Hybrid Transphyseal ACL Reconstruction With Soft Tissue Quadriceps Tendon Autograft Results in Low Rerupture and High Return to Sport Rates in Skeletally Immature Athletes at Mid-Term Follow Up

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¹Emory University Sports Medicine, ²Med Univ of SC Teaching Hosps, ³Emory University Orthopaedic Sports Medicine INTRODUCTION:

ACL injuries in skeletally immature athletes are increasingly common due to higher participation rates and sports specialization. Nonoperative management often yields poor outcomes, prompting advances in ACL reconstruction (ACLR) techniques. Traditional ACLR methods risk physeal damage, potentially causing growth disturbances. Hybrid transepiphyseal techniques aim to minimize physeal disruption while maintaining anatomic ACL reconstruction. This study evaluates the mid-term outcomes, including return to sport (RTS) and reinjury risk, in skeletally immature athletes undergoing hybrid transepiphyseal ACLR with soft tissue guadriceps tendon (QT) autograft. METHODS:

A retrospective analysis was conducted on skeletally immature patients who underwent primary hybrid transepiphyseal ACLR using QT autograft with ≥2 years follow-up. Data collected included demographics, RTS, return to pre-injury competition level, and subsequent ipsilateral/contralateral knee injuries. Statistical analysis was performed using standard descriptive methods.

RESULTS:

Out of 50 eligible patients, 40 (80.0%) completed the survey (mean age: 12.6 years; 87.5% male). At an average followup of 5.7 years, 37 patients (92.5%) returned to unrestricted sports, and 35 (87.5%) returned to their pre-injury level of competition at a mean of 10.6 months. Five patients (12.5%) required subsequent ipsilateral knee surgery, including two ACL revisions (5.0%), two meniscus repairs (5.0%), and one symptomatic hardware removal (2.5%). Three patients (7.5%) sustained contralateral ACL injuries, and one had a contralateral posterior cruciate ligament sprain. **DISCUSSION AND CONCLUSION:**

The mid-term outcomes of hybrid transepiphyseal ACLR using QT autograft in skeletally immature athletes are promising, with high RTS rates and low graft failure risk. The QT autograft is a viable option for young athletes, demonstrating a graft failure risk of 5% and a 92% RTS rate. Further prospective studies are needed to confirm these findings and to compare

techniques.

outcomes	across	different	graft	types	and
Table 1. Demographic Characteristics		Table 2a: Outcome Data		Table 2b: Age at Revision Surgery	
Table 1: Demographic Characteris	suts	Return to Sport, n (%)	37 (92.5)		
A an in second many (CD second)	126(1604160)			Mean age at Revision Surgery, years (SD, range)	16.8 (2.6,14.9-21.4)
Age in years, mean (SD, range)	12.6 (1.7, 9.4, 16.0)	Return to Preinjury Level of Competition, n (%)	35 (87.5)		
Male	12.0 (1.7, 9.4-10.0)			Revision ACL (n=2); years (years to surgery)	16.1 (3.3)
Female	12.5 (1.1, 11.6-14.0)	Ipsilateral Reinjury, n (%)	5 (12.5)		14.9 (4.6)
		ACL Revision	2 (5)	Maniana Banaia (and), anana (anana ta anana)	15.1 (4.1)
Gender, n (%)		Meniscus Surgery	1(25)	weinseus Repair (n-2), years (years to surgery)	16.3 (2.8)
Male	35 (87.5)	Screw Removal	1 (2.3)	Screw Removal (n=1); years (years to surgery)	21.4 (7.1)
Female	5 (12.5)	Contralatoral Injury n (%) *	4(10)		
		Contranactar injury, ii (70)	.((4))	SD: standard deviation.	
Follow-up in years, mean (SD)	5.7 (2.8)	* Contralateral injuries were three ACL injuries and on	e PCL sprain		
Sport, n					
Football	18				
Basketball	14				
Soccer	11				
Baseball	11				
>? sports	18				
_2 sports					
Level of competition, n					
Competitive	26				
Recreational	11				
Astiva	1				
Active Comparison of the section	1				
Somewnat active	2				