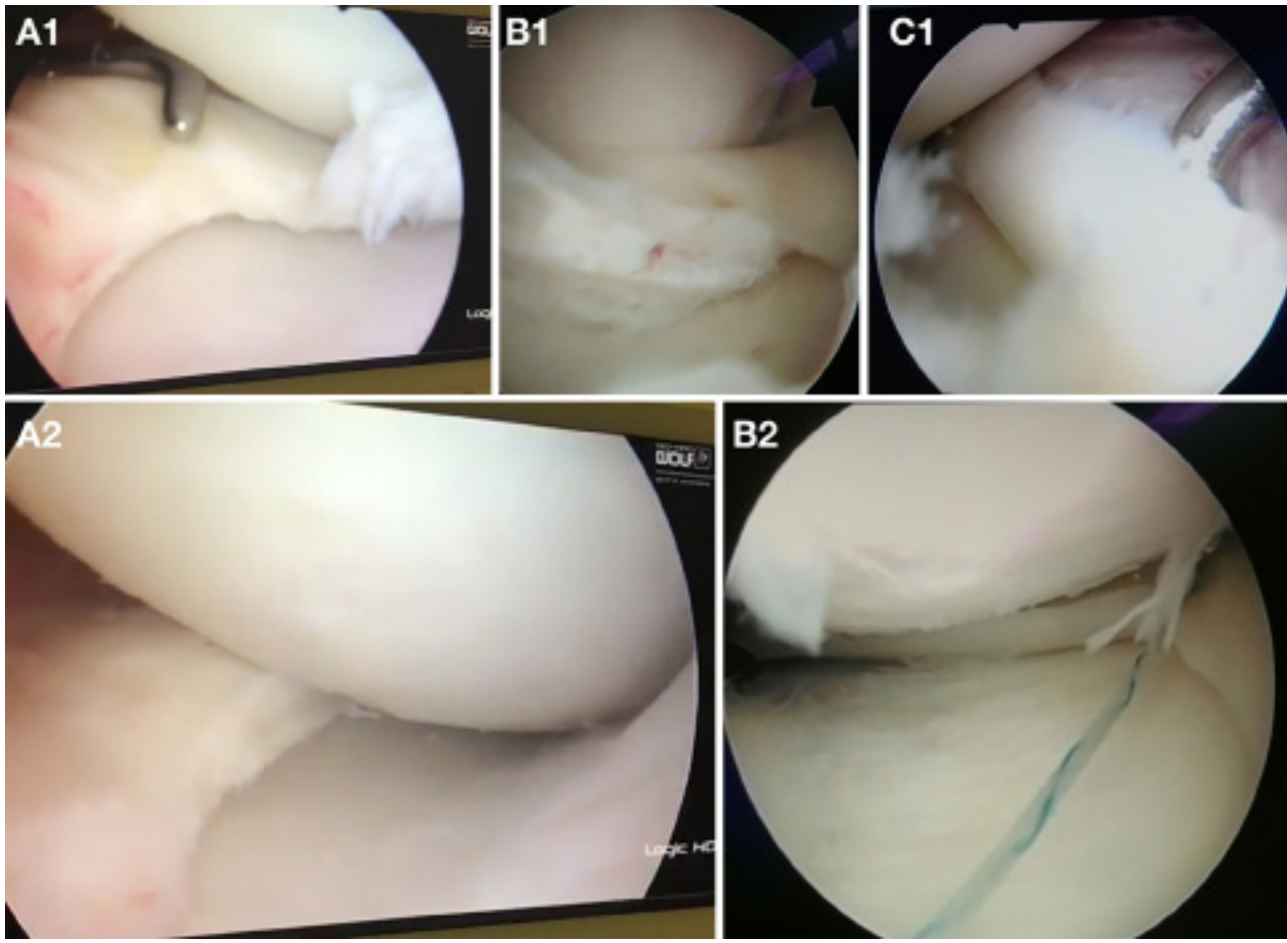


Figure 1. Arthroscopic images of right knee bucket-handle meniscal tears (BHMT) A1: R-W zone BHMT, A2: Torn R-R zone BHMT, B1: Easily dislocated BHMT, B1: Reduced BHMT, and B2: FasT-Fix360 suturing.

tively to protect the ACL graft and repaired meniscus. A standardized post-operative rehabilitation applied to all the patients included range of motion (ROM) and quadriceps strengthening exercises. ROM exercises were started immediately after removal of the drain with the aim of achieving 90° knee flexion within 3 weeks. Partial weight-bearing was permitted after 3 weeks and gradually increased to full weight-bearing by the sixth post-operative week. Quadriceps and gluteal sets were initiated on post-operative day 1 to eliminate the arthrogenic muscle inhibition. Patients encouraged to heel slide till 45° knee flexion. Squatting was not allowed until 12 weeks and sports activity was restricted for 4–8 months postoperatively. The return to sports scoring system that we described according to clinical and radiological findings was used (Table 3). For this purpose, we modified returning to sports criteria[17] and combined with Barrett's criteria[21] to assess meniscus healing (Table 3). In addition, single leg hop tests (vertical jump, triple hop for distance, crossover hop, and side hop test) were also used to evaluate the returning to the sports. Meniscal healing assessments and returning to sports criteria are shown in Table 3. Patients evaluated according to these criteria, who score 0–2, are suitable for returning to sports, 3–4 points are not suitable, tests need to be repeated after 1 month

Table 1. Inclusion-exclusion criteria

Inclusion criteria	Exclusion criteria
Displaced or unstable BHMT concurrent with ACL rupture	Irreparable /Degenerated Meniscus
Sub-chronic or Chronic meniscal tears (TFIS >6 weeks)	Concomitant Complex Tear (Root tears, flaps, large radial tears)
Red-Red or Red-White zone tears	Previous Knee Surgeries, Infection history
Patient who has daily sports activities	Multiligament Injury except ACL
	White-White zone tears

Table 2. Patient demographics and preoperative observations

	Mean±SD (Min-Max)
Age	27.7±7.8 (18–48)
Gender, n (%)	
Male	44 (86.3)
Female	7 (13.7)
Time from locked knee symptoms to surgery (week)	10.5±4.4 (6–24)
ACL chronicity (month)	16,1±12.2 (5–60)
Sub-chronic (n=22)	
Chronic (n=29)	
Knee laterality (right-left), n (%)	30 (58.8), 20 (41.2)
Meniscus side, n (%)	
Medial	39 (76.5)
Lateral	12 (23.5)
Both	–
Preoperative Lysholm Score	45.7±5.7 (33–56)
Level of athlete, n (%)	n=51
Recreational	30 (58.8)
Contact sports	19 (37.2)
Professional	2 (4)

ACL: Anterior cruciate ligament; SD: Standard deviation; Min: Minimum; Max: Maximum.

of physical therapy. Patients with a score of 5–7 should be checked for further examinations.

Statistical Analysis

Comparisons of all pre-operative and post-operative follow-up measurements were performed using a paired t-test and analysis of variance and a Wilcoxon signed rank test was used to compare pre-operative PROs with those of final follow-up. Descriptive statistics were calculated for all variables, including frequencies and mean values. Chi-square and Fisher's exact tests were used to compare intraoperative variables. One-way ANOVA test was used to compare categorized variables with clinical outcomes. All reported P values are 2-tailed, with an α level of 0.05 detecting significant differences (SPSS Statistics, Version 23.0, IBM, Armonk, New York).

RESULTS

A total of 51 patients underwent chronic bucket-handle meniscus repair concurrent with ACL reconstruction between January 2017 and January 2020 at our institution. Evaluation was made of 51 patients, comprising 44 males and seven females with a mean age of 27.7 (range, 18–48 years). The time from the onset of locked knee complaints to surgery was mean 10.5±4.4 weeks (range 6–24). All the cases were treated for unilateral BHMT; 30 right side and 21 left-side. Medial BHMT was detected in 39 patients and lateral BHMT in 12 patients (Table 2). The meniscus tears were determined as displaced in 36 cases and easily displaced types in 12 cases arthroscopically. Of the meniscal tears, 15 (29.4%) were located in the red-red zone and 36 (70.6%) were in the red-white zone. Eighty percent of meniscal tears extended from corpus to the posterior horn. Ramp lesion was found arthroscopically in 11 of 39 patients (28.2%) with medial meniscus bucket-handle tear. A prevalence of 21.5% was calculated for ramp lesions in patients undergoing BHMT repair and ACLR.in this study. A complete description of all patient demographic and pre-operative variables is reported in Table 2. Both lateral and medial meniscus tear were detected in 6 cases (11.7%), and chondral injury in ten case (19.6%). Out of ten cases with chondral damage, two had Grade 4, three had Grade 3, and five had grade 2 according to the modified Outerbridge. Debridement and/or microfracture procedures were performed for these cartilage injuries.

Table 3. Return-to-sport Scoring (Combined with meniscus healing assessment according to modified clinical criteria of Barrett[20])

Return to sports score			Score (P)	Current study (n)
Meniscal healing assessment	Symptoms			
	Joint line tenderness		1	6
	Joint effusion		1	5
	Locking or pain during meniscal provocation test		1	1
	MRI grading	Grade 1–2	1	46
		Grade 3	2	5
SLHTs			1	4*
Anterior-posterior tibial displacement on Lachman's test (>3 mm)			1	1

Scoring: 0–2: Able to return to sports; 3–4: Not able to return to sports, continue rehabilitation and repeat the tests 1 month later; 5–7: Not able to return to sports, further examination needed.
MRI: Magnetic resonance imaging; SLHTs: Single leg hop tests (vertical jump, triple hop for distance, crossover hop, and side hop test); n: number of positive cases; P: point. *Not able to perform test.

The localization of the tear and autograft diameter was recorded intraoperatively. Of the repaired displaced BHMTs, 36 (70.6%) were in the red-on-white zone, 15 (29.4%) were in the red-on-red zone. Our results showed that arthroscopic meniscal repair with all inside and out-in sutures provided a high rate of meniscus healing (88.2%, 45 clinically healed menisci out of 51) according to Barrett et al.'s[21] criteria. The average four-strand hamstring graft diameter was 7.8±0.4 mm. This average graft diameter is thinner when compared with acute ACL reconstructed cases.[22] The mean length of stay in hospital was 2.2±0.5 days. In the early post-operative period, recurrent effusion was observed in the knee of five patients and this was aspirated in all cases (Table 3). Overall, the Lysholm score increased to a mean value of 91.5 (SD 4.1), which was statistically significant compared with the pre-operative mean value of 45.5 (SD 5.8) (p<0.001). Twenty-eight patients (54.9%) had excellent, 22 patients (43.1) had good, and 1 (2%) patient had a fair result. When Lysholm knee scores were compared, no significant difference was found between repaired subchronic and chronic meniscal tears (p=0.074). MRI evaluation showed Grade 1 signals in ten cases, Grade 2 signals in 27 case, and Grade 3 signals in five cases. Only one case had a re-tear at 6th month of follow-up and underwent meniscal repair. Of the patients, 43 (84.3%) were returned to the sports at the mean of 5±0.9 months. The mean RS score was found 1.56±1.4 at the end of rehabilitation period (Table 3). Eight of the patients did not meet return to sports criteria at the end of rehabilitation (Fig. 2).

Table 4. Descriptive statistics of intraoperative variables

Intraoperative findings	**n (%)**
Meniscal Zone	
R-W	36 (70.6)
R-R	15 (29.4)
Meniscal repair technique	
All-inside	33 (64.7)
Combined	18 (35.3)
Chondral procedures	10 (19.6)
Debridement	5 (7.8)
Microfracture	5 (7.8)
Number of sutures used in meniscal repair	3.3±0.7 (2–5)
Anatomic location of tear (C, CA, CP, CAP)	C: 6 (11.8)
	CA: 3 (5.9)
	CAP: 6 (11.8)
	CP: 36 (70.6)
Hamstring autograft diameter	7.8±0.4 (7–8)

C: Corpus; CA: corpus to anterior; CP: Corpus to posterior; CAP: Corpus-anterior-posterior; R-R: Red-red zone; R-W: Red-white zone; n: Number of cases.

No wound infectious was found in any patient. Mild-moderate chondral injury was determined in 10 (19.8%) cases and microfracture was applied to five of these. The Lysholm scores

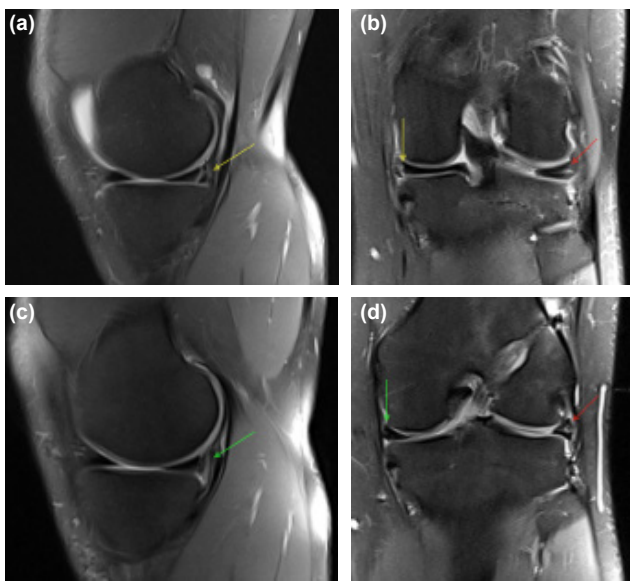


Figure 2. Pre-operative and post-operative magnetic resonance imaging findings of a 26 years old male with chronic bucket-handle meniscal tears (BHMT) (right side) concomitant with Anterior Cruciate Ligament injury. **(a)** Sagittal PD image with yellow arrow shows double side medial meniscus tear, **(b)** coronal PD image with yellow arrow shows medial meniscus tear and red arrow shows lateral meniscus tear, **(c)** post-operative 12th month follow-up PD image, green arrow localizes the healed medial meniscus, and **(d)** coronal PD image shows medial meniscus healing with green arrow and lateral meniscus healing with red arrow at 12th month postoperatively.

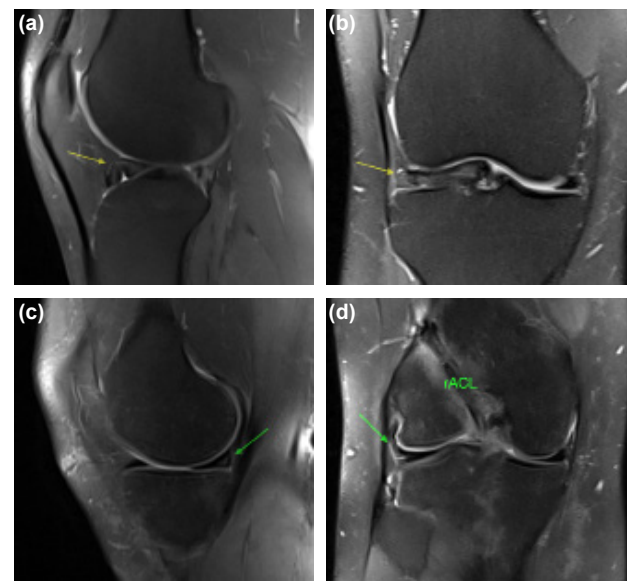


Figure 3. Pre-operative and post-operative magnetic resonance imaging scans of a 25 years old male with chronic bucket-handle meniscal tears (BHMT) (left side) concomitant with Anterior Cruciate Ligament (ACL) injury. **(a)** Sagittal PD image with yellow arrow shows lateral meniscus bucket-handle tear, **(b)** coronal PD with fat saturation image with yellow arrow shows torn lateral meniscus anteriorly, **(c)** post-operative 4th month follow-up PD image, yellow arrow shows the healed lateral meniscus, and **(d)** coronal PD image lateral meniscus healing with red arrow at 4th month postoperatively (rACL: Reconstructed anterior cruciate ligament).

of ten patients with chondral injury (87.4±2.2) were lower than the overall average (91.6±4). No decrease in joint ROM was observed in any of the patients. All patients returned to their daily social activities. Eight of the patients with a previous amateur contact sports history did not continue sports due to the concern of labor loss. The patient outcome is summarized in Table 4 (Fig. 3).

DISCUSSION

Delayed repair of BHMTs with the concomitant ACL reconstruction in chronic cases up to 24 weeks provides excellent and good results. All BHMTs must be repaired if the half plane-concave shape of the meniscus was preserved. The results of this study showed that satisfying outcomes can be obtained with delayed surgical treatment of patients with delayed BHMT accompanying chronic ACL rupture. The targeted patient group was candidates for meniscus reconstruction or meniscectomy, for whom no consensus has as yet been reached.[1–3,14] While many surgeons treat BHMT cases with meniscectomy, others have discussed meniscus transplantation rather than repair.[5,23] With the exception of w-w zone tears, repair has recently become the accepted approach for all locking meniscus tears, irrespective of duration.[6]

In the present study, good clinical outcomes were obtained with repair in BHMT cases, where the anatomic integrity of the meniscus was preserved, where degeneration remained limited histologically, and the half plane-concave structure of the meniscus was preserved, independently of patient age and duration (Table 5). In a study by Feng et al.,[6] no significant difference was reported between patient groups applied with meniscus repair in the acute or chronic period. Although a delay TFIS and degeneration seems to be important, similar results can be obtained in cases, where repair is possible.

Table 5. Patient outcomes

Outcomes	
Follow-up duration (mo.)	25.3±4.5 (range, 16–36)
Return to sports	43 (84.3% of all cases)
Average (mo.)	5.9±0.8 (range, 5–8)
Return to sports score	1.56±1.4
Postoperative Lysholm Score	91.6±4 (83–100)
Sub-chronic cases	92±3.3
Chronic cases	91.2±4.5
Clinical outcomes (Lysholm), n (%)	
Excellent	28 (54.9)
Good	22 (43.1)
Fair	1 (2)

n: Number; mo.: Month.

The frequency of BHMT is known to be approximately 10% of all meniscus tears.[1,23] It is clear that the TFIS will affect the surgical success in these cases, but the main reason for this effect is directly associated with the loss of the natural form of the meniscus. The terminology for the chronicity of meniscal injuries is not described clearly, the injuries up to 4 weeks are called acute injuries, but the terminology for 1 month to 3 months from injury is unclear.[15,21,23] The BHMT cases with a delay from 6 weeks or more considered as subacute/chronic in this study.

It is difficult for the surgeon to decide to return-to-sports (RTS) after cruciate reconstruction surgeries. Approximately 82% of individuals return to sport participation following ACL reconstructive surgery.[24] Only 63% of patients return to their pre-injury level of sport participation, and only 44% return to competitive sport.[19,24] It should be taken into account that accompanying injuries may prolong recovery. RTS tests are utilized in various combinations, including isokinetic strength assessments, single-leg hop testing, limb symmetry index, and other functional outcome scores.[18,20] Webster and Hewett showed in their meta-analysis that only 23% of ACLr patients passed the RTS test batteries.[20] In their meta-analysis, the risk of second ACL injury in athletes who passed the RTS tests did not appear to decrease.[20] However, some authors indicate that passing a battery of assessments for RTS, including strength and hop tests, reduces the risk of re-injury.[19] To the best of our knowledge, there is no study that mentioned on RTS in the literature of an extensive series of cases with chronic BHMT with concomitant ACL rupture. The RTS score we used in this study is easy to apply and algorithmic.

Various clinical results have been reported recently with the use of the outside-in, inside-out, and all-inside repair techniques.[11,25,26] The common point of these studies is that similar results have been obtained in meniscus union of the preferred technique. In the present study, the all-inside technique was preferred in the majority of cases, and in some cases, it was combined with other techniques.

BHMT repair performed with concurrent ACL reconstruction is known to have the highest success rate. Cruciate ligament and meniscus tissue have mechanoreceptors, in which afferent nerve endings are located for proprioceptive sense.[27] From this basic knowledge, the success rate of meniscus repair concurrent with ACL reconstruction can be thought to be joint proprioception. According to our experience, meniscus repair is technically easier in patients with ACL deficits. This may result in better meniscal union rates. In addition to the recovery of the proprioceptive sense, the contribution of stability is great in the success provided.

Although the 2-year survival rates of meniscus are at a satisfactory level, they have been seen to show a decrease.[10] Nevertheless, functional knee results show an improvement with

meniscus repair made in the acute or chronic period. Patient age, gender, weight, and smoking status have been reported not to be determinants of meniscus healing. Saltzman et al.[10] reported no association of the number of sutures used, size of the tear, and duration of symptoms with the risk of failure. One of the most debated subjects is the zone, in which the tear is located. It is generally accepted that the success rate is low in repairs of tears in the avascular zone (w-w zone), but in prospective studies by O'Shea and Shelbourne, repair with an isolated technique, even if the tear is in the W-W zone that was reported to obtain high rates of union.[2]

There is a correlation between chronic coronal instability of the knee and a bucket-handle meniscal tear.[14] Therefore, authors observed that every patient with ACL rupture carries a high risk for meniscal tear in this study. Espejo-Reina et al.[23] reported failure in 17% of 24 patients who underwent chronic BHMT repair after a mean follow-up of 48 months. ACL reconstruction was not performed in these failure cases. In our study, in only one case (1.9%) failure was observed and underwent for second arthroscopic BHMT repair and a revision ACL reconstruction. Our result suggests that concurrent ACL reconstruction has a crucial role for the success of BHMT repair.

Our study has some strengths and limitations. All of the cases are chronic BHMT with concurrent ACL rupture that was diagnosed in the late period and has not yet been surgically treated. Due to the lack of large number of cases and the early period, results were our limitations. The surgeries were performed by two surgeons which could affect the clinical outcomes. We did not routinely perform second-look arthroscopy or repeat advanced imaging to confirm the meniscal healing. Our study presents the rate of return to sports in an average of 5.9 months, but there is no data either in terms of returning to previous performance levels or identifying the risk of re-injury.

Conclusion

All chronic locked BHMT s accompanied by ACL rupture should be repaired in single-stage surgery if the half plane-concave shape of the meniscus has been preserved regardless of the delay in time to surgery. According to our study, 84.3% of the patients who had delayed BHMT repair returned to their sports activities. Four-strand hamstring autograft diameter does not influence the clinical results and rehabilitation phases in chronic cases. Furthermore, in cases with osteochondral damage, although the rate of meniscal healing is independent of age, it affects the success rate of the treatment.

Ethics Committee Approval: This study was approved by the Süleyman Demirel University Hospital Clinical Research Ethics Committee (Date: 01.03.2022, Decision No: 72867572-050-01.04-225899).

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Authorship Contributions: Concept: Ö.B.; Design: Ö.B., M.N.D.; Supervision: M.N.D., O.B., H.G.D.; Materials: Ö.B., T.T.A.; Data: Ö.B.; Analysis: M.N.D., Ö.B.; Literature search: Ö.B., H.G.D.; Writing: Ö.B.; Critical revision: Ö.B.

Conflict of Interest: None declared.

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ORİJİNAL ÇALIŞMA - *ÖZ*

Spor yaralanması ilişkili geç kalınmış kova sapı menisküs tamiri ve eş zamanlı ön çapraz bağ rekonstrüksiyonu sonrası spora dönüş oranı

Dr. Özgür Başal,[1] Dr. Talip Teoman Aslan,[2] Dr. Hande Güney Deniz,[3] Dr. Onur Bilge,[4] Dr. Mahmut Nedim Doral[5]

[1]Emsey Uluslararası Hastanesi, Ortopedi ve Travmatoloji Departmanı, İstanbul
[2]Sağlık Bilimleri Üniversitesi, Darıca Farabi Eğitim ve Araştırma Hastanesi, Ortopedi ve Travmatoloji Anabilim Dalı, Kocaeli
[3]Hacettepe Üniversitesi Sağlık Bilimleri Fakültesi, Fizyoterapi ve Rehabilitasyon Anabilim Dalı, Ankara
[4]Necmettin Erbakan Üniversitesi Meram Tip Fakültesi, Cerrahi Tip Bilimleri Bölümü, Ortopedi ve Travmatoloji Anabilim Dalı, Konya
[5]Hacettepe Üniversitesi Tıp Fakültesi, Ortopedi ve Travmatoloji Anabilim Dalı, Ankara

AMAÇ: Ön çapraz bağ (ÖÇB) rekonstrüksiyonuyla eşzamanlı kronik menisküs onarımı yapılan hastaların spora dönüş oranı belirsizliğini korumaktadır. Özellikle spora dönüşü değerlendirme için iyi tanımlanmış kriterler bulunmamaktadır. Bu geriye dönük çalışmanın amacı, eşlik eden ÖÇB rekonstrüksiyonu ile kronik kilitli kova saplı menisküs yırtığı (BHMT) onarımının spora dönüş başarısını belirlemekti.

GEREÇ VE YÖNTEM: Bu çalışma, en az altı haftalık kova sapı menisküs yırtığı olan ve kronik ACL kopuklu 51 hastayı içermektedir. Bu olgular 2017–2020 yılları arasında artroskopik BHMT onarımı ve ÖÇB rekonstrüksiyonu ile tedavi edildi. Spora dönüş ile ilişkili hasta demografisi, kroniklik, preoperatif ve intraoperatif cerrahi değişkenler tanımlandı. BHMT, all-inside menisküs onarımı ve/veya kombine onarım prosedürü ile onarıldı, ardından femoral fiksasyon için bir süspansiyon cihazı kullanılarak anatomik dıştan içe ACL rekonstrüksiyonu uygulandı. Hastalara yaklaşık dört-sekiz ayda spora dönüş hedefi ile aynı rehabilitasyon programı uygulandı. Bu çalışmada değiştirilmiş bir spora dönüş kriteri(SDK) uygulanmıştır.

BULGULAR: Ortalama yaşı 27.4 (dağılım, 18–48 yaş) olan 51 hasta alındı. Kilitli diz semptomlarının ortaya çıkmasından ameliyata kadar geçen ortalama süre 10.5±4.4 haftaydı. Ortalama takip süresi 25.3±4.5 ay idi. Başlangıçtan son takibe kadar hasta tarafından bildirilen tüm sonuçlarda önemli iyileşme gözlendi. Ortalama modifiye Lysholm diz skoru son takipte 45.5 puandan 91.5'e yükseldi ($p<0.001$). Elli bir hastanın 43'ü (%84.3) eğlence aktivitelerine (amatör sporlara) geri dönmüştü. Spora dönüş süresi ortalama 5.9±0.8 (5–8) aydı.

TARTIŞMA: BHMT onarımı ile ÖÇB rekonstrüksiyonu yapılan hastaların çoğu sekiz ayda ameliyat öncesi aktivite seviyelerine döner. Kronik ÖÇB rüptürü ile birlikte tüm ihmal edilmiş BHMT'ler, cerrahi zamandaki gecikmeye bakılmaksızın menisküsün yarı düzlem-içbükey şekli korunmuşsa, tek aşamalı bir ameliyatta tamir edilmelidir.

Anahtar sözcükler: Diz travması; kilitli diz; kova-sapı; menisküs yırtığı; spora dönüş.

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