

# Mulberry Knot Technique for Arthroscopic Meniscus Repair

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**Received Date:** 31 August 2022; **Accepted Date:** 10 September 2022; **Published date:** 31 October 2022

**Citation:** Aditya K. Agrawal, Bhagirath. K, Nirbhay. S, (2022). Mulberry Knot Technique for Arthroscopic Meniscus Repair. Journal of Skeleton System. 1(1). DOI: 10.58489/2836-2284/004

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## Abstract

Meniscus treatment varies on factors such as age of the patient, cause of injury, time since injury, clinical features, site of torn meniscus and financial capacity. The treatment ranges from conservative in form of visco supplements, analgesics and physiotherapy to surgery in form of open or arthroscopic repair or partial meniscectomy. We aim to show ten cases of arthroscopic meniscus repair using mulberry knot technique. Meniscus tear was reduced using probe and long spinal needle. Conventional instruments used were meniscus repair set which includes needle and dart sheath with canula. The repair was done using 2-0 prolene with mulberry knot. The average follow up period in our study was  $3\pm 1.2$  months. As per knee society score, we have achieved 80% excellent and 20% good results at 3 months as shown in table 1. We did not encounter any complication in our study as far as intra operative or post operative events are concerned. There are different ways and suturing techniques to repair the meniscus. Mulberry knot provides sliding, stable and secured knot formation which is less bulky and more reliable. It has been used frequently to repair rotator cuff in shoulder arthroscopy. It does not cause post operative impingement during movements in rehabilitation process. Mulberry knot technique is unique, stable, secure knot which is done using Prolene 2-0 to be used for meniscus during arthroscopic procedures outside in and inside out repair techniques.

**Keywords:** Meniscus; mulberry knot; arthroscopy; suture technique

## Introduction

Meniscus injuries are one of the most frequently encountered injuries in orthopedics. It has bimodal age distribution [1]. It occurs in young people due to sports injuries and high velocity trauma due to road traffic accidents [2]. It is also associated with cruciate or collateral ligament injuries in these young people. Meniscus injuries also occur in elderly people due to degenerative arthritis of knee joint [3].

Torn meniscus leads to lot of pain and swelling in initial stages of inflammation. It also hampers movements of the knee joint as well as activities of daily living especially in sitting cross-legged or squatting positions [4]. Meniscus treatment varies on factors such as age of the patient, cause of injury, time since injury, clinical features, site of torn meniscus and financial capacity [5]. The treatment ranges from conservative in form of visco

supplements, analgesics and physiotherapy to surgery in form of open or arthroscopic repair or partial meniscectomy [6]. We aim to show ten cases of arthroscopic meniscus repair using mulberry knot technique.

## Material And Methods

All the patients were operated after undergoing routine clinical and radiological examination with their consent. All the patients were operated at single centre by a single arthroscopic surgeon after obtaining ethical approval. The patients were operated under spinal anesthesia in supine position. Diagnostic arthroscopy was performed to find out type, site and side of meniscus tear along with cruciate ligament tear. Meniscus tear was reduced using probe and long spinal needle as shown in Figure 1. Conventional instruments used were

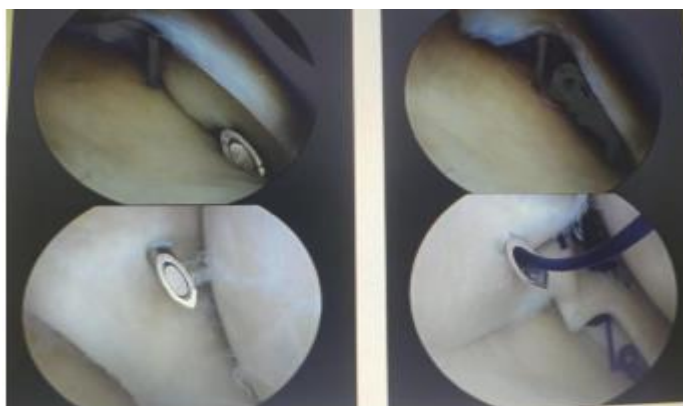
meniscus repair set which includes needle and dart sheath with canula as shown in Figure 2. The repair was done using 2-0 prolene with mulberry knot as shown in Figure 3. This is a kind of knot used by surgeons when suturing a torn meniscus. The surgeon introduces the suture through a wide bore needle which is pushed through the tear in the meniscus from outside in. It is seen under arthroscopic vision and retrieved through the anteromedial or anterolateral portal. This is done twice. The knot is then tied using loop and post technique as done in shoulder arthroscopy. The knot resembles a tiny mulberry on the surface of the meniscus. The suture is then pulled back into the joint

firmly to close the two ends of the tear.

Post operatively passive knee range of motion exercises were started from first day with non-weight bearing. After 1-month, active knee range of motion with partial weight bearing with brace was started and after 6 weeks full weight bearing was permitted. After 3 months, patients were allowed to perform all his routine/occupational activities. Patients were regularly followed up at 1 month, 2 months and 3 months and evaluated using Knee society score. Statistical analysis was done using SPSS software (Illinois, Chicago) with p value less than 0.05 considered statistically significant.



**Fig 1:** Insertion of meniscus repair needle during outside in repair technique in torn meniscus



**Fig 2:** Passing of Prolene 2-0 through the meniscus repair needle twice to form a knot.



**Fig 3:** Arthroscopic view of knee joint shows three mulberry knots over the meniscus and two mulberry knots on the undersurface of the meniscus after stable and secured repair.

## Observations And Results

**Table 1:** Demographic profile and scoring system of patients operated for meniscus

Patient	Menisci	Gender	Mode of Injury (Sports/RTA/ Trivial Trauma)	Associated injury	Knee Society score at final follow-up
1	Medial	Male	Sports	None	87
2	Medial	Male	Sports	ACL	92
3	Lateral	Male	RTA	ACL	76
4	Medial	Female	RTA	None	90
5	Lateral	Male	Sports	ACL+PCL	82
6	Medial	Female	Trivial trauma	None	89
7	Medial	Male	RTA	ACL	74
8	Lateral	Male	Sports	ACL	84
9	Medial	Male	Sports	ACL	90
10	Medial	Male	Trivial trauma	ACL	89

We present you series of 10 cases of repair of bucket handle tear of meniscus with indigenously inside out technique using mulberry knot technique instead of conventional meniscus repair from June 2021 to December 2022. In our study of 10 cases, 50% cases (n=5) had history of sports injury, 30% (n=3) cases had history of road traffic accident and remaining 20% (n=2) due to trivial trauma. 80% patients were male. In 60% cases, medial meniscus was injured and remaining 40% had lateral meniscus injury. In 70% cases, anterior cruciate ligament was found torn along with meniscus while posterior cruciate ligament was found partially torn in one patient. Cruciate injuries were treated accordingly after meniscus repair. The average follow up period in our study was 3±1.2 months. As per knee society score, we have achieved 80% excellent and 20% good results at 3 months as shown in table 1. We did not encounter any complication in our study as far as intra operative or post operative events are concerned.

## Discussion

There are two menisci, medial (U-shaped) and lateral (S-shaped) semi lunar shaped, hydrated, biphasic fibro cartilaginous soft-tissue structures in the medial and lateral tibio femoral compartments of the knee joint, respectively [7]. The morphology of this load-bearing complex structure determines its vital functions: load bearing, joint stability, joint congruity, increasing joint contact area, decreasing joint contact stresses, protection of articular cartilage, shock absorption, lubrication, limitation of extreme movement and proprioception [8]. Meniscus injury of knee results in marked disability due to symptoms like pain, clicking and locking of knee. Patient can develop early osteoarthritis of knee if meniscus

injuries are not treated properly. For these reasons in today's era meniscus repair surgeries are of prime importance. Among meniscus repair techniques, arthroscopic inside out repair technique for meniscus is considered to be the best [9].

Michael E. Hantes et al. did a comparative study between three different techniques of meniscus repair. In his study, 30% patients who underwent outside in repair, 35% had inside out and 35% had all inside repair. Study suggested that inside-out technique is the most preferred one since it provides a high rate of meniscus healing without prolonged operation time [10].

There are different ways and suturing techniques to repair the meniscus. Mulberry knot provides sliding, stable and secured knot formation which is less bulky and more reliable. It has been used frequently to repair rotator cuff in shoulder arthroscopy. It does not cause post operative impingement during movements in rehabilitation process. Limitation of our study is small sample size and shorter follow up. However, it does reaffirm our belief to use this method as quicker and cost-effective method to repair the meniscus.

## Conclusion

Mulberry knot technique is unique, stable, secure knot which is done using Prolene 2-0 to be used for meniscus during arthroscopic procedures outside in and inside out repair techniques. Further studies are required in future to validate our results.

**Note:** There are no ethical issues for the study. Ethical approval was obtained before carrying out the study. There is no conflict of interest among authors. There was no funding or financial help from any sources.

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