

Poster #99

Primary BTB Anterior Cruciate Ligament Reconstruction With and Without Suture Tape Augmentation

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The Columbia Orthopaedic Group



Disclosures

- P.A.S. reports institutional grants, royalties, consulting fees, travel support, and patents, issued or pending, from Arthrex; speakers fees from Kairos Surgical and United Orthopedics; education committee, Arthroscopy Association of North America; and stock or stock options from Spinal Simplicity.
- A.V.D. has nothing to disclose.



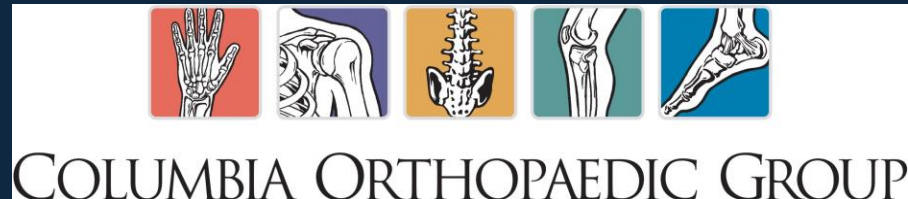
Objective

To investigate patient outcomes, including revision rate, following primary bone patellar–tendon bone autograft (BPTB) anterior cruciate ligament reconstruction (ACLR) with and without suture tape augmentation (STA) in a young and active cohort.



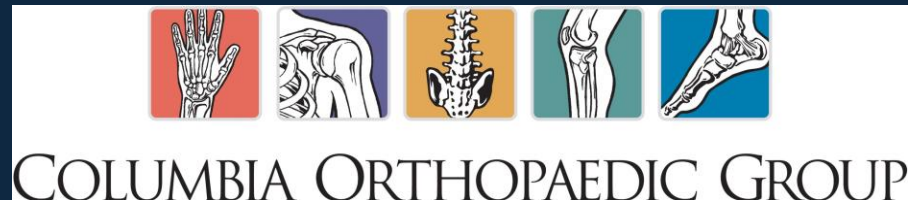
Patient Population

- Single-center, retrospective cohort study
- All available skeletally mature patients ≤ 30 years old who received primary BPTB ACLR with and without STA by the senior author
- Those who received primary BPTB ACLR and were consented to be enrolled in our institution's institutional review board-protected registry with a minimum of 2-year follow-up were included in this study



Subjective Outcomes

- Included validated PROs: Single Assessment Numeric Evaluation (SANE), Visual Analog Scale (VAS) for pain, and Knee Injury and Osteoarthritis Outcome Score (KOOS)
- The minimal clinically important difference (MCID) for each PROM was calculated and applied to the individual patient
- Return to sport was obtained from each patient



Objective Outcomes

- Operative details collected from senior author's operative reports
- Need for subsequent interventions obtained from each patient via EMR, telephone, or office visits
- Other outcome measures: KT-1000 arthrometer measurements, posterior tibial slope, femoral tunnel angle, and tibial tunnel placement





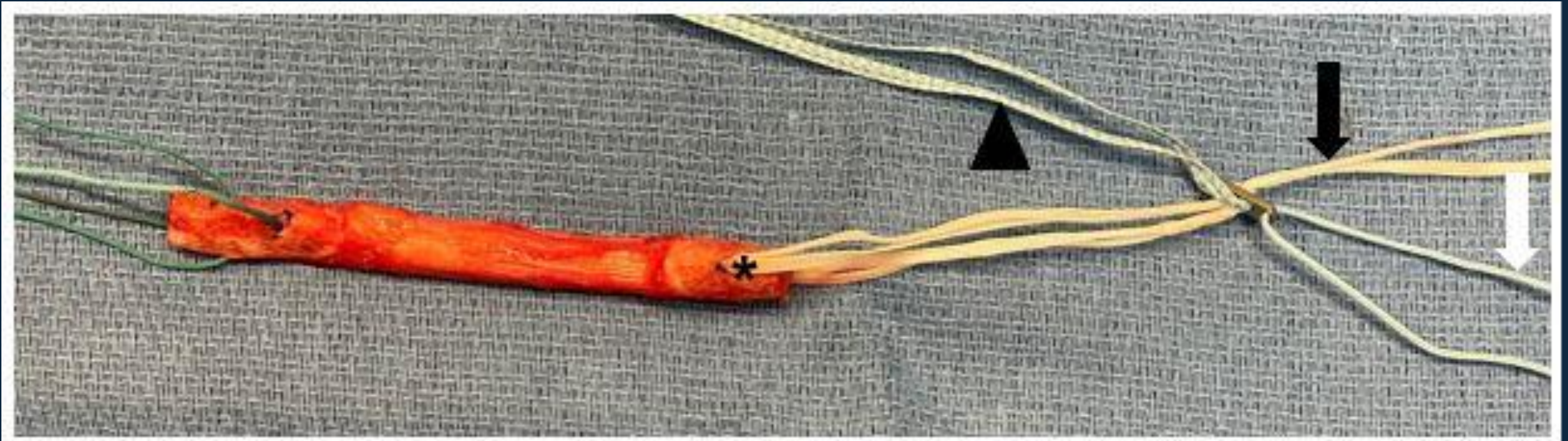
Preoperative lateral radiograph of a skeletally mature right knee demonstrating a posterior tibial slope of 7.6° measured using a 78.2-mm line along the tibial plateau (white arrow) and a second line (asterisk) perpendicular to the posterior tibial cortex (black arrow).



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Surgical Technique

- Proximal ALD fixation & distal interference screw fixation
- Suture tape fixed independently of the graft (tape looped through proximal ALD button and tacked distally with anchor)



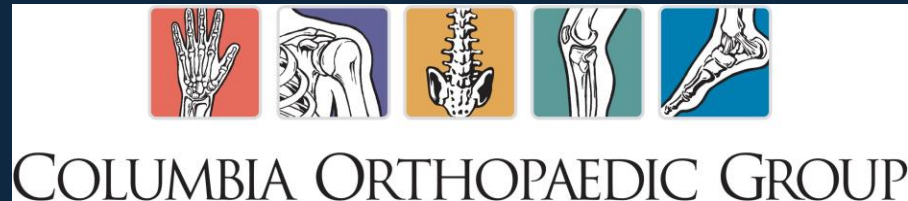
BTB autograft prepped for proximal suspensory adjustable loop fixation (ALD) with a femoral BTB TightRope (asterisk) and independent suture tape passed through the button (black arrowhead). Also labeled: ALD shortening strands (black arrow); button pull sutures (white arrow).



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Postoperative Protocol

- All patients sent home with continuous passive motion machine for first two weeks
- Patients typically full weight-bearing postoperative weeks 2-4
- Closed chain exercises when patient achieves full weight-bearing status



Postoperative Protocol

- Patients typically cleared to jog in ACL brace postoperative month 3, agility exercises begin postoperative month 4, and sport-specific exercises begin postoperative month 5
- Patients potentially released to full activity by postoperative month five depending on physical examination, patient readiness, and PT evaluation



Patient Selection

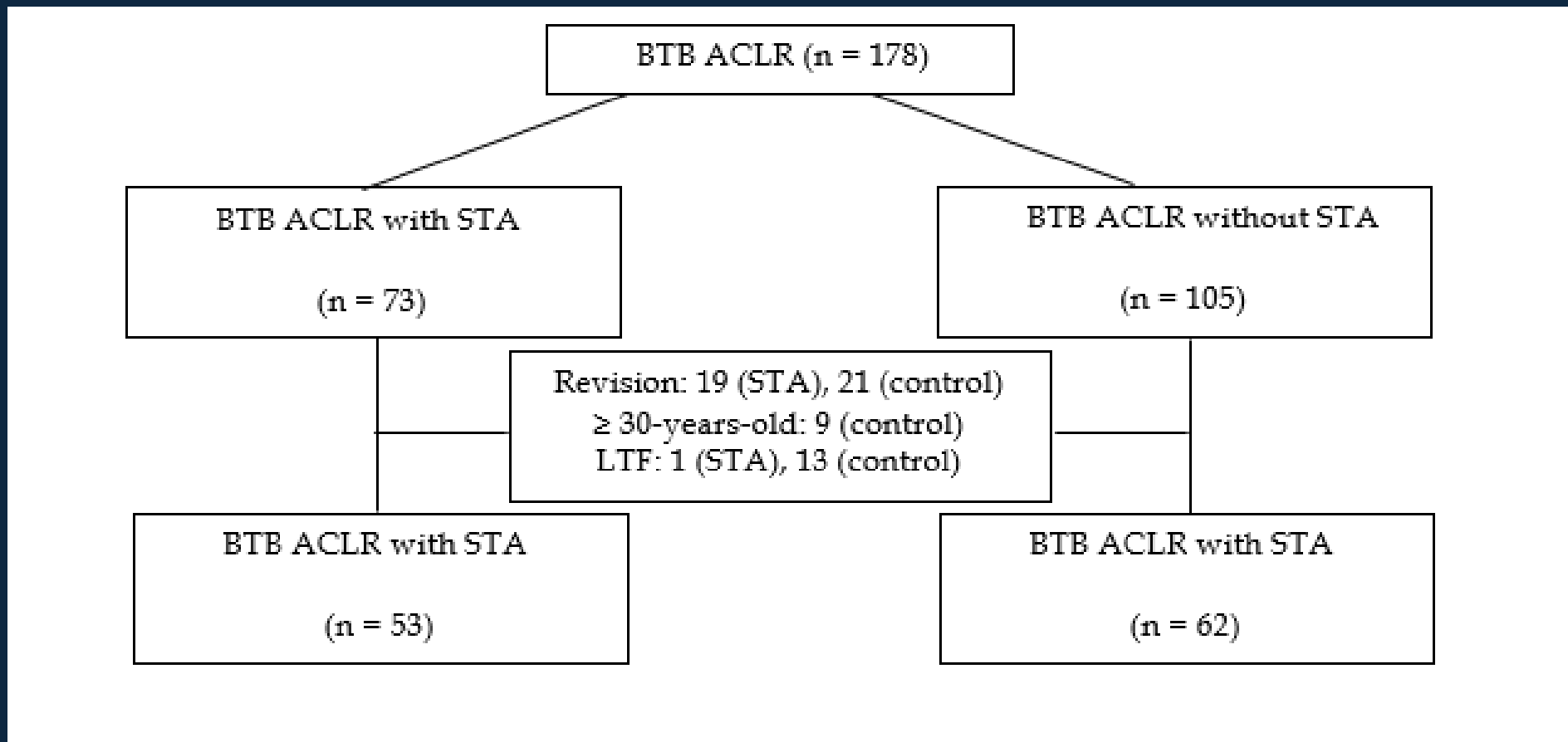


Table 1. Patient characteristics

Characteristic	STA (n = 53)	Control (n = 62)	P
Age, years	18.8 (17.8-19.8)	17.7 (16.9-18.5)	0.059
Sex			0.061
Male	33 (62)	27 (44)	
Female	20 (38)	35 (56)	
Body mass index, kg/m ²	26.6 (24.9-28.2)	27.0 (25.6-28.4)	0.44
Laterality			0.58
Right	25 (47)	33 (53)	
Left	28 (53)	29 (47)	
Final follow-up, years	5.0 (4.7-5.3)	5.2 (4.8-5.6)	0.95

Data represented as either mean (95% confidence intervals) or number (percentage).

Abbreviations: STA, suture tape augmentation.



Table 3. Subsequent surgical intervention.

Intervention	STA (n = 53)	Control (n = 62)	P
Subsequent Procedure	9 (17)	13 (21)	0.64
APM	2 (4)	2 (3)	1.00
Meniscal repair*	(0)	6 (10)	0.017
Arthrolysis	2 (4)	1 (2)	0.53
Chondroplasty	2 (4)	3 (5)	1.00
HWR, proximal tibia	2 (4)	2 (3)	1.00
Revision ACLR	(0)	5 (8)	0.035
Time to revision, months	-	42.4 (4.5-80.3)	-
Contralateral ACLR	3 (6)	10 (16)	0.078
Elapsed time, months	19.3 (13.1-25.6)	25.3 (10.8-39.9)	0.78

Data represented as number (percentage) or mean (95% confidence intervals).

*Five meniscal repairs occurred at the time of revision anterior cruciate ligament reconstruction (p = 0.035).

Abbreviations: STA, suture tape augmentation. APM, arthroscopic partial meniscectomy. HWR, hardware removal. ACLR, anterior cruciate ligament reconstruction.



Table 5. Return to sport.

Parameter	STA (n = 53)	Control (n = 62)	P
Sport			0.044
Football	18 (34)	14 (23)	
Basketball	11 (21)	26 (42)	
Soccer	11 (21)	11 (18)	
Other*	13 (24)	11 (18)	
High-risk sport†	42 (79)	53 (87)	0.32
Level of competition			0.19
Collegiate	19 (36)	18 (29)	
High School	24 (45)	36 (58)	
Recreational	10 (19)	8 (13)	
RTS rate	47 (89)	54 (87)	1.00
Time to RTS, m	7.1 (6.6-7.6)	7.5 (7.0-8.0)	0.17
Not returned	6 (11)	8 (13)	0.43
Graduation	4 (8)	3 (5)	
Disinterest	1 (2)	1 (2)	
↓ knee function	1 (2)	4 (6)	

Data represented as mean (95% confidence intervals) or number (percentage).

*Other sports include: volleyball, track & field, Taekwondo, softball, rugby, racquetball, gymnastics, cheerleading/tumbling, and motocross.

†Football, basketball, soccer, volleyball, and rugby.

Abbreviations: STA, suture tape augmentation. RTS, return to sport. m, months.



Conclusion

Compared with traditional BTB ACLR, additional STA appeared to safely and effectively lead to less subsequent revision ACLR while maintaining acceptable PROMs and objective joint laxity measurements in a young and active patient population



Significance of Findings

- Due to the biomechanical benefit of STA, STA may result in a relatively lower risk of graft re-rupture in a young and active cohort
- However, due to the retrospective nature of the study and the lack of generalizability, more studies utilizing the same technique with a young and active cohort may need to be performed at other institutions to further confirm these findings

