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Arthroscopic Evaluation of Association of Meniscus Injuries in Patients with Anterior Cruciate Ligament Injuries

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Abstract **Original Research Article**

***Background*:** The knee joint's stability relies significantly on the integrity of the meniscus and the anterior cruciate ligament (ACL). Chronic ACL tears can compromise knee stability, making the meniscus a crucial stabilizer. Understanding the prevalence and patterns of meniscus injuries associated with chronic ACL tears is essential for effective management. ***Objective*:** This study aimed to assess the arthroscopic evaluation of association of meniscus injuries in patients with anterior cruciate ligament injuries. ***Method*:** A retrospective analysis was conducted on thirty-three patients diagnosed with ACL injuries at MuMCH between January 2021 and December 2023. Patients aged 18-50 with ACL injuries, with or without meniscus damage, were included. Clinical evaluations, knee MRI scans, and diagnostic knee arthroscopies were performed. The study evaluated meniscus injuries associated with chronic ACL injuries and assessed outcomes using the modified Lysholm score. ***Results*:** The study revealed a predominant occurrence of meniscus injuries (70%) among participants, with a majority falling within the 38-47 years age bracket (45.45%) and a male majority (60%). Sports and accidental injuries accounted for 40% each, while road traffic accidents contributed 20%. Lateral meniscus tears were the most prevalent (30.30%), followed by combined medial and lateral meniscus tears (33.33%). Posterior horn tears were predominant, particularly in the medial meniscus. ***Conclusion*:** The study highlights a high incidence of meniscus injuries associated with chronic ACL tears, with medial meniscus injuries prevailing over lateral tears. Posterior horn tears were predominant, emphasizing the medial meniscus's significant role in knee stability. These findings underscore the importance of early detection and appropriate management of meniscus injuries in chronic ACL-deficient knees to prevent degenerative changes and optimize patient outcomes.

Keywords: Meniscus injuries, anterior cruciate ligament, knee stability, chronic ACL deficiency.

INTRODUCTION

When it comes to the knee joint, the meniscus serves as the secondary stabilizer in the anterior-posterior direction, while the anterior cruciate ligament (ACL) is the major mechanism responsible for stabilizing the knee joint. When there is a chronic rupture of the anterior cruciate ligament (ACL) or when the function of the ACL is lost, the meniscus becomes the primary stabilizer of the knee joint [1, 2]. It is possible that damage to both of these structures might undermine the stability of the knee joint and influence the mobility of the joint [3, 4]. The most prevalent types of meniscal injuries are those that occur in contact sports and those that occur in automobile accidents [5]. Injury to the meniscus is often accompanied by injury to the anterior cruciate ligament [6]. Both magnetic resonance imaging (MRI) and diagnostic arthroscopy knee may be used to provide a diagnosis of meniscal injuries or internal derangement of the knee. The MRI knee is a non-invasive diagnostic tool that may be utilized as a screening tool prior to therapeutic intervention. Additionally, MRI is more accurate in identifying meniscus and ACL damage prior to surgical intervention [7]. In comparison to therapeutic arthroscopy, magnetic resonance imaging (MRI) is a more significant screening technique [7]. When it comes to the early development

of osteoarthritis, it has been noted in a few studies that injuries to the meniscus are connected with the condition. The early development of osteoarthritis is reported in individuals who have had their anterior cruciate ligament (ACL) rebuilt as a result of meniscus damage [8, 9]. In light of this, meniscal tissue is being retained to the greatest extent feasible in modern times, and meniscus restoration is often recommended over meniscectomy [10, 11]. It is very challenging to repair the meniscus in chronic instances of anterior cruciate ligament (ACL) tears because the intricacy of meniscus tears rises with the severity of the rupture [12]. In order to forestall the development of degenerative changes in the knee joint, it is essential to detect and treat a meniscus tear as soon as possible. The purpose of the study was to determine the percentage of side/laterality injuries (medial meniscus or lateral meniscus) and part of meniscus injuries (anterior horn, body, and posterior horn) in chronic ACL-deficient knees among our study population. Additionally, the study aimed to evaluate the incidence of meniscus injuries that are associated with chronic ACL injuries.

OBJECTIVE

The purpose of this study is to evaluate the arthroscopic evaluation of association between meniscus injuries and anterior cruciate ligament injuries in patients.

METHOD

Between the months of January 2021 and December 2023, this retrospective research was carried out on a total of thirty-three patients at MuMCH. All of the participants in the research were between the ages of 18 and 50 and had been diagnosed with an anterior cruciate ligament (ACL) injury in their knees, with or without meniscus damage. A patient was not allowed to participate in the study if they had a rupture in their posterior cruciate ligament (PCL), an injury to their medial collateral ligament (MCL), or an injury to their lateral collateral ligament (LCL), had previously had surgery on index knees, or had more than grade 3 knee osteoarthritis according to the Kellgren and Lawrence classification. It was determined that clinical evaluation of patients who had knee injuries, magnetic resonance imaging (MRI) of the knee joint, and diagnostic arthroscopy of the knee joint were all gathered. After gathering the necessary information, we made an estimate of the number of meniscus injuries that are connected with chronic anterior cruciate ligament injuries. Based on the modified Lysholm score, the highest possible score is 100 points, with a score between 91 and 100 being regarded good, 65 to 90 being considered acceptable, and a score below 64 being deemed inadequate.

RESULTS

Table-1: Age distribution of study population

Age Group	n	%
18-27 years	7	21.21%
28-37 years	11	33.34%
38-47 years	15	45.45%

In table 1 shows age distribution of study population. In terms of age, the majority falls within the 38-47 years bracket, comprising 45.45% of the sample, followed by the 28-37 years group at 33.34%, and the 18-27 years group at 21.21%.

Table-2: Gender distribution of study population

Gender	n	%
Male	20	60%
Female	13	40%

Table 2 shows gender distribution of study population. Regarding gender, males constitute the larger portion at 60%, while females account for 40% of the participants. These findings suggest a slight skew towards younger adults aged 28-37 years and a male majority within the sample population.

The table illustrates the distribution of mechanisms of injury, with sports and accidental occurrences each accounting for 40% of cases, while road traffic accidents (RTAs) contribute to 20% of injuries. This data underscores the significant prevalence of both sports-related and unintentional injuries, highlighting the importance of preventive measures and safety protocols in various settings, from recreational activities to everyday environments. Additionally, the notable portion attributed to RTAs emphasizes the necessity of road safety initiatives and awareness campaigns to mitigate such incidents and their associated risks.

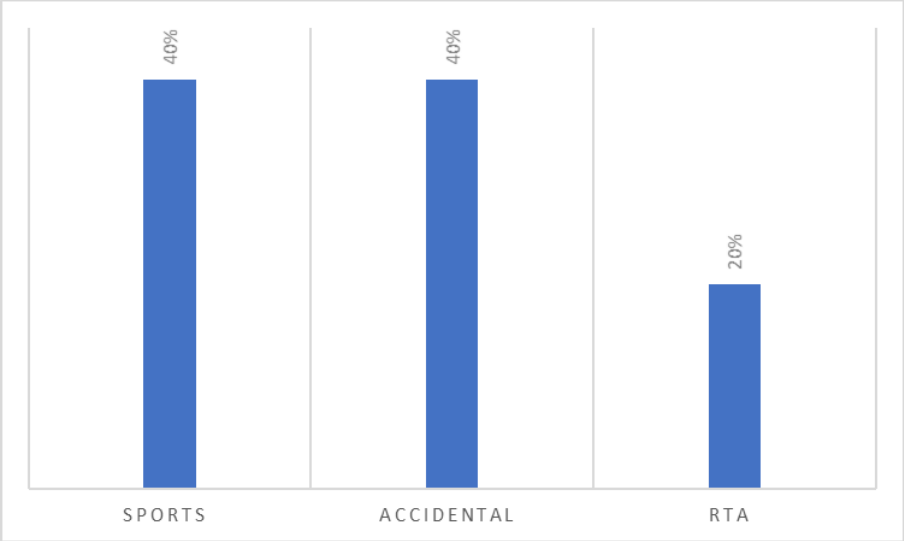

Figure-1: Mechanism of injury

In the study, 70% of participants were found to have meniscus injuries, while the remaining 30% did not exhibit such injuries. These results suggest a significant prevalence of meniscus injuries among the subjects under investigation, highlighting the importance of further research and interventions aimed at understanding and managing this common orthopedic condition.

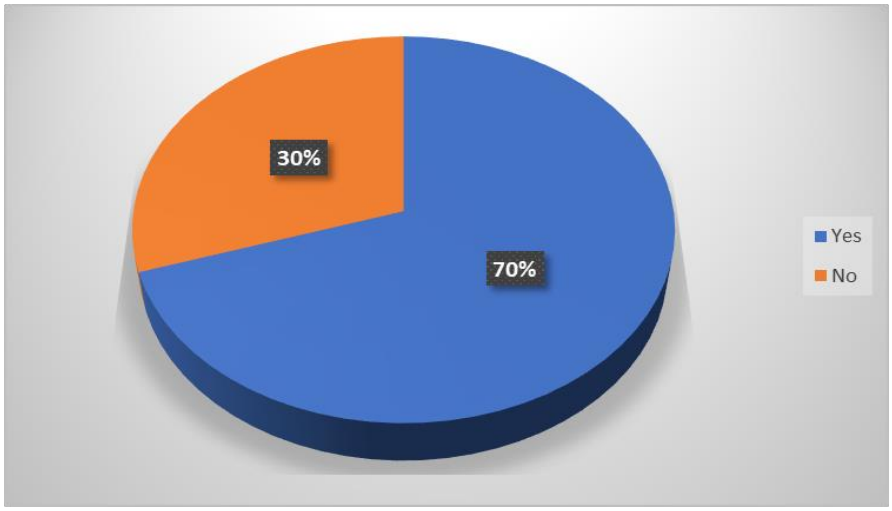

Figure-2: Status of Meniscus injury

The distribution of meniscal tears based on laterality reveals a notable prevalence of lateral meniscus tears, accounting for 30.30% of cases, closely followed by combined tears affecting both the medial and lateral menisci at 33.33%. Isolated medial meniscus tears represent 24.24% of cases, while isolated ACL tears are the least common at 12.13%.

Table-3: Distribution of meniscal tear based on laterality

Distribution of meniscal tear based on laterality	N	%
Isolated medial meniscus tear	8	24.24%
Isolated lateral meniscus tear	10	30.30%
Combined medial and lateral meniscus tear	11	33.33%
Isolated ACL tear	4	12.13%

The table illustrates the distribution of injuries based on the location of meniscus tears, categorizing them into isolated medial meniscus tears combined meniscus tears and isolated lateral meniscus tears. In the case of anterior horn tears, there were 2 instances in the isolated medial meniscus tear group and 3 instances in

the isolated lateral meniscus tear group. Conversely, injuries at the posterior horn were more prevalent, with 17 occurrences in the isolated medial meniscus tear group compared to 6 cases in the isolated lateral meniscus tear group.

Table-4: Injuries based on the location of meniscus tear

Part of Meniscus	Isolated Medial Meniscus tear + Combined Meniscus tear	Isolated Lateral Meniscus + Combined Meniscus tear
Anterior Horn	2	3
Body	3	2
Posterior Horn	17	6

The results indicate the distribution of different types of knee operations performed, with reconstruction procedures comprising the highest percentage at 60%, followed by partial meniscectomy at 25%, and meniscectomy with reconstruction at 15%. These figures suggest a notable prevalence of reconstruction surgeries, possibly indicating a trend towards more conservative approaches aimed at preserving knee function and structure whenever possible. The relatively lower percentages of partial meniscectomy and meniscectomy with reconstruction may reflect advancements in surgical techniques prioritizing preservation of tissue and joint integrity.

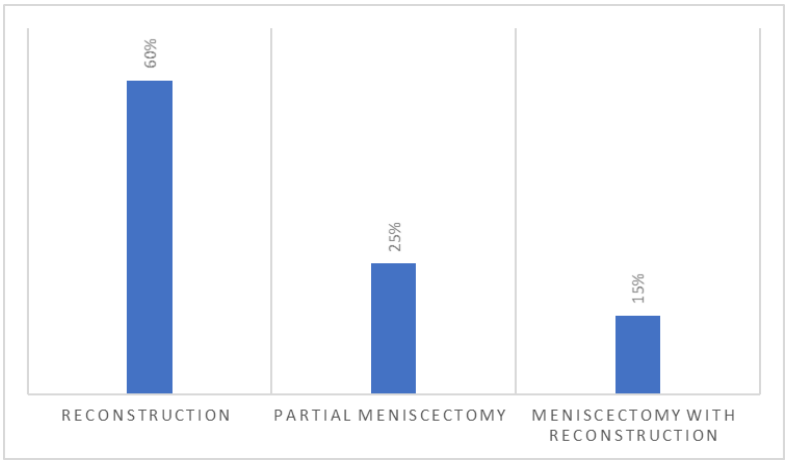

Figure-3: Types of Operation

According to the figure, 70% of the outcomes are classified as excellent, while 25% are considered satisfactory, and 5% fall under the unsatisfactory category. This indicates a higher proportion of outcomes are deemed satisfactory compared to excellent or unsatisfactory. It suggests a moderate level of success overall, with room for improvement in enhancing outcomes to reach higher levels of excellence while addressing areas of dissatisfaction.

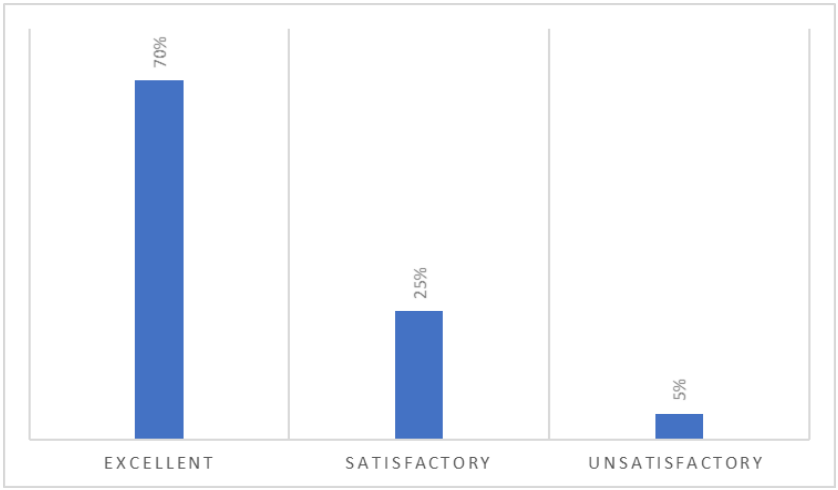

Figure-4: Outcomes of patients based on modified Lysholm score

DISCUSSION

Within our community, we were able to determine the prevalence of meniscal injuries that are connected with anterior cruciate ligament tears. Concomitant meniscal injuries linked with ACL tears were shown to occur in as many as 83 percent of patients, according to the analysis of the relevant literature [14]. Concomitant with anterior cruciate ligament (ACL) injuries, the findings of the research conducted by Kilcoyne *et al*., [14] revealed that 56% of tears occurred in the medial meniscus, whereas 44% of tears occurred in the lateral meniscus. Additionally, they discovered that the frequency of medial meniscus damage and lateral meniscus injury was the same, which was 56% and 44%, respectively, in individuals who had sustained acute and chronic injuries to their anterior cruciate ligament (ACL).

According to the findings of our research, the distribution of meniscal tears based on laterality indicates a significant predominance of lateral meniscus tears, which account for 30.30 percent of cases. Lateral meniscus tears are closely followed by mixed tears that impact both the medial and lateral menisci, which account for 33.33 percent of cases. Torn medial meniscus tears account for 24.24 percent of all instances, whereas isolated torn anterior cruciate ligament tears account for just 12.13 percent of all cases. As a consequence of this, the medial meniscus is more susceptible to damage when the knee joint is subjected to twisting motions [15]. The research conducted by Thompson and colleagues shown that the meniscus is capable of providing knee stability in anterior-posterior (AP), varus-valgus, and rotational stability in vitro in knees that are lacking in the anterior-posterior ligament (ACL). Due to the fact that the meniscus is subjected to a greater amount of stress anytime joint movement takes place, particularly when twisting movement is involved, it is more likely to sustain an injury in a knee that has a chronic ACL deficiency [16]. According to the findings of our research, the frequency of medial meniscus damage linked with chronic anterior cruciate ligament injury was higher than the incidence of lateral meniscus injury. The medial meniscus will serve as the major stabilizer of the knee joint, particularly in the anterior-posterior direction, in the event that the anterior cruciate ligament (ACL) is torn or does not function properly. When there is movement in the direction of tibial translation, the posterior horn of the medial meniscus functions as a wedge or a mechanical barrier between the femur and the tibia. The fact that our sample size was so small was a disadvantage of our research. It would be necessary to have a bigger population in order to determine the real incidence of meniscus tears occurring concurrently with ACL tears.

CONCLUSION

In our study sample, meniscus injuries frequently coincided with persistent ACL injuries. The incidence of medial meniscus injury was notably higher than lateral meniscus injury when coupled with ACL tear. Furthermore, the posterior horn of the medial meniscus experienced the majority of tears compared to the anterior horn and body.

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