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Comparison of Clinical And Radiological Outcomes Of The Anatomic Single Bundle ACL Reconstruction (SB-ACLR) With A Novel Modified All-Inside Double Bundle ACL Reconstruction Technique Using Single Tibial Socket And Two Femoral Sockets (DB- ACLR)

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PRESENTING AUTHOR: DR. VINOD KUMAR

CO-AUTHOR: DR. TEJA PRASHANTH RONGALI

DEPARTMENT OF ORTHOPAEDICS,

MAULANA AZAD MEDICAL COLLEGE, NEW DELHI, INDIA

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Presenters Financial Disclosure

I (or a member of my immediate family) **do not** have a financial interest or other relationship with a commercial company related directly or indirectly with the ***ISAKOS 15th Biennial Congress 2025.***

INTRODUCTION

- Surgical techniques of arthroscopic ACL reconstruction (ACLR) have evolved considerably

transtibial single bundle ACLR

↓

transportal anatomic single bundle ACL reconstruction(SB-ACLR)

↓

anatomic double bundle ACL reconstruction(DB-ACLR).

- Transportal anatomic SB-ACLR is currently the most accepted technique of doing ACL surgery.
- All inside anatomic SB-ACLR using small bony sockets has following advantages over conventional SB-ACLR :
  - It preserves bone.
  - It utilises only single semitendinosus tendon graft harvesting.
  - It reduces post operative pain and swelling

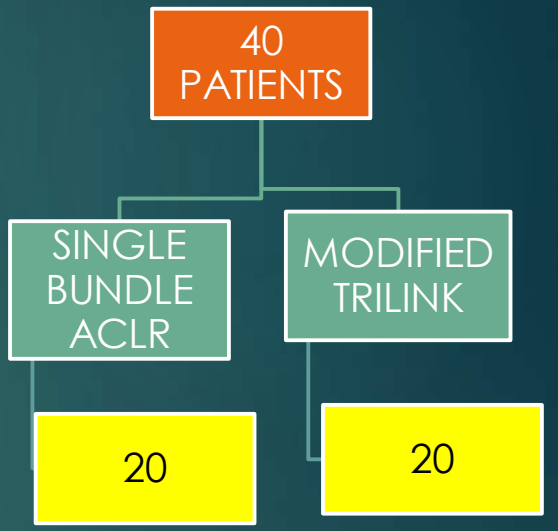
AIM and OBJECTIVES

Assessment of clinical and radiological outcomes of a Novel Modified All-Inside Double Bundle ACL Reconstruction Technique(Modified Trilink) versus The all inside single-bundle technique of arthroscopic ACL reconstruction using ipsilateral semitendinosus graft

Materials and Methods

Design	Prospective Comparative Study (Covariate Adaptive Randomization)
Follow up	Minimum 1 year

INCLUSION CRITERIA:	**EXCLUSION CRITERIA:**
Clinico-radiologically diagnosed symptomatic cases of complete ACL tear with an unstable knee	Patients having pre-existing degenerative changes in the knee.
Age between 18 and 60 yrs.	Patients with a history of previous knee surgeries
	Patients with other ligament injuries requiring operative repair or reconstruction.
	. Poorly motivated patients.



Clinical Outcomes –

Tests

- Lachman's test
- Anterior Drawer test
- Pivot Shift
- KT 1000 arthrometry

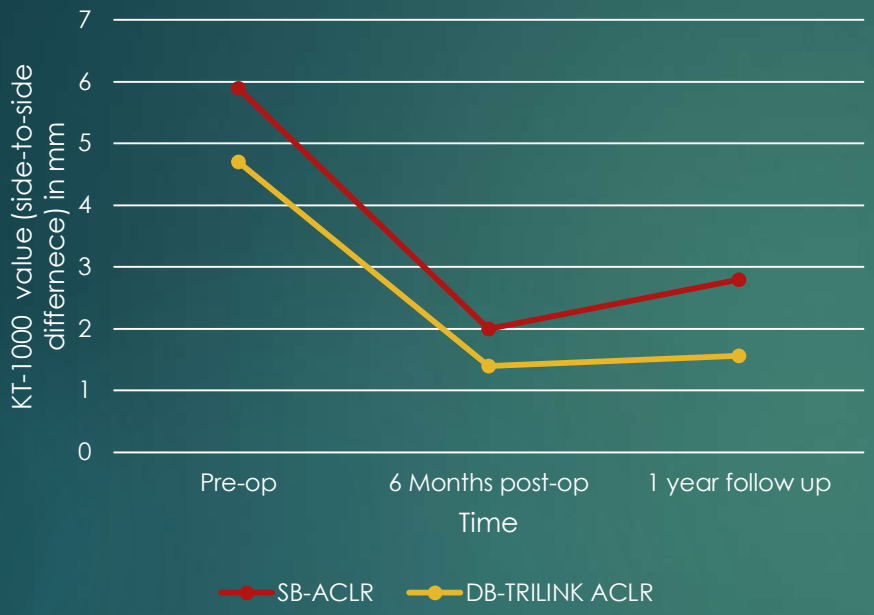
Scoring systems

- Lysholm's score
- IKDC (International knee documentation committee) score
- KOOS (knee injury and osteoarthritis outcome score)
- Tegner activity scale

RESULTS

- The postoperative Lysholm, IKDC and Tegner scores improved significantly in both groups with a greater improvement in DB- ACLR group (insignificant, $P>0.05$).
- The Lachman test positivity rate, Anterior drawer test positivity rate and pivot shift test positivity rate, and KT-2000 measured anterior knee laxity (2.8±1.05 vs. 5.90±1.91mm in the SB-ACLR group; 1.56±1.22 vs 4.70±1.70mm in the DB- ACLR group) were significantly reduced post-operatively in both groups ($P < 0.05$). However, no statistically significant difference was observed between the two groups at the final follow-up ($P > 0.05$).
- Tunnel dilatation (with more widening in SB-ACLR group $P<0.0.5$) and good ligamentization was observed in both groups.

KT 1000 ARTHROMETER

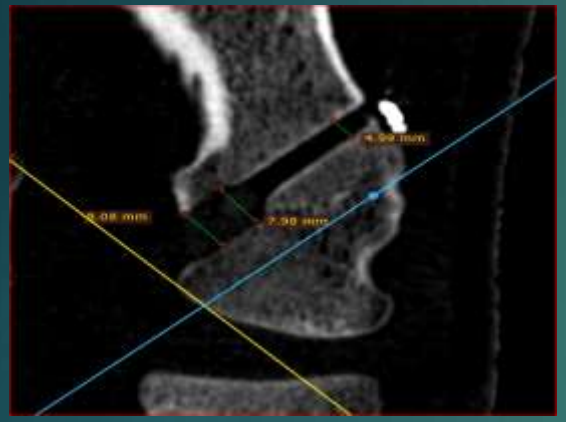


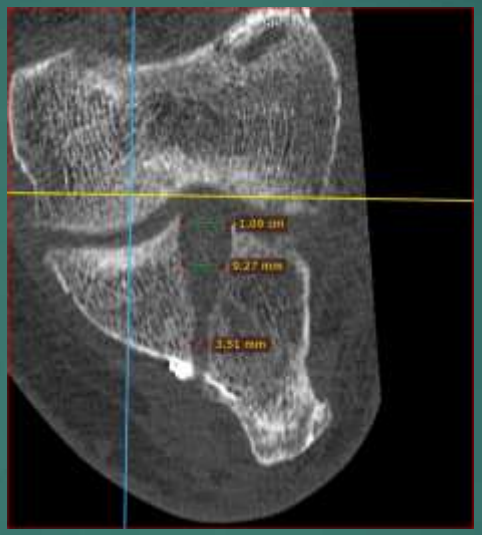
KT 1000 (side to side difference)	SBACLR (n=20)	DB-TRILINK ACLR (n=20)	p value
Preop	5.90±1.91	4.70±1.70	0.16
6 months Post-op	2.0±1.15	1.40±1.07	0.24
1 year follow up	2.8±1.05	1.56±1.22	**0.05**

Greater reduction in mean KT-2000 side-to-side difference measured **anterior laxity in DB-Trilink ACLR** group as compared to the SB-ACLR group. Mann Whitney U test used to find that the difference was significant at 1 year follow up($p<0.05$).

Wilcoxin test for individual groups determined significant difference in pre and post op laxity in individual groups

Single bundle ACLR





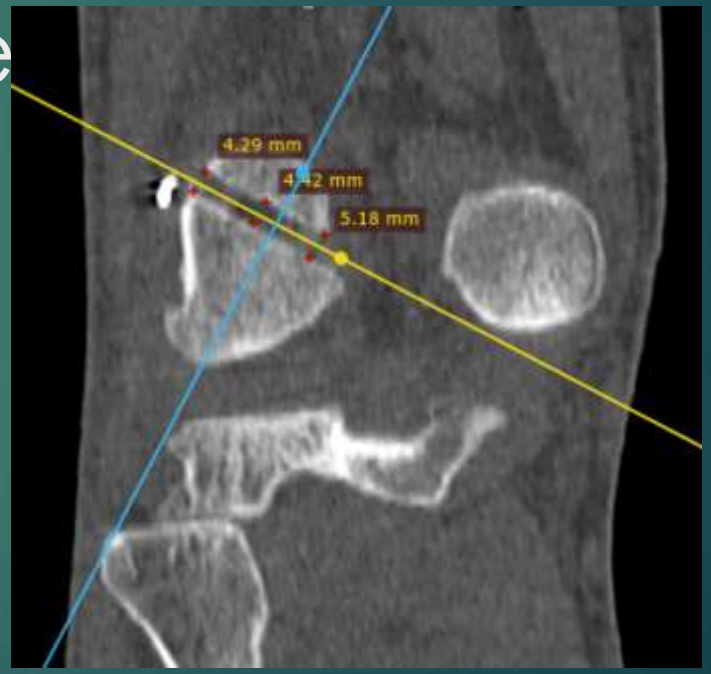
Femoral tunnel and tibial tunnel,
Oblique coronal view

Tibial tunnel widened more as compared to the femoral tunnel

	Day 3	1 year	% change	p value
Tibial tunnel observer 1				
Entry (mm)	8.77±0.76	10.21±0.90	16.5±4.01	<0.001
Mid (mm)	8.64±0.77	10.07±0.88	16.69±3.78	<0.001
Exit (mm)	4.37±0.16	3.19±0.26	-26.84±3.78	<0.001
Tibial tunnel observer 2				
Entry (mm)	8.76±0.72	10.24±0.90	16.90±4.74	<0.001
Mid (mm)	8.65±0.71	10.09±0.83	16.73±4.88	<0.001
Exit (mm)	4.43±0.08	3.19±0.24	-27.92±5.89	<0.001

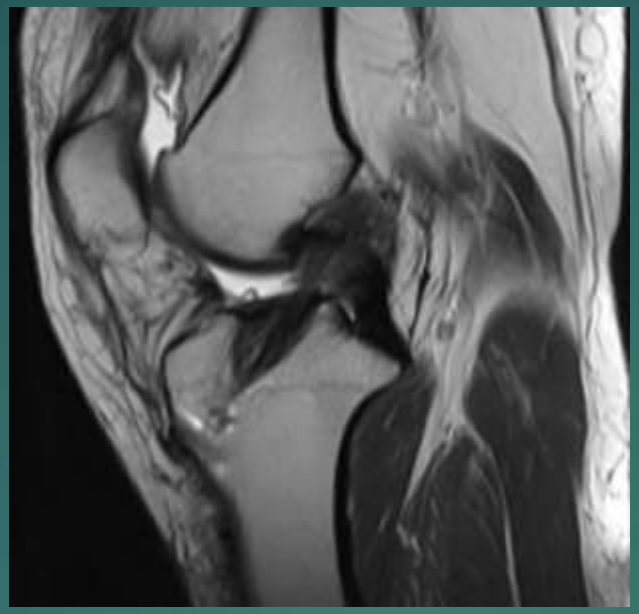
	Day 3	1 year	% change	p value
Femoral tunnel observer 1				
Entry (mm)	8.43±0.62	9.71±0.79	15.06±2.39	<0.001
Mid (mm)	8.34±0.60	9.44±0.77	13.10±2.54	<0.001
Exit (mm)	4.37±0.13	3.07±0.24	-29.66±4.58	<0.001
Femoral tunnel observer 2				
Entry (mm)	8.47±0.63	9.74±0.84	14.97±3.74	<0.001
Mid (mm)	8.35±0.62	9.48±0.83	13.54±3.70	<0.001
Exit (mm)	4.39±0.15	3.06±0.21	-30.26±3.87	<0.001

PL femoral tunnel was widened more as compared to the AM femoral and tib be



Meaurement of tibial tunnel and PL tunnel diameters in oblique coronal view of CT scan using MPR technique

MRI ASSESSMENT



	SB-ACLR		DB-TRILINK ACLR	
	Number	%	Number	%
Ligamentization: Graft signal pattern (> 50%)				
Hypo-intense	12	60%	12	60%
Isointense	6	30%	8	40%
Hyper-intense	2	10%	-	0%
Synovial fluid at graft tunnel interface				
Absent	18	90%	20	100%
Present	2	10%	-	
Figueroa score				
3	2	10%	-	0%
4	6	30%	8	40%
5	12	60%	12	60%

Good ligamentization (>4 Figueroa)-

90% SB ACL and 100% Modified Trilink group

(Not significant difference)

2 patients in Single bundle group had poor ligamentization.

CONCLUSION –

- Modified trilink technique showed –
- 1. Greater objective improvement in knee laxity
- 2. Less tibial tunnel dilation
- Comparable functional and radiological outcomes to All inside SB- ACLR.
- Our technique provides the advantages of double bundle ACL reconstruction with maximal graft preservation and minimal bone loss.

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