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A study on associated injuries of anterior cruciate ligament tear

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Abstract
Introduction: Over the last decade, reconstruction of the anterior cruciate ligament (ACL) has evolved from a surgical technique in which the objectives were 'isometric' femoral tunnel placement and avoidance of inter-condylar notch roof impingement, towards an 'anatomic' surgical technique which attempts to restore the native ACL. Achieving the goals of isometric ACL graft placement and avoidance of roof impingement often resulted in the ACL femoral tunnel extending into the roof of the notch, outside of the native ACL femoral attachment site and the tibial tunnel being positioned in the posterior half of the native ACL tibial attachment site.
Methodology: All patients admitted with clinico-radiological diagnosis of ACL tear with h/o injury (trauma) who met the inclusion criteria. This was a Prospective observational study with the minimum follow up 12 months. The sample size was 30.
Results: A Total of 90% (27 cases) (n=27) patients had associated injuries usually the meniscal tear. Isolated medial meniscal tear were found in 33.3% (10 cases) (n=10) while isolated lateral meniscus tear were found in 33.3% (10 patients) (n=10) of cases. Combined medial and lateral meniscus tear were found in 23%% (7 cases) (n=7).
Conclusion: Chondral changes were found in 30% (9 cases) (n=9) MCL, LCL and posterior cruciate ligament tear was found in none.

Keywords: ACL tear, associated injuries, sports

Introduction
The early pioneers of operative treatment of ACL rupture mostly focused on direct repair [1]. It wasn't until 1916 when Hey Groves of Bristol performed the first reconstruction [2]. He recognized the anatomy of the ACL, and the need for an intra-articular, obliquely orientated graft to control anterior translation; in his case, using the entire fascia-lata, routed into the joint via a laterally placed bone tunnel. In fact, he and a number of surgeons at that time were the early adopters of anatomic ACL reconstruction, but their philosophy was largely forgotten, until resurrected more recently by Fu and Yasuda in the early 2000's [3, 4].
Anatomic techniques were soon to be replaced by extra-articular reconstruction, pioneered by Strickler (1937), lemaire (1960) and macIntosh (1970's), utilizing a lateral extra-articular tenodesis to control anterolateral tibial subluxation, and by Slocum who described the pes anserinus transfer, to help control anteromedial rotational laxity [1]. Although these techniques were shown to control external rotational laxity, they were soon found to stretch out and not control the knee to the desired manner. This then led the way to combined intra and extra-articular reconstruction. Interestingly, although the combined procedure by in large went out of fashion in the late 1990's, extra-articular tenodesis is making somewhat of a resurgence, with a number of authors using the procedure to aid control of rotational laxity, particularly in revision scenarios [5].
The 1980's and 90's were dominated by which technique intra-articular reconstruction should be performed. David Dandy of Cambridge performed the first arthroscopic assisted intra-articular ACL reconstruction in 1980 [1]. He combined a carbon fibre intra-articular graft with a Macintosh lateral extra-articular tenodesis, reporting satisfactory results. However, it was later noted that the synthetic ligament soon failed.

Over the last decade, reconstruction of the anterior cruciate ligament (ACL) has evolved from a surgical technique in which the objectives were 'isometric' femoral tunnel placement and avoidance of inter-condylar notch roof impingement, towards an 'anatomic' surgical technique which attempts to restore the native ACL [6, 7]. Achieving the goals of isometric ACL graft placement and avoidance of roof impingement often resulted in the ACL femoral tunnel extending into the roof of the notch, outside of the native ACL femoral attachment site and the tibial tunnel being positioned in the posterior half of the native ACL tibial attachment site [8, 9]. Although this approach decreased roof impingement of the ACL graft and minimised the need for a notch-plasty, when performed using a trans-tibial surgical technique it often produced a non-anatomic, vertically oriented ACL graft in both the coronal and sagittal planes [8, 9]. It should be noted that the classic 2-incision surgical approach had previously placed the ACL femoral tunnel on the sidewall of the notch within the native ACL femoral attachment site and the tibial tunnel in the centre of the native ACL tibial attachment site [10]. Publications of the 2-incision technique reported a low failure rate (return of a positive pivot-shift test) and a low rate of revision ACL surgery [11].

Biomechanical studies have demonstrated that a vertical ACL graft may resist anterior tibial translation, but often fails to resist the combined motions of anterior tibial translation and internal tibial rotation which occur during the pivot-shift phenomenon[12]. The inability of a vertical ACL graft to resist these combined motions may result in the patient continuing to complain of symptoms of instability and continuing to experience giving-way episodes despite having an intact ACL graft. The goal of performing an anatomic ACL reconstruction is to reproduce the anatomy of the native ACL as closely as possible [6].

It has been proven biomechanically and clinically that anatomic ACL reconstructions better restore anterior tibial translation, rotational stability and normal knee kinematics compared to non-anatomic ACL reconstructions [12]. It is hoped, but not yet proven, that by restoring more normal knee kinematics, anatomic ACL reconstruction techniques will lead to better clinical outcomes as well as decrease the incidence of osteoarthritis after ACL reconstruction.

Methodology

All patients admitted with clinico-radiological diagnosis of ACL tear with h/o injury (trauma) who met the inclusion criteria.

Study Site: Orthopedic Department Superspeciality Hospital

Study Population: 30 patients (n=30)

Study Design: Prospective observational study with the minimum follow up 12 months.

Sample Size With Justification: Total 30 patients (n=30)

Selection Criteria: Clinical / radiological / evidence of ACL deficiency which is symptomatic Even after conservative therapy for 8 weeks duration.

Exclusion Criteria: The following patients were excluded from the study,

- Patients with bilateral ACL tear.
- Patients with other systemic diseases compromising their pre-anaesthetic fitness.
- Patients who did not consented for surgery.
- Patients with multi-ligamentous injury of the knee.
- Patients with hyper laxity syndrome as measured by beighton score.
- Patients who underwent ACL reconstruction of both the knees and those
- With open physis were excluded from the study.
- Patients with other ligamentous instability and those with articular cartilage lesion exceeding grade 3 will be also excluded.
- Patients with local skin pathologies.
- Patients who are undergoing for revision ACL reconstruction surgery.
- Patients who are belongs to immature skeletal group.

Results

In our series' most common cause of ACL tear were basketball players in which pivoting is most commonly involved about 37.5% (3 cases) (n=3), and all other sports activities mentioned in the chart were distributed one case for each sport activity.

Table 1: Sports causing ACL Tear

Sports causing ACL tear	No. of patients	%
Basket ball	3	37.5
Foot ball	1	12.5
Badminton	1	12.5
Kho Kho	1	12.5
Kabbaddi	1	12.5
Volley ball	1	12.5
Total	8	100.0

A Total of 90% (27 cases) (n=27) patients had associated injuries usually the meniscal tear. Isolated medial meniscal tear were found in 33.3% (10 cases) (n=10) while isolated lateral meniscus tear were found in 33.3% (10 patients) (n=10) of cases. Combined medial and lateral meniscus tear were found in 23%% (7 cases) (n=7). Chondral changes were found in 30% (9 cases) (n=9) MCL, LCL and posterior cruciate ligament tear was found in none.

Table 2: Associated injuries

Associated Injuries	No. of patients (n=30)	%
Isolated ACL tear	3	10.0
Medial meniscal tear	10	33.3
Lateral meniscal tear	10	33.3
Medial & lateral meniscal tear	7	23.0
Posterior cruciate ligament tear	0	0.0
Medial collateral ligament tear	0	0.0
Lateral collateral ligament tear	0	0.0
Chondral changes	9	30.0

There was no significant difference in the outcome among the patients who had associated knee injury in the form of meniscal and chondral injuries. P value 0.136, not significant, fisher exact test.

Table 3: Outcome of associated injuries

Results	Isolated injury	%	MM injury	%	LM injury	%	MM+LM injury	%	Chondral changes	%
Excellent	3	100.0	8	80.0	10	100.0	5	71.4	5	55.6
Good	0	0.0	2	20.0	0	0.0	2	25.6	4	44.4
Fair	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Poor	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Total	3	100.0	10	100.0	10	100.0	7	100.0	9	100.0
P=0.136, Not significant, Fisher Exact test										

Discussion

The present study was observational prospective study was conducted in yashoda superspeciality hospital, malakpet, Hyderabad, to clinically evaluate the results of arthroscopic anatomical single bundle anterior cruciate ligament reconstruction. It comprises of 30 (n=30) patients with minimum of 1 year follow up.

A Total of 90% (27 cases) patients had associated injuries. Isolated medial meniscal tear were found in 33.3% (10 cases) while isolated lateral meniscus tear were found in 33.3% (10 cases) patients. Combined medial and lateral meniscus tear were found in 23% (7 cases) patients. Chondral changes were found in 30% (9 cases) patients, 92 patients with associated injuries like meniscal tear were excised and balanced, where-as chondral defect co-ablation done, MCL, LCL and posterior cruciate ligament tear was found in none.

Kruger- Franke M, Reinmuth S, Kugler A & Rosemeyer B. (1995) [13] in their series of 107 patients found that 55% of the acute ACL ruptures involved a tear of the lateral meniscus., 45% of the medial meniscus, and 34% had a lesion of medial collateral ligament. In their series the most frequent combination of the injuries with ACL rupture was the tear in both menisci and the lesion of the medial collateral ligament with the tear in the lateral meniscus. Meniscus injury may occur at the time of initial injury along with ACL tear or later on in a chronic cruciate ligament deficient knee. In chronic ACL insufficiency meniscus damage occurs more often (60%) as seen in the series of Russel F Warren and Martin Levy (1993).

Indelicato PA & Bittar ES (1995) [14] in their series found that the incidence of the meniscus tear increased from 77% in the acute injuries to 91% in the chronically re-injured knee: furthermore, articular surface disease increased from 23% in the acute injury to 54% in the chronically ACL lax knee. The majority of the meniscus tear in this series were medial.

Conclusion

There was no significant difference in the outcome among the patients who had associated knee injury in the form of meniscal and chondral injuries

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