ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

TITLE :Arthroscopic ACL Reconstruction using Hamstring Tendon versus Hamstring tendon augmented with fibre tape.

Presenter: Dr. Sushit Kumar Sonu, Institute of Medical Sciences, Banaras Hindu University, Varanasi, India.

Supervisor: Dr. Saurabh Singh, Professor, Institute of Medical Sciences,Banaras Hindu University, Varanasi, India.

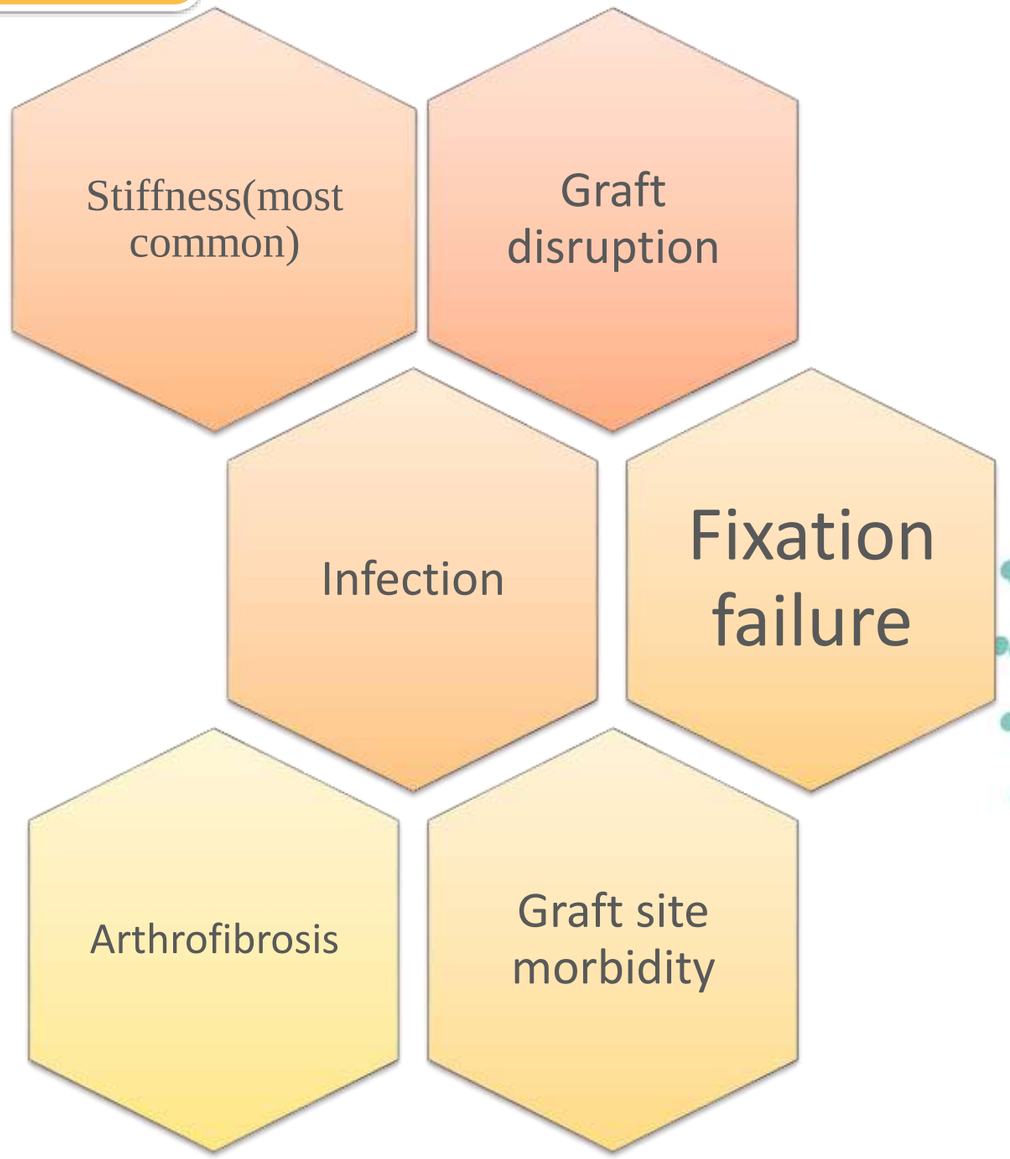
Faculty Disclosure Information

- No disclosures to be made .
- There are no conflicts of interest related to this work.

INTRODUCTION

- **Incidence** of ACL tear in both contact and non-contact injury- 84/1lakh population year (male >>female).
- **Treatment options –** conservative (eg- crossed leg bracing), ACL repair , ACL reconstruction.
- **Anterior cruciate ligament reconstruction (ACLR)** has been recognized as the standard treatment to restore knee stability and joint function after an ACL rupture.
- Several autograft options are currently used for ACLR, such as bone-patellar tendon-bone, hamstring tendon, and quadriceps tendon.

COMPLICATIONS POST SURGERY



- **INTERNAL BRACE** :An artificially woven ultra-high-molecular weight (UHMW) polyethylene/polyester suture tape, such as Fiber Tape (Arthrex, Naples, FL, USA) and Ethibond (Ethicon, Somerville, NJ, USA) to provide additional strength to the healing tissue, allowing early return to sport and preventing re-injury.

- **Uses**: ACL repair, Ankle ligament repair, Augmentation of grafts for ACL.

- **Advantage** : 1. Decreased post op laxity

2. Decreased graft retear rate.

3. Early return to sports

AIMS

PRIMARY OBJECTIVE

1. To study functional outcomes following Arthroscopic ACL Reconstruction using Hamstring Tendon versus Augmented hamstring tendon autograft

SECONDARY OBJECTIVE

1. To study the return of muscle strength in the two study groups as compared to the opposite limb

2. To study and compare the post op laxity in both the grops

3. To study the effect of internal bracing on return to sports time

MATERIALS AND METHODS

- Retro-Prospective study.
- Thirty cases operated from May 2022 onwards were included in the study.
- Sample size calculation – Sample size was calculated using Lemeshow method as shown :
  $N = (z/D)\ 2\ p\ (1-p)$.
- Study was done to analyse the patients operated for Arthroscopic ACL reconstruction using Hamstring tendon autograft and Peroneus tendon autograft(30 patients each) at the department of Orthopaedics, IMS BHU, India.
- Follow up in 0-3-6-12 months
- Operative records will be accessed and data collected according to designed proforma. Patient will be called for follow up and final clinical status recorded. Statistical analysis will be done using SPSS software version 22, IBM Corporation

SELECTION CRITERIA

INCLUSION CRITERIA	EXCLUSION CRITERIA
a. Period of study-2022-2025 b. Age group 18-45 years of both sex c. ACL tear diagnosed clinically and by MRI d. Willingness to participate and follow up e. Normal contralateral knee	a. Revision ACL Reconstruction b. ACL injuries with associated intra articular fracture c. Previous knee surgery d. Anterior cruciate ligament tear with posterior cruciate ligament, collateral ligament requiring surgery, posterolateral complex injuries,(multiligament injuries) osteoarthritis of knee e. Meniscus tear requiring repair

Surgical procedure

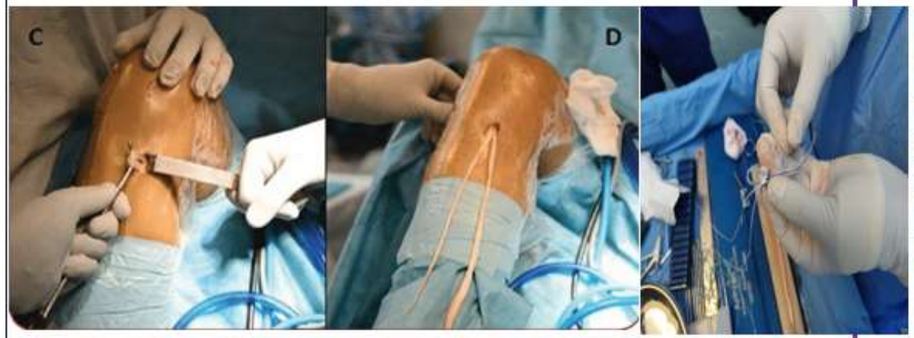
1

Diagnostic scopy

2

Graft harvesting

Hamstring graft

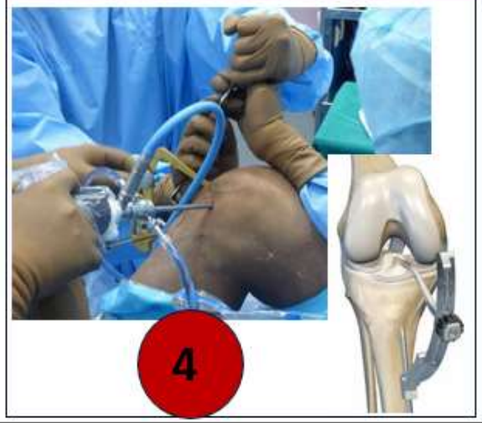


Augmentation of graft

Graft preparation

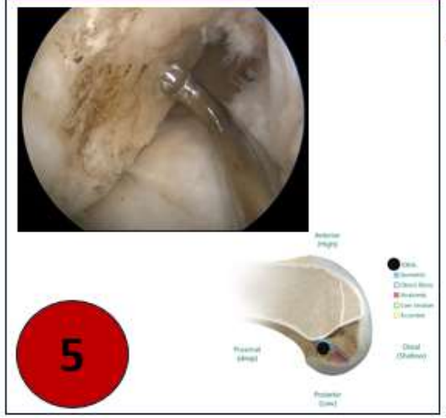
3

TIBIAL TUNNEL



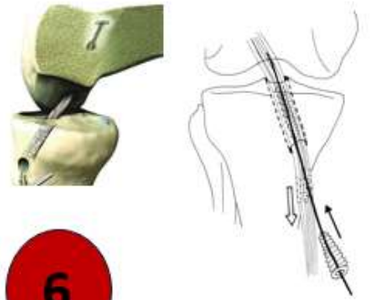
4

FEMORAL TUNNEL



5

PASSAGE OF GRAFT & fixation of graft



6

ISAKOS CONGRESS 2025 | MUNICH GERMANY June 8–11

RESULTS

Comparison of knee laxity and stability			
	Grade 1	Grade 2	Grade 3
Hamstring group(n=30)	22	5	0
Augmented hamstring tendon group(n=30)	25	4	2

Functional outcome of hamstring and augmented hamstring tendon groups			
		Pre-operative	Last follow up
Lysholm	**augmented hamstring tendon**	54.3±2.5	94.07 ± 1.57
	hamstring	53.8±8.4	90.03 ± 1.16
	P-value	0.76(n.s.)	<0.001(s.)
IKDC	**augmented hamstring tendon**	62.5±10.2	85.10 ± 0.85
	hamstring	63.3±7.0	79.77 ± 3.12
	P-value	0.490(n.s.)	<0.001(s).

Lachman test assessment showed findings of grade 1 laxity in 47 patients, while 9 patients had grade 2 laxity (5 in hamstring and 3 in augmented hamstring group) .2 patients had grade 3 laxity both in hamstring tendon group

DISCUSSION

- The most crucial finding of this study was that the augmented hamstring tendon seemed to be an appropriate autograft option for ACLR, provided significantly better functional results, less post op laxity and prevented potential post op complications.
- In augmented hamstring tendon group ,there was deficit of terminal extension of knee in augmented hamstring tendon group. This might be because of overtightening of the graft augment intraoperatively .
- In these two groups there was no significant differences in terms of knee laxity.
- Autograft diameter has an essential effect on the re-rupture and revision rate . Recent studies argued that a less than 8mm graft diameter is not acceptable. In the current study, the mean diameter of the augmented tendon graft was 7.5 mm
- However in our study group no re-rupture was detected till the recent follow up.
- This may be because of the stress shielding and load sharing properties of the Internal Brace(Fiber tape) used for augmentation, till ligamentisation of the hamstring graft is occurring. The internal brace protects this graft during the early phases of graft healing .

CONCLUSION

- Better functional outcome, less thigh hypotrophy and more satisfaction were observed in Augmented Hamstring tendon patients.
- Augmented Hamstring tendon graft can be an appropriate graft for ACLR due to its strength, stiffness, load sharing nature and better functional outcome.

LIMITATIONS

- Longer follow- up studies
- Instrumented laxity measurements were not done

REFERENCES

1. Lu, W.; Deng, Z.; Essien, A.E.; Arthur Vithran, D.T.; Opoku, M.; Li, Y.; Xiao, W. Clinical Research Progress of Internal Brace Ligament Augmentation Technique in Knee Ligament Injury Repair and Reconstruction: A Narrative Review. J. Clin. Med. 2023, 12, 1999. https:// doi.org/10.3390/jcm12051999

2. von Essen C, Sarakatsianos V, Cristiani R, Stålman A. Suture tape reinforcement of hamstring tendon graft reduces postoperative knee laxity after primary ACL reconstruction. J Exp Orthop. 2022 Feb 23;9(1):20. doi: 10.1186/s40634-022-00454-2. PMID: 35195796; PMCID: PMC8866616.

3. Raja BS, Arora M, Gowda AKS, Maheshwari VK, Regmi A. Augmentation with Fibertape Leads to Biomechanically Superior but Similar Clinical Outcomes in ACL Surgeries: Systematic Review and Meta-analysis. Indian J Orthop. 2023 Jan 6;57(5):722-747. doi: 10.1007/s43465-022-00805-2. PMID: 37128558; PMCID: PMC10147891.

4. Magnussen R, Lawrence J, West R, Toth A, Taylor D, Garrett W. Graft size and patient age are predictors of early revision after anterior cruciate ligament reconstruction with hamstring autograft. Arthroscopy 2012; 28(4)526-31.

5. Marchand J, Ruiz N, Coupry A, Bowen M, Robert H. Do graft diameter or patient age influence the results of ACL reconstruction? Knee Surg Sports Traumatol Arthrosc 2016; 24(9):2998-3004.

6. Mackay GM, Wilson WT, Hopper GP. Editorial Commentary: Anterior Cruciate Ligament Repair or Reconstruction With Internal Bracing, for Properly Indicated Patients, Is Safe, Biocompatible, and Biomimetic. Arthroscopy. 2024 Sep;40(9):2504-2506. doi: 10.1016/j.arthro.2024.03.014. Epub 2024 Mar 16. PMID: 38499115.