

EVALUATION OF SPORTS RELATED MENISCAL TEARS USING 3T MRI

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ABSTRACT

Aims and Objectives – The main aim of the study is to evaluate sports related meniscal injuries using 3T MRI and describe and classify the meniscal injuries in sports related trauma.

Methodology - This is a retrospective study done in Department of Radiology, Yenepoya Medical College and Hospital, Mangalore. All patients who undergo MRI Knee in Yenepoya medical college hospital from January 2022 to July 2022 will be identified using Hospital information system. Out of these patients those who have sports related history will be selected.

Results – 90.6% were males and only 9.4% were females. Mean age of the study participants was 24.41 ± 4.196 years with minimum and maximum age being 18 and 33 years respectively. 71.8% (23 patients) had medial meniscal injury and 46.8% (15 patients) had lateral meniscal injuries. 59.4% of the cases also had associated ligament injuries.

Conclusion - MRI is efficient in providing more information about the grades of meniscal injuries and any associated ligamentous injuries to guide the surgeon.

Key words – Meniscal injuries, Sports related, Athletes, MRI

1. INTRODUCTION

Magnetic resonance (MR) imaging is currently the modality of choice for detecting meniscal injuries⁵ and planning subsequent treatment. MR imaging demonstrates high sensitivity (93% for the medial meniscus and 79% for the lateral meniscus) and specificity (88% for the medial meniscus and 96% for the lateral meniscus) for detection of meniscal tears. MRI diagnosis is based on the presence of linear signal changes that come in contact with the meniscal surfaces, or is based on the shape and size alterations of the meniscus⁶.

Acute traumatic meniscal tears are frequently seen in the athletic population either as an isolated finding or in conjunction with other injuries⁴. Meniscal tears can be classified into horizontal, vertical, radial, longitudinal, horizontal flap, vertical flap or complex. Meniscal tears with associated ligamentous injuries have been most extensively studied in the setting of ACL tears.

2. MATERIALS AND METHODS

Study design

Retrospective cross-sectional study.

Study population

Data for the study was collected from the patients who present to OPDs with a history of sports related injury referred to the department of diagnostic radiology at Yenepoya medical college and hospital, over a period of six months.

Period of study

January 2022 to July 2022

Place of study

Department of Radiology, Yenepoya Medical College and Hospital, Mangalore.

Inclusion criteria for cases

1. Patient who have sports related knee injury and had undergone MRI knee at Yenepoya medical college will be included in the study.

Exclusion criteria

1. Patients who do not have history of sports related trauma.
2. Patients who have not undergone MRI knee.

Study procedure

Patient's selection - The patients was included in the study irrespective of sex and socio-economic status using the inclusion criteria. We will exclude the patients who has history of claustrophobia and Patients with metallic prosthetic implants from our study. Patients with previous surgical history were also excluded from the study. A detailed clinical history was taken followed by MRI evaluation.

MRI of the knee

lain MRI was performed using a 3 Tesla machine. Imaging parameters included in the study are: The standard sequences are coronal T2-weighted fast spin-echo with fat saturation, sagittal proton-density spin-echo, sagittal T2-weighted fast spin echo, and axial proton-density fast spin-echo with fat saturation

Statistical analysis

Data will be entered into Microsoft excel data sheet and will be analyzed using SPSS 22 version software. Categorical data will be represented in the form of Frequencies and proportions. Chi-square will be used as test of significance.

3. RESULTS

The mean age of the study participants was 24.41 ± 4.196 years with minimum and maximum age being 18 and 33 years respectively.

Table 1: Distribution of study participants according to Gender

Gender	Frequency	Percentage
Female	3	9.4
Male	29	90.6
Total	32	100.0

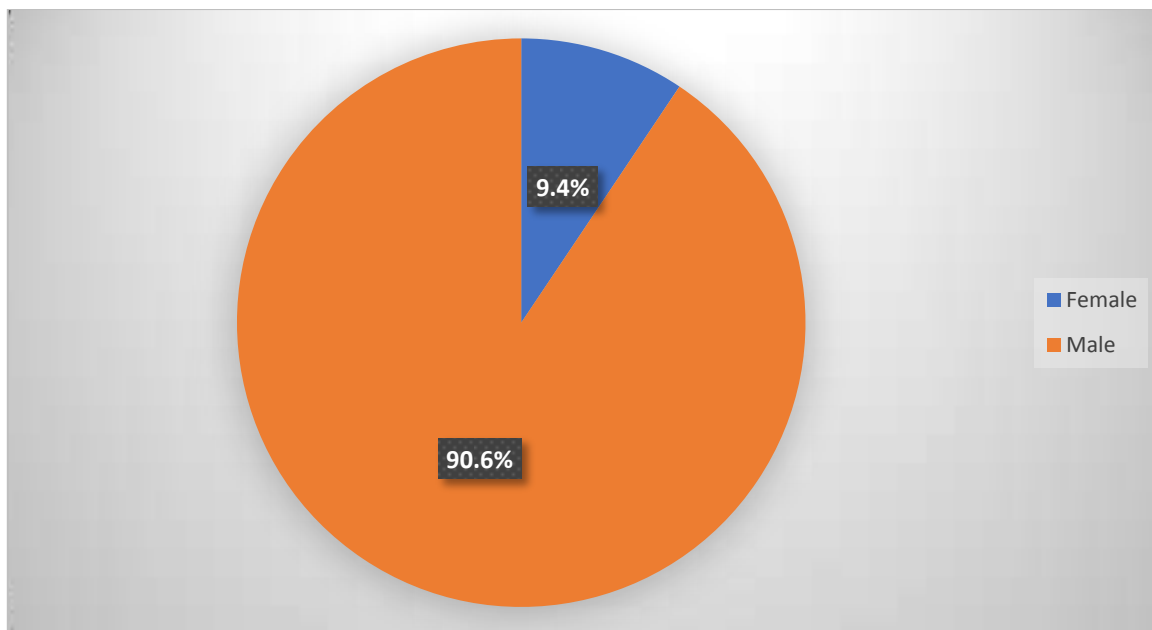


Table 2: Distribution of study participants according to meniscal injury

Injury	Frequency	Percentage
Medial meniscal injury	23	71.8
Lateral meniscal injury	15	46.8

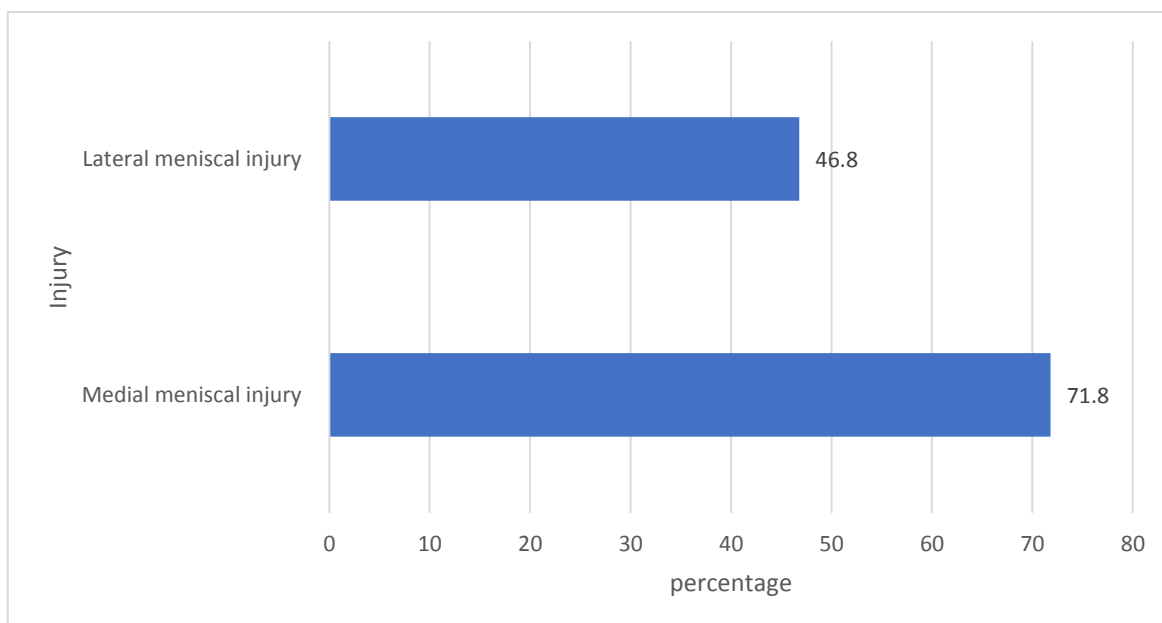


Table 3: Distribution of study participants according to Medial meniscal injury

Medial meniscal injury	Frequency	Percentage
Grade I	11	47.8
Grade II	3	13.1

Grade III	9	39.1
Total	23	100.0

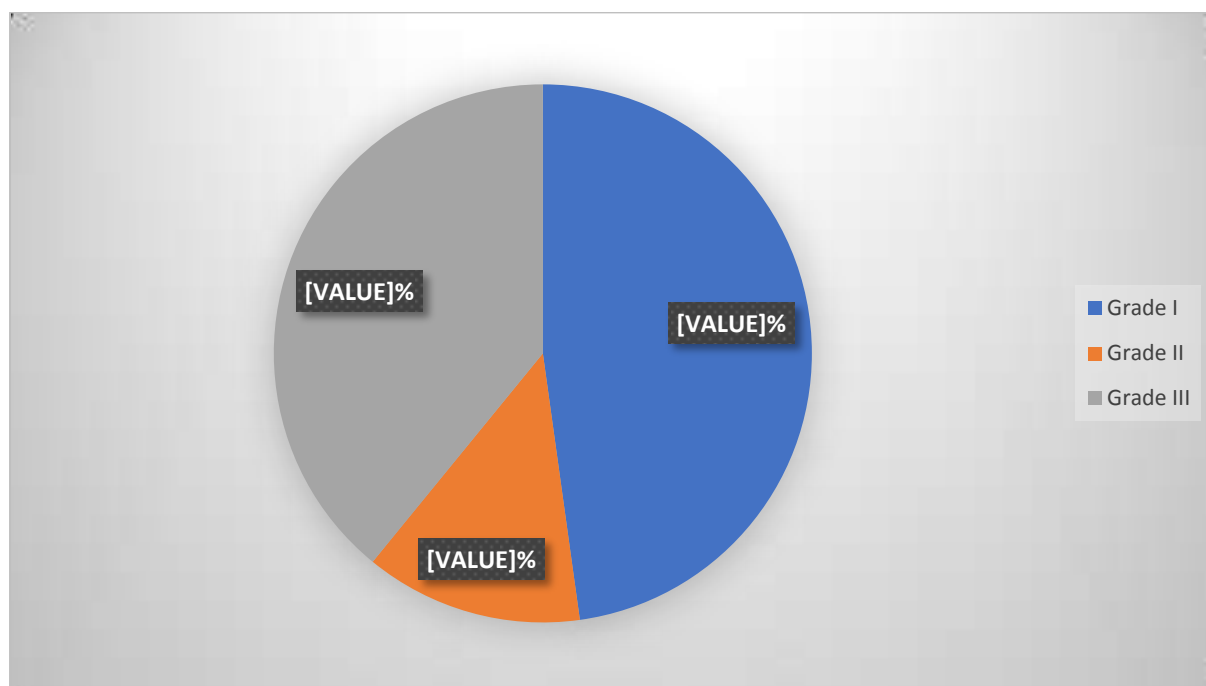


Table 4: Distribution of study participants according to Lateral meniscal injury

Lateral meniscal injury	Frequency	Percentage
Grade I	6	40.0
Grade II	6	40.0
Grade III	3	20.0
Total	15	100.0

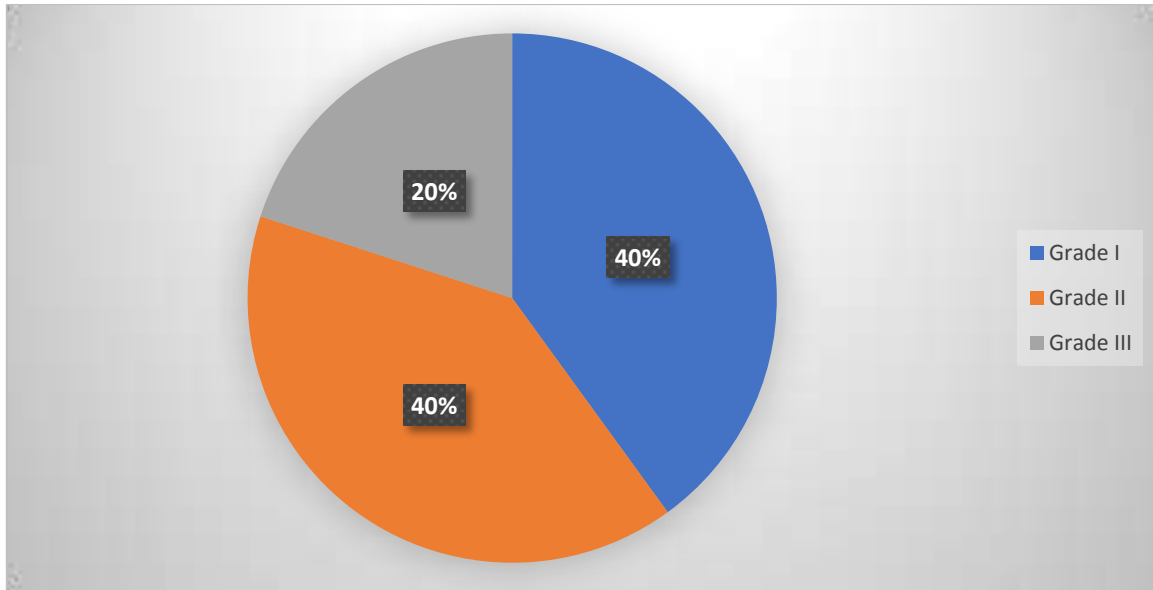
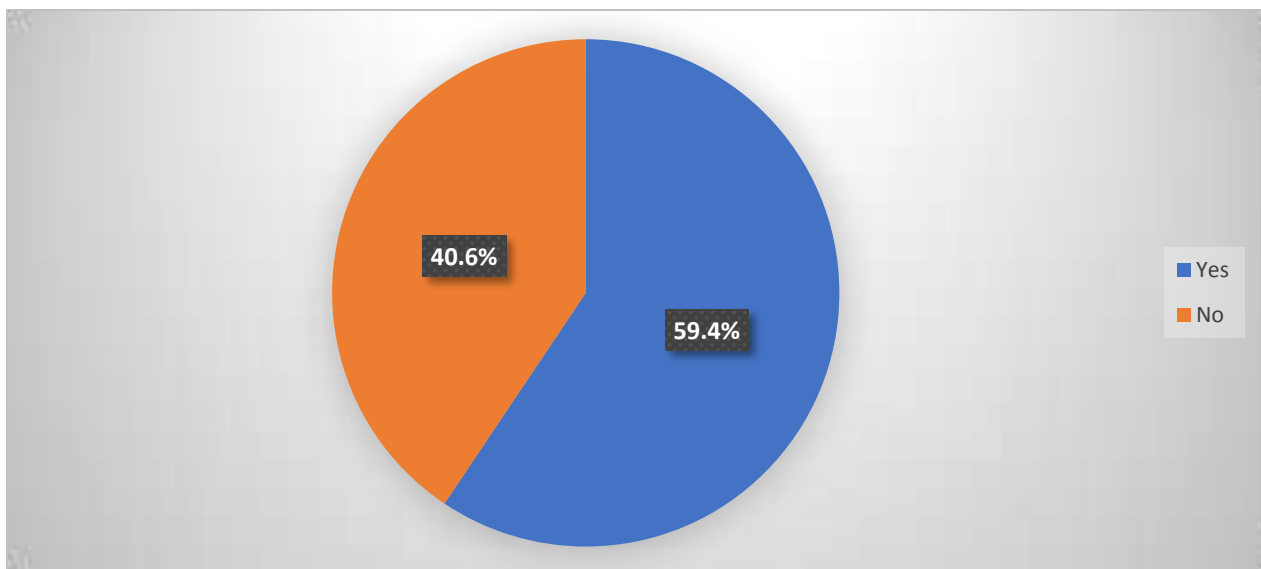


Table 5: Distribution of study participants according to ligamentous injuries

ligamentous injuries	Frequency	Percentage
Yes	19	59.4
No	13	40.6
Total	32	100.0



4. DISCUSSION

Meniscal injuries are very common among professional and amateur athletes and are a major cause of functional impairment of the knee. It is the most common indication for arthroscopic surgery of the knee. For athletes, unnecessary treatment or intervention may be as damaging to a competitive future as failure to diagnose a clinically significant injury.

In our study ,90.6% were males in case and only 9.4% were females. mean age of the study participants was 24.41 ± 4.196 years with minimum and maximum age being 18 and 33 years

respectively. In the study done by Waleed hetta et al in Egypt, 93.4% of the patients were males and 6.6% were females. the age of the patients ranged between 15 and 30 years with a mean age of $[21.4 \pm 3.45]$.

In our study 71.8% (23 patients) had medial meniscal injury and 46.8% (15 patients) had lateral meniscal injuries. 59.4% of the cases also had associated ligament injuries.

In a study done by Soumya v et al in India, the mean age of the study participants was 27. Out of the 100 patients, 62 were males (62%) and 38 (38%) were females. The commonest age group was 21 to 30 years for both males and females with mean age of 31.67 years for male and 35.1 years for female. There were 18 medial meniscal tear and 17 lateral meniscal tears.

In another study conducted by sharad G Gadgil et al in India, 90.44 % had medial meniscal tear while 18.38 % patients had lateral meniscal tear. Both medial and lateral meniscal tears were found in 8.82 % patients. Atleast 50% of the cases also had associated ligament injuries.

Criteria for Meniscal Tears
 There are three basic MR criteria of meniscal tears: a)high intrameniscal signal extending to at least one articular surface (b)which should be seen in at least two slices called two slice touch rule (do not have to be contiguous, e.g. sagittal and coronal slices) c)distortion of the normal meniscal morphology if no prior surgery.⁵ The grading system used for meniscal signal changes are described as: Grade I signal—globular signal intensity within the meniscus not contiguous with the articular surface. Grade II signal—linear signal intensity within the meniscus not contiguous with the articular surface. Grade III signal— linear signal intensity within the meniscus extending to the articular surface. Traumatic injuries of the MCL are common and range from intrasubstance tears (grade 1 sprain) to incomplete tears (grade 2 sprain) to complete disruption (grade 3 sprain).

In conclusion, Most of the study subjects were males compared to females with a mean age of 24.41 ± 4.196 years with minimum and maximum age being 18 and 33 years. Medial meniscal injuries were more prevalent compared to lateral meniscal injuries. Our data indicates that Grade I tear of the medial meniscus are the most frequent ones only next to Grade I tear of the lateral meniscus.

5. CONCLUSION

Complex anatomy and biomechanics of the knee is important to be understood for better diagnosis of sports injuries of the knee. Injuries to subtle structures and the lack of clarity of ligamentous and meniscal injuries often have significant impact in surgical management of patients. It is highly important to appreciate the limitations and pitfalls of imaging tests to reduce interpretive errors and have a better overall outcome. The mechanism of injury, inferred from osseous contusions, and recognition of patterns of injury can be helpful in understanding the full extent of the injury.

6. REFERENCES

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