

# A Study on Associated Injuries with Anterior Cruciate Ligament Tear

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## Abstract :

We reviewed 113 patients who had undergone reconstruction of anterior cruciate ligament [acl] between 2009 TO 2012. The incidence of isolated acl tears and acl tears associated with injuries like meniscal tears, other ligamentous injuries and degenerative changes were assessed.

**Aim:** The main aim of this study is to investigate the relationship between the length of time gap between initial ACL injury and ACL reconstruction surgery, and the prevalence of associated injuries such as meniscal tears and osteochondral defects in the knee.

**Materials and Methods :** All patients who underwent ACL reconstruction surgeries at the S S Institute of Medical Sciences & R C Davangere from 2009 to 2012 were evaluated. The time period between initial ACL injury and ACL reconstruction was noted and patients were divided into 2 groups early (less than 3 months) & late (above 3months).incidence of isolated tears and associated injuries with ACL tears was studied in both groups and statically analyzed.

**Results:** A total of 113 patients with ACL deficiency were reconstructed during the time period, 65 patients were in the early group and 48 patients in the late group. Only 55% of the patients in the early had associated injuries in the early group and 75% of patients had associated injuries in the late group. This was significant stastically (p value0.032). Early group had more no of meniscal tears and late group had more no osteochondral defects and other ligamentous injuries.

**Conclusions:** Associated injuries to ACL deficiency are common, meniscal tears might be the result of initial trauma or repeated instability but ostoechondral defects were associated with repeated trauma due to instability. A relationship does exist between the length of time from injury to ACL reconstruction, and higher incidence of associated injuries. Early reconstruction is therefore recommended to prevent osteochondral injuries and early degeneration of the joint.

## Introduction:

Anterior cruciate ligament rupture is the most common serious injury of the knee. Functional instability, especially in the active sporting population, has been found to be associated with meniscal and chondral injuries as well as with the development of degenerative joint disease.<sup>1-7</sup> The ACL is the primary stabilizer against anterior translation of the tibia on the femur<sup>8,9</sup> and is important in counteracting rotation and valgus stress. Anterior cruciate ligament deficiency leads to knee instability and repeated bucking. This results in recurrent injuries and increased risk of intra-articular damage, especially the meniscus<sup>10-15</sup>. Dandy and bray in their study concluded that meniscal lesions appear to be result of instability and not the cause<sup>16</sup>. It is known that reconstruction of the ACL reduces the incidence of

meniscal tears. The relationship of reconstruction to the prevention of osteoarthritis is more controversial<sup>17</sup>.

Acute injury of the meniscus and ligaments about knee joint is often associated with accompanying bony injury, acl tear being most frequent injury associated with occult subchondral fracture or bone bruise<sup>18-26</sup> it has been suggested that even in the absence of visible articular cartilage injury, a bone bruise on MR image represents a blunt injury to underlying articular cartilage and subchondral bone, that may lead to future cartilage degeneration and early degenerative osteoarthritic changes<sup>27,28</sup>.

There are a number of outcome studies which have examined the long-term results of patients who have had reconstruction of the ACL<sup>29-32</sup>. These and other studies have made observations in regard to meniscal tears in both the ACL-deficient and reconstructed knee<sup>33-36</sup>.

In general, early rather than late reconstruction has been recommended to minimize the risk of meniscal tears. Some studies have compared surgical with conservative

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treatment and have shown an improved outcome in the surgical groups even when surgery was performed late after injury<sup>37,38</sup>.

The goals of the ACL reconstruction are to restore stability to the knee; allow the patient to return to normal activities, including sports; and to delay the onset of osteoarthritis with associated recurrent injuries to the articular cartilage and loss of meniscal functions<sup>11,39-42</sup>.

One study showed that delayed reconstruction in the young was associated with a higher incidence of medial meniscal tears<sup>43</sup>.

Another examined the different patterns of meniscal tear in acute, subacute, subchronic and chronic ACL ruptures and showed an increased incidence of medial meniscal tears in chronic ACL-deficient knees<sup>44</sup>.

It is unclear, however, as to how long reconstruction can be delayed before meniscal tears and degenerative change begin to occur. In this study we recorded the incidence of meniscal tears and degenerative change at the time of reconstruction of the ACL and related the findings to the time elapsed since injury. Our aim was to determine the safe period in which to perform reconstruction before the development of meniscal tears and degenerative change in the ACL-deficient knee.

**Materials and Methods :**

We reviewed 113 patients younger than 50 years of age who had undergone reconstruction

of the ACL at S S Institute of Medical Sciences & R C Davangere from 2009 to 2012. There were 95 men and 18 women with a mean age of 28.74 years (16 to 50). The age and gender distributions across the groups are shown in Table 1.

Table 1: sex distribution

Sex	Number	Percentage
Males	95	84%
Females	18	16%
Total	113	

**Table 3 :Duration diagnosis Crosstabulation**

	diagnosis		Total
	Issolated injuries	Associated injuries	
DURATION < 3 Months	29	36	65
% within DURATION	44.6%	55.4%	100.0%
> 3 Months	12	36	48
% within DURATION	25.0%	75.0%	100.0%
Total	41	72	113
% within DURATION	36.3%	63.7%	100.0%

The mean time from injury to surgery was 40.90 weeks in late group. Reconstruction was carried out using a quadruple hamstring graft in 61 and a middle-third patellar tendon graft in 52 patients. The inclusion criteria are patients between 16-50 years, with history of knee instability, Exclusion criteria is age above 50 years and previous knee surgery. Osteoarthritic knee, All the surgical procedures were carried out by, the orthopaedic surgeons who recorded the presence and type of meniscal tear and the type of degenerative change, if any, in the knee. All the records were reviewed to evaluate the incidence of meniscal tears and degeneration at surgery. Additional details such as age, gender, the mechanism of injury, the time to surgery, the type of graft, the operative findings and associated injuries or surgery were noted. The incidence of meniscal tears and degenerative change was determined and then compared with the time to surgery. cartilage injuries were classified according to outerbridge classification as grade 1 to grade 4. The relationships between meniscal tears and degenerative change to time to surgery were then statistically analyzed to determine whether a delay in surgery resulted in an increased incidence of meniscal tears and/or degenerative change.

The patients were divided into 2 groups according to the time to surgery. The ACL reconstructions performed up to 3 months after injury were described as early and those after 3 months from injury as late reconstructions. Each group was again divided into patients having isolated ACL injury and those having associated injuries. Details are given below in the Table2 & 3.

**Table 2: Duration between injury and surgery**

Duration	Number of Patients	Percentage
<3 months	65	57.5%
>3 months	48	42.5%
Total	113	

65 patients were in the early group and 48 in late group. In the early group 29 out of 65 patients (44.6%) were isolated tears and 36(55.4%) patients had associated

injuries. In the late group 36 out of 48(75%) had associated injuries and 12(25%) had isolated tears.

**Results**

**Statistical analysis.**

Categorical data were analysed using the chi-squared test. A p value of 0.05 was considered significant.

**Incidence of meniscal tears.**

The incidence of associated injuries in the early and delayed groups is shown in Table 4.

Table4:Pattern of associated injuries comparing early and late group

	Early	Late
Medial menisci	20	12
Lateral menisci	12	12
Medial and lateral menisci	2	5
Osteochondral defects	0	5
Posterolateral corner injury	-	2
Posteromedial corner injury	-	1
ACL and PCL injury	1	3

There were 20 medial meniscus and 12 lateral meniscus injury in early group, compared to 12 medial meniscus and 12 lateral meniscus injuries in late group. 7 patients had both medial and lateral meniscal injuries out of which 5 were in late group and 2 in early group. Single meniscal injury was common in the early group, Medial menisci injuries were common (20) compared to lateral menisci injuries (12), but both meniscal injuries were common in late group.

**Incidence of cartilage injuries.**

The incidence of degenerative changes found at surgery was noted and classified according to Outerbridge classification, 5 patients had cartilage defects and all of them were grade 4 cartilage defects. The incidence of degenerative change was seen only in the delayed

Surgical group.

**Incidence of other ligamentous injuries.** 1 patient had medial collateral ligament injury & 2 patients had posterolateral corner injury in the late group. 4 patients had both combined ACL and PCL injury, out of which 3 were in the late group.

In our study p value was 0.032 for associated injuries in late group, which was statistically significant

**Discussion**

Our findings show a highly significant increase in meniscal tears and degeneration of the knee in patients undergoing reconstruction of the ACL more than 3 months after injury. It has been demonstrated that the

incidence of degenerative change increases when surgery is performed after 3 months from injury. Some degenerative change in a proportion of these knees would therefore be expected since ACL deficiency is well documented to be associated with the development of late degenerative change.<sup>35,30</sup>

Our findings indicate that reconstruction carried out within three months of injury was associated with a very low incidence of degenerative change. It remains to be seen whether a reconstruction carried out at this stage confers a longer-term benefit in the prevention of late degenerative change. Although satisfactory results can be achieved even with late reconstruction,<sup>30</sup> the results in a degenerative knee have been shown not to match those of early reconstruction in a knee with normal articular cartilage.<sup>36</sup>

Only one other study has specifically evaluated the incidence of meniscal tears and osteochondral damage in acute and chronic ACL-deficient knees. In that study, MRI findings

were compared in the two groups, there was a higher incidence of medial meniscal tears in chronic ACL-deficient knees, 78% in chronic ACL tears v/s 40% in acute ACL tears. The study did not evaluate the effect of time from injury to reconstruction on the incidence of meniscal tears, nor was there a detailed assessment of degenerative change. Other studies have looked generally at the incidence of meniscal tears and degenerative change in the ACL-deficient knee<sup>29-32</sup>. No previous study has attempted to relate the development of this pathology to the timing of reconstruction of the ACL.

We had large number of patients for study. All operative findings were documented by the same surgeons who also performed or supervised every operation. This minimized the observer variability in the classification of the type of meniscal tear and the degree of degenerative change. Very few studies have evaluated the incidence of meniscal tears and degenerative change and related this to the timing of surgery<sup>45</sup>.

There is evidence from previous evaluation of outcome after reconstruction of the ACL that early reconstruction is associated with better results than late reconstruction, often carried out in the presence of meniscal tears or degenerative change<sup>17</sup>. Observations from our study suggests that meniscal tears might be the result of initial trauma or repeated instability but osteochondral defects were associated with repeated trauma due to instability. A relationship does exist between the length of time from injury to ACL

reconstruction, and higher incidence of associated injuries. Early reconstruction is therefore recommended to prevent osteochondral injuries and early degeneration of the joint.

To verify the findings of our study a larger prospective study would be of value, A randomized study comparing early and late reconstruction and A functional follow-up incorporated into the design of the study would be ideal but there are practical and ethical difficulties in conducting such a trial in modern day practice.

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