



RESEARCH ARTICLE

Comparative Study of Conservative versus Surgical Management of Anterior Cruciate Ligament Injuries in Young Population in the Indian Scenario

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ABSTRACT

Background: Anterior cruciate ligament (ACL) injuries are among the most common ligamentous injuries of the knee joint, particularly in young, active individuals involved in sports such as football, kabaddi, and athletics. Management strategies vary between conservative rehabilitation and surgical reconstruction. In the Indian context, socioeconomic, infrastructural, and rehabilitative disparities influence treatment decisions.

Objective: To compare the outcomes of conservative versus surgical management of ACL injuries in the young Indian population and assess which modality ensures better return to function and sport.

Methods: A literature-based comparative analysis was conducted using recent Indian and international studies, including randomized controlled trials and cohort analyses. Outcome measures compared included functional scores (IKDC, Lysholm), knee stability, return-to-sport rate, and complications.

Results: Evidence suggests that in selected young patients, structured rehabilitation alone may yield outcomes comparable to early reconstruction in terms of knee function and long-term osteoarthritis risk. However, in highly active individuals or competitive athletes, surgical reconstruction provides superior mechanical stability and higher rates of return to sport. Indian cohort studies reveal high success rates with ACL reconstruction, especially when coupled with lateral extra-articular tenodesis (LET).

Conclusion: In the Indian scenario, the choice between conservative and surgical management should be individualized. While both methods can provide satisfactory outcomes, surgical management is favored for high-demand athletes and cases of recurrent instability. Adequate rehabilitation infrastructure and patient compliance are essential determinants of success in either approach.

Keywords: Anterior cruciate ligament injury, ACL reconstruction, conservative management, physiotherapy, knee instability, young athletes, Indian population, sports injury rehabilitation.

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INTRODUCTION

Anterior cruciate ligament (ACL) injury is a major cause of knee instability, particularly among young individuals engaged in contact and pivoting sports such as football, kabaddi, and basketball. The ACL plays a crucial role in stabilizing the knee against anterior tibial translation and rotational forces. Its rupture results in pain, instability, and functional limitation.

In India, the burden of ACL injuries has increased due to the rise in sports participation and motor vehicle accidents. Selecting the right treatment modality conservative or surgical depends on multiple factors including patient age, occupation, sport type, lifestyle, access to physiotherapy, and economic status.

Conservative Management

Principles

Conservative management aims to restore functional stability and strength without surgical reconstruction. It includes:

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Pain management (analgesics, cryotherapy)

Use of knee braces for temporary stability

- Supervised physiotherapy focusing on:
- Quadriceps and hamstring strengthening
- Proprioceptive and balance training
- Progressive return-to-sport activities

Evidence

The KANON trial by Frobell et al. (2013) compared early ACL reconstruction plus rehabilitation versus rehabilitation with optional delayed reconstruction in young active adults and found no significant difference in long-term functional outcomes between the groups.^[1]

MRI follow-up in a secondary analysis revealed partial ACL healing in approximately one-third of patients treated conservatively, correlating with better knee function.^[2]

Advantages

Avoids surgical complications and graft morbidity
 Lower immediate cost.
 Suitable for patients with low-demand lifestyle or good rehabilitation access.

Limitations

Residual instability may persist.
 Increased risk of secondary meniscal injuries in unstable knees.
 Requires strict rehabilitation adherence.

Surgical Management

Rationale

Surgical reconstruction (ACLR) restores the anatomic and mechanical stability of the knee, enabling early return to high-level activity. Techniques include using autografts such as hamstring or bone–patellar tendon–bone grafts, sometimes combined with lateral extra-articular tenodesis (LET) for added rotational control.

Evidence

In elite Indian kabaddi players, ACL reconstruction combined with LET demonstrated 86% return to pre-injury performance with very low re-injury rates.^[3]

A meta-analysis of 26 Indian studies concluded that ACLR using hamstring autografts provides excellent functional results and patient satisfaction.^[4]

Nevertheless, international trials^[1,5] show that in general, early ACLR may not be superior to rehabilitation in non-elite populations.

Advantages

Restores knee stability.
 Higher return-to-sport success in high-demand athletes.
 Reduces risk of secondary meniscus or cartilage injury.

Limitations

Surgical risks (infection, stiffness, graft failure).
 Higher cost.
 Requires extensive postoperative rehabilitation.

Comparative Analysis in Indian Context

In India, resource availability greatly influences the treatment choice. In urban centers with advanced rehabilitation facilities, conservative management may suffice in select patients. However, in rural or semi-urban areas where physiotherapy facilities are limited, early surgical stabilization may yield more predictable results (Table 1).

DISCUSSION

The key determinant of success in both approaches lies in rehabilitation quality and patient motivation. Evidence from Western literature may not directly apply to India due to differences in activity patterns, access to physiotherapy, and socioeconomic constraints.

Younger age, competitive sports involvement, and recurrent instability are strong indicators for early surgical reconstruction. Conversely, sedentary individuals or

Table 1: Comparison of Conservative vs Surgical Management

<i>Parameter</i>	<i>Conservative Management</i>	<i>Surgical Management</i>
Ideal Candidates	Non-athletic, low-demand patients	Athletes, high-demand individuals
Cost	Lower	Higher
Rehabilitation Requirement	High	High
Instability Risk	May persist	Low after successful graft healing
Return to Sport	Gradual, sometimes incomplete	Faster, more reliable
Complications	Secondary meniscal injury	Surgical site complications
Availability in Rural India	Easier to implement (with physiotherapy access)	Limited by infrastructure and cost

those unable to afford surgery may benefit from intensive conservative therapy.

CONCLUSION

Both conservative and surgical management approaches have well-defined roles in the treatment of ACL injuries. In the young Indian population:

Surgical reconstruction is ideal for athletes and physically active individuals.

Conservative treatment remains viable for less active patients with good access to structured rehabilitation.

A multidisciplinary approach involving orthopedic surgeons, physiotherapists, and sports medicine experts ensures optimal outcomes. Further Indian randomized controlled trials are needed to establish clear treatment guidelines.

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