Original Article

A Prospective Study to Evaluate the Efficacy of Clinical Assessment, MRI, And Arthroscopic Findings in Meniscal Tear

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Abstract

Background: These tears of the meniscus are one of the most common intra-articular knee conditions, causing pain, dysfunction and disability. Proper diagnosis is crucial to proper management. The purpose of this study was to prospectively assess and make comparisons between the diagnostic value of the clinical examination, MRI and arthroscopy evaluation in the patient presenting with a suspected meniscal tear. **Material and Methods:** A prospective study was carried out in patients with clinical presentation suggestive of meniscal injury. After detailed clinical examination and MRI, the patients all had arthroscopy. The sensitivity, specificity, and overall diagnostic (accuracy) accuracy of clinical evaluation and MRI was determined compared to arthroscopic diagnosis. The reference standard was considered to be the findings. **Results:** Clinical examination proved to be very sensitive but not quite as specific as MRI. MRI was more accurate than other methods in the diagnosis of medial and lateral tears. Arthroscopy confirmed the pitfalls of clinical and radiographic examinations, and emphasized the need for arthroscopy as the ultimate diagnostic and therapeutic tool. **Conclusion:** Clinical assessment and MRI are useful, non-invasive means of evaluating meniscal tears with MRI having greater overall diagnostic accuracy. But definitive diagnosis and management cannot be achieved without arthroscopy.

Keywords: Meniscal tear, Meniscal injury, Arthroscopy (Gold Standard).

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Introduction

Meniscal tears are one of the most common knee pathologies seen in orthopaedics at any age and may be traumatic, acute (especially in young athletes) or degenerative (as part of chronic joint disease in older individuals). The menisci are the semilunar fibrocartilaginous structures that are situated between the femoral condyles and the tibial plateau and serve an important function in load transmission, shock absorption, joint congruity, proprioception and the stability of the knee. The loss of meniscal integrity has been strongly correlated with changes in joint biomechanics, an increase in contact stresses and heightened cartilage degeneration which lead to early onset osteoarthritis.[1] When a meniscal tear is suspected, a diagnosis must be made with accuracy and a meniscal management plan designed to preserve meniscal tissue, and restore joint function, will help delay or avoid long-term degenerative changes. Clinical evaluation has traditionally been the basis for the initial assessment, which includes history-taking and maneuvers including joint line tenderness, McMurray's test, Apley's grind test and Thessaly test. Although easily performed, non-invasive and inexpensive, the diagnostic accuracy of these tests can be variable, particularly with varying examiner skill and patient co-operation, the presence of co-injury and the chronicity of the symptoms.[2]

Magnetic resonance imaging has become the most commonly used non-invasive imaging tool for assessment of internal derangements of the knee. MRI is great for the nonradioactive imaging of menisci, ligaments, cartilage, and subchondral bone, and for imaging in multiple planes.The fantastic benefits of MRI include the ability to image menisci, ligaments, cartilage, and subchondral bone without exposure to radiation, and imaging in multiple planes. Numerous studies reported high sensitivity (and specificity) of MRI for the diagnosis of meniscal tear, it is an indispensable instrument of modern orthopaedics practice.[3-5]

Arthroscopy of the knee is widely regarded as the gold standard for the diagnosis of meniscal pathology, offering direct visualization of intra-articular structures and allowing simultaneous therapeutic intervention. Arthroscopy enables precise assessment of tear type, location, stability, and reparability, facilitating individualized management strategies

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aimed at meniscal preservation whenever feasible.[6]

Given the clinical, economic, and prognostic implications of accurate meniscal tear diagnosis, there is a compelling need for prospective studies that systematically compare clinical assessment, MRI, and arthroscopic findings within a single patient cohort. In this context, the present prospective study aims to evaluate the efficacy of clinical assessment, MRI, and arthroscopic findings in patients with suspected meniscal tears, thereby contributing to a more rational and judicious approach to the diagnosis and management of meniscal injuries.

Materials and Methods

This was a prospective interventional study conducted at the Department of Orthopaedics, Netaji Subhash Chandra Bose Medical College and Hospital, Jabalpur, from May 2024 to April 2026. Informed consent was obtained from all participants prior to enrolment.

Inclusion criteria

- Patients between 18-50years of age presenting with knee pain

Exclusion criteria

- Patient with associated fractures around knee joint
- Previous history of knee surgery
- Dengerative knee joint disorders
- Infection or inflammatory conditions of the knee joint, ferromagnetic implants, pacemakers and aneurysm clips

A total of 31 patients met the inclusion criteria and was included in study.

Methodology

The present study conducted in Department of Orthopaedics, NSCB Medical College Jabalpur and patients with knee pain of age group 15-50 years are examined clinically.

The selected patients were briefed about the nature of study and a written informed consent was taken.

On the basis of chief complaints, patient was examined clinically and following clinical tests were done-

- Joint line tenderness
- Mcmurrays test
- Apleys grind test
- Thessaly test

And MRI was advised as per clinical findings, further patients with meniscal tear was posted for diagnostic arthroscopy.

Operative Technique

Patient are operated in supine position on OT table with attached arthroscopic attachments under spinal anaesthesia.

Appropriate size tourniquet applied.

Painting draping done.

Arthroscopic portals (Standard Anteromedial and Anterolateral) are marked with skin marker.

Diagnostic Arthroscopy, in which suprapatellar pouch, medial and lateral gutter, intercondylar notch area, medial and lateral femorotibial compartments are assessed followed by meniscal examination using probe to look for tear and stability and pattern note tear classified.

Instruments

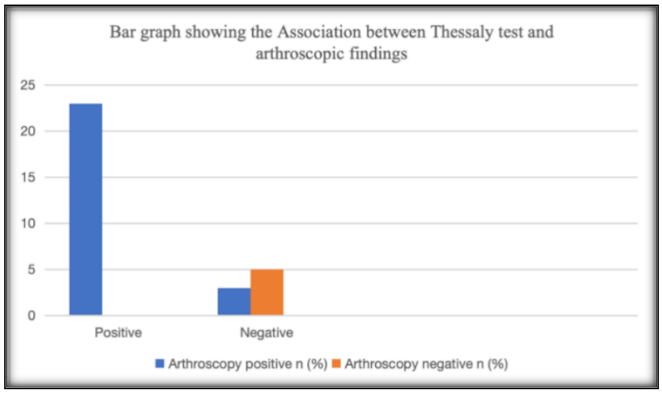
Results

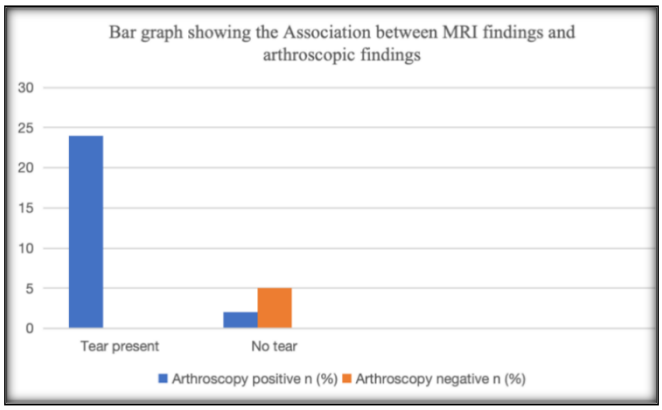
Table 1: Association between Thessaly test and arthroscopic findings (N = 31)

Thessaly test	Arthroscopy positive n (%)	Arthroscopy negative n (%)	Total n (%)
Positive	23 (100.0%)	0 (0.0%)	23 (100.0%)
Negative	3 (37.5%)	5 (62.5%)	8 (100.0%)
Total	26 (83.9%)	5 (16.1%)	31 (100.0%)

Table 2: Association between MRI findings and arthroscopic findings (N = 31)

MRI finding	Arthroscopy positive n (%)	Arthroscopy negative n (%)	Total n (%)
Tear present	24 (100.0%)	0 (0.0%)	24 (100.0%)
No tear	2 (28.6%)	5 (71.4%)	7 (100.0%)
Total	26 (83.9%)	5 (16.1%)	31 (100.0%)





Discussion

The aim of the present study was to evaluate the diagnostic accuracy of clinical examination and magnetic resonance imaging in detecting meniscal tears of the knee by comparing their findings with arthroscopy as the gold standard. The study specifically examined the usefulness of symptoms such as locking, swelling, and instability; clinical signs and special tests including joint line tenderness, McMurray's test, Apley's test, and Thessaly test; and the diagnostic contribution of MRI in relation to arthroscopic findings. By demonstrating the relative value of bedside clinical assessment and MRI against arthroscopy, the study provides evidence that can help optimize diagnostic pathways, particularly in settings where resources may be limited. The findings also highlight the continuing importance of careful clinical examination in modern practice, reinforce the role of MRI as a complementary tool, and contribute to improved patient selection for arthroscopy and appropriate management of meniscal injuries.

Conclusion

In the present study, the conclusion was reached that meniscal tears are indeed a very common knee injury in the young and middle aged population that causes symptoms. Locking showed highly significant association with arthroscopically confirmed meniscal tear, while there wasn't a significant association with swelling or instability. The special tests with the highest sensitivity were the Thessaly test (84.6%), McMurray's test (76.9%) and the Apley's test (69.2%) and there was no difference in their specificity (all 80.0%). MRI also performed very well with a sensitivity of 88.5%, specificity of 80.0%, and an overall diagnostic accuracy of 87.1%, and was found to be highly associated with arthroscopic findings. In general, the study finds that the integrated approach in which clinical assessment is the basis for the diagnosis, MRI as an important additional diagnostic tool, and arthroscopy can be used to confirm and treat the patient when indicated in well-selected patients.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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