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Clinical outcome of meniscus repair for isolated meniscus tear in athletes



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ABSTRACT

Objective: To examine the clinical and functional outcomes for a series of patients who underwent meniscal repair for isolated meniscal tears focusing the study population on athletes.

Methods: This study represents a case series of 46 athletes who underwent repair of isolated meniscal lesions of the knee from 2010 to 2015. Cases of discoid meniscal lesions and combined ligament injuries were excluded. The mean age of the patients was 22.9 years ranging from 12 to 50 years. Arthroscopic inside-out repair was primarily a procedure of option. For repair of tears with degeneration and inferior vascularity, autogenous fibrin clot was implanted to the repair site for healing enhancement. The mean follow-up period of all patients was 19.8 ± 6.8 months (range; 12 months–33 months).

Results: In total, 37 of 46 patients (80%) could go back to their original sports activities. During the follow-up period, re-tear was encountered in 4 of 46 knees (8.7%). No significant differences in clinical/functional outcomes and re-tear rate were detected between the medial and lateral meniscal repairs.

Conclusion: In our expanded repair indication for isolated meniscus repair for athletes, the rate of satisfactory return to sports was 91.3% in total (88.9% for the medial meniscus group; 92.9% for the lateral meniscus group). During the follow-up period ranging from 12 to 33 months (mean, 19.8 months), re-tear of the repaired site was encountered in 4 of the 46 knees (8.7%).

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1. Introduction

In surgical option for symptomatic meniscal tears, meniscal repair was conventionally indicated for tears within the vascular region without apparent degeneration of the meniscal substance while meniscectomy was indicated for the remaining “irreparable tear.”

There have been several articles that comparatively examined the outcome of meniscectomy and meniscal repair. Praxton et al.¹ performed a metaanalysis that compared outcomes of those two procedures, and concluded that meniscal repair was associated with higher clinical score and less postoperative osteoarthritic progression in the long-term results while reoperation rate was

higher after meniscal repair. Other studies also have shown better function and less osteoarthritis for meniscal repair compared with meniscectomy.^{2,3} When the study subject was limited to athletes, difference in the outcome between the two procedures is more distinct. Benneux et al.⁴ noted postoperative arthritic (Fairbank’s) changes in more than 90% of the patients after partial lateral meniscectomy for isolated lesions. In addition, although rare, severe complications such as rapid chondrolysis have been reported after partial meniscectomy in athletes.^{5,6} Consequently, in consideration of surgical option for meniscal tears in athletes, recent trend has been shifted to preservation of meniscal function as much as possible.

There have been some studies that examined the outcome of meniscal repair focusing on athletes^{7–9}; however, those studies included meniscal repair concomitantly performed with anterior cruciate ligament reconstruction. Therefore, outcome of repair of isolated meniscal tear has not been clarified.

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In an attempt to preserve the meniscus, we have expanded the indication for meniscal repair including tears in the avascular region and degenerative tears with use of fibrin clot¹⁰ for healing enhancement since 2012. Healing rate and functional outcome after meniscal repair with fibrin clot supplementation in athletes have not been reported in previous literature.

The purpose of this study was to examine the clinical and functional outcomes for a series of patients who underwent meniscal repair for isolated meniscal tears focusing the study population on athletes. In the data analysis, clinical factors potentially influencing the surgical results were assessed. We hypothesized that repair of meniscal tears including those in avascular region and degenerative tears would afford satisfactory outcome comparable to meniscal repair with conventional indication, and there would be some clinical characteristics that influence the healing rate of the repair.

2. Patients and methods

This study represents a case series of 46 athletes who underwent repair of isolated meniscal lesions of the knee from 2010 to 2015. Cases of discoid meniscal lesions and combined ligament injuries were excluded. The mean age of the patients was 22.9 years ranging from 12 to 50 years. The study population was made up of 18 knees with medial meniscal lesions and 28 knees with lateral meniscal lesions. There were no significant differences in demographic and clinical characteristics between the groups (Table 1). The mean follow-up period of all patients was 19.8 ± 6.8 months (range; 12 months–33 months). The ethics review board of Hyogo College of Medicine approved this study [No. 2217].

2.1. Surgical procedure

All surgeries were performed by the three senior authors (H.N., S.Y., M.Y.) under general anesthesia. We used a tourniquet for all cases. The inside-out technique was primarily used as the repair technique,¹⁰ while the outside-in technique and the all-inside technique utilizing Fast-Fix (Smith & Nephew) were used alone or in conjunction with inside-out repair. A fibrin clot¹¹ was inserted and fixed to the capsule neighboring the repair site to enhance the meniscal healing in case of degenerative tears and tears in poorly vascularized region.

2.2. Postoperative management

Postoperative treatment generally consisted of immobilization in extension with a brace and no weight bearing for the initial 3 weeks after surgery. Afterwards, range-of-motion exercises and partial weight-bearing was introduced with full weight-bearing beginning 4–5 weeks after surgery. Running was permitted 3 months after surgery. At 5–6 months after surgery, the athletes

were permitted to return to full athletic activity, provided recoveries of strength and neuromuscular coordination were confirmed.

2.3. Clinical assessment

All assessments were performed by a single physician (H.N.). After surgery, the patients were followed-up periodically (at 3, 6, 9, and 12 months) for routine checkups. The clinical outcome was evaluated with validated subjective assessments (Lysholm and Tegner scores) preoperatively and at the final follow-up. We assessed the rate of return to play and postoperative time period before return to play (recovery time). Diagnosis of failed repair was based on clinical symptoms and signs suggestive of re-tear of the repaired meniscus. When the re-tear was clinically suspected, status of the healing at the repair site was assessed with MRI followed by repeat arthroscopy. In radiological evaluation, we compared the Rosenberg view radiographs before surgery and at 1 year for postoperative change in joint space width.¹²

2.4. Statistical analysis

Differences in clinical parameters between the two groups were statistically assessed using the unpaired student's *t*-test with the significance level set at $P < 0.05$.

3. Results

3.1. Tear type and location

The most frequent type of tear in the medial meniscus group was the bucket handle tear that was seen in 8 of 18 knees (44.4%), while the most frequent type for the lateral meniscus group was the longitudinal tear that was seen in 13 of 28 knees (46.4%) (Table 2). In regards to the tear location, the most frequent for the medial meniscus group was a tear from the middle horn to the posterior horn in 9 knees (50%). On the other hand, the most frequent location for tears in the lateral meniscus group was from the middle horn to the posterior horn, which was seen in 11 knees (39.3%); however, there were cases of anterior horn lesions and middle horn lesions.

3.2. Repair procedure

The majority of the tears were repaired using inside-out technique with vertical stacked suture configuration. When the healing capability of the repaired tissue was in question, fibrin clot was inserted in 11 of 18 knees (61.1%) in the medial meniscus group and 7 of 28 knees (25%) in the lateral meniscus group.

Table 1
Profiles of study population.

Variable	Study Group (n = 46)
Age, (years)	22.9 ± 9.6^a (range, 12–50)
Sex, n (%)	
Male	34 (74)
Female	12 (26)
Side of tear, n (%)	
Medial meniscus	18 (32)
Lateral meniscus	28 (68)
Follow-up period (months)	19.8 ± 6.8^a (range, 12–30)

^a Mean \pm SD.

Table 2
Profiles of tear types.

Longitudinal tear, n (%)	
Medical meniscus	4
Lateral meniscus	1
Radial tear, n (%)	
Medical meniscus	1
Lateral meniscus	4
Complex tear, n (%)	
Medical meniscus	5
Lateral meniscus	3
Bucket handle tear, n (%)	
Medical meniscus	8
Lateral meniscus	8

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