

Functional Recovery And Time For Return To Ballistics And Return To Sport Testing After Anterior Cruciate Ligament Reconstruction Utilizing Quadriceps Tendon Patellar Bone Autograft In The Adolescent

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BACKGROUND

- The use of quadriceps tendon patellar bone autograft (QPA) for primary anterior cruciate ligament reconstruction (ACLR) is a suitable graft choice for patients who have not reached skeletal maturity.
- Timelines for achieving functional milestones and return to sport testing have not been reported following this procedure.
- **Purpose:** to identify a timeline for return to ballistics and return to sport (RTS) testing, and to investigate performance using common functional tests adolescents who underwent ACLR with QPA with or without meniscus repair.

METHODS

- Retrospective design of individuals aged 12-18 years who underwent ACLR utilizing QPA and completed RTS testing.
- We collected data from subjects with isolated ACLR and ACLR with concomitant meniscus repair.
- We excluded subjects with concomitant injury requiring surgical intervention, previous or contralateral ACLR, and those who did not complete RTS testing.
- Outcomes between subjects undergoing isolated ACLR were compared to those with ACLR and concomitant meniscus repair at return to ballistics and RTS testing time points using independent samples t-tests for normally distributed continuous variables, Mann-Whitney U for non-normally distributed variables, and chi-square analyses for categorical variables.

RESULTS

- Patients who underwent meniscus repair and ACLR were significantly older than those who underwent isolated ACLR (Table 1).
- On average, patients returned to ballistics approximately 4 months following surgery, and completed return to sport testing at approximately 9 months after surgery (Table 1).
- Although there was a difference in single leg squat involved/uninvolved percentages between individuals with ACLR and meniscus repair and those with isolated ACLR, this difference was not statistically significant.
- There were no statistically significant differences between groups on any of the functional outcome measures performed during the return to sport test (Table 2).

Table 1. Demographic and injury characteristics for all subjects and comparisons between those with and without concomitant meniscus repair. Data are presented as means (SD) or median [IQR] for continuous variables dependent on the distribution of the data, and n (%) for categorical variables

Variable	All participants (n= 62)	ACL reconstruction & meniscus surgery (n= 38)	Isolated ACL reconstruction (n=24)	P value
Age (years)	15.7 (1.4)	16.1 (1.2)	15.0 (1.5)	0.001
Sex (female)	33 (53%)	19 (50%)	14 (58%)	0.52
Involved limb (right)	28 (45%)	17 (45%)	11 (46%)	0.93
Time to return to ballistics (days) †	118 [96,132]	120 [96,138]	116 [97,127]	0.59
Time to return to sport testing (days) †	278 [248,344]	274 [242,342]	303 [249,358]	0.57

† Data presented as median [interquartile range]

Table 2: Functional outcomes percentage differences between limbs for all subjects and comparisons between those with and without concomitant meniscus repair at return to sport testing. Data presented as means (sd)

Variable	All Participants	ACL reconstruction and meniscus surgery	Isolated ACL reconstruction	P value
Single Leg Squat Difference Between Limbs (%) (n=56)	97.7 (8.4)	98.0 (9.1)	97.2 (7.1)	0.71
Y Balance Anterior Reach Difference Between Limbs (%) (n=39)	96.4 (5.0)	95.9 (5.9)	97.2 (3.3)	0.41
Y Balance Composite Score Difference Between Limbs (%) (n=12)	99.6 (1.7)	99.9 (1.6)	98.5 (1.9)	0.24
Forward Hop For Distance Difference Between Limbs (%) (n=58)	96.8 (10.4)	96.9 (10.0)	96.8 (11.2)	0.97
Single Leg Triple Side Hop For Distance Between Limbs (%) (n=32)	98.0 (5.6)	98.1 (6.2)	98.0 (4.2)	0.97
Triple Crossover Hop For Distance Difference Between Limbs (%) (n=51)	98.6 (6.1)	98.1 (6.2)	99.2 (6.0)	0.51
6-Meter Hop Test Difference Between Limbs (%) (n=56)	100.4 (7.6)	100.3 (8.2)	100.4 (7.0)	0.97

CONCLUSIONS

- Timelines for recovery from ACLR with QPA in this study can support clinicians in decision making and planning for adolescents requiring ACLR.
- A limitation of this study is the small number of subjects that completed all functional tests.
- Of these subjects, a mean of greater than 95% symmetry was achieved on all functional tests at return to sport testing. This is consistent with return to sport clearance criteria at this institution