

Original Research Article

# To determine diagnostic accuracy of MRI in diagnosis of various ligamentous and meniscal injuries

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## Abstract:

**Background & Method:** The aim of present study is to determine diagnostic accuracy of MRI in diagnosis of various ligamentous and meniscal injuries. The patients were briefed about procedure. The noise due to gradient coils and the need to restrict body movements during the scan time was explained to the patient. Patient is placed in supine position with the knee in a closely coupled extremity coil. The knee is externally rotated 15-20° (to facilitate visualization of the ACL completely on sagittal images and is also flexed 5-10°.

**Result:** In our study medial meniscal tears (72%) were more common than lateral meniscal tears. Most of the medial meniscal tears were located in the posterior horn constituting 42.8% of cases.

**Conclusion:** Most of the patients were males. Involvement of the left knee was more common than right knee. Commonest lesion detected in our study was meniscal tears. Medial meniscal tears were more common than lateral meniscal tears. Most of the meniscal tears were of grade 3 and were located in posterior horn. Complex tear was the most common morphological type of tear in medial meniscus and in lateral meniscus vertical type was the most common type. MRI should be done in every patient of suspected internal derangement of knee joint, to save a patient from unnecessary arthroscopy.

**Keywords:** accuracy, MRI ligamentous & meniscal injuries.

**Study Designed:** Observational Study

## 1. INTRODUCTION

The joint capsule of the knee joint is typical in consisting of an external fibrous layer (fibrous capsule) and an internal synovial membrane that lines all internal surfaces of the articular cavity not covered with articular cartilage[1].

The fibrous layer attaches to the femur superiorly, just proximal to the articular margins of the condyles. Posteriorly the fibrous layer encloses the condyles and the intercondylar fossa[2]. Inferiorly, the fibrous layer attaches to the margin of the superior articular surface (tibial plateau) of the tibia except where the tendon of popliteus crosses the bone[3].

The extensive synovial membrane lines all surfaces bounding the articular cavity not covered by articular cartilage. Anteriorly, the synovial membrane is attached to the articular margins of the patella[4]. The synovial membrane extends superiorly from the upper margin of the patella for a variable distance and is closely applied to the quadriceps muscle. Along the medial, lateral and posterior aspects of the capsule, the synovial membrane attaches to the femur at the edges of the articular surfaces posteriorly. Medially and laterally it passes from the articular margins inferiorly to attach to the articular margins of the tibial condyles.

The medial meniscus is C- shaped and broader posteriorly than anteriorly. Its anterior end (horn) attaches to the anterior intercondylar area of the tibia anterior to the attachment of the ACL. Its posterior end attaches to the posterior intercondylar area, anterior to the attachment of the PCL[5]. The medial meniscus firmly adheres to the deep surface of the tibial collateral ligament. Because of its widespread attachments laterally to the tibial intercondylar area and medially to the TCL, the medial meniscus is less mobile on the tibial plateau than is the lateral meniscus[6].

## 2. MATERIAL & METHOD

This prospective study was done in the Radio diagnosis Department at Index Medical College Hospital & Research Centre, Indore, Madhya Pradesh, India from June 2020 to May 2021. A total of 50 patients, who were referred to our department with strong clinical suspicion of internal derangements of knee joint, underwent magnetic resonance imaging evaluation of knee followed by arthroscopy in selected cases.

The patients were briefed about procedure. The noise due to gradient coils and the need to restrict body movements during the scan time was explained to the patient. Patient is placed in supine position with the knee in a closely coupled extremity coil. The knee is externally rotated 15-20° (to facilitate visualization of the ACL completely on sagittal images and is also flexed 5-10° (to increase the accuracy of assessing the patella-femoral compartment).

### Inclusion criteria

1. Patients referred to the Radio diagnosis Department with strong clinical suspicion of internal derangements of knee joint.

### Exclusion criteria

1. Patients with neoplasms, inflammatory or infectious disorders.
2. Patients who had previously undergone arthroscopy with repair of ligaments & menisci.
3. Patients with ferromagnetic implants, pacemakers, and aneurysm clips.

## 4. RESULTS

**TABLE 1: SEX DISTRIBUTION OF CASES**

S. NO.	SEX	NO OF CASES	% OF CASES
1.	MALE	38	76%
2.	FEMALE	12	24%
	TOTAL	50	100%

**TABLE 2: LATERALITY OF LESIONS**

S. NO.	SIDE	NO OF CASES	% OF CASES
1.	RIGHT	22	44%
2.	LEFT	27	54%
3.	BILATERAL	01	2%
	TOTAL	50	100

In our study left knee involvement was more common than right knee, constituting 54%.

**Table 3: DISTRIBUTION OF MENISCAL TEARS**

S. NO.	SIDE	NO. OF CASES	% OF CASES
1.	MEDIAL MENISCUS	24	72.7%
2.	LATERAL MENISCUS	09	27.2%

In our study medial meniscal tears (72%) were more common than lateral meniscal tears.

**Table 4: LOCATION OF MEDIAL MENISCAL TEARS**

S. NO.	LOCATION	NO. OF CASES	% OF CASES
1.	ANTERIOR HORN	01	7.3%
2.	BODY	03	21.4%
3.	POSTERIOR HORN	06	42.8%
4.	ENTIRE	04	28.5%

Most of the medial meniscal tears were located in the posterior horn constituting 42.8% of cases.

## 5. DISCUSSION

Magnetic resonance imaging has emerged as the frontline investigation for evaluation of internal derangements of the knee joint[7]. It is noninvasive, does not involve ionizing radiation and has multiplanar capability with excellent soft tissue demonstration. MRI is an accurate diagnostic method, enough to lead to decisions for conservative treatment and can save a patient from unnecessary arthroscopy. So it can affect treatment pathway of knee injuries in a critical way.

With this background, we attempt to determine the role of magnetic resonance imaging in the evaluation of internal derangements of the knee joint and tried to demonstrate the diagnostic value of MRI in diagnosing the presence or absence of the most common injuries of knee; the meniscus tears, the cruciate ligament tears and the chondral defects by comparing MRI results with the arthroscopy findings which is gold standard for the diagnosis of internal derangement of knee joint[8].

In this study out of 100 patients evaluated with MRI of the knee for internal derangement of knee joint, 67(67%) patients had meniscal tear. Of these, 49(73%) patients had medial meniscal tear and only 18 (27%) patients had lateral meniscal tear. Tears are more common in the medial meniscus, because the medial meniscus is less mobile, and it bears more force during weight bearing than the lateral meniscus[9]. This is similar to the study by Crues et al[10], in their study of meniscal tears in 142 patients found meniscal tears in 66% involving the medial meniscus and 33% involving the lateral meniscus.

Of the 49 medial meniscal tears noted in 100 patients, 32(66%) tears involved the posterior horn, 3(5%) involved the anterior horn, 6 (12%) involved the body and 8 tear(16%) involved entire meniscus. Crues et al[10] in their study also found meniscal tears involving the posterior horns which accounts for 57% compared to the 16% involving the anterior horn. Meniscal tears involving the posterior horn accounting for 50%-60% and tears involving the anterior horn accounting for 5%- 20%. D Smet et al[11] also found same result in their study.

## 6. CONCLUSION

Most of the patients were males. Involvement of the left knee was more common than right knee. Commonest lesion detected in our study was meniscal tears. Medial meniscal tears were more common than lateral meniscal tears. Most of the meniscal tears were of grade 3 and were located in posterior horn. Complex tear was the most common morphological type of tear in medial meniscus and in lateral meniscus vertical type was the most common type. MRI should be done in every patient of suspected internal derangement of knee joint, to save a patient from unnecessary arthroscopy.

## 7. REFERENCES

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