ISAKOS 15th Biennial Congress 2025

Clinico-Radiological Outcomes Of Arthroscopic All Inside Anterior Cruciate Ligament Reconstruction By Single Tibial And Double Femoral Socket Technique Using Autogenous Semitendinosus Graft: - A Novel Approach

(ABSTRACT ID: 25169)

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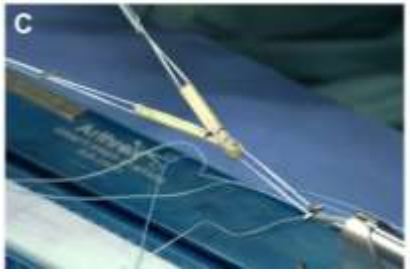
ISAKOS 15th Biennial Congress 2025

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

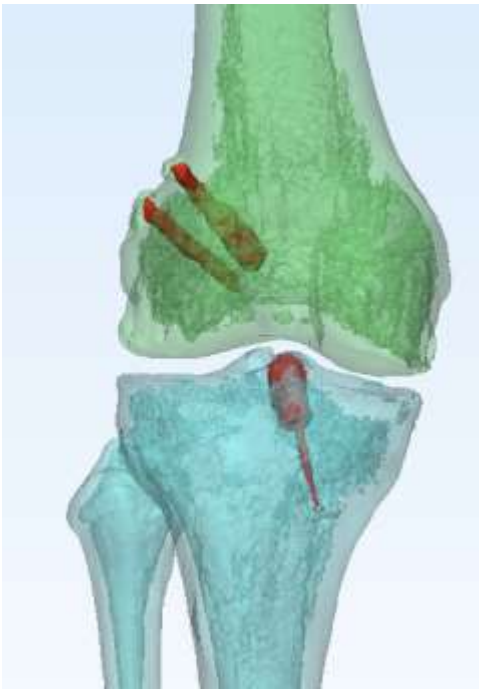
- The **Original Tri Link** technique of all inside double bundle ACL reconstruction using a Y graft
  - Yasen et al, 2012
- The problem with the Y graft –

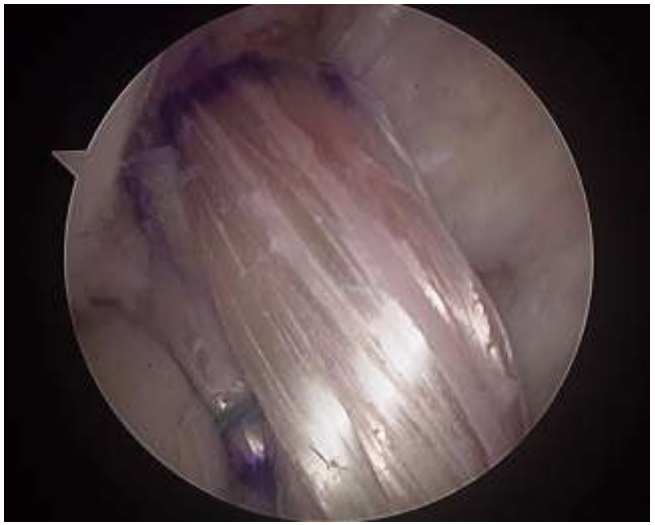


- 1. Separate tensioning of the 2 bundles was not possible
- 2. Poor orientation and control of the graft on the tibial side

MODIFIED TRILINK TECHNIQUE

- Using 2 separate graft bundles
- Tensioning- AM in Flexion, PL in extension
- This allows a more anatomic graft placement and tensioning





AIM and OBJECTIVES

- Assessment of clinical and radiological outcomes of a novel 3 socket(single tibial and double femoral) ‘’Modified Trilink Technique’’ of Double Bundle ACL reconstructrion

Material And Methods

- **Interventional Prospective Clinical Study :** 15 patients
- **Study Duration:** Patients were follow- up for 12 months Post-Operatively.

Inclusion Criteria

1. Clinico - radiologically diagnosed symptomatic cases of complete ACL tear with unstable knee

2. Age group: 18 to 60 years

Exclusion Criteria

1. Patients having pre-existing degenerative changes in the knee

2. Patients with other ligament injuries requiring operative repair or reconstruction.

3. Patients with history of previous knee surgeries.

4. Patients with acute ACL avulsion bony fracture.

Post Op Evaluation

1. IKDC
2. Lysholm's score
3. Knee injury and osteoarthritis outcome score (KOOS)
4. Tegner score
5. Clinical Examination:
    a) Anterior drawer test
    b) Lachman's test
    c) Pivot shift test
6. KT-1000 study – anterior laxity

7. Radiological assessment-

a) **X-ray** – AP, Lateral view of operated knee on first postoperative day to see, grossly, the position of tunnels

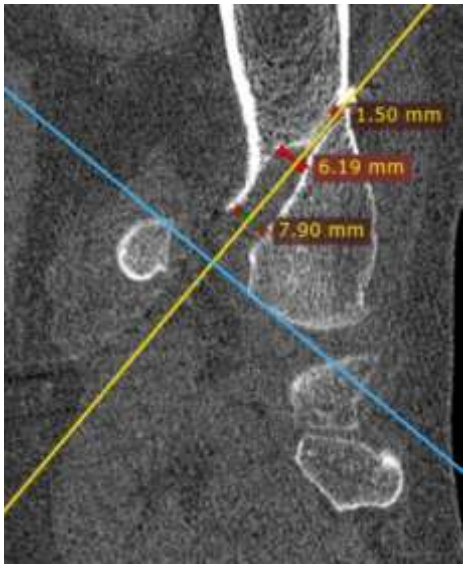
b) **CT-Scan evaluation** will be done on 12 month post-operative to assess the size, position and enlargement of tunnels.

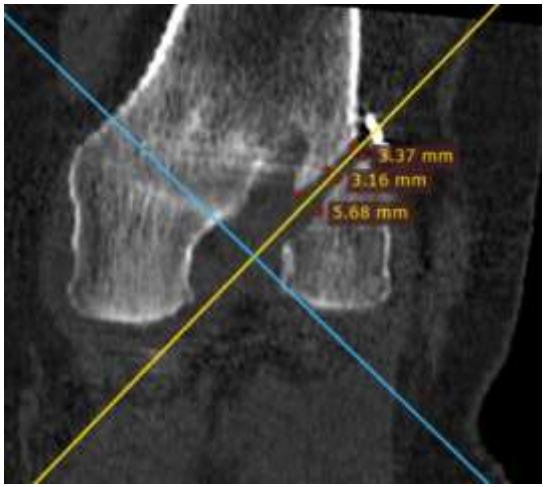
c) **MRI** will be done at 12months to assess healing and vascularity of the graft.

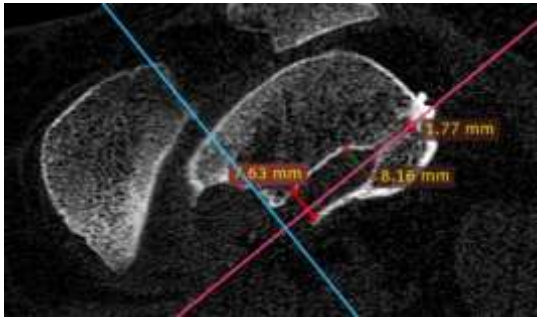
RESULTS

- The mean Tegner Scale (pre-operative) was 3.60 ± 1.55 which increased to 7.40±1.50 (range: 5-10) at 1 year post surgery.
- KT-1000 examination showed that the mean side-to-side difference in anterior knee laxity was 11.20±3.03 (range: 2- 15) mm pre-operatively and 2.80±0.77 (range: 2-4) mm post operatively at 1 year.
- The mean of IKDC score was 49.20%±3.88 (range: 42-55) in pre-operative period which increased to 72.87±5.59 (range: 63-82) at 3 months post-operatively. The mean further increased to 81.67%±3.87% (range: 76-90) at 1-year post-surgery.
- 93.3% of the subjects showed excellent Lysholm's outcome whereas 6.7% showed good outcome at 1 year post ACL reconstruction.
- There was no significant widening of femoral and tibial tunnels at 12 months as compared to the literature as assessed on CT scan.
- MRI done at 12 months was evaluated to assess healing of the graft. 26.5% of the subjects had 5 as the Figueroa score whereas 73.3% had 4 which give indirect evidence of good ligamentization in 15 subjects. None cases had synovial fluid at graft tunnel interface.

MODIFIED TRILINK ACLR



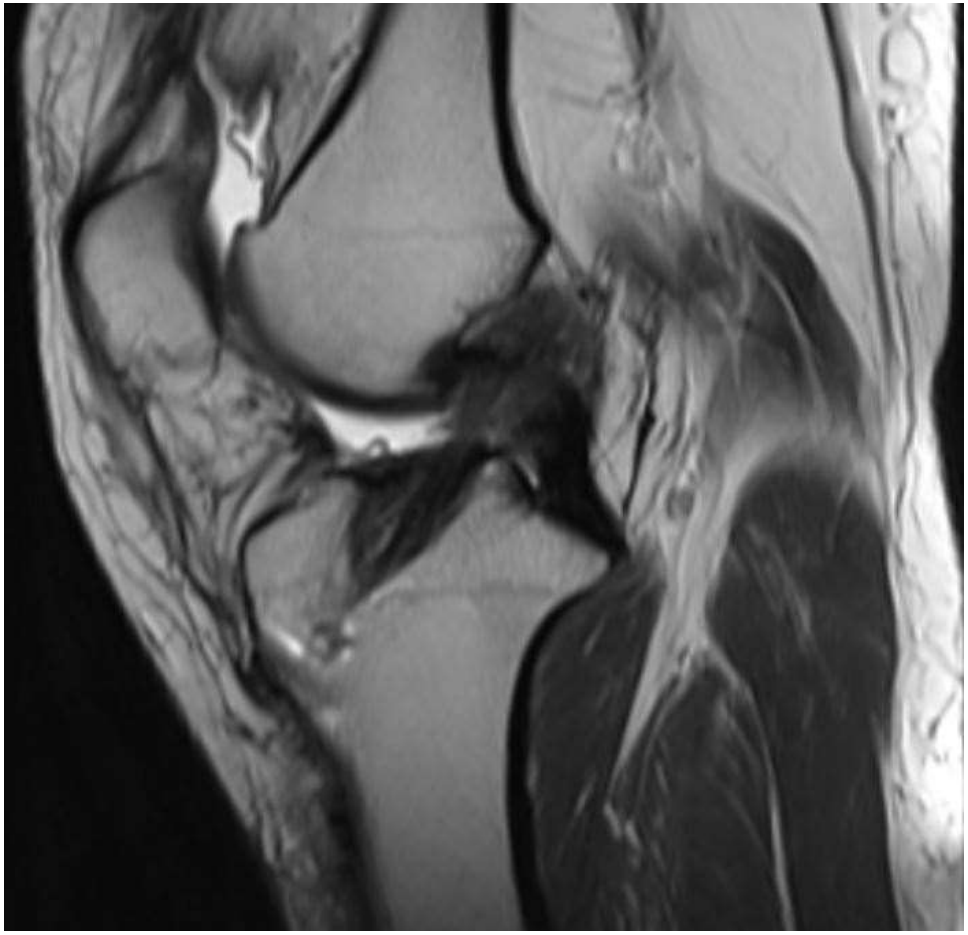




AM and PL tunnels in coronal and sagittal sections

	Day 3	12 months	% change	p value
Tibial tunnel observer 1				
Entry (mm)	9.47±0.50	10.67±0.54	12.64±2.75	<0.001
Mid (mm)	9.23±0.49	9.99±0.79	8.19±4.28	<0.001
Exit (mm)	4.34±0.12	3.48±0.45	-19.57±11.4	<0.001
Tibial tunnel observer 2				
Entry (mm)	9.45±0.50	10.78±0.46	14.20±4.15	<0.001
Mid (mm)	9.25±0.48	9.99±0.64	7.93±3.33	<0.001
Exit (mm)	4.34±0.15	3.49±0.61	-19.23±16.3	0.004

z	Day 3	12 months	% change	p value
Femoral AM tunnel observer 1				
Entry (mm)	7.12±0.21	8.38±0.30	17.58±2.62	<0.001
Mid (mm)	6.92±0.30	7.79±0.64	12.60±8.29	0.001
Exit (mm)	4.60±0.81	3.76±0.81	-18.44±10.06	<0.001
Femoral PL tunnel observer 1				
Entry (mm)	5.45±0.36	6.76±0.56	24.06±5.83	<0.001
Mid (mm)	5.26±0.29	6.06±0.51	15.16±6.28	<0.001
Exit (mm)	4.55±0.36	3.48±0.57	-23.63±8.97	<0.001
Femoral AM tunnel observer 2				
Entry (mm)	7.17±0.26	8.42±0.38	17.34±2.59	<0.001
Mid (mm)	7.01±0.29	7.98±0.55	13.84±5.01	<0.001
Exit (mm)	4.59±0.72	3.84±0.88	-16.56±10.56	0.001
Femoral PL tunnel observer 2				
Entry (mm)	5.46±0.35	6.69±0.44	22.78±6.54	<0.001
Mid (mm)	5.25±0.30	6.09±0.42	16.12±6.43	<0.001
Exit (mm)	4.47±0.36	3.46±0.46	-22.82±6.23	<0.001



ACL GRAFT LIGAMENTIZATION AT ONE YEAR FOLLOW-UP AS SEEN ON MRI SAGITTAL SECTION

Limitations

- Small scale study => Need a larger study
- Longer follow up results are awaited
- Unavailability of objective validated functional scoring analysis during rehabilitation

Conclusion

- Modified trilink technique showed –
- 1. Significant objective improvement in knee laxity as measured on KT-1000 arthrometer
- 2. Less tibial tunnel dilation
- This technique Mimics natural knee kinematics and native knee anisometry similar to the anatomic double bundle technique.
- Our technique provides the advantages of double bundle ACL reconstruction with maximal graft preservation and minimal bone loss.

REFERENCES

1. Ashish Devgan, Amanpreet Singh, Paritosh Gogna, Rohit Single, Narendra Kumar Magu et al. Arthroscopic anatomical double bundle anterior cruciate ligament reconstruction: a prospective longitudinal study. Indian J Orthop 2015;49(2):136-142
2. Cerulli G, Zamarra G, Vercillo F, Pelosi F. ACL reconstruction with “the original all inside technique”. Knee Surg Sports Traumatol Arthrosc. 2011;19(5):829-31.
3. Yasen SK, Logan JS, Smith JO, Nancoo T, Risebury MJ, Wilson AJ. TriLink: Anatomic double-bundle anterior cruciate ligament reconstruction. Arthrosc Tech. 2014;3(1):13-20.
4. Mayr R, Smekal V, Koidl C, Coppola C, Fritz J, Rudisch A, et al. Tunnel widening after ACL reconstruction with aperture screw fixation or all-inside reconstruction with suspensory cortical button fixation: volumetric measurements on CT and MRI scans. Knee. 2017;24(5):1047-54.