Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

PRE-OPERATIVE EVALUATION OF SEMITENDINOSUS GRAFT DIMENSIONS AND ITS INTRAOPERATIVE CORRELATION FOR ARTHROSCOPIC ACL RECONSTRUCTIONS

[1]Dr JITHIN LAL P, [2] Dr VINAY PAWAR, [3]Dr A A HOSANGADI

[1]Postgraduate Student, Department of Orthopaedics, Karnataka Medical College And Research Institute,Hubballi, Karnataka, India.
[2] Assistant Professor, Department of Orthopaedics, Karnataka Medical College And Research Institute, Hubballi, Karnataka, India.
[3] Associate Professor, Department of Orthopaedics, Karnataka Medical College And Research Institute, Hubballi, Karnataka, India.

Corresponding author: [1]Dr Jithin Lal P

ABSTRACT

Background :

Preoperative prediction of semitendinosus graft dimensions using MRI can significantly impact graft choice and surgical outcomes in ACL reconstruction. Accurate pre-surgical information may enhance the success of the procedure by ensuring the use of adequately sized grafts.

Methods:

This study included 30 patients with complete ACL tears. Preoperative MRI scans were conducted to measure the maximum anteroposterior (AP) and mediolateral (ML) diameters of the semitendinosus tendon. These measurements were taken at the joint line and physeal line. During surgery, the semitendinosus graft was harvested, and its thickness was measured manually using measuring guage.

Results :

The mean ± standard deviation for the AP and ML diameters of the semitendinosus tendon on MRI at the joint line were 6.34±0.88 mm and 6.57±0.71 mm, respectively. At the physeal line, the measurements were 6.71±0.61 mm and 6.99±0.39 mm, respectively. A significant

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

statistical correlation was found between the MRI measurements and the intraoperative dimensions of the 4-stranded semitendinosus autograft ($p < 0.05$)

ROC analysis suggests that a CSA > 17.66 mm^2 at the joint line and > 22.53 mm^2 at the physeal line predicts an 8 mm thickness graft.

Minimum CSA for an 8mm Graft;

- Joint line CSA: ≥ 17.66 mm^2
- Physeal line CSA: ≥ 22.53 mm^2

These cutoff values provide the best sensitivity and specificity for predicting an 8mm graft size based on MRI.

Conclusion :

Preoperative MRI assessment of the semitendinosus tendon is a reliable method for predicting graft size. This approach can identify tendons that may be inadequate for ACL reconstruction, thus serving as a sensitive and specific screening tool for surgical planning. This preoperative evaluation enhances surgical outcomes by ensuring the use of sufficiently sized grafts.

Thus, the surgeon can be better prepared for the surgery and can seek alternate graft options if the graft size is deemed inadequate pre-operatively.

Introduction

Anterior cruciate ligament (ACL) injuries are among the most frequently encountered knee injuries, particularly in athletes involved in pivoting sports such as football, basketball, and

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

skiing. These injuries not only compromise knee stability but also significantly impact physical function, quality of life, and athletic performance [1]. Over the years, arthroscopic ACL reconstruction has emerged as the gold standard for restoring joint stability and preventing secondary damage such as meniscal tears and early osteoarthritis [2]. Among the various graft options available for ACL reconstruction, the hamstring tendon autograft—primarily the semitendinosus tendon, either alone or in combination with the gracilis—has gained widespread popularity. This preference is largely due to its adequate tensile strength, low donor site morbidity, and relatively easier harvest compared to bone-patellar tendon-bone grafts [3]. However, one of the most critical determinants of graft success is the diameter and length of the harvested tendon, which directly influences the biomechanical properties of the reconstructed ligament and its long-term durability [4]. Clinical evidence has consistently shown that smaller diameter grafts, particularly those less than 8 mm, are associated with increased risks of graft failure and revision surgery, especially in young, active patients [5]. This has brought attention to the importance of accurate pre-operative prediction of graft dimensions, allowing surgeons to plan appropriately and consider alternative graft sources, graft augmentation, or even a change in surgical technique if the predicted autograft size is inadequate. Several anthropometric parameters such as patient height, weight, body mass index (BMI), thigh circumference, and sex have been studied as potential predictors of hamstring graft size. These parameters have shown varying degrees of correlation, with height and thigh circumference generally emerging as more consistent indicators of graft diameter [6]. In parallel, imaging modalities such as magnetic resonance imaging (MRI) and ultrasonography have been investigated for pre-operative graft evaluation. Although MRI offers good soft tissue resolution and visualization, its predictive accuracy remains moderate, and practical limitations such as cost and availability can restrict its routine use [7].

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Given the clinical significance of achieving an optimal graft size and the limitations of current predictive tools, it is essential to evaluate and correlate pre-operative assessments—both clinical and radiological—with actual intraoperative graft measurements. Such correlation studies not only enhance the surgeon's preparedness but also contribute to individualized surgical planning, improving overall outcomes in ACL reconstruction.

The present study aims to assess the dimensions of the semitendinosus tendon pre-operatively using anthropometric and radiologic parameters and to correlate these findings with intraoperative graft measurements. This will help in validating the reliability of non-invasive predictors and in developing standardized protocols for better surgical planning.

OBJECTIVES OF THE STUDY:

1 To study the correlation between MRI pre-operative cross sectional area measurements of the Semitendinosus tendon to determine whether MRI cross sectional area measurements of the hamstring tendon can be used as a predictor of single bundle (SB) hamstring graft diameter.

2 To study the minimum hamstring tendon cross sectional area on MRI required to produce an equivalent 8-mm thickness SB hamstring graft.

MATERIALS AND METHODS:

SOURCE OF DATA:

Study will be conducted from April 2023 to November 2024 (18 months), among 30 subjects who will admit in Department of Orthopedics, KMCRI, Hubballi, with complete tear of anterior cruciate ligament.

METHODS OF COLLECTION OF DATA:

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Study design:

Prospective cohort study

Study period:

April 2023 to November 2024

Place of study:

Karnataka medical college and research institute , Hubballi

Sample size: 30

ESTIMATION OF SAMPLE SIZE:

A review of medical records from KMCRI, Hubballi, for the year 2022 provided the following data:

Total number of knee injuries in KMCRI HUBLI the year 2022 : 130

Total number of ACL injuries in KMCRI HUBLI in the year 2022 : 35

Proportion of ACL injuries operated in KMCRI HUBLI in the whole year- (p):

P =35/130 =0.2692 ,Approximately =0.27

If p is 0.27 , then q = 1- p

So, q = 1- 0.27 = 0.73

q =0.73

To estimate the required sample size (n), the formula used is :

√n= (1.96 √pq)/ l

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

n =1.96 , p = 0.27 , q = 0.73

l (margin of error) = 0.15

Z value (for 95% confidence level) = 1.96

Solving for n:

n = 33.64

Approximately = 34

Thus, the estimated sample size for our study is 30, considering feasibility constraints.

INCLUSION CRITERIA :

1. Patients aged between 18 to 45 years without gender predilection
2. Anterior cruciate ligament tear confirmed by Lachman test, anterior drawer test, classic pivot shift maneuver of MacIntosh and Galway and MRI

EXCLUSION CRITERIA :

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

1.Patients who had failed primary ACL reconstruction surgery.

2.Age less than 18 years and more than 45 years.

3.Anterior cruciate ligament tear of less than 2 weeks.

4.Anterior cruciate ligament tear associated with other ligament injuries (posterior cruciate ligament tear, collateral ligament injuries).

5.Patients who had semitendinosus and/or gracilis tendon injuries were all excluded from the study.

6.Anterior cruciate ligament tear associated with bony injury around the knee.

METHODOLOGY:

Informed consent will be taken before start of the study. Demographic data will be obtained from case records. A diagnostic arthroscopy will be performed prior to tendon harvest. The graft will be harvested through an oblique anteromedial incision at the level of the pes anserine insertion by dividing the superficial pes anserine fascia and exposing the insertion of semitendinosus and gracilis. MRI scans will be performed at one site with a 1.5T Siemens MAGNETOM scanner (Siemens, Erlangen, Germany).

The following sequences were performed:

Sagittal PD/T2-weighted spin echo with fat saturation having a repetition time of 4240 ms, an echo time of 13 ms (PD) and 78 ms (T2), a slice thickness of 3.0 mm, a field of view of 170 mm and a matrix of 269 × 384.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Coronal PD/T2-weighted spin echo with fat saturation using a repetition time of 4210 ms, an echo time of 13 ms (PD) and 78 ms (T2), a slice thickness of 3.0 mm, a field of view of 170 mm and a matrix of 192 × 384.

Axial—Medic using a repetition time of 773 ms, an echo time of 18 ms, a slice thickness of 3.0 mm, a field of view of 170 mm and a matrix of 256 × 90.

Maximum AP and ML diameters will be measured on axial MRI images. The cross sectional area (CSA)measurement will be evaluated manually tracing the tendon with the free hand tool. Measurements of diameter and CSA will be performed at the outermost border of the hypointense region of the tendon. Data obtained from MRI will be compared with intraoperatively measured diameter of 4-stranded ST autograft tendon. All surgeries will be performed by arthroscopic methods.

The graft will be harvested through anteromedial incision. Soft tissue remnants of the graft will be removed and its length was adjusted to at least 8 cm after folding as 4-stranded. Then diameters of grafts will be measured using cylindrical caliber gauges(from 5 to 11 mm with increment by 0.5 mm). For the purpose of standardization, diameters will be measured and evaluated from the un sutured femoral part of the graft.

The CSA of the graft will be adjusted so as to leave at least 2.5 cm of the graft within the femoral tunnel. Endobutton will be used for femoral fixation and screw or tibial base plate will be used for tibial fixation.

FOLLOWUP: Patient is followed up regularly at 6 weeks ,3 months and at 12 months

During all the visits, the power of flexion and extension at knee joint is tested by MRC grading.

RESULTS

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

A total of 30 cases are included in this study The mean age of the patient was 27.27 ± 5.878 , minimum age was 18 years and maximum age was 45 years.

Table 1: Distribution of Age :

Age in years	
Mean	27.27
Std. Deviation	5.878
Minimum	18
Maximum	45

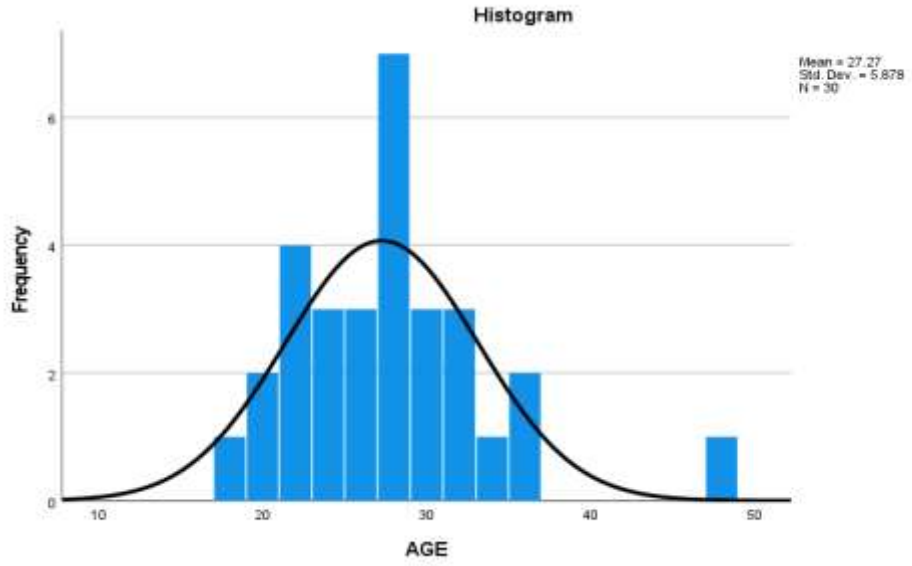
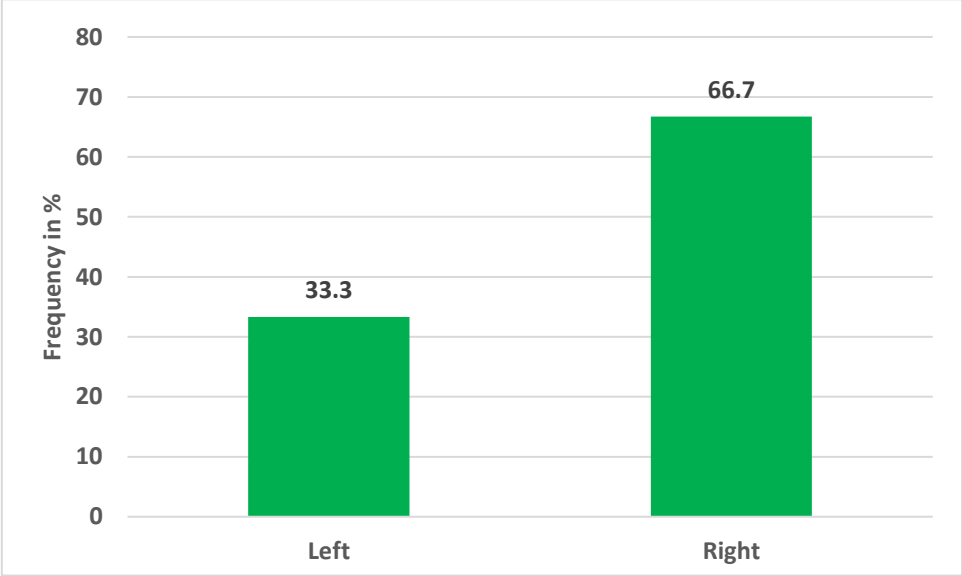


Table 2: Distribution of side :

Side of leg	No.	%
Left	10	33.3

Right	20	66.7
Total	30	100.0



the distribution of leg sides, with 10 individuals (33.3%) having their left leg, and 20 individuals (66.7%) having their right leg.

Table 3: Graft Characteristics :

	Mean	Std. Deviation	Minimum	Maximum
Total graft length	29.10	1.749	24	32
Diameter after quadrupling (mm)	7.03	0.765	6	8
Final diameter after integrating gracilis tendon	8.80	0.664	8	10
Total graft length after quadrupling (cm)	8.57	0.817	7	10

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Table 3 presents several measurements related to graft characteristics. The total graft length has a mean of 29.10 cm, with a standard deviation of 1.749 cm, ranging from 24 cm to 32 cm. The diameter after quadrupling has a mean of 7.03 mm with a standard deviation of 0.765 mm, ranging from 6 mm to 8 mm. The final diameter after integrating the gracilis tendon shows a mean of 8.80 mm, with a standard deviation of 0.664mm, ranging from 8 mm to 10 mm. Finally, the total graft length after quadrupling (in cm) has a mean of 8.57 cm, with a standard deviation of 0.817 cm, ranging from 7 cm to 10 cm.

Table 4 : MRI Graft charteritics :

	Mean	Std. Deviation	Minimum	Maximum
MRI medio lateral diameter at joint line(mm)	3.950	0.4216	3.2	4.9
MRI antero posterior diameter at joint line	5.357	0.6168	4.1	6.1
MRI cross sectional area at joint line	16.614	2.6537	10.88	20.77
MRI anteroposterior diameter at physeal line (mm)	5.470	0.3789	4.6	6.0
MRI mediolateral diameter at physeal line(mm)	5.067	0.5241	4.2	6.0
MRI cross sectional area at physeal line	21.6730	1.80986	15.53	24.59

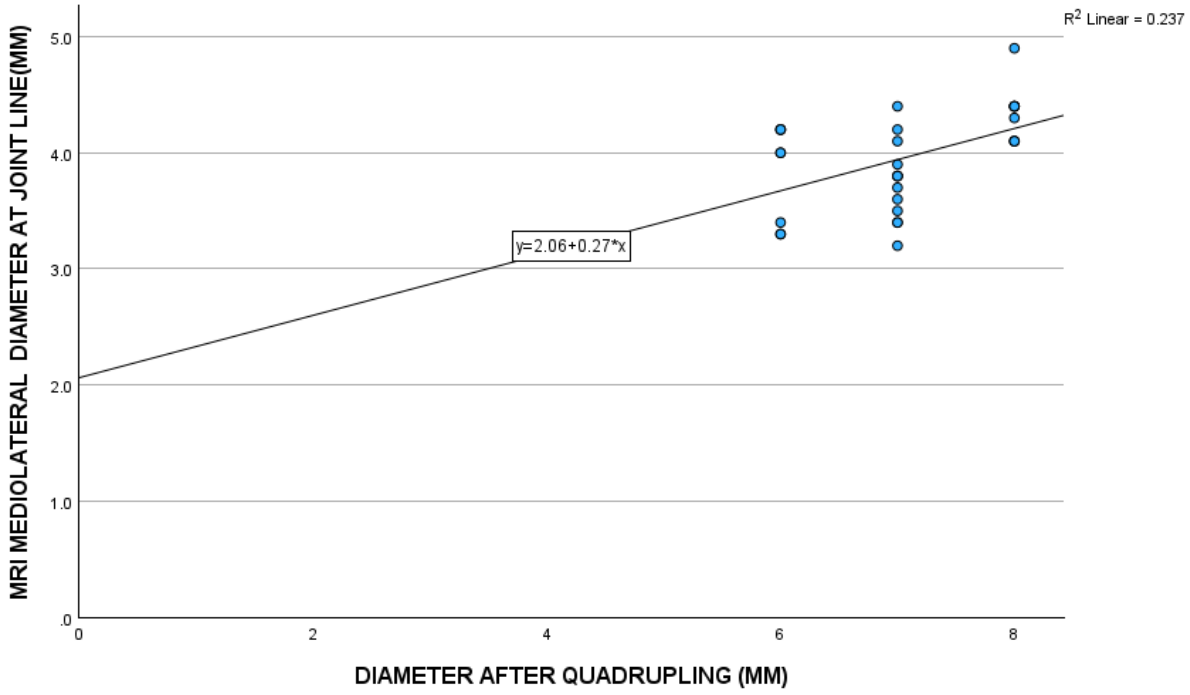
ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Table 4 illustrates various MRI measurements related to joint and physical lines. The MRI mediolateral diameter at the joint line has a mean of 3.950 mm, with a standard deviation of 0.4216mm, ranging from 3.2 mm to 4.9 mm. The MRI anteroposterior diameter at the joint line has a mean of 5.357 mm, with a standard deviation of 0.6168 mm, ranging from 4.1 mm to 6.1 mm. The MRI cross-sectional area at the joint line has a mean of 16.614 mm^2, with a standard deviation of 2.6537, ranging from 10.88 mm^2 to 20.77 mm^2. For the MRI anteroposterior diameter at the physical line, the mean is 5.470 mm with a standard deviation of 0.3789, ranging from 4.6 mm to 6.0 mm. The MRI mediolateral diameter at the physeal line has a mean of 5.067 mm, with a standard deviation of 0.5241, ranging from 4.2 mm to 6.0 mm. Finally, the MRI cross-sectional area at the physical line has a mean of 21.6730 mm^2, with a standard deviation of 1.80986, ranging from 15.53 mm^2 to 24.59 mm^2

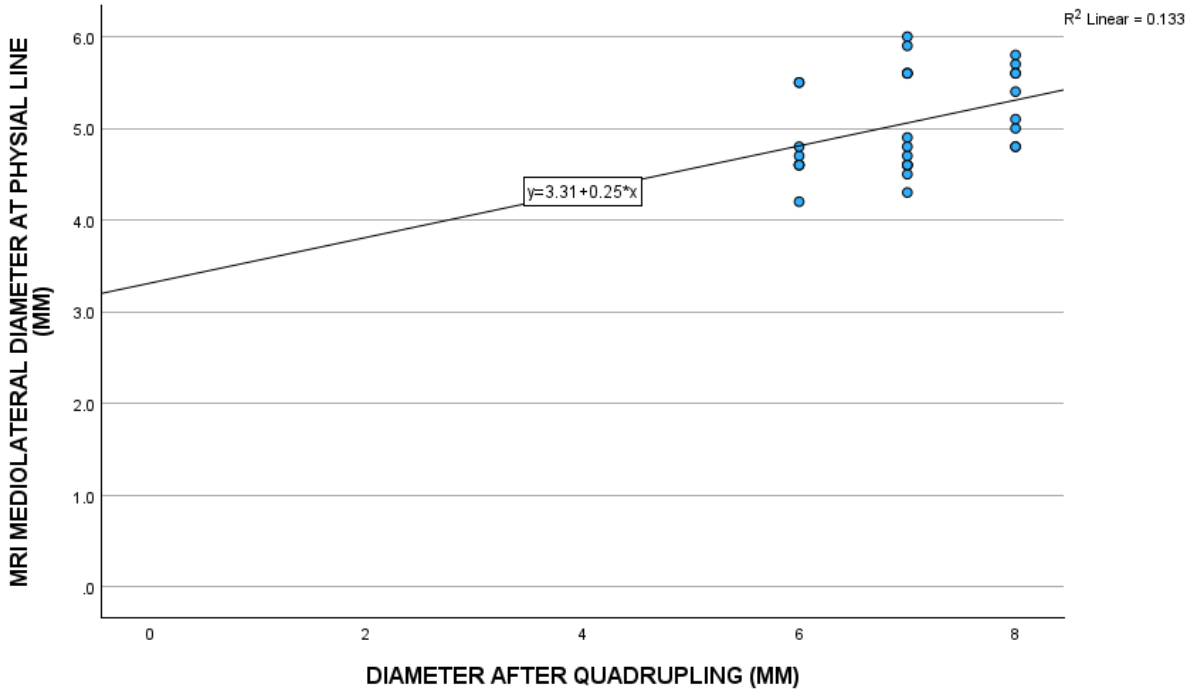
Table 5: Correlation between MRI parameters and Diameter After Quadrupling

	Diameter After Quadrupling	
	r- value	p-value
MRI MEDIOLATERAL DIAMETER AT JOINT LINE(MM)	0.498	0.005
MRI ANTEROPOSTERIOR DIAMETER AT JOINT LINE	0.013	0.947
MRI CROSS SECTIONAL AREA AT JOINT LINE	0.344	0.068
MRI MEDIOLATERAL DIAMETER AT PHYSEAL LINE(MM)	0.429	0.018
MRI ANTEROPOSTERIOR DIAMETER AT PHYSEAL LINE (MM)	-0.160	0.399
MRI CROSS SECTIONAL AREA AT PHYSEAL LINE	0.367	0.046

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

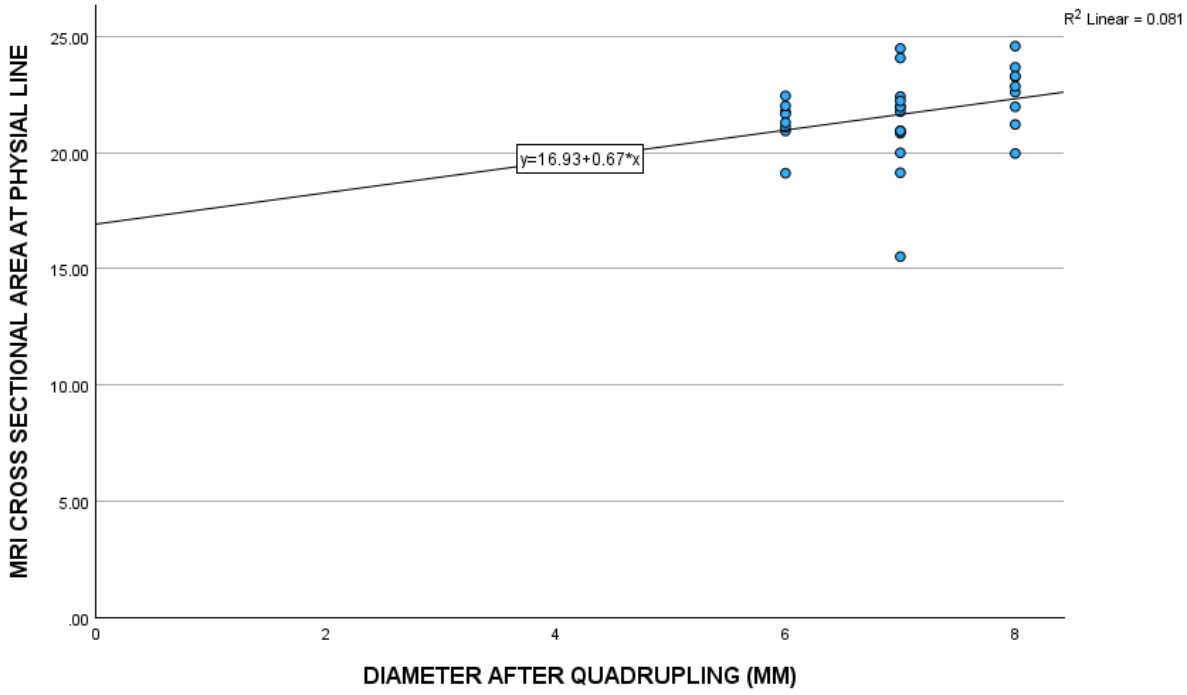


Scatter diagram of MRI mediolateral diameter at JL and diameter after quadrupling.



Scatter diagram of MRI mediolateral diameter at PL and diameter after quadrupling.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025



Scatter diagram of MRI cross sectional area at PL and diameter after quadrupling.

The MRI mediolateral diameter at the joint line has an r- value of 0.4981 and a p-value of 0.005, indicating a moderate positive correlation that is statistically significant ($p < 0.05$). The MRI anteroposterior diameter at the joint line has an r- value of 0.013 and a p-value of 0.947, suggesting no correlation, which is not statistically significant ($p > 0.05$). The MRI cross-sectional area at the joint line shows an r- value of 0.344 and a p-value of 0.068, indicating a very weak positive correlation that is not statistically significant ($p > 0.05$). The MRI mediolateral diameter at the physical line has an r- value of 0.429 and a p-value of 0.018, indicating a moderate positive correlation that is statistically significant ($p < 0.05$). The MRI anteroposterior diameter at the physical line has an r-value of -0.160 and a p-value of 0.399, suggesting a weak negative correlation, which is not statistically significant ($p > 0.05$). The MRI cross-sectional area at the physical line has an r-value of 0.367 and a p-value of 0.046, indicating a significant weak positive correlation ($p > 0.05$). The mediolateral diameter at both

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

the joint line & physical line and MRI cross sectional area at PL show statistically significant positive correlations with the Diameter After Quadrupling (Table 5 Figure 3 , 4 and).

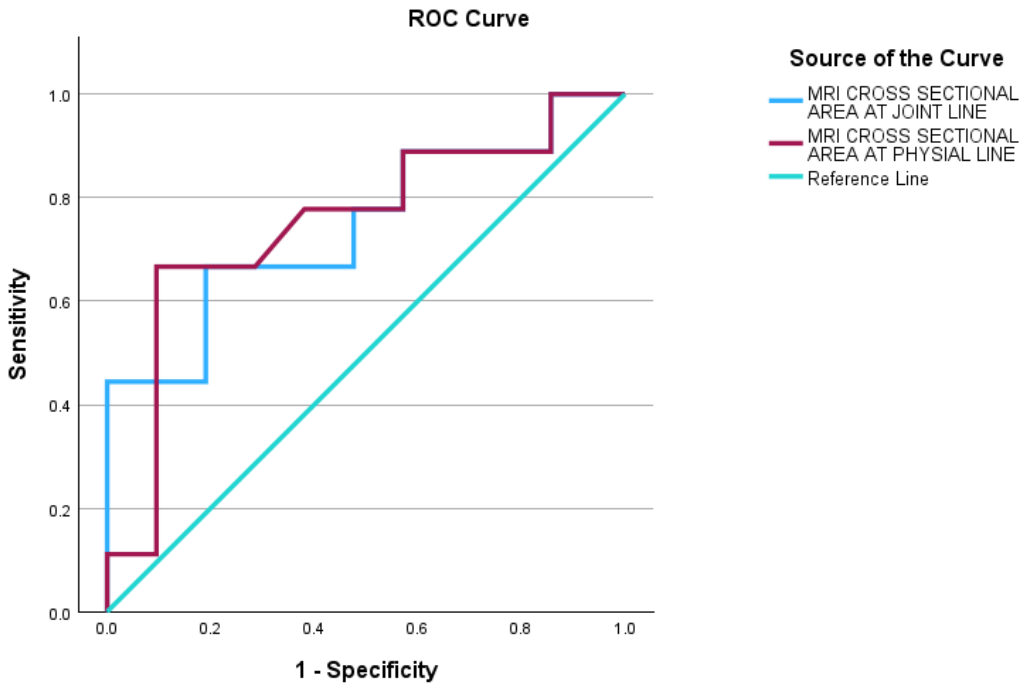
Table 6: Comparison of CSA with respect to diameter after quadrupling

	DIAMETER AFTER QUADRUPLING (MM)	N	Mean	Std. Deviation	p-value
MRI CROSS SECTIONAL AREA AT JOINT LINE	8 mm	9	18.15	2.647	0.035
	<8mm	21	15.95	2.427	
MRI CROSS SECTIONAL AREA AT PHYSEAL LINE	8 mm	9	22.6089	1.38465	0.062
	<8mm	21	21.2719	1.84923	

Table 6 Shows Diameter After Quadrupling (MM) with the MRI cross-sectional areas at both the joint line and the physical line, categorized by two groups: 8 mm and less than 8 mm. For individuals with a diameter after quadrupling of 8 mm, the mean cross-sectional area at the joint line is 18.15 mm², with a standard deviation of 2.647. For those with a diameter after quadrupling of less than 8 mm, the mean is 15.955 mm², with a standard deviation of 2.427. The p-value is 0.035, indicating that there is statistically significant difference in mean cross sectional area between the two groups. For individuals with a " diameter after quadrupling of 8 mm, the mean cross-sectional area at the physical line is 22.6089 mm², with a standard deviation of 1.38465. For those with a diameter after quadrupling of less than 8 mm, the mean is 21.2719 mm², with a standard deviation of 1.84923. The p-value is 0.062, which is close to 0.05 but still not statistically significant, suggesting a marginal difference between the two groups, though not conclusive. That is, while there is a slight difference in cross-sectional areas

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

at the physeal line between the two groups, neither of the comparisons shows a statistically significant result.



FROC curve of MRI Cross sectional area at JL and PL.

MRI cross-sectional area (CSA) at the joint line significantly differentiates 8mm grafts from smaller grafts ($p = 0.035$).

ROC analysis suggests that a CSA > 17.66 mm^2 at the joint line and > 22.53 mm^2 at the physeal line predicts an 8mm graft.

Minimum CSA for an 8mm Graft

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

Joint line CSA: ≥ 17.66 mm²

Physeal line CSA: ≥ 22.53 mm²

These cutoff values provide the best sensitivity and specificity for predicting an 8mm graft size based on MRI.

Table 7: Area under the curve of MRI Cross sectional area at JL and PL.

Test Result Variable(s)	Area Under the Curve (AUC)	p-value	p-value*	Asymptotic 95% Confidence Interval of AUC	
				Lower Bound	Upper Bound
MRI CROSS SECTIONAL AREA AT JOINT LINE	0.746	0.022	0.967	0.535	0.957
MRI CROSS SECTIONAL AREA AT PHYSEAL LINE	0.751	0.017		0.545	0.958

*comparison of two ROC curve

Table 7 shows that the results of a test for two variables, specifically the area under the curve (AUC) and the associated p-values and confidence intervals. For MRI Cross-Sectional Area at the Joint Line , the AUC is 0.746, with a p-value of 0.022. The asymptotic 95% confidence interval of the AUC is between 0.535 and 0.957. Since the p-value is less than 0.05, this indicates that the MRI cross-sectional area at the joint line is statistically significant ability to discriminate between the Diameter After Quadrupling groups (8 mm Vs <8 mm) in this test. For MRI Cross-Sectional Area at the Physical Line, the AUC is 0.751, with a p-value of 0.032. The asymptotic 95% confidence interval of the AUC is between 0.545 and 0.958. Since the p-value is less than 0.05, this indicates that the MRI cross-sectional area at the physical line is statistically significant and has a good ability to discriminate between the groups, with a

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

relatively high AUC value. There is no statistically significant difference in the area under the curve (AUC) of two CSR p-value was found to be 0.9.

Table 8: Diagnostic parameters of CSA cutoff :

CSA	cutoff	Sensitivity (95% CI)	Specificity (95% CI)	PPV (95% CI)	NPV (95% CI)
JL	>17.66	66% (29.93% - 92.51%)	80.95% (58.09%- 94.55%)	60% (35.66%- 80.23%)	85% (68.73%- 93.59%)
PL	>22.53	66.7% (29.93% - 92.51%)	90.5% (69.62%- 98.83%)	75.0% (42.6% - 92.38%)	86.36% (71.33%- 94.16%)

Table 8 provides performance metrics for two MRI cross-sectional area (CSA) cutoffs: one at the joint line (JL) and one at the physical line (PL). For the JL cutoff, sensitivity is 66% (95% CI: 29.93%-92.51%), specificity is 80.95% (95% CI: 58.09%-94.55%), PPV is 60% (95% CI: 35.66%-80.23%), and NPV is 85% (95% CI: 68.73%-93.59%). The PL cutoff shows slightly higher sensitivity at 66.7% (95% CI: 29.93%-92.51%), a notably higher specificity of 90.5% (95% CI: 69.62%-98.83%), a higher PPV of 75% (95% CI: 42.6%-92.38%), and an increased NPV of 86.36% (95% CI: 71.33%-94.16%). These results suggest that while both cutoffs have comparable sensitivity, the PL cutoff offers improved specificity, PPV, and NPV, indicating a

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

better overall diagnostic accuracy, particularly in ruling out false positives and predicting true negatives.

Discussion

Anterior cruciate ligament (ACL) reconstruction using hamstring autografts, particularly the semitendinosus tendon, is a widely accepted procedure due to its biomechanical strength, minimal donor site morbidity, and good clinical outcomes [8]. A critical factor for surgical success is achieving an adequate graft diameter, with 8 mm being the minimum threshold often cited to reduce failure rates [9]. Our study aimed to preoperatively evaluate the semitendinosus graft dimensions via MRI and correlate these measurements with intraoperative findings to facilitate surgical planning. The mean age of patients was 27.27 ± 5.878 years, consistent with the typical demographic of ACL injuries, which commonly affect young and active individuals [10]. The majority of ACL injuries in our study affected the right leg (66.7%), aligning with previous reports attributing this to leg dominance and associated dynamic movement patterns [11]. MRI-based preoperative prediction of graft size is increasingly explored to reduce intraoperative surprises and avoid the need for allografts or gracilis augmentation [12]. In our cohort, the mean graft diameter after quadrupling was 7.03 mm (SD: 0.765), and the final diameter after gracilis augmentation was 8.80 mm (SD: 0.664). This emphasizes the role of gracilis integration in achieving optimal graft size, consistent with prior findings [13].

MRI parameters showed a significant correlation with intraoperative graft diameter. Specifically, the mediolateral diameter at the joint line ($r = 0.498$, $p = 0.005$), mediolateral diameter at the physeal line ($r = 0.429$, $p = 0.018$), and cross-sectional area at the physeal line ($r = 0.367$, $p = 0.046$) were significantly associated with the diameter after quadrupling. These findings mirror earlier studies suggesting that the mediolateral dimension may better reflect the semitendinosus volume due to its anatomical alignment in the axial plane [14,15].

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

The ROC analysis further reinforced the utility of MRI CSA in predicting graft adequacy. A CSA >17.66 mm² at the joint line and >22.53 mm² at the physeal line predicted an 8 mm graft. The AUCs for these were 0.746 and 0.751 respectively, both statistically significant ($p = 0.022$ and $p = 0.017$), suggesting moderate diagnostic accuracy. Similar thresholds have been proposed in previous works, where the CSA values above 17–20 mm² at the joint line were linked to acceptable graft diameters [16]. The diagnostic analysis revealed that the physeal line CSA cutoff (>22.53 mm²) had better specificity (90.5%) and predictive values (PPV: 75%, NPV: 86.36%) than the joint line CSA. This suggests that the physeal level may be a more reliable site for assessing graft adequacy via MRI, as also concluded by other comparative studies [17,18]. Additionally, we observed that grafts <8 mm were associated with significantly lower joint line CSA ($p = 0.035$), while the difference at the physeal line approached significance ($p = 0.062$), indicating the joint line may be more sensitive to smaller grafts.

Collectively, our findings support the role of preoperative MRI, particularly CSA and mediolateral dimensions at the joint and physeal lines, as reliable predictors of graft size in ACL reconstruction. Early identification of patients at risk for undersized grafts can facilitate planning for gracilis augmentation or alternative strategies.

Conclusion :

Preoperative MRI assessment of the semitendinosus tendon is a reliable method for predicting graft size. This approach can identify tendons that may be inadequate for ACL reconstruction, thus serving as a sensitive and specific screening tool for surgical planning. This preoperative evaluation enhances surgical outcomes by ensuring the use of sufficiently sized grafts.

Thus, the surgeon can be better prepared for the surgery and can seek alternate graft options if the graft size is deemed inadequate pre-operatively.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

References

1. Griffin LY, Agel J, Albohm MJ, Arendt EA, Dick RW, Garrett WE, et al. Noncontact anterior cruciate ligament injuries: risk factors and prevention strategies. J Am Acad Orthop Surg. 2000;8(3):141–50.
2. Fu FH, Bennett CH, Ma CB, Menetrey J, Lattermann C. Current trends in anterior cruciate ligament reconstruction. Am J Sports Med. 2000;28(1):124–30.
3. Prodromos CC, Han Y, Rogowski J, Joyce B, Shi K. A meta-analysis of the incidence of anterior cruciate ligament tears as a function of gender, sport, and a knee injury–reduction regimen. Arthroscopy. 2007;23(12):1320–5.e6.
4. McRae S, Chahal J. Graft selection in anterior cruciate ligament reconstruction. Orthop Clin North Am. 2013;44(4):695–708.
5. Magnussen RA, Lawrence JT, West RL, Toth AP, Taylor DC, Garrett WE. Graft size and patient age are predictors of early revision after anterior cruciate ligament reconstruction with hamstring autograft. Arthroscopy. 2012;28(4):526–31.
6. Tuman JM, Diduch DR, Rubino LJ, Baumfeld JA, Nguyen HS, Hart JM. Predictors for hamstring graft diameter in anterior cruciate ligament reconstruction. Am J Sports Med. 2007;35(11):1945–9.
7. Erquicia JI, Gelber PE, Doreste JL, Pelfort X, Abat F, Monllau JC. How to predict semitendinosus and gracilis tendon lengths and diameters before harvesting for ACL reconstruction? Knee. 2013;20(6):532–5.
8. Tuman JM, Diduch DR, Rubino LJ, Baumfeld JA, Nguyen HS, Hart JM. Predictors for hamstring graft diameter in anterior cruciate ligament reconstruction. Am J Sports Med. 2007 Nov;35(11):1945-9.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

9. Mariscalco MW, Flanigan DC, Mitchell J, Pedroza A, Jones MH, Andrish JT, et al. The influence of hamstring autograft size on patient-reported outcomes and risk of revision after anterior cruciate ligament reconstruction: a Multicenter Orthopaedic Outcomes Network (MOON) cohort study. Arthroscopy. 2013 Nov;29(11):1948-53.
10. Majewski M, Susanne H, Klaus S. Epidemiology of athletic knee injuries: A 10-year study. Knee. 2006 Jun;13(3):184–8.
11. Brophy RH, Schmitz L, Wright RW, Dunn WR, Parker RD, Andrish JT, et al. Return to play and future ACL injury risk after ACL reconstruction in soccer athletes from the Multicenter Orthopaedic Outcomes Network (MOON) group. Am J Sports Med. 2012 Nov;40(11):2517–22.
12. Bickel BA, Fowler TT, Mowbray JG, Mahaffey BL, Sherrill W, Hughes JL. Preoperative magnetic resonance imaging cross-sectional area best correlates with intraoperative hamstring autograft diameter during anterior cruciate ligament reconstruction. Arthroscopy. 2008 Sep;24(9): 1097–104.
13. Ramkumar PN, Marquez-Lara A, McNamara BA, Chandrasekaran S, Wolf BR. Hamstring autograft in anterior cruciate ligament reconstruction: A review of harvesting techniques and critical factors in graft diameter. J Knee Surg. 2016 May;29(3):196–202.
14. Leiter JR, Gourlay R, McRae S, de Korompay N, MacDonald PB. The effect of graft diameter on the outcome of hamstring autograft anterior cruciate ligament reconstruction. Knee Surg Sports Traumatol Arthrosc. 2014 Mar;22(3): 533–8.
15. Erquicia JI, Gelber PE, Doreste JL, Pelfort X, Abat F, Monllau JC. Correlation between preoperative magnetic resonance imaging and intraoperative hamstring graft diameter in anterior cruciate ligament reconstruction. Knee Surg Sports Traumatol Arthrosc. 2013 Jan;21(1): 97–101.

ISSN: 0975-3583,0976-2833 VOL 16, ISSUE 5, 2025

16. Yasumoto M, Horibe S, Okahashi K, Takahashi M, Nakamura N, Hamada M, et al. Prediction of hamstring tendon graft diameter before anterior cruciate ligament reconstruction. Am J Sports Med. 2006 Dec;34(12): 2126–30.
17. Bickel BA, George SZ, Mahaffey BL, Lintner DM. In vivo preoperative prediction of hamstring tendon graft diameter using magnetic resonance imaging. J Knee Surg. 2008 Oct;21(4): 279–85.
18. Wernecke D, Harris IA, Houang MT, Seeto BG, Seeto BG. Predictor variables of hamstring tendon autograft diameter in anterior cruciate ligament reconstruction. Knee. 2011 Dec;18(6): 440–3.