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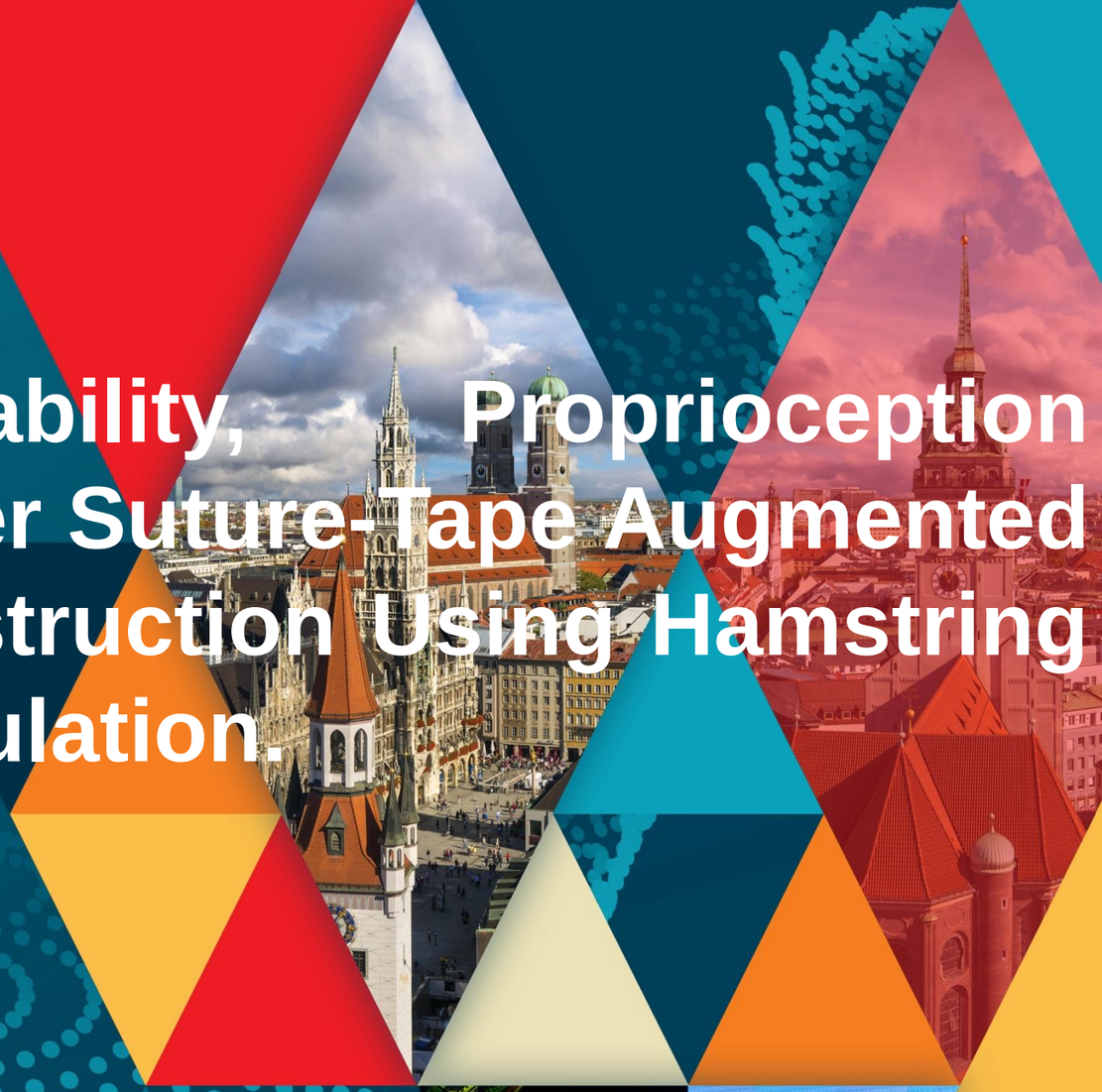
No Difference In Stability, Proprioception And Neuromuscular Control After Suture-Tape Augmented ACL Repair Versus ACL Reconstruction Using Hamstring Autografts In Young, Active Population.



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Faculty Disclosure Information

Nothing to disclosure

The aim

To determine if anterior cruciate ligament repair with suture tape augmentation (IB) provides better results in stability, proprioception and neuromuscular control in comparison to ACL reconstruction (ACLR) with hamstrings autograft.

Material and methods

- Retrospective analysis of data collected in gait laboratory between 2019-2022

- Patients treated operatively with IB or single bundle ACL reconstruction with hamstring autografts after at least 12 months of rehabilitation protocol.

- Inclusion criteria for IB: proximal ACL tear with a good remnant quality, < 3 weeks from injury to surgery.

Material and methods

Exclusion criteria:

- high-grade collateral ligament injury
- PCL and/ or PLC injury
- meniscal repair
- cartilage injury
- any injury to contralateral lower extremity
- rheumatic and neurologic disorders
- previous surgeries to lower extremities

Study group

- ACL repair with IB

N = 20

8 F / 12 M

25.0±10.5

28±15

- ACL reconstruction

N = 28

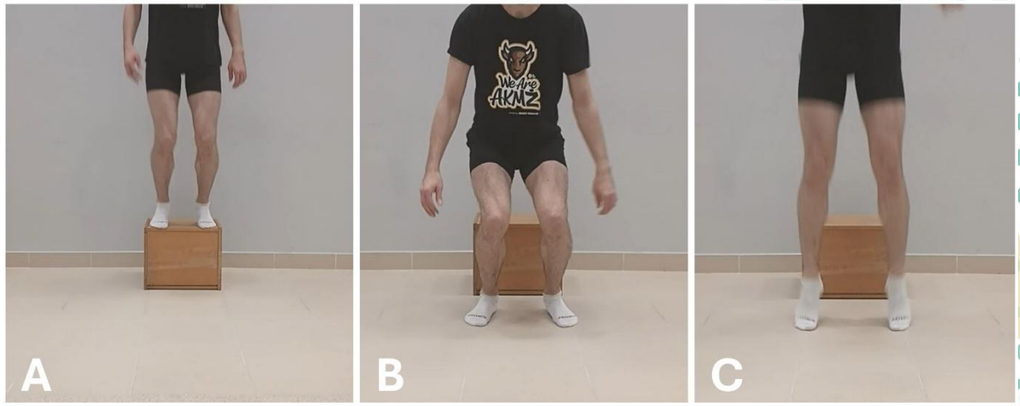
10 F / 18 M

21.8±4.8

30±18

Material and methods

- anterior tibial translation (ATT) measurement with rolimeter (Aircast, Germany) in 30˚ and 90˚ of flexion
- the joint position sense test (JPS) in 30˚ and 60˚ of flexion (Biodex System 4Pro)
- dynamic valgus analysis and muscle activity assesment with surface EMG (Biometrics Ltd, Newport, United Kingdom) and time-synchronized motion capture system (Qualisys AB, Gothenburg, Sweden)



Statistical analysis

- Shapiro – Wilk test
- Welch’s test
- Paired - samples T- test
- **Cohen’s effect size g**

=> >0,8 0,5- 0,8 < 0,5

- IB vs ACLR and operated vs non-operated leg

Results

Anterior tibial translation

Group / Parameter	30°		90°	
	mean ± SD [mm]	side-to-side difference [mm] with CI 95%	mean ± SD [mm]	side-to-side difference [mm] with CI 95%
IB op	5.8±3.1	0.6 (-0.1, 1.3)	4.8±3.4	0.7 (-0.03, 1,49)
IB h	5.2±2.9		4.1±2.7	
ACLR op	5.8±2.4	1.5 (0.8, 2.2)	4.2±2.0	0.1 (-0.22, 0.50)
ACLR h	4.3±1.3		4.1±1.9	
p-value	< 0.001 (ACLR op vs ACLR h) (g= 0.820) 0.083 (IB op vs IB h) (g= 0.039) 0.981 (ACLR op vs IB op) (g= -0.010) 0.195 (ACLR h vs IB h) (g=-0.400)		0.424 (ACLR op vs ACLR h) (g=0.150) 0.058 (IB op vs IB h) (g= 0.430) 0.432 (ACLR op vs IB op) (g= -.0240) 0.907 (ACLR h vs IB h)(g=-0.030)	

Results

Joint position sense test

Group / Parameter	30° passive [°]	30° active [°]	p-value (passive vs active)
IB op	6.3±3.6	4.4±2.3	0.109 (g= 0.370)
IB h	6.3±2.9	4.3±3.1	0.091 (g = 0.390)
ACLR op	5.3±2.9	4.7±2.9	0.370 (g=0.170)
ACLR h	5.0±2.8	3.3±1.7	0.003 (g=0.620)
p-value (between groups)	0.371 (ACLR op vs ACLR h)(g=0.170) 0.965 (IB op vs IB h) (g=0.010) 0.350(ACLR op vs IB op) (g=-0.280) 0.133 (ACLR h vs IB h) (g=-.045)	0.016 (ACLR op vs ACLR h)(g=0.470) 0.898 (IB op vs IB h)(g=0.030) 0.383 (ACLR op vs IB op) (g=0.110) 0.230 (ACLR h vs IB h) (g= -0.037)	

Group / Parameter	60° passive [°]	60° active [°]	p-value (passive vs active)
IB op	3.4±1.7	4.8±2.8	0.061 (g=-.045)
IB h	2.9±1.4	3.9±3.0	0.200 (g=-0.290)
ACLR op	3.5±1.6	3.9±2.0	0.444(-0.140)
ACLR h	2.8±2.1	3.3±2.0	0.299 (g=-0.190)
p-value (between groups)	0.117 (ACLR op vs ACLR h) (g=0.300) 0.262 (IB op vs IB h)(g=0.250) 0.832 (ACLR op vs IB op)(g=0.060) 0.870 (ACLR h vs IB h)(g=-0.050)	0.084 (ACLR op vs ACLR h) (g=0.330) 0.027 (IB op vs IB h) (g=0.550) 0.110(ACLR op vs IB op) (g=-0.500) 0.444 (ACLR h vs IB h)(g=-.023)	

Results

Muscle activity in dynamic tasks

BF Parameter	IB	ACLR	p-value
0% [%MVC]	20.3±11.5 op 20.4±14.1 h	25.7±11.4 op 19.8±10.5 h	< 0.001 (ACLR op vs ACLR h) (g=0.800) 0.845 (IB op vs IB h) (g=0.050) 0.141 (ACLR op vs IB op)(g=0.470) 0.872 (ACLR h vs IB h)(g=0.050)
Max [%MVC]	19.7±12.2 op 23.5±17.4 h	25.9±13.5 op 24.1±15.1h	0.542 (ACLR op vs ACLR h) (g=0.130) 0.455(IB op vs IB h)(g=0.180) 0.146 (ACLR op vs IB op)(g=0.470) 0.907 (ACLR h vs IB h) (g=0.040)
100 % [%MVC]	41.2±14.7 op 38.2±16.3 h	49.9±16.6 op 40.3±12.6 h	0.012 (ACLR op vs ACLR h) (g=0.540) 0.537 (IB op vs IB h)(g=0.120) 0.086 (ACLR op vs IB op)(g=0.540) 0.658 (ACLR h vs IB h)(g=0.140)

ST Parameter	IB	ACLR	p-value
0% [%MVC]	28.4±14.6 op 24.7±10.8 h	33.8±20.3 op 26.8±19.6 h	0.431 (ACLR op vs ACLR h) (g=0.180) 0.369 (IB op vs IB h)(g=0.230) 0.366 (ACLR op vs IB op)(g=0.300) 0.697 (ACLR h vs IB h)(g=0.130)
Max [%MVC]	26.3±11.9 op 20.8±13.4 h	29.1±18.1 op 24.2±17.6 h	0.595 (ACLR op vs ACLR h)(g=0.130) 0.087 (IB op vs IB h)(g=0.480) 0.594 (ACLR op vs IB op)(g=0.180) 0.548 (ACLR h vs IB h)(g=0.210)
100 % [%MVC]	40.3±25.9 op 35.9±20.8 h	46.0±20.3 op 33.7±18.3 h	0.049 (ACLR op vs ACLR h)(g=0.460) 0.472 (IB op vs IB h)(g=0.190) 0.492 (ACLR op vs IB op)(g=0.240) 0.725 (ACLR h vs IB h)(g=-0.110)

Conclusion

Primary ACL repair with suture tape augmentation and ACLR with hamstring autografts yield similar results in term of stability, proprioception and neuromuscular control in a population of young, active patients

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