

## Original Research Article

# Comparing the findings of clinical examination versus magnetic resonance imaging for the diagnosis of ligamentous injuries of knee in rural area

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### ABSTRACT

**Background:** The knee is a complex synovial joint allowing flexion, extension, anteroposterior gliding and internal-external rotation. The major articular surfaces are the medial and lateral condyles of the femur and patellar surface. The aim of the study was to compare the findings of clinical examination versus magnetic resonance imaging (MRI) for the diagnosis of ligamentous injuries of knee in rural area.

**Methods:** Present study was an observational study carried out at rural medical college under orthopaedic department. All patients coming with ligamentous injury to orthopaedic department were studied. Thus such 50 cases were studied. All cases were referred to radiology department for MRI of knee. MRI reports and clinical reports were compared and analysis was done. Cases contraindicated for MRI examination were excluded from study. General demographic history, clinical presentation and MRI reports were recorded. All data was compiled in Microsoft excel and analysed using OpenEPI 2.3.1.

**Results:** Mean age was  $46.4 \pm 11.2$  years. Majority were males 70% and 30% were females. Swelling 62% was most commonly seen followed by knee pain. Majority 58% cases had grade 3 tear on MRI, followed by 36% had grade II and only 6% had grade I.

**Conclusions:** MRI is an excellent, non-invasive, radiation free imaging modality with multilane capabilities and excellent soft tissue delineation. It can accurately detect, localize and characterize various internal derangements of the knee joint and help in arriving at a correct anatomical diagnosis thereby guiding further management of the patient.

**Keywords:** Clinical examination, MRI, Ligamentous injuries, Knee

### INTRODUCTION

The knee is a complex synovial joint allowing flexion, extension, anteroposterior gliding and internal-external rotation. The major articular surfaces are the medial and lateral condyles of the femur and patellar surface. Four bands of tissue, the anterior and posterior cruciate ligaments, and the medial and lateral collateral ligaments connect the femur and the tibia and provide joint stability. Strong thigh muscles give the knee, strength and mobility. Semicircular rings of tough fibrous-cartilage tissue called

the lateral and medial menisci act as shock absorbers and the bones of the knee are surrounded by a thin, smooth tissue capsule lined by a thin synovial membrane which releases a special fluid that lubricates the knee, reducing friction to nearly zero in a healthy knee.<sup>1</sup>

Common anatomic structures that can mimic a tear include the transverse meniscal ligament, menisiofemoral ligaments (MFLs), popliteomeniscal fascicles, and meniscomeniscal ligament. Multi-ligament knee injuries (MLKIs) are rare but serious injuries that are usually

caused by high-energy trauma. Early detection of injured structures is crucial for the management of MLKIs, magnetic resonance imaging (MRI) is the necessary preoperative imaging examination, which is also valuable in detecting nerve injuries.<sup>2-5</sup> Present study was carried out to compare the findings of clinical examination versus MRI for the diagnosis of ligamentous injuries of knee in rural area.

**Aim**

The aim of the study was to compare the findings of clinical examination versus MRI for the diagnosis of ligamentous injuries of knee in rural area.

**METHODS**

**Study type**

Present study was an observational study.

**Study place**

Carried out at Pravara Rural Medical College, Loni under orthopedic department.

**Study duration**

Study was carried out for duration of 2 years. October 2020 to October 2022.

**Selection criteria**

The selection criteria was all cases having recent ligamentous injury, age>18 years, and both genders.

**Study population**

All patients coming with ligamentous injury to orthopaedic department were studied.

**Sample size**

Thus such 50 cases were studied. Simple random sampling was used (sample size was calculated using open epi software)

**Procedure**

All cases were referred to radiology department for MRI of knee. MRI reports and clinical reports were compared and analysis was done. Cases contraindicated for MRI examination were excluded from study. General demographic history, clinical presentation and MRI reports were recorded.

**Ethics**

Ethical approval was taken prior to start of study.

**Data analysis**

All data was compiled in Microsoft excel and analysed using Ope Epi 2.3.1.

**RESULTS**

Mean age was 46.4±11.2 years.

Majority were males 70% and 30% were females. Swelling 62% was most commonly seen followed by knee pain. Majority 58% cases had grade 3 tear on MRI, followed by 36% had grade II and only 6% had grade I.

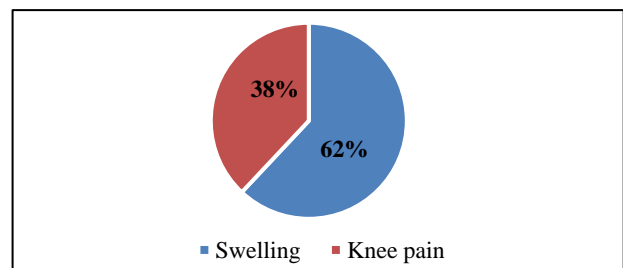
Table 2 shows that MRI sensitivity=91.11%, specificity=80%, positive predictive value=97.62%, negative predictive value=50%, accuracy=90%, p<0.001 HS.

**Table 1: Age distribution.**

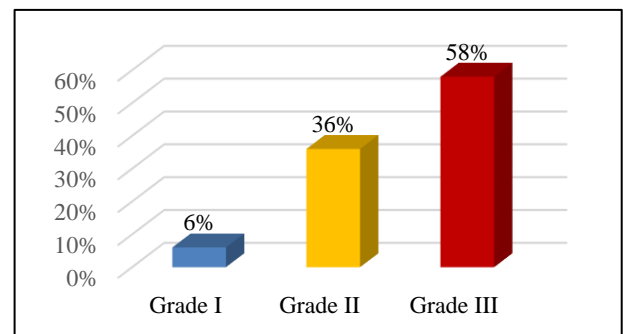
| Age in years | Frequency | Percentage |
|--------------|-----------|------------|
| <40          | 12        | 24         |
| >40          | 38        | 76         |
| <b>Total</b> | <b>50</b> | <b>100</b> |

**Table 2: Comparison between ligament tear on MRI and clinical diagnosis.**

| Ligament tear on MRI | Clinical examination |          | Total     |
|----------------------|----------------------|----------|-----------|
|                      | Positive             | Negative |           |
| <b>MRI positive</b>  | 41                   | 1        | 42        |
| <b>MRI negative</b>  | 4                    | 4        | 8         |
| <b>Total</b>         | <b>45</b>            | <b>5</b> | <b>50</b> |



**Figure 1: Clinical features.**



**Figure 2: Ligament tear.**

## DISCUSSION

Study by Li et al also showed male preponderance.<sup>7</sup> Madhusudhan et al showed that 68% were males and mean age was 52 years and majority cases had swelling as most common complaints.<sup>9</sup>

Similar findings were seen by Ruth et al that MRI is highly accurate in diagnosing meniscal and anterior cruciate ligament (ACL) tears.<sup>5</sup> It is the most appropriate screening tool before therapeutic arthroscopy. Study by Meyer et al found that interestingly, preoperative clinical examination was slightly inferior to stress radiography in the detection of MCL lesions.<sup>6</sup> However, clinical testing under general anaesthesia performed similar to stress radiography. The methodological quality analysis showed a low risk of bias regarding patient selection and index testing in each imaging modality. MRI was found to have high sensitivity (90.7%) and moderate specificity (63.6%) in the diagnosis of injuries to the ACL; high sensitivity (90.4%) and moderate specificity (50%) in the diagnosis of injuries to the PCL.<sup>7</sup>

Siddiqui et al showed there were only marginal differences in sensitivity and specificity of clinical examination and MRI in diagnosis of lateral meniscal and ACL injury.<sup>8</sup>

### Limitation

Sample size was less. If such studies will be carried out among more number of cases we can have good knowledge about various clinical presentations of cases. Even the study is conducted in a rural area. It can be done in rural as well as urban area.

## CONCLUSION

MRI is an excellent, noninvasive, radiation free imaging modality with multilane capabilities and excellent soft tissue delineation. It can accurately detect, localize and characterize various internal derangements of the knee joint and help in arriving at a correct anatomical diagnosis thereby guiding further management of the patient. MRI should be the initial investigation of choice after clinical examination in the evaluation of all cases of knee joint injuries. Because it can detect both intra and extra articular pathologies and also osseous structures. Based on the findings of MRI it acts as road map for further management.

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*Ethical approval: The study was approved by the institutional ethics committee*

## REFERENCES

1. Gray SD, Kaplan PA, Dussault RG. Imaging of the knee. Current status. Orthop Clin North Am. 1997;28(4):643-58.
2. Lachman JR, Rehman S, Pipitone PS. Traumatic Knee Dislocations: Evaluation, Management, and Surgical Treatment. Orthop Clin North Am. 2015;46(4):479-93.
3. Hua X, Tao H, Fang W, Tang J. Single-stage in situ suture repair of multiple-ligament knee injury: a retrospective study of 17 patients (18 knees). BMC Musculoskelet Disord. 2016;17:41.
4. Azar FM, Brandt JC, Miller RH, Phillips BB. Ultra-low-velocity knee dislocations. Am J Sports Med. 2011;39(10):2170-4.
5. Crawford R, Walley G, Bridgman S, Maffulli N. Magnetic resonance imaging versus arthroscopy in the diagnosis of knee pathology, concentrating on meniscal lesions and ACL tears: a systematic review. Br Med Bull. 2007;84:5-23.
6. Meyer P, Reiter A, Akoto R, Steadman J, Pagenstert G, Frosch KH, et al. Imaging of the medial collateral ligament of the knee: a systematic review. Arch Orthop Trauma Surg. 2022;142(12):3721-36.
7. Li X, Hou Q, Zhan X, Chang L, Ma X, Yuan H. The accuracy of MRI in diagnosing and classifying acute traumatic multiple ligament knee injuries. BMC Musculoskelet Disord. 2022;23(1):43.
8. Siddiqui MA, Ahmad I, Sabir AB, Ullah E, Rizvi SA, Rizvi SW. Clinical examination vs. MRI: evaluation of diagnostic accuracy in detecting ACL and meniscal injuries in comparison to arthroscopy. Pol Orthop Traumatol. 2013;78:59-63.
9. Madhusudhan TR, Kumar TM, Bastawrous SS, Sinha A. Clinical examination, MRI and arthroscopy in meniscal and ligamentous knee Injuries - a prospective study. J Orthop Surg Res. 2008;3:19.

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