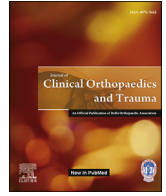




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“Trends and beliefs in ACL reconstruction surgery: Indian perspectives”



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ABSTRACT

Objectives: The survey aimed to assess trends and beliefs in the management of anterior cruciate ligament reconstruction (ACLR) amongst orthopaedic surgeons in India.

Methods: A survey was created and distributed among the various orthopaedic surgeons from India. The questionnaire included brief details of surgeons and their experience, clinical assessment, management strategies and the rehabilitation protocol.

Results: 135 surgeons completed the survey. 35% of them were having experience of more than 12 years. A large number of surgeons were from government academic institutes (35.5%). The most common criteria for deciding about surgery was Clinical evaluation (94.8%). The most common graft choice was hamstring tendon (94%), and suspensory fixation on the femur side and interference screw on the tibial side (80%) is the most common fixation method. Almost two-thirds of surgeons in this survey use bracing to protect ACL graft in the initial phase.

Conclusion: We presented the preferences amongst the group of surgeons on the management of ACL injuries. Hamstring tendon graft remains the most preferred graft for ACL reconstruction. Further, the suspensory loop on the femoral side and interference screw on the tibial side are the preferred fixation method. This group of surgeons is conservative in terms of the timing of surgeries and post-operative bracing. Level of evidence Level V, Expert Opinion.

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1. Introduction

Anterior cruciate ligament (ACL) injuries are common in sporting^{1,2}, military training and high demand professional populations^{3–5}. In the symptomatic population with hampered activity and risk of re-injury, arthroscopic ACL reconstruction surgery is considered a gold standard⁶. However, return to pre-injury level of activity even after successful surgery remains unpredictable^{7,8}. In the past decade, there have been significant improvements in ACL reconstruction techniques and altered rehabilitation protocols to achieve the pre-injury level of activity^{9,10}. Various

studies have documented similar functional outcomes using different types of graft options^{9,11,12}. But debate regarding ideal graft choice, tunnel placement and graft fixation method remain.^{8,12} Even rehabilitation protocols are still evolving. With the advent of accelerated rehabilitation protocol, the return to sports and functionality may be possible much earlier.^{13,14}

To study the prevalent practices of arthroscopic ACL reconstruction amongst surgeons, surveys exist coming out of the western population.^{15,16} However, there is no such survey available from the Asian population regarding indications, management and the rehabilitation protocol. A web-based survey was conducted to assess the practices followed in respect of the management of ACL injuries amongst orthopaedic surgeons of India. This survey aimed to report the preference in relation to ACL reconstruction technique and rehabilitation protocol among Indian surgeons and to compare

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it with other published surveys. Further, the survey would compare the options of this group of surgeons on graft type, tunnel placement and fixation options.

2. Material and methods

A team of four experienced surgeons who are regularly managing ACL injuries each with more than two decades of experience surveyed between June 2021 and Oct 2021. The survey form was created after carrying out discussion with each of the surgeons. The questionnaire was made to bring out the prevalent practices, the gap in knowledge and surgical options utilized. The survey included a questionnaire regarding pre-operative diagnosis, clinico-radiological examination, management strategies and rehabilitation protocols followed. The survey included twenty-five questions which included brief details of surgeons professional role and their experience, clinical assessment, management and the rehabilitation protocol. It was prepared on google forms and the link of the same was distributed via email and various social media platforms like WhatsApp and telegram to as many Orthopaedics surgeons managing sports injuries as possible. Consent of willingness to participate was obtained from all the surgeons informing them about the use of received data.

In the survey, Surgeons were asked about their professional backgrounds like Orthopaedics surgeons and fellowship trained sports medicine surgeons. Fellowship trained surgeons were defined as surgeons who underwent minimum one year formal training. Surgeons were also asked about their work institute like government academic institutes, private multispecialty hospital, private orthopaedics hospital, academic private sector, and non-academic government sector. Private multispecialty hospital was a referral tertiary care hospital which had all faculties of medical, surgical and allied subjects including specialties under one roof. Whereas specialized Orthopaedic centres were standalone surgical centres with visiting consultants of other specialty on need basis.

2.1. Statistical analysis

Data was collected on a Microsoft excel sheet and analysis was done using Stata Version 12 (StataCorp LP, Texas, USA) response to the survey were documented frequency or percentage of the total. Part of the survey was reported using descriptive methods. As the analysis was of respondents, therefore no a priori sample size calculation or power of the study was obtained. For certain questions, participants were given the option of choosing multiple questions, and for those questions, the total percentage may be more than 100% on addition.

3. Results

3.1. Demographics

A total of 135 orthopaedic surgeons with varying experience responded to the survey. All were male and more than 65% of them were between 35 and 50 years of age, and approximately 20% were more than 50 years of age. 32% of them were fellowship-trained sports medicine surgeons, while the rest were Orthopaedics surgeons. More than 35% of them were doing these surgeries for more than 12 years (Fig. 1). Most surgeons were from government academic institutes (35.5%). The remaining were from the private multispecialty hospital (22.2%), private orthopaedics hospital (19.3%), academic private sector (14%), and rest (9%) were from the non-academic government sector. Approximately 30% of the surgeons were performing more than 100 ACL reconstruction surgeries in a year while the rest were performing less than 100

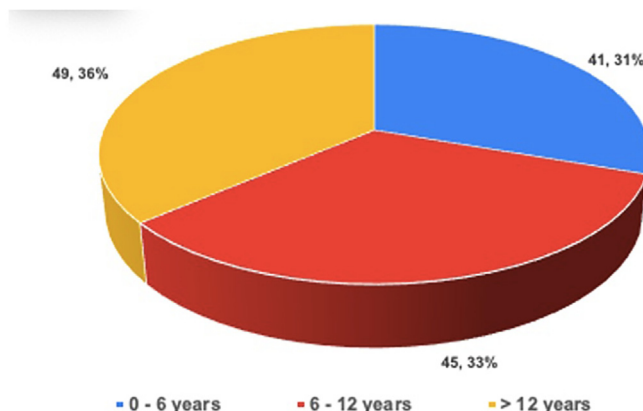


Fig. 1. Number of years of Practice in Arthroscopy of surgeons as per this survey.

surgeries in a year (Fig. 2).

3.1.1. Indication for surgeries

The criteria for deciding about the ACL reconstruction surgeries were symptoms of instability (91.1%), Clinical evaluation (94.8%), MRI finding (65.2%), and duration from injury (27.4%) (Fig. 3) Majority of surgeons (57%) perform surgery after the knee is quiescent, while (37%) perform surgery after a period of rehabilitation. Only 6% of the surgeon perform surgery as soon as possible. As per the survey, quiescent knee meant “when patient achieved full passive extension, mild swelling and minimal pain allowing easy unsupported ambulation”. The period of rehabilitation required before surgery is about 6 weeks as per the majority of surgeons (70%). In the setting of ACL injury with associated osteoarthritis (defined as per Kellgren and Lawrence classification), 45% of surgeons do not prefer to perform reconstruction, 20% will do ACL reconstruction while the rest 35% will do some associated ligament reconstruction or corrective osteotomy with ACL reconstruction. 35% of surgeons feel that no ACL reconstruction should perform in patients with age >55 years. while 32% of surgeons think that there is no upper age limit.

3.1.2. Graft options, fixation methods and additional fixations

Hamstring tendon autograft is the commonest used graft. The majority of surgeons in India (94%) use hamstring tendon grafts.

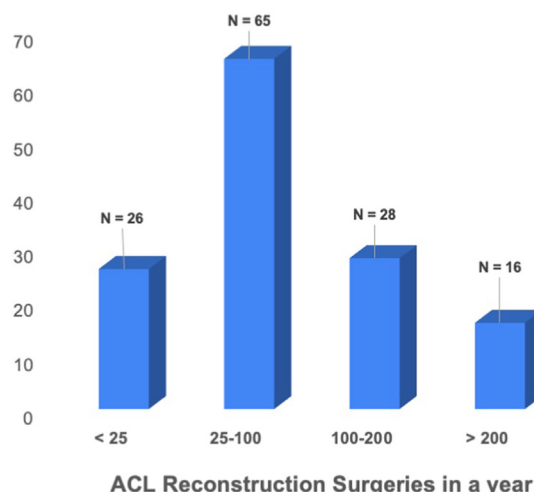


Fig. 2. Number of surgeries performed yearly by surgeons.

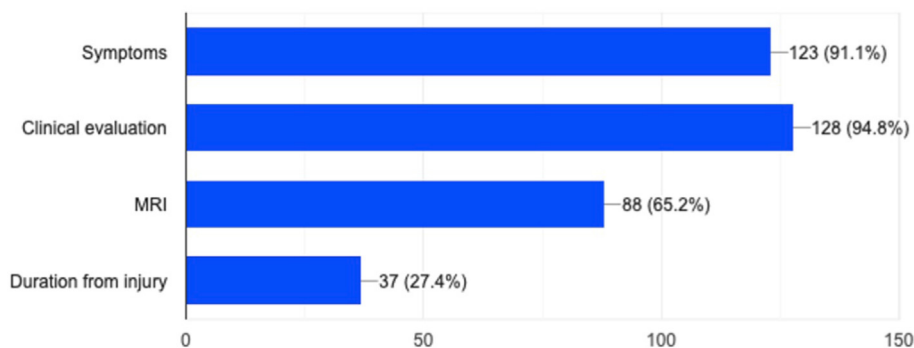
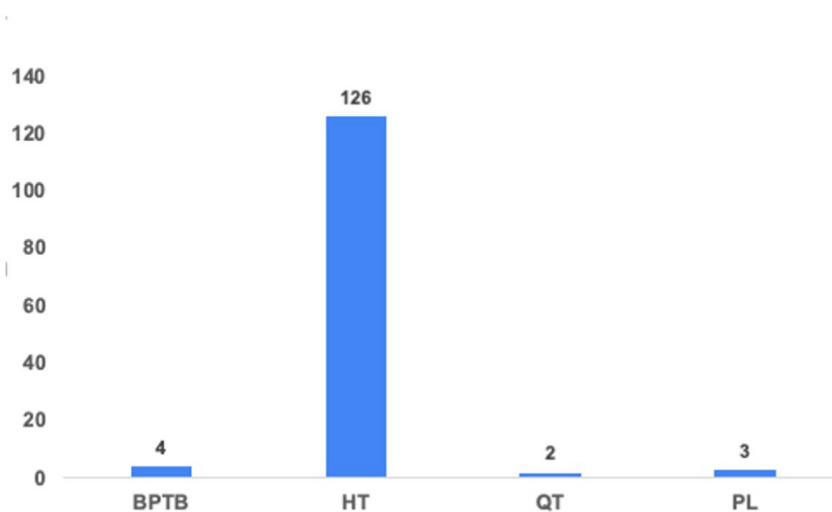


Fig. 3. Criteria for deciding ACL reconstruction.



ACL, anterior cruciate ligament reconstruction; BPTB, bone-patella tendon-bone; HT, hamstring tendon; QT, quadriceps tendon PL, Peroneus longus.

Fig. 4. Commonly used graft for ACL reconstruction in this survey?

Other commonly used grafts are bone-patellar tendon-bone graft, quadriceps and peroneus tendon graft (Fig. 4).

The most commonly used fixation method is the suspensory fixation on the femur side and interference screw on the tibial side (80%). Other commonly used methods are suspensory fixation of femur and fixation on the tibial side can be suspensory/preserved insertion/suture post and suture disc.

In the setting of explosive pivot shift (Grade III Pivot, with complete subluxation and relocation of lateral condyle of femur on

applying valgus and rotatory force), approximately 50% of respondents are performing Lateral extra-articular (LET)/ALL reconstruction. However, the rate of LET reconstructions varies. Out of the total, 44% of respondents are performing LET reconstruction in <10% of total ACL patients. While 6% are performing LET reconstruction in 10–30% of total cases (Fig. 5).

3.1.3. Rehabilitation

Knee bracing is commonly used by most surgeons (67%) for at

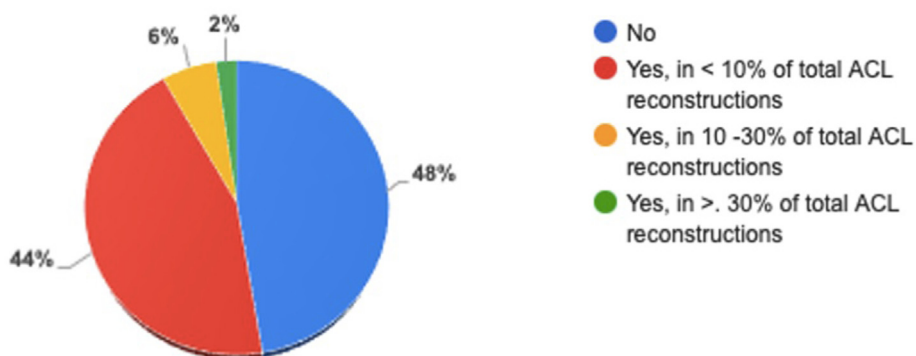


Fig. 5. In addition to ACL reconstruction, do you use extra-articular augmentation?

Table 1
Review of Literature and comparison with various studies.

Authors	Region/group	n	Practice	Indication for Surgery	Number of ACL Surgeries performed by respondents	Operative options			Post surgery rehab		Frequency of failure
						Graft	Type of fixation		Extra-articular Augmentation	Bracing	
Shermn et al ¹⁶⁾	ACL study group	140	Academic 35%			HT 53%	Suspensory 50%	Absorbable interference screw (28%) Metal interference screw (22%).	Often 15%	Yes 53%	6–8 months (44%)
	International		Private 37%			BTB 36%			Sometimes 31%		8–12 months (41%)
			Mixed practice 24%						Rarely 35%		
Arnold et.al ²⁴⁾	ACL study group (survey of 14 meetings) Worldwide					HT 50%	NA	NA	Never 19%		
Vascellari et. al. ²⁰⁾	Italy	131	–		<25–37% 25-50- 29% >50-33%	HT >80% BTB 16% QT 0% Allo 2% HT 63%	Cortical suspension 51%	NA	–	Yes 49%	
Chechik et al ¹⁵⁾	International	261	–			HT 63%	Suspensory 40%	Suspensory 40%	–	NA	
						BTB 26%	Absorbable interference screw (34%)	Absorbable interference screw (34%)			
						Allo 11%	Metal interference screw (12%). Rigid fix 11%	Metal interference screw 12%. Rigid fix 11%			
Shafizadeh et al. ¹⁷⁾	Germany	155		Instability > Lachman > MRI > Stress test.	0-10 ACL - 9%	HT > BTB > QT > Allo 11%	Suspensory 38%	Absorbable interference screw (60%)			High volume Surgeon 10%
					11-50 ACL – 50%		Transfixation pin 27%	Suture Disc (17%) Metal interference screw (07%).			Low volume Surgeon 16%
Synovec et al. ²²⁾	USA	75			>50 ACL – 41%		Bioscrew 11% (14%)	Different fixation (15%)			
					<10–89%	BTB > HT > QT	For BPTB interference screw (88%)	For BPTB Interference screw non-metallic (75%). Interference screw metallic (24%)			
Present study	India	135		Instability>, Clinical evaluation > MRI finding > and duration from injury.	<25- 19%	HT >93%	Autograft > Allograft	For HT Suspensory 87%			
								For Hamstring tendon	No 48%	Yes- 78%	Pivoting <5% failure – 58%

4

Academic Govt. 35.6%	25-100 - 48%	BTB 3%	For Hamstring tendon Suspendersy	Interference screw non-metallic (80%), others suspensory/preserved insertion.	Yes but in <10% cases -45% Yes in >10% cases -8%	No- 22%	>9 months- 64% 6-9 months 30% Non-pivoting	5-10% failure 37% >10% failure 5%
Non-academic Govt. 8.9%	100-200-21%	QT 1%						
Academic Private 14.1%	>200 -11%	PL 2%						
Other Hospitals 41.5%								

least 06 weeks, while 23% do not use brace post-operatively. Rest use brace for 3 or 6 months. 60% of respondents keep patients full weight-bearing, while 38% keep patients partial weight-bearing following ACL reconstruction. However, 68% keep patients non-weight bearing for 6 weeks and 29% allow partial weight-bearing following meniscus repair. When respondents were asked about criteria for return to sports following ACL reconstruction, variable responses were recorded like the range of movements, strength of quadriceps, timing from surgery, grade of laxity and negative pivot shift test. 50% of respondents recommended return to non-pivoting sports at 6–8 months while 64% recommends return to sports at 9 months for pivoting sports. The majority of surgeons (>60%) are not sure about the percentage of operating patients returning to sport. While approximately 25% of surgeons feel that 60% of their patients return to some level of sports after the surgery. Most of the respondents (>73%) do not assess psychological readiness before return to sports.

The failure rate at 2 years after the return to sports is <5% as per 58%, 5–10% as per 37% of respondents while for the rest of them it was more than 10%.

4. Discussion

This survey aimed to assess the practices followed by orthopaedics surgeons in the management of patients with ACL tears. Also, to compare their choices with literature.

The clinical evaluation in terms of symptoms of instability and positive tests of instability were the most common factors deciding for ACL reconstructions. These findings are similar to those reported in the literature. (Table 1). According to Shafizadeh et al.,¹⁷ subjective instability was the most important criteria for which reconstruction was performed followed by tests for instability. While the other parameters like radiographic analysis are of less importance.

The timing of surgery after initial injury remains debatable, but the majority of respondents in our study prefer to operate after 06 weeks of injury. Only very few respondents operate as soon as possible. Various recent studies documents that there is no increase in the incidence of stiffness even if patients are operated as early as the first week after the injury.^{18,19} However, in the survey by Sherman et al.,¹⁶ surgeons prefer to operate within 06 weeks of injury without much complications and stiffness. However, the ACL study group further recommends that each case should be assessed separately and clinical evaluation like the range of motion, effusion, pain and stiffness should be taken into account before deciding about the reconstruction.

Another factor that remains a matter of debate is the choice of graft. The most commonly used graft in the present study is the hamstring tendon graft (94%). The percentage of surgeons using hamstring grafts is much higher than various other surveys.^{15,17,20} The current literature is divided about the type of graft and which graft is better.^{8,21} Various studies from Europe document hamstring tendon graft as the preferred option.^{17,20} While the BPTB graft is preferred in various studies from the USA.^{22,23} However, this trend is also changing in the USA in recent years.^{23,24} The reasons for preference of Hamstring tendon graft are lower donor site morbidity, decrease post-operative pain and early recovery.²⁵ Further, usage of fixation method in our study is also similar to various other studies and trends in recent past which favour suspensory fixation on femur side and interference screw on the tibial side as preferred options.^{22,23}

One of the findings of our study which is similar to various other studies is the use of brace post-operatively. 67% of respondents in our study are using knee brace post-operatively. These findings are similar to various other studies which have also documented

bracing at the rate of 35–60%.^{16,20} However, studies have also documented no beneficial effects of knee brace in terms of laxity, range of movements, subjective and objective outcomes.²³

Regarding weight bearing on the operated limb, the majority of respondents (60%) allow full weight-bearing postoperatively. However, studies have not found any difference in terms of functional outcome or stability between full weight bearing from day one or delayed weight-bearing.²⁶

Return to non-pivoting sports has been recommended at 6–8 months by 50% of respondents, while two-thirds of respondents recommend return to pivoting sports at 9 months. These findings of our survey are similar to various studies published worldwide.^{27,28}

One of the limitations of our study is less number of participants i.e. 135. But, these numbers are much higher than the surveys from Turkey, UK.^{29,30}

The strengths of this survey are that it included the right mix of orthopaedics and fellowship-trained knee arthroscopy surgeons (67%–33%). Also, the group has a good mix of experience <6 years (30%), 6–12 years (33%), and >12 years (37%). Another strength of our study is that only 19% of respondents were performing less than 25 surgeries in a year as compared to a study from Italy in which 37% of respondents were performing <25 surgeries annually.

The present survey is the first conducted from the Indian/Asian population regarding preferences of surgeons regarding ACL reconstruction. The results suggest that the Hamstring tendon graft is preferred for ACL reconstruction with the suspensory loop on the femoral side and interference screw on the tibial side as the preferred fixation method. The results showed a conservative approach employed by this group in terms of timing of surgeries and post-operative bracing.

Source of income

Nil.

Financial disclosure

None to declare.

Declaration of competing interest

Nil.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.jcot.2023.102148>.

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