

## Original Research

# Assessment Of Association Of The Lateral Meniscus Tear With High Grade Anterior Cruciate Ligament

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### Abstract

**Background:** The present study was conducted for assessing the association of the lateral meniscus tear with high grade anterior cruciate ligament.

**Materials & methods:** A total of 80 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. Radiographic examination was done and detailed information in relation to primary ACL reconstruction was recorded on separate Performa. Inclusion criteria for the present study included patients with isolated high grade ACL lateral meniscus tears. On the basis of arthroscopic appearance of the lateral meniscus, patients were divided broadly into three study groups: 'no tear,' 'minor tear,' and 'major tear.' All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Univariate analysis was performed for analysis of level of significance.

**Results:** A total of 80 subjects were enrolled. 37.5 percent of the subjects showed no tear while 21.25 percent of the subjects showed minor tear. 31.25 percent of the subjects showed major tear. While analyzing the results with univariate analysis, gender, age and mechanism of injury were found to be significant factors affecting tear severity.

**Conclusion:** Male gender, advancing age, and especially subjects who sustained a contact injury have a high risk for an associated major lateral meniscus tear.

**Key words:** Lateral meniscus tear, Anterior cruciate ligament

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### Introduction

The anterior cruciate ligament (ACL) is one of 2 cruciate ligaments that aids in stabilizing the knee joint. It is a strong band made of connective tissue and collagenous fibers that originate from the anteromedial aspect of the intercondylar region of the tibial plateau and extends postero-laterally to attach to the medial aspect of the lateral femoral condyle, where there are two important landmarks; The lateral intercondylar ridge which defines the anterior boundary of the ACL, and the bifurcate ridge which separates the 2 ACL bundles.<sup>1- 3</sup>The ACL is composed of two bundles: the anteromedial (AMB) and the posterolateral (PLB). The AMB fascicles arise from the most posterior and proximal site of the femoral attachment and attach to the anteromedial portion of the tibial attachment. The PLB fascicles arise from the distal portion of the

femoral attachment and attach to the posterolateral portion of the tibial attachment. The ACL is mostly composed of the PLB.<sup>4, 5</sup>The ligament may get avulsed from any one of its attachments. The severity may depend on the mechanism of injury ranging from a sprain to a complete tear of the ACL. There may even be an avulsion of a small piece of bone accompanying the ligament, which can be visualized on the X-rays. It can occur as an isolated ACL tear or involvement of a multi-ligamentous injury, depending on the mechanism and severity of the damage. Another rare type of injury is knee dislocation leading to multi-ligamentous damage. Clinical features of complete ACL tear include pain, swelling secondary to hemarthrosis, and instability in case of chronic tears. Clinically ACL tears can be diagnosed by the anterior drawer test and the Lachman test.<sup>4- 6</sup>Hence; the present study was conducted for

assessing the association of the lateral meniscus tear with high grade anterior cruciate ligament.

### Materials & methods

The present study was conducted for assessing association of the lateral meniscus tear with high grade anterior cruciate ligament. A total of 80 patients were enrolled. Complete demographic and clinical details of all the patients was obtained. Radiographic examination was done and detailed information in relation to primary ACL reconstruction was recorded on separate Performa. Inclusion criteria for the present study included patients with isolated high grade ACL lateral meniscus tears. Patients with concomitant insufficiency of the posterior cruciate ligament were included from the present study. Detailed photographic documentation of every diagnostic arthroscopy and of crucial steps of each arthroscopic procedure was recorded. On the basis of arthroscopic appearance of the lateral meniscus, patients were divided broadly into three study groups: 'no tear,' 'minor tear,' and 'major tear.' Minor tear patterns included radial or flap rips involving less than 75% of the meniscal breadth, complete stable longitudinal tears not extending more than 1 cm in front

of the popliteus tendon, and incomplete longitudinal tears. Major tear patterns included root tears, unstable longitudinal rips such as bucket-handle tears, and full radial tears involving meniscus transection. All patients' preoperative clinical notes were examined in order to gather history and demographic information. According to the World Health Organization's categorization, patients were split into three groups for the purpose of BMI analysis: <24.9 kg/m<sup>2</sup> (normal), 25–29.9 kg/m<sup>2</sup> (overweight), and >30 kg/m<sup>2</sup> (obesity).<sup>7</sup>All the results were recorded in Microsoft excel sheet and were subjected to statistical analysis using SPSS software. Univariate analysis was performed for analysis of level of significance.

### Results

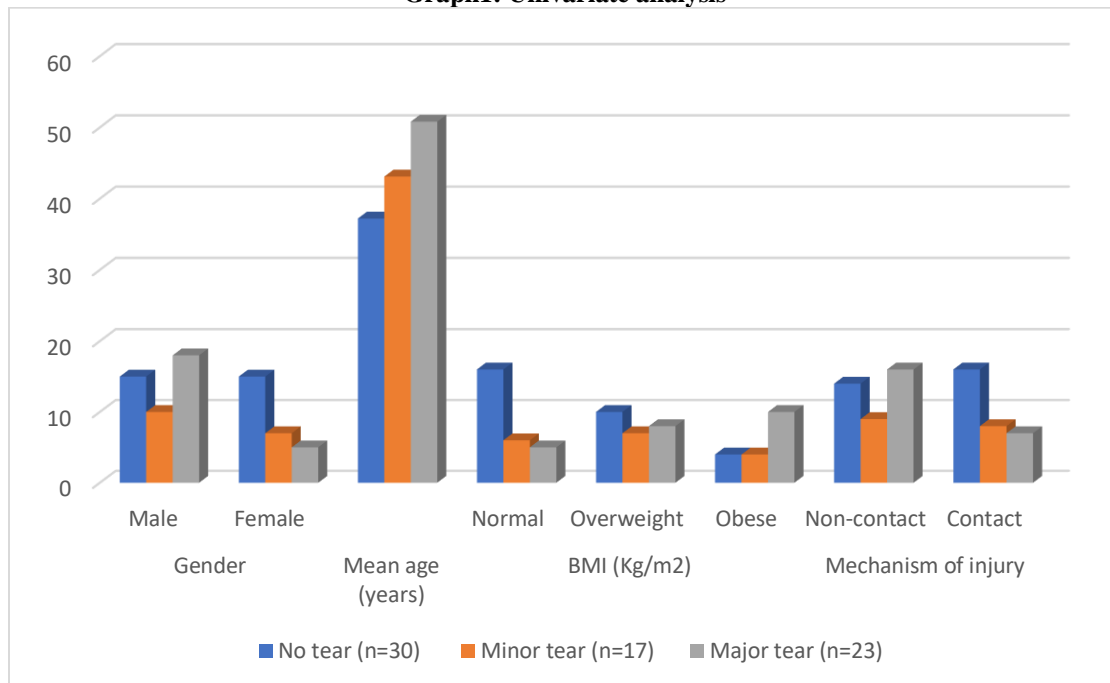
A total of 80 subjects were enrolled. Mean age of the subjects was 47.3 years. 37.5 percent of the subjects showed no tear while 21.25 percent of the subjects showed minor tear. 31.25 percent of the subjects showed major tear. While analyzing the results with univariate analysis, gender, age and mechanism of injury were found to be significant factors affecting tear severity.

**Table 1: Distribution of meniscus tear pattern**

Group	Number	Percentage	
No tear	30	37.5	
Minor tear	17	21.25	
Major tear	Root tear	12	15
	Radial split tear	13	16.25
	Unstable longitudinal	8	10
Total	80	100	

**Table 2: Univariate analysis**

Variable	No tear (n=30)	Minor tear (n=17)	Major tear (n=23)	p-value
Gender	Male	15	10	0.002 (Significant)
	Female	15	7	
Mean age (years)	37.2	43.1	50.8	0.047 (Significant)
BMI (Kg/m <sup>2</sup> )	Normal	16	6	0.845
	Overweight	10	7	
	Obese	4	4	
Mechanism of injury	Non-contact	14	9	0.001 (Significant)
	Contact	16	8	

**Graph1: Univariate analysis**

## Discussion

The anterior cruciate ligament (ACL) is a frequently injured ligament and can present in combination with other ligament, cartilage, or meniscal tears. Sports injuries and road traffic accidents are the common modes of such injuries. Lateral meniscus posterior root tears are reported to occur in 6.6% of ACL tears. Concomitant Grade 3 tears of medial collateral ligament (MCL) in the presence of ACL tears are found in just about 1% of patients. Fractures of the tibial condyle, on the other hand, are associated with more violent trauma. An axial plane fracture of the posterolateral tibia is not even included in standard classification systems.<sup>8-11</sup>Hence; the present study was conducted for assessing the association of the lateral meniscus tear with high grade anterior cruciate ligament. In the present study, a total of 80 subjects were enrolled. Mean age of the subjects was 47.3 years. 37.5 percent of the subjects showed no tear while 21.25 percent of the subjects showed minor tear. 31.25 percent of the subjects showed major tear. In a study conducted by Feucht et al, authors analyzed the associated tears of the lateral meniscus in anterior cruciate ligament injuries. A database of 268 patients undergoing primary ACL reconstruction was used to identify all patients with isolated ACL tears and patients with an associated tear of the lateral meniscus. Two hundred fifteen patients met the inclusion and exclusion criteria. Of those, 56% had isolated ACL tears, 27% had associated minor tears, and 17% had associated major tears of the lateral meniscus. Univariate analysis revealed significant differences between the three groups for gender, age

groups, and mechanism of injury. A contact injury mechanism was a risk factor for minor tears and major tears. Additional risk factors for major tears were male gender and age <30 years.<sup>12</sup>In the present study, while analyzing the results with univariate analysis, gender, age and mechanism of injury were found to be significant factors affecting tear severity. Gupta R et al, in a previous study, identified the incidence and relative association of meniscus injuries in complete and partial ACL injuries. Patients were divided into 2 groups; group I: partial ACL tear and group 2: complete ACL tear. Combined meniscal tears had non-significant relation in two groups. Partial ACL injuries present with less risk of acquiring isolated meniscus tears, compared to complete ACL injuries.<sup>13</sup>In another study conducted by Venkataraman S et al, authors assessed if there was a link between meniscus injuries and ACL injuries in rural community. Patients between the ages of 18-65 diagnosed with ACL tear with/without meniscus damage in their knees were included in the study. Clinical assessment of patients with knee injuries, MRI and diagnostic arthroscopy of the knee joint details were collected. After obtaining the data, we estimated the incidence of meniscus injuries associated with chronic ACL injuries. Excellent, satisfactory, and unsatisfactory scores were observed in seven, eleven, and seven patients on the left side and excellent, satisfactory, and unsatisfactory scores in four, fifteen, and four patients on the right side, respectively.<sup>14</sup>Michalitsis S et al correlated the incidence of meniscal and cartilage lesions in ACL-deficient knees with time from injury. Data were

analyzed from 109 consecutive patients with ACL rupture. Meniscal and articular cartilage lesions were documented during the arthroscopic reconstruction of the ACL. Of 109 patients, 32 (29%) had a medial meniscus tear, 20 (19%) had a lateral meniscus tear, 17 (15%) had both menisci torn and 40 (37%) had no meniscal tear. The presence of high-grade cartilage lesions is significantly increased in an ACL-deficient knee when reconstruction is performed more than 12 months after injury.<sup>15</sup>

### Conclusion

Male gender, advancing age, and especially subjects who sustained a contact injury have a high risk for an associated major lateral meniscus tear.

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