

A research study on incidence and rate of re rupture of ACL after Tibial stump preserving ACL Reconstruction

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Abstract:

Objective: The main purpose of this study is to find the incidence and rate of re rupture of ACL after Tibial stump preserving ACL Reconstruction.

Materials & Methods: From January 2021 to July 2022 having total study duration of 1.5 years, about 130 patients consisting of 10 females and 120 Male who were having torn ACL whether Acute or chronic underwent reconstruction of ACL with tibial stump of ACL preservation to retain vascular supply of ACL and proprioception function of knee joint.

Individuals were carefully monitored for the rate of re rupture of ACL after Tibial stump preserving ACL Reconstruction.

BMI was ranging from 25.4-30.62 kg/m² in all patients who participated in this study

Results: This study included total 130 patients, out of these A nodules scar tissue development was identified in 30 out of the 130 patients during the subsequent arthroscopic examination. Nevertheless, the rate of rupture was 2.3%

Conclusion: rate of re rupture of ACL after Tibial stump preserving ACL Reconstruction is a not commonly occurring complication which usually happens after the Anterior Cruciate ligament reconstruction (ACLR).

Keywords: ACL, Tibial Stump, ACL reconstruction

Introduction: Injuries to the Anterior cruciate ligament (ACL) usually occur in youthful and energetic patients, with a yearly frequency of over 200,000 in the United States solely (1). Roughly 65% of these individuals experience ACL reconstruction, but there is an ongoing argument about the most fitting methods (2). Earlier investigations have analyzed the significance of burrow arrangement, joint selection, joint fixation, and rehabilitation procedures, but recent concentration has centered on the function of double-bundle reconstruction (3)

The Inherent ACL comprises of two distinct anterior-medial and posterior-lateral bundles, which individually contribute to translational and rotational steadiness (4). Double-strand ACL reconstruction entails reconstructing both of these bundles autonomously and is believed to more accurately reinstate the natural knee configuration and mechanics (5). In a tibial stump-preserving ACL reconstruction, the surgeon only removes the damaged portion of the ACL and preserves the tibial stump. The surgeon then attaches the new graft to the preserved tibial stump and secures it with screws or other fixation devices (3) Anterior cruciate ligament (ACL) reconstruction (ACLR) is a frequently performed surgical procedure to restore knee stability and enable a return to athletic activities following ACL injury. Despite favorable to exceptional clinical results, graft failure remains a concern, and there are numerous factors contributing to failure. (10) Histopathological studies have confirmed the existence of a circulatory system and viable mechanoreceptors within the ACL remnants, and preservation of these elements may stimulate cell

proliferation and the restoration of proprioceptive function, as well as the reestablishment of blood supply to the graft and its synovial covering post-surgery (6) . Though the post-operative occurrence frequency of complications is low, the deprivation of knee elongation might require corrective surgery (7). After a tibial stump-preserving ACL reconstruction, there is still a risk of re-rupture of the ACL. Although the procedure aims to preserve the tibial stump of the torn ACL and create a new ligament using grafts, it doesn't guarantee complete immunity to future injuries(8,9).

Several factors can contribute to re-rupture, such as:
 (10,11)

- Excessive stress on the knee joint during activities or sports.
- Failure of the graft to fully integrate and heal.
- Insufficient rehabilitation or not following post-operative instructions.
- Engaging in high-impact activities too soon after surgery.
- Pre-existing conditions that affect the stability of the knee joint.

The main aim of this methodical analysis of literature was to assess the rate of re rupture of ACL after tibial stump Preserving ACL reconstruction.

Materials & Methods: From January 2021 to July 2022 total 130 patients consisting of 10 females and 120 Male who were having torn ACL whether Acute or chronic underwent reconstruction of ACL with tibial stump preservation.

Acute reconstruction was defined as procedure performed within six weeks of torn ACL.

Total 40 forty patients were there who went under Acute reconstruction.

Individuals were carefully monitored for the re rupture of ACL after Tibial stump preserving ACL Reconstruction.

The positioning of the tibial tunnel was assessed using side-view X-rays. The ratio of the gap between the front part of the tibia and the tunnel at the joint level (A) to the combined width of the upper tibia (A+B) was computed.

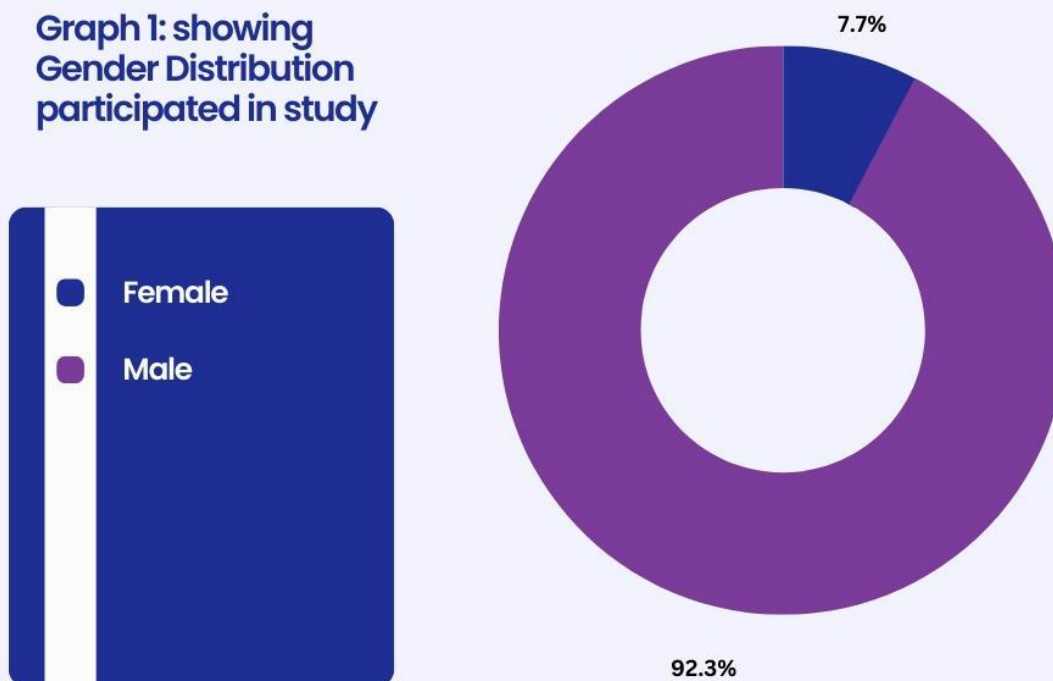
After a monitoring period of no less than 18 months, individuals were summoned for a follow-up assessment. The evaluation encompassed a medical inspection, evaluation of personal symptoms and operational testing, and radiography. The extent of movement was quantified using a goniometer while the individual was lying on their back.

Results: This study included total 130 patients, out of these A nodules scar tissue development was identified in 30 out of the 130 patients during the subsequent arthroscopic examination . Nevertheless, the rate of re rupture of ACL after Tibial stump preserving ACL Reconstruction was seen in only three patients, comprising of just 2.3% of total.

Table 1: showing Baseline Demographic details of patients (n=130)

Parameter	Frequency	Percentage
Age		
25-30 years	80	61.53%
31-40 years	50	38.46%
Gender		
Male	120	93.7%
Female	10	7.7%
BMI(kg/m²)	25.4-30.62	---

Graph 1: showing Gender Distribution participated in study



Those patients who participated in this study were both male and female. Total patients ranging 25-30 years were 80 in number making 61.53% major portion in study. While remaining age was ranging 31-40 years. These were total 50 patients out of 130 having participating age of 38.46%.

Females participants were higher in number contributing 53.84% of total participants while remaining 60(46.15%) were male patients. BMI was ranging from 25.4-30.62 kg/m².

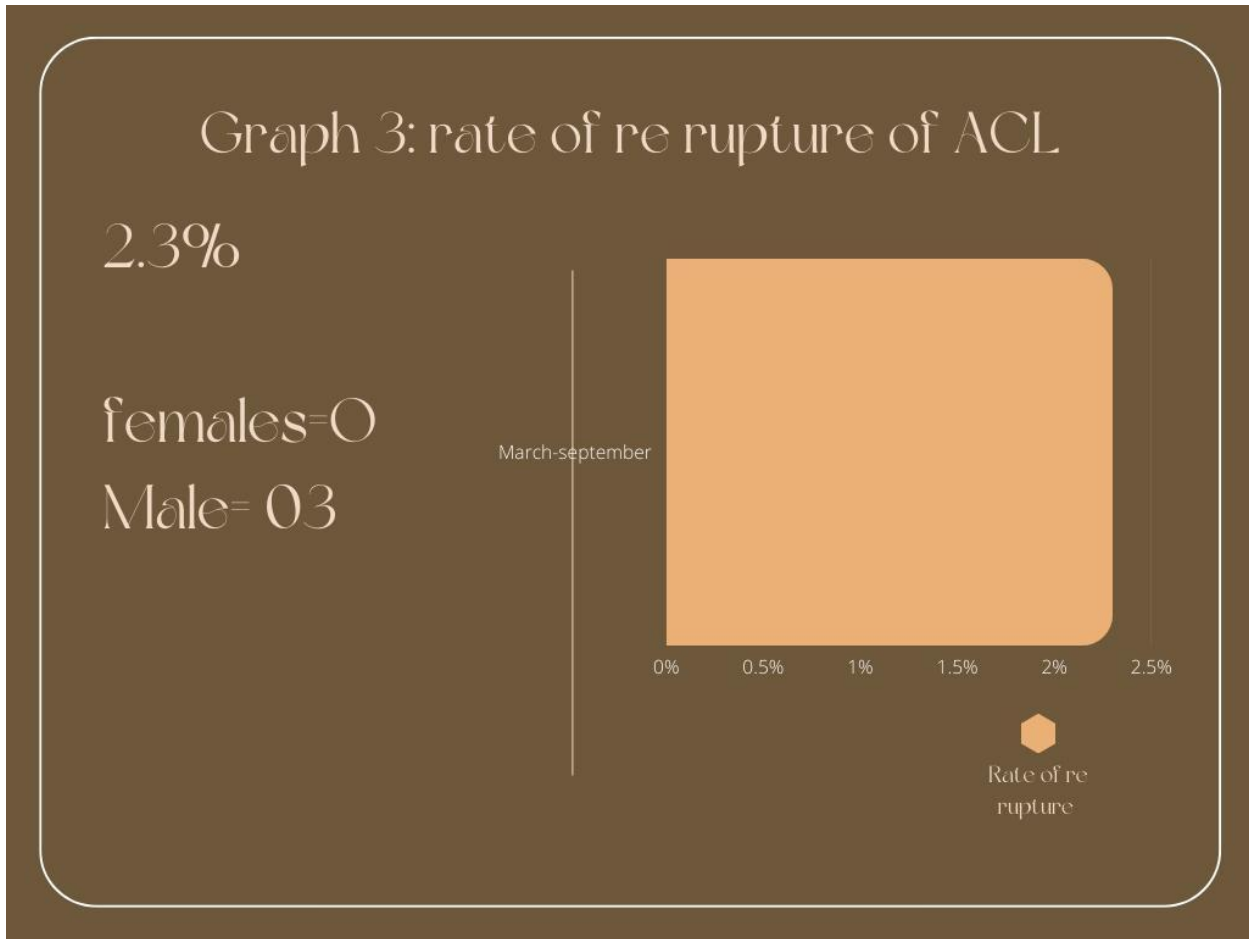
Table 2: Incidence of cyclops Lesions clinically and Radiologically.

Sr.No	Gender	Incidence of cyclops lesions		Total	Percentage	Rerupture of ACL	Percentage
		Clinical	Radiological				

1.	Male	12	15			3	
2.	Female	1	2			0	
		13.	17	Total=30	23.07%	Total=03	2.3%

Clinical symptoms noted in 13 patients.

Incidence of re rupture of ACL was seen in only three male patients. No re rupture noted in any female patients.



Total recurrence rate was only 2.3%. This is because tibial stump may increase the vascular supply and thus decreases the recurrence rate.

Discussion:

The rate of re-rupture after tibial stump preserving ACL reconstruction is generally lower compared to traditional ACL reconstruction techniques. This is because tibial stump preserving procedures aim to retain the native ACL tissue, which may improve the stability and healing process (15,16).

A re-rupture of the ACL (anterior cruciate ligament) after a tibial stump preserving ACL reconstruction can occur in some cases. There could be various reasons for this, such as inadequate healing, improper rehabilitation, or a return to high-impact activities too soon (14). After a tibial stump preserving ACL reconstruction, a re-rupture of the ACL refers to the occurrence of a subsequent tear in the reconstructed anterior cruciate ligament (ACL) (17,18). This situation can happen when the ACL graft fails to heal properly or when excessive stress is placed on the new ligament during activities. (19). Gradually

returning to physical activities and sports while ensuring proper strengthening and stability exercises can also help prevent future ACL injuries.(20,22).

Those patients who participated in this study were both male and female. Total patients ranging 25-30 years were 80 in number making 61.53% major portion in study. While remaining age was ranging 31-40 years. These were total 50 patients out of 130 having participating age of 38.46%.

In our particular research writing paper, Incidence of re rupture of ACL was seen in only three male patients. No re rupture noted in any female patients. Total recurrence rate was 2.3%.

According to our research, A tibial stump preserving ACL reconstruction is a surgical procedure in which the original tibial insertion of the ACL is preserved while the damaged ligament is reconstructed using graft tissue. Despite this approach, there is still a risk of re-rupture, which can be caused by several reasons, including:

Re-injury: Engaging in activities or sports too soon after surgery, without adequate healing time and rehabilitation, can lead to a new ACL tear.

Graft failure: The reconstructed ACL graft may not integrate properly or may fail to withstand the stress placed on it during physical activities.

Insufficient rehabilitation: Proper post-surgery rehabilitation is crucial for restoring strength, flexibility, and stability. Inadequate rehab can increase the risk of re-rupture.

Returning to high-risk activities too early: Engaging in high-impact or high-risk activities before the knee has fully healed and regained strength can lead to re-injury.

Poor surgical technique: In some cases, the failure may be due to surgical errors during the initial reconstruction (24,26). It is uncertain if the formation of a singular-eyed scar can metamorphose into a cyclops autonomously or conceivably via cellular modification instigated by compressive forces. (25).

Prevention:

After Tibial stump preserving ACL reconstruction, it's essential to take certain precautions to minimize the risk of re-rupture: (21-26).

Follow Rehabilitation Protocol: Adhere to the prescribed rehabilitation program and work closely with a physical therapist to ensure a gradual and safe recovery process.

Avoid High-impact Activities: Stay away from activities that put excessive stress on the knee, such as jumping, running, or sudden changes in direction, especially during the initial recovery phase.

Strengthen Muscles: Focus on strengthening the muscles around the knee, including quadriceps, hamstrings, and calf muscles, to provide better support and stability to the reconstructed ACL.

Maintain Proper Form: Practice good body mechanics and technique during physical activities to reduce the strain on the knee joint.

Wear Protective Gear: In sports or activities that carry a higher risk of injury, consider wearing appropriate knee braces or supports to provide added protection.

Listen to Your Body: Pay attention to any signs of pain, swelling, or discomfort in the knee. If you experience any issues, consult your doctor promptly.

Gradual Return to Sports: Before returning to sports or high-intensity activities, ensure that your knee is fully healed, and you have regained sufficient strength and flexibility.

Regular Check-ups: Continue with regular follow-up visits to your orthopedic surgeon to monitor the progress of your knee and identify any potential issues early on.

It's essential for patients to follow their surgeon's post-operative instructions carefully, undergo proper rehabilitation, and gradually return to sports and activities to minimize the risk of re-rupture. However, no surgical technique guarantees 100% protection against re-injury, and the outcome varies depending on individual circumstances

Conclusion: rate of re rupture of ACL after Tibial stump preserving ACL Reconstruction is a not commonly occurring complication which usually happens after the Anterior Cruciate ligament reconstruction (ACLR)

Conflict of interest: In this study Author did not find any conflict of interest

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