

# Radiological incidence of meniscus and knee injury in ACL tears

## Abstract

**Background:** Although data demonstrate the ability of the menisci to transmit load, they do not contribute to the primary stability of the knee. In absence of ACL, the menisci have shown to enhance the knee's stability in AP, varus-valgus, internal-external direction *in vitro*.

The importance of addressing meniscal pathology associated with anterior cruciate ligament (ACL) insufficiency stems from the increased incidence of meniscal tear with chronic instability. Most of the studies showed Lateral meniscus injury with acute ACL tear

**Keywords:** anterior cruciate ligament, meniscus, arthroscopy

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## Aim

The aim of this study is to retrospectively review the patients admitted and treated in King Fahd Hofuf Hospital, in alhasa, Saudi Arabia for an ACL tear reconstruction over a 5-year period and document the meniscal involvement

## Patients

We searched our hospital database between January 2011 and December 2016 and evaluated the patient's records with the diagnosis of ACL tear.

### Inclusion criteria were:

Admitted and operated for an ACL tear with arthroscopic reconstruction.

Admitted between January 2011 and December 2016.

Did MRI before operation.

### Exclusion criteria were:

No MRI before the operation

Revision ACL reconstruction

Patient older than 55 years

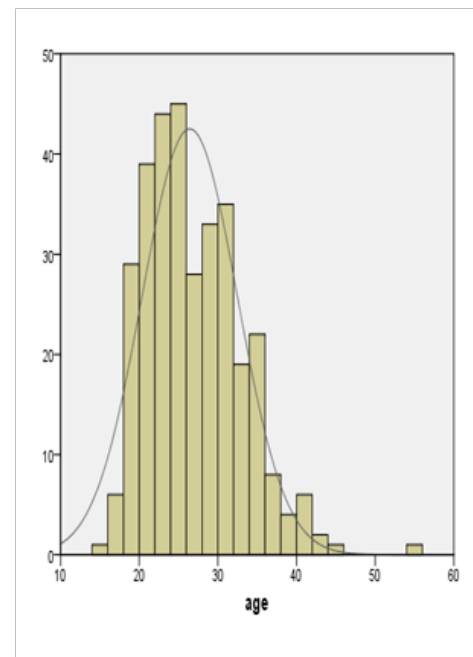
Open ACL reconstruction.

## Methods

We retrospectively studied the records, surgery documents and the MRI for every patient that met our inclusion and exclusion criteria within the mentioned time frame. After recording the patient demographics, we documented all the intra-articular lesions found (ligament, meniscus and bone changes).

## Results

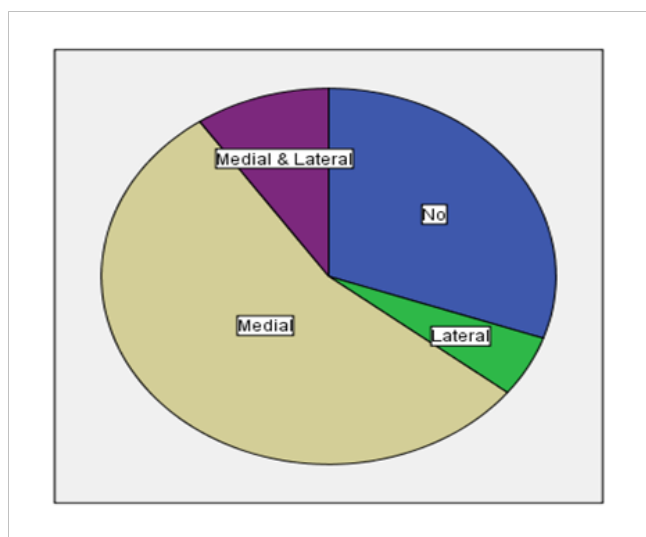
During the study period 323 patients met the inclusion and exclusion criteria. There were 315 males (97.5%) and 8 females (2.5%) with a mean age of 26.4 years, range from 15 to 55 years (Figure 1).



**Figure 1** Bar diagram showing percentage of ACL tear.

Out of our subjects we found that 158 had complete ACL tear (48.9%). 98 subject (30.3%) of ACL injury had no associated meniscus injury,

17 subject (5.3%) had lateral meniscus tear and 177 (54.8%) had medial meniscus injury, while 31 (9.6%) had both menisci injury (Figure 2).



**Figure 2** Pie diagram showing percentage of ACL tear.

Also 95.4% of our subjects have no LCL injury. Almost the same for MCL 95.4% with no injury. Whereas for PCL 40 subjects had shown some degree of injury. Being a female had much greater tendency of having complete ACL tear ( $p=0.027$ ). Interestingly 177 subjects which represent 54.8% had Medial Meniscus injury, out of those 98 (55.3%) had partial ACL injury. And 17 subjects (5.3%) have lateral meniscus injury. However, 31 subjects (9.6%) have both medial and lateral injury. Effusion was significant when the subject had both meniscal injury ( $p=0.018$ ). For bone bruises at the femoral side we found that 5.9% was on medial side, 18.9% Lateral and 5.3% both.

Whereas bone bruises at the tibial side showed 3.7% medially, 22% laterally, and 12.1% both sides. The results showed that 15 patients with MCL injury. Out of those 13 had complete ACL injury and 3 patients had partial. Also 40 patients had PCL injury. Out of those 27 had complete ACL injury and 13 patients had Partial?

Interestingly we found that there is significant positive relationship between having partial ACL tear and MCL injury ( $p=0.014$ ) and PCL injury ( $p=0.012$ ).

## Discussion

Kurt P Spindler<sup>1</sup> support the concept that the common mechanism of injury to anterior cruciate ligament involve sever anterior subluxation with impaction of posterior tibia on the anterior femur which determine the significance of bone bruising, articular cartilage damage or meniscal tear will require long term of follow up that includes evaluation of arthritis, stability and function.

Gregory CR Keene<sup>2</sup> highlights the increasing incidence of meniscal injury in chronic anterior cruciate ligament insufficiency with the meniscal tears becoming more complex and therefore less amenable to suture.

In study done by PM Binfield<sup>3</sup> in 1993 arthroscopy of ACL deficient knees, 41.25% of the patients did not have an associated meniscus tear while in 31 % lateral meniscus meniscus was torn

and 21.25% the ACL tear was associated with medial meniscus tear, remaining 7 % bot menisci was torn. Our study show 98 subject (30.3) of ACL injury had no associated meniscus injury, 17 subject (5.3) had lateral meniscus tear and 177 (54.8) had medial meniscus injury, while 31 (9.6) had both menisci injury based on MRI finding. AA De Smet & BK Graf<sup>4</sup> concluded that If a tear of the anterior cruciate ligament is detected, special attention should be given to the subtle peripheral tears that may be present in either meniscus, but most commonly in the posterior horn of the lateral meniscus. These tears are especially difficult to detect on MR images. Acute lateral meniscal tears are more common than acute medial tears, whereas medial tears occur more often with chronic ACL deficiency, MCL injuries occur in approximately 25% of cases<sup>5</sup> and Reha N Tandogan<sup>6</sup> concluded that the most common tear types were longitudinal tears in the posterior and middle horns of both menisci. Tears of the lateral meniscus were more centrally located than those of the medial meniscus. Incomplete tears and radial tears were significantly more common in the lateral meniscus. As prescribed, The peripheral meniscal blood supply is capable of producing a reparative response similar to that observed in other connective tissues because of a perimeniscal capillary plexus that supplies the peripheral 10% to 25% of the menisci<sup>7</sup> which means that if there lateral meniscus tear it will not heal with time before diagnosed by MRI and make lateral meniscus less common according to our study.

AA De Smet & BK Graf<sup>4</sup> in 1994 concluded that some tears found at arthroscopy are not shown on MR imaging and according to them it is Because of their location and configuration, meniscal tears associated with an anterior cruciate ligament injury are more difficult to detect on MR images than are tears in knees with an intact ligament. If a tear of the anterior cruciate ligament is detected, special attention should be given to the subtle peripheral tears that may be present in either meniscus, but most commonly in the posterior horn of the lateral meniscus. These tears are especially difficult to detect on MR images, and according to our study medial meniscus should be thoroughly investigated and examined by arthroscopy during ACL reconstruction surgery.

## Conclusion

On our study we concluded that on diagnosis of ACL injury medial meniscus should be evaluated and examined thoroughly by arthroscopy on ACL reconstruction as it most common meniscus injury with ACL deficient knees. It will be good if it included more detailed intraoperative finding which will be tried in the future.

## Acknowledgments

None.

## Conflicts of interest

The authors declare there are no conflicts of interest.

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