

5-Year Survival of Pediatric ACL Reconstruction With Living Donor Hamstring Tendon Grafts

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Background:

It is well accepted that there is a higher incidence of repeat anterior cruciate ligament (ACL) injuries in the pediatric population after ACL reconstruction (ACLR) with autograft tissue compared with adults. Hamstring autograft harvest may contribute to the risk for repeat ACL injuries in this high functional demand group. A novel method is the use of a living donor hamstring tendon (LDHT) graft from a parent; however, there is currently limited research on the outcomes of this technique, particularly beyond the short term.

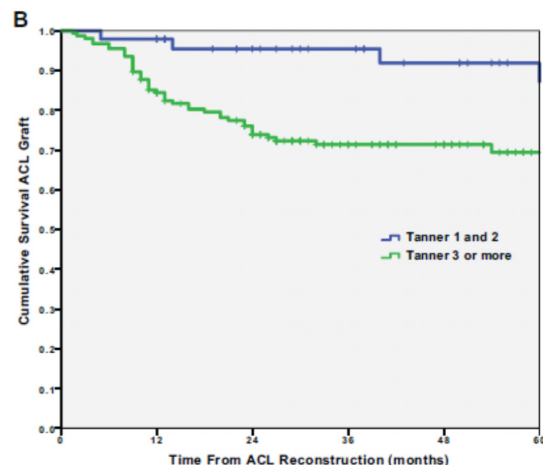
The purpose was to determine the medium-term survival of the ACL graft and the contralateral ACL (CACL) after primary ACLR with the use of an LDHT graft from a parent in those aged less than 18 years and to identify factors associated with subsequent ACL injuries.

Methods:

Between 2005 and 2014, 247 (of 265 eligible) consecutive patients in a prospective database, having undergone primary ACLR with the use of an LDHT graft and aged less than 18 years, were included. Outcomes were assessed at a minimum of 2 years after surgery including data on ACL reinjuries, International Knee Documentation Committee (IKDC) scores, and current symptoms, as well as factors associated with the ACL reinjury risk were investigated.

Results: Patients were reviewed at a mean of 4.5 years (range, 24-127 months [10.6 years]) after ACLR with an LDHT graft. Fifty one patients (20.6%) sustained an ACL graft rupture, 28 patients (11.3%) sustained a CACL rupture, and 2 patients sustained both an ACL graft rupture and a CACL rupture (0.8%). Survival of the ACL graft was 89%, 82%, and 76% at 1, 2, and 5 years,

respectively. Survival of the CACL was 99%, 94%, and 86% at 1, 2, and 5 years, respectively. Survival of the ACL graft was favorable in patients with Tanner stage 1-2 at the time of surgery versus Tanner stage 3-5 at 5 years (87% vs 69%, respectively; hazard ratio, 3.7; $P = .01$). The mean IKDC score was 91.7. A return to preinjury levels of activity was reported by 59.1%.



Conclusion:

After ACLR with an LDHT graft from a parent in those aged less than 18 years, a second ACL injury (ACL graft or CACL injury) occurred in 1 in 3 patients. The 5-year survival rate of the ACL graft was 76%, and the 5-year survival rate of the CACL was 86%. High IKDC scores and continued participation in sports were maintained over the medium term. Importantly, there was favorable survival of the ACL graft in patients with Tanner stage 1-2 compared with patients with Tanner stage 3-5 over 5 years. Patients with Tanner stage 1-2 also had a significantly lower incidence of second ACL injuries over 5 years compared with those with Tanner stage 3-5, occurring in 1 in 5 patients. Thus, an LDHT graft from a parent is an appropriate graft for physically immature children.

Survival of ACL Grafts With Univariate Hazard Ratios by Sex^a

	Male Sex		Female Sex	
	Odds Ratio (95% CI)	P Value	Odds Ratio (95% CI)	P Value
Positive family history	2.95 (1.3-6.9)	.01	0.21 (0.0-11.1)	.23
Tanner stage 3-5	3.53 (1.2-9.9)	.02	0.40 (0.0-68.7)	.40
Age ≥14 years	0.47 (0.2-1.9)	.06	1.60 (0.4-7.2)	.54
Open growth plate	0.79 (0.4-1.5)	.49	2.67 (0.4-20.5)	.35