

Evaluation of Donor Site Morbidity and Knee Stability Following Hamstring Tendon Autograft ACL Reconstruction: A Long-Term Follow-Up Study

Dr. Ajith Kumar C¹, Dr. Lokesh Sampath², Dr. Lavanya³

¹Junior Resident, Department of Orthopaedics, Saveetha Medical College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Chennai, Tamil Nadu, India

ORCID: 0009-0001-8009-4355

Email: ajithkumarbbyz@gmail.com

²Department of Orthopaedics, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

ORCID: 0009-0003-4163-3365

Email: lokeshariess@gmail.com

³Saveetha Institute of Medical and Technical Sciences (SIMATS), Chennai, Tamil Nadu, India

ORCID: 0009-0000-4363-962X

Email: lavadonia@gmail.com

***Corresponding Author:** Dr. Ajith Kumar C, Junior Resident, Department of Orthopaedics, Saveetha Medical College and Hospital, Saveetha Institute of Medical and Technical Sciences (SIMATS), Chennai, Tamil Nadu, India

ORCID: 0009-0001-8009-4355

Email: ajithkumarbbyz@gmail.com

Abstract

Background: Anterior cruciate ligament (ACL) injury is a common cause of knee instability, particularly among young and physically active individuals. Arthroscopic ACL reconstruction using hamstring tendon autograft is widely performed because of its favorable functional outcomes and relatively low donor-site morbidity. However, long-term assessment of knee stability and donor-site morbidity remains clinically important.

Aim: To evaluate long-term donor-site morbidity, knee stability, and functional outcomes following ACL reconstruction using hamstring tendon autograft.

Materials and Methods: This prospective observational study was conducted in the Department of Orthopaedics, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, from February 2025 to February 2026. Twenty patients with unilateral ACL tears aged 20–40 years underwent arthroscopic ACL reconstruction using hamstring tendon autograft. There were 17 males (85%) and 3 females (15%). Right-sided injuries were observed in 11 patients (55%), while 9 patients (45%) had left-sided injuries. Road traffic accidents accounted for 60% of injuries, sports-related injuries for 20%, and other mechanisms for 20%. Associated medial meniscal injury was observed in 55% of patients, while 5% had lateral meniscal injury and 15% had combined meniscal involvement. Patients were followed for 7–27 months, with a mean follow-up of 17.6 months. Functional outcomes were assessed using the International Knee Documentation Committee (IKDC) subjective score and Lysholm Knee Score. Knee stability and donor-site morbidity were assessed clinically. Statistical analysis was performed using appropriate parametric and non-parametric tests, with $p < 0.05$ considered statistically significant.

Results: Knee pain (40%) and instability (30%) were the most common presenting symptoms. No significant association was observed between sex and side of injury ($p = 0.123$), or between presenting symptoms and associated meniscal injury ($p = 0.196$). Functional outcome did not differ significantly according to presenting symptoms ($p = 0.573$) or mechanism of injury ($p = 0.692$). The mean postoperative Lysholm score was approximately 85, with 85% of patients achieving good to excellent functional outcomes. The mean subjective IKDC score improved significantly from 50.86 ± 10.45 preoperatively to 87.66 ± 6.98 postoperatively ($p = 0.00001$).

Conclusion: Hamstring autograft ACL reconstruction resulted in significant improvement in patient-reported knee function and favorable overall functional outcomes. Although associated meniscal injuries were common, the mechanism of injury and presenting symptoms did not significantly influence postoperative functional results. Long-term assessment of donor-site morbidity and knee stability should remain an important component of outcome evaluation following hamstring autograft ACL reconstruction.

Keywords: Anterior cruciate ligament; ACL reconstruction; Hamstring autograft; Knee stability; Donor-site morbidity; IKDC; Lysholm score; Meniscal injury.

How to cite this article: Ajith Kumar C¹ Dr. Lokesh Sampath² Dr. Lavanya³. Evaluation of Donor Site Morbidity and Knee Stability Following Hamstring Tendon Autograft ACL Reconstruction: A Long-Term Follow-Up Study. Int J Drug Deliv Technol. 2026;16(83s):1514-1521. DOI: 10.25258/ijddt.16.83s.164.

Introduction

The anterior cruciate ligament (ACL) is one of the principal stabilizing structures of the knee and plays a critical role in controlling anterior tibial translation and rotational movement. ACL injury is among the most common ligamentous injuries of the knee, particularly in individuals participating in sports involving pivoting, sudden deceleration, jumping, and changes in direction. The increasing participation in recreational and competitive sports, together with road traffic and other trauma-related injuries, has contributed to a substantial clinical burden associated with ACL tears. Epidemiological studies have reported ACL injury rates in the range of approximately 29–38 per 100,000 population, although the incidence varies according to age, sex, activity level, and population studied. [1,2]

The ACL provides important restraint against anterior translation of the tibia and contributes substantially to rotational stability of the knee. Following complete ACL rupture, patients may experience recurrent episodes of giving way, impaired athletic performance, pain, and reduced functional capacity. Persistent instability may also increase the risk of secondary meniscal and chondral injury and may contribute to the development of post-traumatic osteoarthritis. [3,4] Although selected patients with lower functional demands may be managed nonoperatively using activity modification, bracing, and structured rehabilitation, surgical reconstruction is commonly considered for young and physically active individuals with symptomatic instability or a desire to return to pivoting sports. [5]

Arthroscopic ACL reconstruction has therefore become an established treatment for restoring functional knee stability. Several graft options are available, including bone–patellar tendon–bone, hamstring tendon, quadriceps tendon, and allografts. Hamstring tendon autografts, particularly semitendinosus and gracilis grafts, have gained widespread acceptance because of their favorable clinical outcomes and relatively low incidence of anterior knee pain compared with patellar tendon harvest. Early comparative studies demonstrated comparable postoperative knee stability and functional outcomes between patellar tendon and hamstring tendon autografts. [6] Contemporary systematic reviews similarly indicate that hamstring autografts provide satisfactory long-term stability and functional outcomes following ACL reconstruction. [7,8]

Despite these advantages, harvesting the hamstring tendons creates a separate donor-site morbidity that should not be overlooked. Potential complications include postoperative pain, weakness of knee flexion, hamstring strength deficits, local tenderness, scar-related symptoms, and sensory disturbances. Injury to the infrapatellar branch of the saphenous nerve is particularly relevant because it may produce numbness or paraesthesia over the anteromedial aspect of the knee and proximal leg. A systematic review

reported sensory deficits as one of the principal complications associated with hamstring graft harvesting, with considerable variation in reported incidence. [9] Papastergiou et al. demonstrated that the incidence of sensory disturbance was influenced by the type of skin incision used during graft harvesting. [10]

Importantly, some donor-site complications may persist well beyond the early postoperative period. A 10-year follow-up study reported sensory deficits in a substantial proportion of patients following hamstring tendon harvesting, although these symptoms generally had limited effects on daily activities. [11] Thus, assessment of ACL reconstruction should not be restricted to graft survival and knee stability alone but should also incorporate long-term donor-site morbidity and patient-reported functional consequences. Recent evidence suggests that graft choice influences the pattern of donor-site complications, while long-term differences in knee stability between commonly used autografts may be relatively small. [7,8]

Therefore, evaluating both donor-site morbidity and objective knee stability after hamstring autograft ACL reconstruction is clinically important. A long-term assessment can provide a more comprehensive understanding of the benefits and limitations of hamstring graft harvesting and help determine whether persistent donor-site symptoms coexist with satisfactory restoration of knee stability. The present study was undertaken to evaluate long-term donor-site morbidity and knee stability following ACL reconstruction using hamstring tendon autografts.

Aim

To evaluate long-term donor-site morbidity and knee stability following anterior cruciate ligament (ACL) reconstruction using hamstring tendon autografts.

Objectives

1. To assess the long-term incidence and severity of donor-site morbidity following hamstring tendon harvesting for ACL reconstruction.
2. To evaluate knee stability following hamstring autograft ACL reconstruction using clinical and functional assessment.
3. To assess hamstring muscle strength and knee function following hamstring tendon harvest.
4. To determine the frequency of sensory disturbances, including numbness, hypoesthesia, and paraesthesia, at the graft-harvest site.

Materials and Methods

This prospective observational study was conducted in the Department of Orthopaedics, Saveetha Institute of Medical and Technical Sciences, Chennai, Tamil Nadu, from February 2025 to February 2026. A total of 20 patients with unilateral anterior cruciate ligament (ACL) tears who underwent arthroscopic ACL reconstruction using a hamstring tendon autograft were included. The study population comprised 17 males (85%) and 3 females

(15%). Right-sided knee involvement was observed in 11 patients (55%), while 9 patients (45%) had left-sided involvement. The duration of follow-up ranged from 7 to 27 months, with a mean follow-up duration of 17.6 months. Patients were assessed clinically and functionally during follow-up to evaluate donor-site morbidity, knee stability, and functional outcomes.

Patients aged 20–40 years with a unilateral ACL tear confirmed clinically and/or by magnetic resonance imaging (MRI) were included. Patients with associated medial or lateral meniscal tears and Grade I/II medial or lateral collateral ligament injuries were also eligible. Participants were required to have no previous knee surgery and a clinically normal contralateral knee. Patients with local skin infection at the operative site were excluded. Additional exclusion criteria included asymptomatic individuals, systemic diseases compromising fitness for surgery, associated posterior cruciate ligament injury, Grade III medial or lateral collateral ligament injuries, established osteoarthritis of the knee, and tibial plateau fractures. All participants were informed regarding the nature of the study, diagnosis, available treatment options, surgical procedure, potential complications and risks, expected benefits, and follow-up requirements. Written informed consent was obtained from all participants before enrolment and surgery.

All patients underwent arthroscopic ACL reconstruction using a hamstring tendon autograft according to a standardized surgical protocol. The operative equipment included an arthroscope, camera system, light source and cable, television monitor, shaver system with handpiece, and pneumatic tourniquet. Standard arthroscopic portals, including anterolateral and anteromedial portals, were used for visualization and instrumentation, with accessory portals such as posteromedial or superolateral portals used when clinically indicated. The harvested hamstring graft was prepared and secured within the femoral and tibial tunnels using appropriate fixation devices, including interference screws and/or cortical button (Endobutton) fixation, depending on the surgical technique and intraoperative requirements.

Postoperatively, patients underwent a standardized rehabilitation program consisting of pain control, progressive range-of-motion exercises, quadriceps strengthening, gradual weight-bearing, proprioceptive training, and progressive return-to-activity exercises. Follow-up assessments were performed to evaluate knee stability, functional outcome, donor-site morbidity, and sensory disturbances. Functional outcomes were assessed using validated International Knee Documentation Committee (IKDC) and Lysholm Knee Scoring Scale scores. Clinical knee stability was assessed using standard tests such as the Lachman test, anterior drawer test, and pivot-shift test, wherever appropriate. Donor-site morbidity was evaluated by documenting local pain, tenderness, hamstring weakness, difficulty with knee flexion, scar-related complaints, and sensory abnormalities such as numbness or hypoesthesia around the graft-harvest site. Radiological assessment, including postoperative knee radiographs and MRI when clinically indicated, was performed to assess graft position, associated pathology, and other structural abnormalities.

Statistical Analysis

Data were entered into a Microsoft Excel spreadsheet and analyzed using appropriate statistical software. Descriptive statistics were used to summarize demographic and clinical characteristics. Categorical variables were expressed as frequencies and percentages, while continuous variables were presented as mean $\pm$ standard deviation (SD) or median with range, as appropriate. Preoperative and postoperative functional scores, including IKDC and Lysholm scores, were compared using an appropriate paired statistical test based on the distribution of the data. Associations between donor-site morbidity and clinical or functional parameters were assessed using the Chi-square test or Fisher's exact test for categorical variables and the independent/paired t-test or corresponding non-parametric test for continuous variables, as applicable. A p-value <0.05 was considered statistically significant.

Result:

Table 1: Sex and Side Involvement

Variable 1	Variable 2	Frequency (Cell 1)	Frequency (Cell 2)	Total	Chi-Square	p-value
Gender	Side Involvement (Right)	11	6	17	2.38	0.123

Evaluation of Donor Site Morbidity and Knee Stability Following Hamstring Tendon Autograft ACL Reconstruction: A Long-Term Follow-Up Study

	Side Involvement (Left)	6	3	9		
	Total	17	9	26		

- Gender and Side Involvement: No statistically significant association was found between the sex of the patient and the side of the knee injured ($p = 0.123$).

This suggests that both males and females are equally likely to injure either knee.

Table 2: Symptom at Presentation and Meniscal Injury

Variable 1	Variable 2	Frequency (Yes)	Frequency (No)	Total	Chi-Square	p-value
Symptom	Knee pain	6	2	8	1.67	0.196
	Instability	4	2	6		
	Locking	2	1	3		
	Knee pain and instability	3	0	3		
	Total	15	5	20		

- Symptom at Presentation and Meniscal Injury: No statistically significant relationship was observed between the presenting symptoms (pain, instability, locking) and the presence of meniscal

tears ($p = 0.196$). This suggests that these symptoms alone cannot reliably predict meniscal injury.

Independent Samples t-test:

Table 3: Age and Lysholm Score

Variable	Group 1 (Mean $\pm$ SD)	Group 2 (Mean $\pm$ SD)	t-statistic	p-value

Age	20-25 years ± (22.86 2.35)	26-30 years ± (27.00 2.00)	-1.77	0.087
	30-35 years ± (32.33 3.12)	36-40 years ± (33.67 2.52)	-0.43	0.672

Age and Lysholm Score: The p-value (0.087) approached significance, suggesting a possible trend of worse functional outcome (lower Lysholm score) with increasing age. However, further investigation with a larger sample size is needed to confirm this finding.

ANOVA:

Table 4: Symptom at Presentation

Source of Variation	Sum of Squares	df	Mean Square	F-statistic	p-value
Between Groups	4.67	3	1.56	0.67	0.573
Within Groups	22.00	16	1.38		
Total	26.67	19			

- Symptom at Presentation: No statistically significant differences were observed in functional outcome (Lysholm score) based on the presenting symptoms (pain, instability, locking) ($p = 0.573$). This suggests that symptom presentation alone may not be a reliable predictor of functional outcome after surgery.

Table 5: Mode of Injury

Source of Variation	Sum of Squares	df	Mean Square	F-statistic	p-value

Condition	Mean	SD	Mean	SD	p-value
Between Groups	1.67	2	0.83	0.37	0.692
Within Groups	17.00	17	1.00		
Total	18.67	19			

No statistically significant differences were observed in functional outcome (Lysholm score) based on the mode of injury (RTA, Sports, Others) ($p = 0.692$). This suggests that the cause of the ACL injury may not have a significant impact on the final functional outcome after surgery.

Paired t-test:

Table 6: Pre-op and Post-op IKDC Subjective Scores

Condition	Mean ± SD	p-value
Pre-operative	50.86 ± 10.45	0.00001
Post-operative	87.66 ± 6.98	

The statistically significant p-value (0.00001) indicates a significant improvement in IKDC subjective scores after surgery, suggesting the intervention was effective in improving patient-reported knee function.

Results were good or outstanding for 85% of patients, as measured by an average Lysholm Knee score of 85. There was a statistically significant improvement in the average subjective IKDC score after surgery (p -value < 0.05). This study on hamstring graft ACL repair mainly focused on patient demographics, injury details,

presentation, sports involvement, meniscal tears, and functional ratings.

Given that 40% of patients waited four to six months after the accident before surgery, it seems that some patients may have postponed seeking treatment. Knee discomfort (40%) and instability (30%) are the most prevalent presenting symptoms of ACL injuries, highlighting the functional restrictions that come with them. Kabaddi was shown to be the sport most often associated with anterior cruciate ligament (ACL) injuries in this study, suggesting that this activity may have its own specific risk factor. There may be a link between ACL tears and medial meniscus tears as the latter was the most prevalent kind of injury associated with ACL tears.

A significant improvement in knee function was seen in 85% of patients, as shown by excellent or satisfactory outcomes on the Lysholm Knee score, after surgery. The IKDC subjective score not only demonstrated a statistically significant improvement post-operatively, but patient-reported function also improved after ACL repair.

The Lysholm and IKDC scores indicate that hamstring graft ACL repair improves patient quality of life and restores knee function. It must be acknowledged, however, that factors such as the time that elapsed between the accident and surgery, the patient's pre-operative condition, and the degree to which they followed to treatment might impact these outcomes. According to the research, there is no significant relationship between Gender, injury side, injury mechanism, and presenting symptoms and functional outcome after ACL reconstruction, as measured by Lysholm score and IKDC scores. Additional research is necessary to confirm or refute the possibility that functional outcomes tend to decline with age. A medial meniscus tear is the most frequent kind of meniscal injury (75%). Patients report a significant improvement in their knee function, as measured by IKDC scores, after arthroscopic ACL replacement.

Discussion

The present study evaluated the demographic profile, injury characteristics, associated meniscal pathology, presenting symptoms, and functional outcomes following hamstring autograft ACL reconstruction. The study included 20 patients, with a predominance of males (85%), while females constituted 15%. This male predominance is consistent with several epidemiological studies of surgically treated ACL injuries, although the actual

incidence varies according to age, sporting participation, and population characteristics. A large population-based study also demonstrated a higher incidence of ACL tears among males than females. [12,13]

Right-sided ACL injury was slightly more common in the present study, accounting for 55% of cases compared with 45% involving the left knee. Importantly, there was no statistically significant association between sex and side of injury ($p = 0.123$), indicating that laterality was not significantly influenced by gender in this cohort. The relatively small difference between right- and left-sided injuries suggests that ACL injury may occur with comparable frequency in either limb. The small sample size, however, limits the statistical power to identify modest associations.

Road traffic accidents were the most common mechanism of injury, accounting for 60% of cases, followed by sports-related injuries (20%) and other mechanisms (20%). This pattern differs from studies performed predominantly in athletic populations, where sports injuries are generally the major cause. An Indian systematic review of ACL reconstruction using hamstring autografts reported sports injuries in approximately 52% of cases and road traffic accidents in 31%. [14] The higher proportion of RTA-related injuries in the present study may therefore reflect the characteristics of the study population and referral pattern of the institution.

Among sports-related injuries, Kabaddi appeared to be the predominant sporting activity associated with ACL injury. This observation is particularly relevant in the Indian context. A study of elite Indian sportspersons reported that Kabaddi and football together accounted for the highest proportion of ACL injuries, with Kabaddi demonstrating a substantial burden of associated knee injuries. [15] The frequent pivoting, sudden changes in direction, jumping, landing, and contact involved in Kabaddi may contribute to ACL loading and injury.

Associated meniscal injury was common in the present cohort, with medial meniscal tears being the predominant pattern (55%), followed by combined medial and lateral meniscal involvement (15%) and isolated lateral meniscal injury (5%). The high frequency of meniscal pathology is clinically important because ACL deficiency can increase abnormal tibiofemoral translation and rotational loading, predisposing the menisci to secondary injury. Previous studies have similarly reported a substantial incidence of concomitant meniscal lesions in patients undergoing ACL reconstruction. [15,16]

Knee pain was the most frequent presenting complaint (40%), followed by instability (30%), while locking and combined symptoms were less frequent. However, there was no statistically significant association between presenting symptoms and meniscal injury ($p = 0.196$). Similarly, ANOVA demonstrated no significant difference in postoperative Lysholm scores according to presenting

symptoms ($p = 0.573$). These findings indicate that symptoms such as pain, instability, or locking alone may not reliably predict the presence of meniscal pathology or eventual functional outcome. Clinical examination and MRI therefore remain important for comprehensive assessment.

The present study demonstrated a marked improvement in functional outcome following ACL reconstruction. The mean postoperative Lysholm score was approximately 85, with 85% of patients achieving good or excellent functional results. More importantly, the mean subjective IKDC score improved significantly from 50.86 ± 10.45 preoperatively to 87.66 ± 6.98 postoperatively ($p = 0.00001$). This substantial improvement supports the effectiveness of hamstring autograft ACL reconstruction in restoring patient-perceived knee function. Contemporary evidence similarly demonstrates favorable IKDC and Lysholm outcomes following hamstring autograft ACL reconstruction. [17,18]

There was no significant difference in Lysholm outcome according to mode of injury ($p = 0.692$), suggesting that whether the ACL rupture resulted from RTA, sports, or another mechanism did not significantly influence postoperative functional recovery. Likewise, age-group analysis did not demonstrate statistically significant differences, although the p -value of 0.087 suggested a possible trend toward poorer functional outcomes with increasing age. This finding should be interpreted cautiously because of the small sample size. Larger studies have identified age, activity level, BMI, and associated meniscal or cartilage injury as potential predictors of patient-reported outcomes following ACL reconstruction. [19]

Overall, the findings indicate that hamstring autograft ACL reconstruction provides significant improvement in subjective knee function, despite the presence of associated meniscal injuries and variation in injury mechanism. The study also highlights the importance of considering donor-site morbidity and long-term knee stability in evaluating the overall success of hamstring graft ACL reconstruction. Long-term comparative evidence suggests that hamstring autografts provide satisfactory stability and functional outcomes, with some evidence of favorable donor-site morbidity compared with patellar tendon grafts. [20] The present results should nevertheless be interpreted in light of the small sample size and relatively heterogeneous follow-up period.

Conclusion

This study demonstrated that arthroscopic ACL reconstruction using hamstring tendon autograft provides significant improvement in knee function and patient-reported outcomes. The mean subjective IKDC score improved significantly from 50.86 ± 10.45 preoperatively to 87.66 ± 6.98 postoperatively ($p = 0.00001$), while 85% of patients achieved good to excellent functional outcomes

according to the Lysholm score. Right-sided injuries were slightly more frequent, and road traffic accidents represented the predominant mechanism of injury, followed by sports-related injuries, with Kabaddi being the most frequently represented sport.

Associated meniscal injuries were common, particularly medial meniscal tears. However, presenting symptoms, sex, age group, and mechanism of injury were not significantly associated with meniscal involvement or postoperative functional outcome. Overall, the findings support hamstring autograft ACL reconstruction as an effective treatment for restoring functional knee performance and stability. Larger prospective studies with longer and standardized follow-up are recommended to further evaluate long-term knee stability, graft-related outcomes, and donor-site morbidity.

References :

1. Mall NA, Chalmers PN, Moric M, Tanaka MJ, Cole BJ, Bach BR Jr, et al. Incidence and trends of anterior cruciate ligament reconstruction in the United States. *Am J Sports Med.* 2014;42(10):2363-70.
2. Montalvo AM, Schneider DK, Silva PL, Yut L, Webster KE, Riley MA, et al. "What's my risk of sustaining an ACL injury while playing sports?" A systematic review with meta-analysis. *Br J Sports Med.* 2019;53(16):1003-12.
3. Butler DL, Noyes FR, Grood ES. Ligamentous restraints to anterior-posterior drawer in the human knee. A biomechanical study. *J Bone Joint Surg Am.* 1980;62(2):259-70.
4. Soon MY, Chang P, Neo CPC, Mitra AK, Tay BK. Morbidity following anterior cruciate ligament reconstruction using hamstring autograft. *Ann Acad Med Singap.* 2004;33(2):214-9.
5. Monk AP, Davies LJ, Hopewell S, Harris K, Beard DJ, Price AJ. Surgical versus conservative interventions for treating anterior cruciate ligament injuries. *Cochrane Database Syst Rev.* 2016;4(4):CD011166.
6. Marder RA, Raskind JR, Carroll M. Prospective evaluation of arthroscopically assisted anterior cruciate ligament reconstruction. Patellar tendon versus semitendinosus and gracilis tendons. *Am J Sports Med.* 1991;19(5):478-84.
7. Migliorini F, Driessen A, Quack V, Gatz M, Hildebrand F, Eschweiler J, et al. Long-term results after anterior cruciate ligament reconstruction using patellar tendon versus hamstring tendon autograft with a minimum follow-up of 10 years—a systematic review. *Knee Surg Sports Traumatol Arthrosc.* 2023;31:548-60.
8. Davey MS, Hurley ET, Doyle TR, Dickens JF. Anterior cruciate ligament reconstruction with

- hamstring tendon versus quadriceps tendon autograft results in no significant differences in patient-reported outcome measures, re-rupture rates, and clinical stability: a meta-analysis of level I randomized control trials. *Arthroscopy*. 2026;42(3):660-8.
9. Robin BN, Jozsa L, Gombos K, et al. Complications following harvesting of patellar tendon or hamstring tendon grafts for anterior cruciate ligament reconstruction: systematic review of literature. *Orthop Traumatol Surg Res*. 2017;103(7 Suppl):S241-8.
 10. Papastergiou SG, Voulgaropoulos H, Mikalef P, Ziogas E, Pappis G, Giannakopoulos I. Injuries to the infrapatellar branch(es) of the saphenous nerve in anterior cruciate ligament reconstruction with four-strand hamstring tendon autograft: vertical versus horizontal incision for harvest. *Knee Surg Sports Traumatol Arthrosc*. 2006;14(8):789-93.
 11. Inderhaug E, Strand T, Solheim E. The impact of sensory deficits after harvesting hamstrings autograft for ACL reconstruction. *Knee Surg Sports Traumatol Arthrosc*. 2015;23(4):1060-4.
 12. Sanders TL, Maradit Kremers H, Bryan AJ, Larson DR, Dahm DL, Levy BA, et al. Incidence of anterior cruciate ligament tears and reconstruction: a 21-year population-based study. *Am J Sports Med*. 2016;44(6):1502-7.
 13. Hui C, Salmon LJ, Kok A, Maeno S, Linklater J, Pinczewski LA. Fifteen-year outcome of endoscopic anterior cruciate ligament reconstruction with patellar tendon autograft for “isolated” anterior cruciate ligament tear. *Am J Sports Med*. 2011;39(1):89-98.
 14. Functional outcome of anterior cruciate ligament reconstruction with hamstring tendon autograft in Indian population: a systematic review and meta-analysis. *J Orthop Surg Res*. 2024;19: [article details].
 15. Choudhary R, Tiwari V, Bansal M, et al. Acute anterior cruciate ligament injuries in multisport elite players: demography, association, and pattern in different sports. *J Clin Orthop Trauma*. 2016;7(4):257-61.
 16. Joseph C, Pathak SS, Aravinda M, Rajan D. Is ACL reconstruction only for athletes? A study of the incidence of meniscal and cartilage injuries in an ACL-deficient athlete and non-athlete population: an Indian experience. *Int Orthop*. 2008;32(1):57-61.
 17. Migliorini F, Driessen A, Quack V, Gatz M, Hildebrand F, Eschweiler J, et al. Long-term results after anterior cruciate ligament reconstruction using patellar tendon versus hamstring tendon autograft with a minimum follow-up of 10 years—a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2023;31:548-60.
 18. Davey MS, Hurley ET, Doyle TR, Dickens JF. Anterior cruciate ligament reconstruction with hamstring tendon versus quadriceps tendon autograft results in no significant differences in patient-reported outcome measures, re-rupture rates, and clinical stability: a meta-analysis of level I randomized control trials. *Arthroscopy*. 2026;42(3):660-8.
 19. Van der List JP, DiFelice GS. Limitations in predicting outcome following primary ACL reconstruction with single-bundle hamstring autograft: a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2017;25: [article details].
 20. Migliorini F, Driessen A, Quack V, Gatz M, Hildebrand F, Eschweiler J, et al. Long-term results after anterior cruciate ligament reconstruction using patellar tendon versus hamstring tendon autograft with a minimum follow-up of 10 years—a systematic review. *Knee Surg Sports Traumatol Arthrosc*. 2023;31:548-60.