

Original Research Article

The use of arthroscopy in diagnosing and treating sports-related cartilage lesions

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ABSTRACT

Background: Sports-related cartilage lesions pose challenges for athletes. Cartilage, vital for smooth joint movement, can be damaged. Arthroscopy, a minimally invasive procedure, allows precise diagnosis and treatment of joint issues, offering quicker recovery and minimal scarring, enhancing orthopedic interventions. This study aimed to assess the use of arthroscopy in diagnosing and treating sports-related cartilage lesions.

Methods: This prospective observational study was conducted at the department of orthopaedics and traumatology, Life Line Hospital Moulovibazar, Mount Adora Hospital Sylhet, MAG Osmani Medical College Hospital Sylhet, Bangladesh from January 2022 to December 2023. As the study subjects, a total of 58 patients with non-surgically treated acute or chronic sports-related cartilage lesions were enrolled by using a purposive sampling technique. After 6 months, a follow-up report was recorded. Data were analyzed by using Microsoft Office tools.

Results: In this study, 72% of participants underwent cuff repair, with the remaining 28% opting for loop repair. The arthroscopic assessment revealed anterior medial cartilage lesions in 34% and anterior lateral lesions in 28%. Posterior medial, posterior lateral, and mid-talus dome cartilage lesions were observed in 17%, 5%, and 16%, respectively. Capsule repair was employed in 86% of cases. Significant improvement in hip range of motion, as well as radiological parameters like lateral center-edge angle, alpha angle (anteroposterior), and alpha angle (Dunn), was observed 6 months postoperatively ($p < 0.001$).

Conclusions: In detecting and treating sports-related cartilage lesions, arthroscopy is an effective method. This minimally invasive less painful treatment approach contributes to faster rehabilitation and a quicker return to normal activities.

Keywords: Arthroscopy, Sports-related, Cartilage lesions, Anterior, Posterior medial, Cuff repair

INTRODUCTION

In various field sports, athletes are frequently required to execute rapid changes in direction, accelerate, and decelerate, factors that can increase the susceptibility of players to injuries.^{1,2} Notably, ankle injuries account for 15% of all sports-related injuries, with sprains constituting 75% of these cases.³ While clinical tests effectively assess

complete ligament ruptures following sprains, diagnosing associated cartilage injuries remains challenging due to the indistinct nature of their symptoms, as reported in the literature, often resulting in oversight.^{4,5} In contact sports like professional soccer and rugby, the conventional "sprain" mechanism may be obscured, particularly in tackles involving direct impact from an opponent's leg, shoe, or studs. While not systematically examined, instances of such injuries were observed in some of the

current cases, particularly during games captured by Sky Sports videos provided by team medics. Traditionally, chondral injuries of the ankle have been linked to inversion or eversion sprains and ligament tears. In a study from 1991, Taga et al operated on 31 patients with lateral ligament injuries and unstable ankles, revealing that 89% of acutely injured ankles and 95% of chronically injured ankles also had chondral injuries.⁶ These findings align with the results of Hintermann, Schafer, and Takao, who reported elevated incidences of cartilage lesions in individuals with chronically unstable ankles.^{3,7,8} Notably, none of the current cases exhibited instability as a primary issue. Failure to establish a comprehensive initial diagnosis may leave an athlete with a painful ankle or hindered ability to participate in sports, even after thorough rehabilitation. Currently, no systematic data is categorizing characteristic symptoms and signs specific to cartilage injuries in such cases. Physicians may overlook these injuries when the suspected mechanism is a simple "sprain" and the symptoms and signs are nonspecific. Although arthroscopy is acknowledged as an excellent tool for evaluation and treatment in such conditions, it is typically initiated after a significant delay, when symptoms persist despite prolonged conservative treatments.^{5,9} The presence of artifacts further complicates the diagnostic process.¹⁰ While several magnetic resonance imaging (MRI) sequences are touted as cartilage-specific, in daily MRI practice, especially in the UK, such pulse sequences are seldom utilized. Instead, the common practice involves a combination of spin-echo, fat-suppressed fast spin-echo, and short inversion time inversion recovery (STIR) images. Numerous studies have explored the relationship between MRI and cartilage injuries in the knee joint, although the majority involve fewer than 50 injuries. A recent study by Rubin et al demonstrated that the presence of subchondral edema in the knee may suggest a defect in the overlying articular surface.^{11,12} Rubin recommended that when focal marrow abnormalities are detected, a thorough inspection of the overlying cartilage should be conducted using arthroscopy. As of our knowledge, there is no corresponding study focusing on the ankle. The objective of this study was to assess the use of arthroscopy in diagnosing and treating sports-related cartilage lesions.

METHODS

This was a prospective observational study that was conducted at the department of orthopaedics and traumatology, Life Line Hospital Moulovibazar, Mount Adora Hospital Sylhet, MAG Osmani Medical College Hospital Sylhet, Bangladesh from January 2022 to December 2023. The study included a total of 58 patients with non-surgically treated acute or chronic sports-related cartilage lesions, selected through purposive sampling. Prior to data collection, informed consent was obtained from all participants. In accordance with the study's inclusion criteria, patients underwent an arthroscopic treatment procedure, and the findings were systematically documented on a standardized form. Conversely, patients

with a history of previous anterior cruciate ligament or posterior cruciate ligament surgery, as well as those with a concomitant anterior cruciate ligament injury, were excluded based on the study's exclusion criteria. A follow-up report was recorded six months after the procedure, and comprehensive demographic and clinical information for all participants was documented. Data processing and analysis were conducted using Microsoft Office tools.

RESULTS

In this study, as the age distribution of participants, we observed that most of the participants (67%) were from the 19–35-year age group. According to the gender distribution, most of the participants (88%) were male. Based on the participants' injury types, it was noted that unilateral injuries (84%) were the most common, while bilateral injuries accounted for 16%. It was noted that pain emerged as the predominant subjective symptom, presenting in 93% of participants. Additionally, swelling and instability were observed in 26% and 21% of cases, respectively. Upon examining the clinical findings of participants, it was noted that joint line tenderness was present in the majority of cases (91%) followed by effusion in 70% of cases. In the course of this study, the majority of participants (72%) underwent cuff repair, while 28% of cases opted for loop repair. In arthroscopic assessment, in more than one-third of cases (34%) anterior medial, and more than one-fourth of cases (28%), anterior lateral cartilage lesions were found. Besides, in 17%, 5%, and 16% of cases posterior medial, posterior lateral, and mid-talus dome cartilage lesions were observed. In this ongoing study, regarding the surgical approach to the capsule of participants, it was noted that the capsule repair approach was employed in the majority of cases (86%). In analyzing the outcomes, upon assessing the range of motion (hip) we found statistically significant improvement after 6 months postoperatively in flexion, abduction, internal rotation, external rotation, and total range of motion (ROM) where the p values were less than 0.05. Besides, by the same duration, in comparing the radiological parameters like lateral center-edge angle (LCEA), alpha angle (anteroposterior), and alpha angle (Dunn) we observed statistically extremely significant improvement where the p values were less than 0.001.

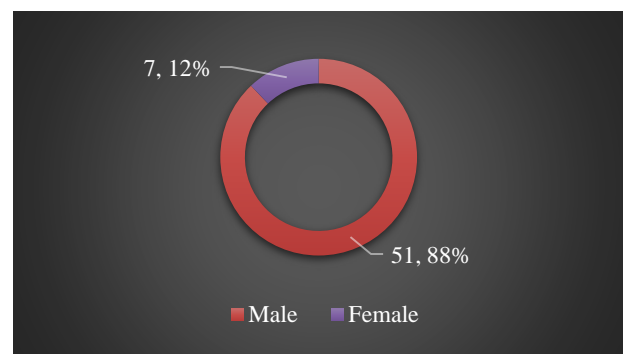


Figure 1: Gender distribution.

Table 1: Ages of participants (n=58).

Age (years)	N	%
12-18	9	16
19-35	39	67
36-45	10	17

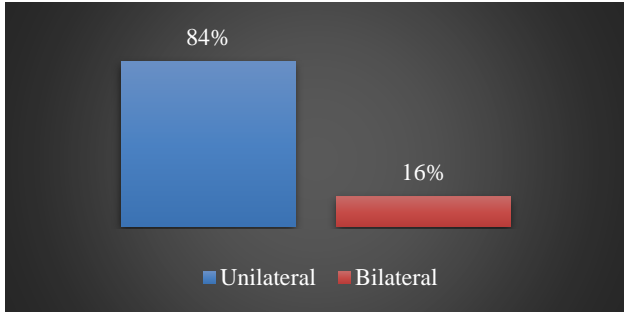


Figure 2: Type of injuries.

Table 2: Subjective symptoms.

Subjective symptoms	N	%
Pain	54	93
Swelling	15	26
Stiffness	3	5
Instability	12	21
Clicking or locking	7	12

Table 3: Clinical findings.

Clinical findings	N	%
Joint line tenderness	53	91
Effusion	45	78
Decreased range of motion	23	40
Clicking on passive movement	4	7

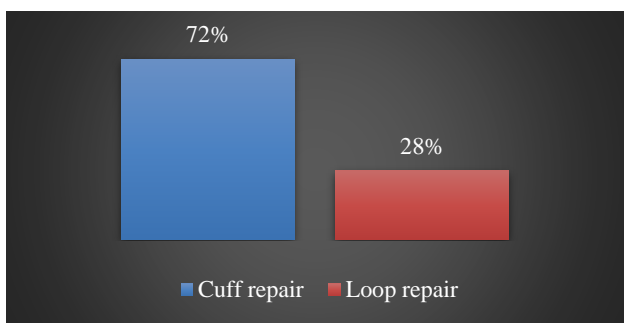


Figure 3: Type of repair.

Table 4: Cartilage lesions detected by arthroscopy.

Cartilage lesions	N	%
Anterior medial	20	34
Posterior medial	10	17
Anterior lateral	16	28
Posterior lateral	3	5
Mid talus dome	9	16

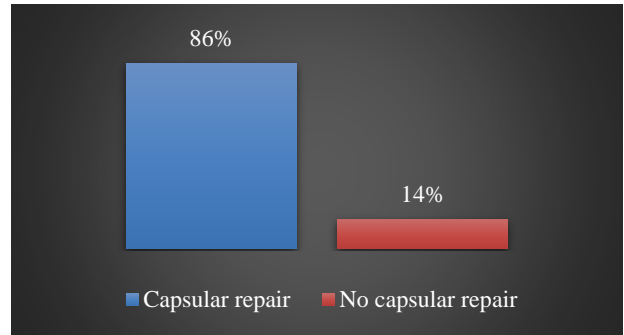


Figure 4: Surgical approach to capsule.

Table 5: Outcome analysis.

Characteristics	Preoperative	Postoperative (after 6 months)	P value
Range of motion (hip)			
Flexion	113.7±10.7	118.1±9.3	0.020
Abduction	45.8±9.6	50.1±9.2	0.015
Internal rotation	25.2±10.5	30.8±9.3	0.003
External rotation	37.1±7.2	39.9±7.4	0.041
Total ROM	243.6±30.8	261.5±29.1	0.002
Radiological parameters			
LCEA	34.2±5.4	30.3±5.2	<0.001
Alpha angle (AP)	66.9±16.4	60.2±15.3	<0.001
Alpha angle (Dunn)	60.2±12.3	50.2±10.2	<0.001

ROM: Range of motion, LCEA: lateral center-edge angle, AP: anteroposterior

DISCUSSION

In this study, concerning the age distribution of participants, the majority (67%) fell within the 19-35 age group, aligning with findings from other studies.^{13,14} In terms of gender distribution, a significant proportion (88%) of participants were male, a pattern also observed in a parallel study.¹⁵ Regarding the type of injuries, unilateral injuries were predominant, constituting 84% of cases, while bilateral injuries were found in 16%. Notably, pain emerged as the most prevalent subjective symptom, affecting 93% of participants. Additionally, swelling and instability were present in 26% and 21% of cases, respectively. Van Dijk et al identified an association between lateral ligament rupture and medial joint pain, revealing 19 cartilage lesions on the medial malleoli or medial talus in 30 patients with lateral ligament ruptures.¹⁶ Upon analyzing the clinical findings of participants in this study, joint line tenderness and effusion were prevalent, with 91% and 70% of cases exhibiting these symptoms, respectively. Concerning the type of repair, the majority (72%) underwent cuff repair, while 28% opted for loop repair, consistent with findings in another study where

70% underwent cuff repair and 30% underwent loop repair.¹⁷ Arthroscopy revealed that more than one-third of cases (34%) had anterior medial cartilage lesions, and more than one-fourth (28%) had anterior lateral cartilage lesions. Furthermore, cartilage lesions were identified in 17%, 5%, and 16% of cases in the posterior medial, posterior lateral, and mid talus dome regions, respectively. In a study by Christer et al they reported anterior medial (35%), posterior medial (17%), and anterior lateral (27%) cartilage lesions among their total participants (52).¹⁸ Regarding the surgical approach to the capsule of participants in the current study, the majority (86%) underwent the capsule repair surgical approach, aligning with results from a previous study.¹⁷ Significant improvements in hip range of motion and radiological parameters, including the lateral center-edge angle, alpha angle (anteroposterior), and alpha angle (Dunn), were noted six months postoperatively ($p < 0.001$). These findings were consistent with those of the earlier study, indicating a positive trend in outcomes.¹⁷

Limitations

It's essential to acknowledge the limitations of this study, including its single-center design and small sample size. Furthermore, the study was conducted over a relatively brief period. Consequently, caution should be exercised in generalizing the findings, as they may not fully represent the broader scenario across the entire country. Larger, more diverse studies conducted over extended durations would be valuable for obtaining a more comprehensive understanding of the subject matter.

CONCLUSION

The use of arthroscopy proves to be a highly effective approach in both detecting and treating sports-related cartilage lesions. Its minimally invasive nature not only ensures a less painful experience for patients but also plays a pivotal role in expediting rehabilitation and facilitating a swifter return to normal activities. The benefits of this approach highlight its significance in enhancing patient outcomes and overall quality of life, affirming arthroscopy as a valuable tool in the comprehensive management of sports-related cartilage injuries.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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