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Cross-Sectional Outcomes After Treatment With ACL Reconstruction Compared With Rehabilitation Alone During The First 12 Months Of Treatment After ACL Injury

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Faculty Disclosure Information

- Disclosure(s) is/are
  - Kristian Samuelsson is a member of board at Getinge AB

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Background

Anterior cruciate ligament (ACL) injuries are common, yet evidence that compares outcomes after ACL reconstruction versus rehabilitation alone remains scarce. Previous randomized trials have reported no significant differences in patient-reported outcomes (PROs) between treatments, although crossover to surgery is frequent among patients initially managed non-operatively (1,2). Few studies have compared muscle function or return to sport in the early stages of recovery between treatment groups.

Purpose

To cross-sectionally compare muscle function, return to knee-strenuous sport, and PROs between patients treated with anterior cruciate ligament (ACL) reconstruction and rehabilitation alone within the first 12 months after ACL injury.

Metod

This cross-sectional study used data from Project ACL, a rehabilitation outcome registry which includes patients with ACL injuries. Patients aged >15 years at time of injury/reconstruction, treated with either ACL reconstruction or rehabilitation alone were included if they completed at least one follow-up within 12 months from injury/reconstruction. Muscle strength for knee extension and flexion was assessed using an isokinetic dynamometer, and PROs included the KOOS, K-SES, ACL-RSI, and Tegner activity scale. Outcomes were compared between groups at 10 weeks, 4-, 8-, and 12 months using age-adjusted analyses.

Results

A total of 2,536 patients were included in this study, of which 362 patients were treated with rehabilitation alone (ACL rehabilitation), and 2,174 patients were treated with ACL reconstruction.

Table 1. Demographics for included patients stratified by groups with reconstruction or rehabilitation alone

	ACL rehabilitation (n = 362)	ACL reconstruction (n = 2174)	p-value	Differences between groups (95% CI)	Effect size
Sex, n (%)					
Male	142 (39.2%)	1037 (47.7%)		8.5 (2.9; 14.1)	0.17
Female	220 (60.8%)	1137 (52.3%)	0.032	-8.5 (-14.1; -2.9)	0.17
Age at injury, years, mean (SD)					
All	36.5 (12.9)	26.4 (10)	<.0001	10.1 (8.9; 11.3)	0.969
Male	34.1 (12.8)	26.7 (9.1)	<.0001	7.4 (5.7; 9.1)	0.780
Female	38 (12.8)	26.1 (10.7)	<.0001	11.9 (10.3; 13.5)	1.080

Patients in the ACL rehabilitation group were older than patients treated with ACL reconstruction at each follow-up (Table 1). Thus, statistical comparison of results of muscle function tests and PROs were adjusted for age using logistic regressions. Between 120 and 1,495 patients were compared at follow-ups (Table 2).

Table 2. Number of patients participating and missing for each of the follow-ups

Patients (n)	Test	ACL rehabilitation	missing	ACL reconstruction	missing
10 weeks	MF	120	242	1032	1142
	PROs	177	185	1455	719
4 months	MF	148	214	1241	933
	PROs	219	143	1495	679
8 months	MF	159	203	1246	928
	PROs	221	221	1493	681
12 months	MF	122	240	997	1177
	PROs	180	182	1196	978

n = number; MF = muscle function; PROs = patient reported outcome outcomes

Results

Patients in the ACL rehabilitation group displayed greater symmetrical strength at each follow-up, both in knee extension and knee flexion (Figure 1A and 1B). Statistical significance was reached for all comparisons at each follow-up. Effect sizes varied between 0.384 to 1.100.

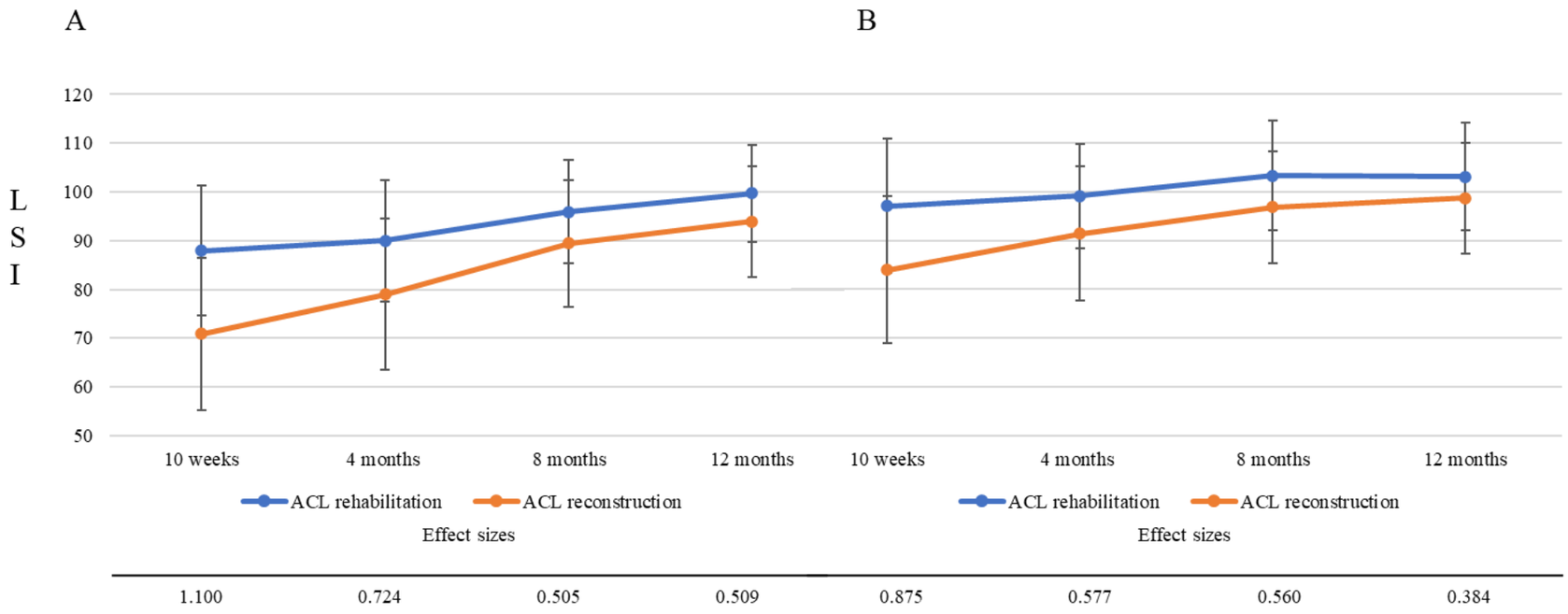

Figure 1A and B: limb symmetry index for knee extension (1A) and knee flexion (1B) between patients treated with rehabilitation alone or reconstruction. A = knee extension; B = knee flexion. Effect sizes for comparison for each follow-up are presented in the figure. LSI = Limb Symmetry Index

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Results

In the included PROs, patients treated with ACL reconstruction scored less pain at 10 weeks and 4 months, and higher function in sports and recreation at 4, 8 and 12 months after injury/reconstruction (Table 3).

Table 3: KOOS values compared between groups for subscales pain, symptoms, sports and quality of life. For significant differences effect sizes are presented

	pain			symptoms			sports			quality		
	ACL rehab	ACL rec	ES	ACL rehab	ACL rec	ES	ACL rehab	ACL rec	ES	ACL rehab	ACL rec	ES
10 w	**73 (15.2)**	**76.2 (14.2)**	**0.225**	**59 (18.5)**	**63.6 (17.6)**	**0.260**	31.8 (15.1)	31 (21.7)		36.6 (16)	37.9 (15.)	
4 m	**77.2 (15.7)**	**81.1 (12.6)**	**0.297**	68.5 (19.6)	70.9 (16.4)		**43 (26)**	**48.3 (22.8)**	**0.226**	43.7 (17.8)	44.9 (16.2)	
8 m	84.2 (14.3)	85.7 (11.6)		76.8 (16.1)	75.7 (15.8)		**60.4 (24.4)**	**64.9 (21.7)**	**0.204**	53.9 (19.8)	54.3 (17.9)	
12 m	86.2 (12.5)	87.7 (11.2)		79.9 (15.8)	78.6 (15.5)		**66.3 (24.7)**	**72.1 (22.2)**	**0.256**	59.2 (20.7)	60.6 (19.1)	

ACL = Anterior cruciate ligament, rehab = ACL rehabilitation group; rec = ACL reconstruction group; KOOS = knee injury and osteoarthritis outcome score; bold style = $p < 0.05$ ES = effect size; w = weeks; m = months. Results are presented as values (standard deviation). Analysis adjusted for age at reconstruction through logistic regression

Also, patients treated with ACL reconstruction scored higher present knee self-efficacy at 4, 8, and 12 months as well as higher future knee self-efficacy at each follow-up (Table 4)

Table 4: Between groups comparison for the K-SES present and future subscale and ACL-RSI. For significant differences effect sizes are presented

	K-SES present			K-SES future			ACL-RSI		
	ACL rehab	ACL rec	ES	ACL rehab	ACL rec	ES	ACL rehab	ACL rec	ES
10 w	4.4 (2.1)	4.2 (1.8)		**5.9 (1.9)**	**7.3 (1.6)**	**0.798**			
4 m	**5.4 (2.1)**	**5.8 (1.8)**	**0.211**	**6.1 (2.1)**	**7.3 (1.6)**	**0.691**			
8 m	**6.9 (2.1)**	**7.6 (1.6)**	**0.428**	**6.3 (2.1)**	**7.3 (1.7)**	**0.536**	53.5 (19.9)	56.3 (19.3)	
12 m	**7.4 (1.8)**	**8.3 (1.5)**	**0.567**	**6.5 (2.1)**	**7.3 (1.8)**	**0.445**	**54.2 (23.5)**	**61.5 (21.1)**	**0.343**

ACL = Anterior cruciate ligament, rehab = ACL rehabilitation group; rec = ACL reconstruction group; K-SES = knee self-efficacy scale; ACL-RSI = anterior cruciate ligament return to sport after injury scale; rehab = rehabilitation; rec = reconstruction; ES = effect size; w = weeks; m = months; bold style = $p < 0.05$. Results are presented as value (standard deviation). Analysis adjusted for age at reconstruction through logistic regression

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Results

For level of physical activity, patients treated with ACL reconstruction were active at a higher level of physical activity before ACL injury (p<.0001), and at 8 and 12 months (p<.0001 and p<.0001, respectively) compared with patients in the ACL rehabilitation group. (Figure 2)

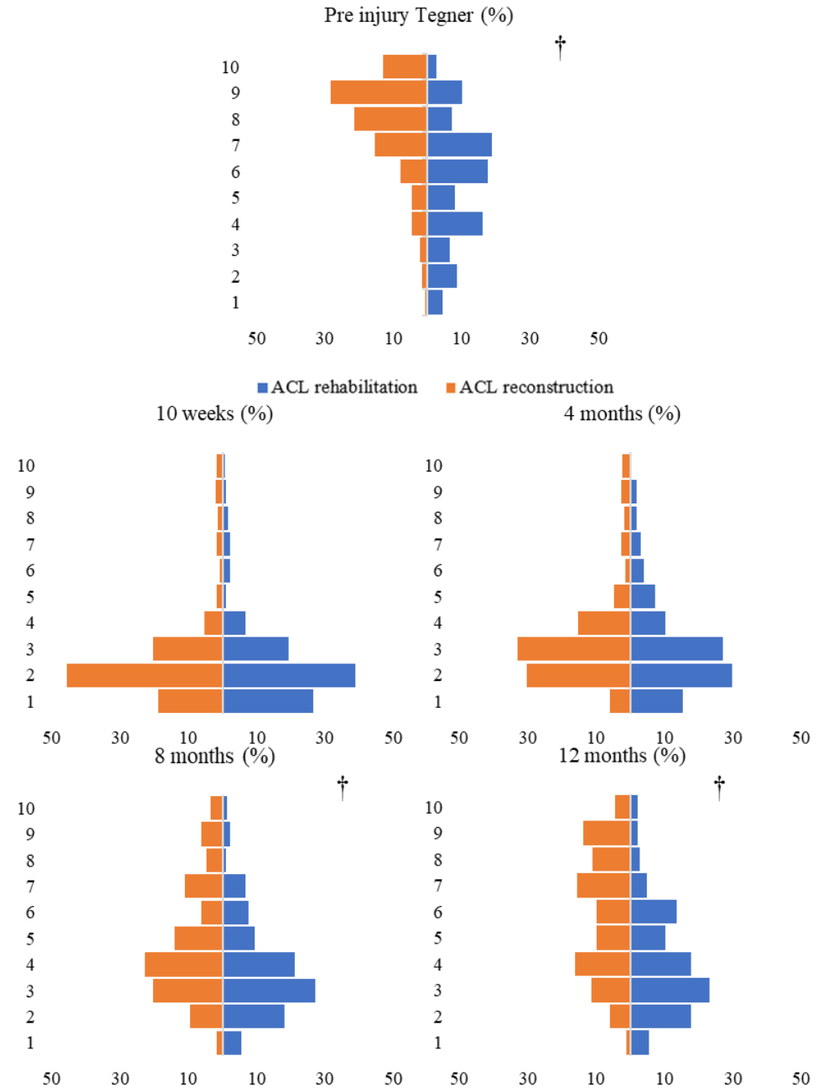

Figure 2: The Tegner Activity Scale. † - statistically significant difference; Y axis: Tegner activity level; X axis: percentage (%) of patients

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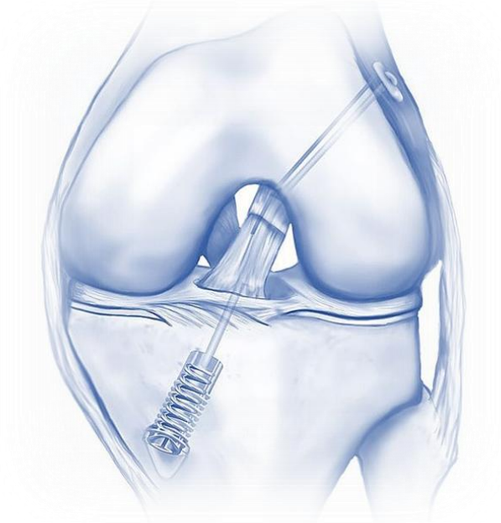
Conclusion

Patients treated with rehabilitation alone achieve greater symmetrical strength compared with patients treated with ACL reconstruction up to the 12 months follow-up. Patients treated with ACL reconstruction report higher self-reported knee function, present and future self-efficacy, and are active to a higher knee-demanding level pre-injury and 8 and 12 months after reconstruction



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Want to know more?

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