A Single-Center Retrospective Review of ACL Allograft Reconstruction in the Adolescent Population
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OBJECTIVES
The purpose of this study is to examine a single center’s experience with ACL allograft reconstructions in pediatric and adolescent patients. Primary outcomes include functional outcomes, graft failure, and need for revision surgery. Failure is identified as diagnosed re-injury or revision reconstruction surgery.

BACKGROUND
Historically, the management of ACL tears in skeletally immature patients consisted of bracing and modification of activities until skeletal maturity. The literature demonstrated that patients treated nonoperatively until skeletal maturity had poorer functional outcomes, and increased rates of secondary articular and meniscal injuries[1-3]. The trend for early operative management of ACL tears in the skeletally immature patient is strongly supported in the literature [4-7]. The rate of increase in ACL reconstruction in this population is significantly outpacing the increase in ACL reconstructions in a comparative adult cohort [8].

Considerations regarding age, open physes, graft type and source are important factors for the skeletally immature patient. In those with open physes, a soft tissue graft is strongly recommended to prevent growth disturbances [9, 10], however, soft tissue grafts are also associated with increased risk of failure compared to BTB grafts [11]. Early studies demonstrated successful outcomes with allograft reconstruction in the pediatric and adolescent population [12, 13]; however, recent and large multicenter studies have suggested a higher failure rate with allograft in children and adolescents [14-16].

METHODS
A retrospective chart review was performed on all ACL reconstructions performed at our institution between 2002 and 2017. Inclusion criteria included all patients 25 years of age and younger who underwent a primary arthroscopic ACL reconstruction. Exclusion criteria included patients with a concomitant multi-ligamentous knee injury; congenital ACL absence, revision ACL reconstruction or less than 6 months follow up postoperatively.

Primary outcomes include graft failure, and need for revision surgery. Secondary outcomes included the pediatric Injury and Osteoarthritis Outcome Score (KOOS) and pediatric International Knee Documentation Committee (IKDC) functional scores obtained via a RedCap online survey. Pre- and post-operative data were obtained through a retrospective chart and imaging review.

We used Fisher’s Exact Test to test for association between graft type and failure rates. Statistical analysis was performed using R and Roudioi (STATA Corp, College Station, TX). The study was powered to analyze the graft failure rate of allograft versus autograft ACL reconstruction.

RESULTS
Over 15 years, 242 total ACL reconstructions were identified. Of these, the average age at time of reconstruction was 15.8 years (range, 10-21 years). 124 patients were female (51%), and 118 were male (49%). 202 grafts were allografts (83%), with 26 autografts (10.7%) and 14 autograft/allograft hybrids (5.7%).

Twenty-one graft failures were identified (8.7%), of which 18 (86%) were allografts, 2 (9.5%) were autograft, and 1 (4.7%) was hybrid (p=0.99). Failure rates by graft type were as follows: BTB autograft 25%, BTB allograft 9.2%, soft tissue autograft 4.5%, soft tissue allograft 0%, and hybrid 7.1% (p=0.55). Average time to re-tear was approximately 16.3 months (range, 4 months - 4.5 years). We were able to contact 101 patients (42%) for functional surveys, of which 44 (44%) patients completed the survey. Functional scores demonstrated no significant difference in KOOS or IKDC scores when comparing autograft versus allograft ACL reconstruction.

CONCLUSION
Overall, our ACL graft failure rate of 8.7% is lower than that current literature. Our failure rates were noted to be comparable for allografts, autograft, and hybrid graft sources (8.9%, 7.7% and 7.1%, respectively). Preliminary data from our institution demonstrate that outcomes from ACL reconstruction using allograft yield comparable results to autograft reconstruction.

REFERENCES