



A 32 TO 37 YEAR FOLLOW-UP OF FOOTBALL AND NON-FOOTBALL RELATED ANTERIOR CRUCIATE LIGAMENT INJURY

Filbay S ^{1, 2}, Andersson C ³, Ardern C ², Gauffin H ³, Kvist J ^{2, 4}

1 University of Oxford, Oxford, United Kingdom,
2 Linköping University, Linköping, Sweden,
3 Linköping Hospital, Linköping, Sweden,
4 Karolinska Institute, Stockholm, Sweden

Introduction

The impact of the anterior cruciate ligament (ACL)-injured knee on quality of life (QOL) and knee function more than 30 years after ACL injury is unclear. Additionally, comparison in outcome following football and non-football related ACL injury, and the impact of meniscus injury, ACL treatment and knee function on patient-report outcomes (PROs) 32-37 years following injury has not been investigated. This study aimed to:

- Evaluate PROs 32-37 years following football compared with non-football related ACL injury;
- Assess the relationship between ACL treatment, baseline meniscus injury and mid-term knee function with PROs, 32-37 years following football compared with non-football related ACL injury

Methods

From 1980-1985, 293 patients within 14 days of ACL injury were allocated to early surgical (augmented or non-augmented repair) or non-surgical ACL treatment.[1] ACL surgery was performed at Linköping Hospital (Sweden) within 24 (mean 5±4) days of injury. Meniscus injury was diagnosed arthroscopically ≤21 days of injury. At mid-term follow-up (mean 4±1 (range 3-7) years after ACL injury) quadriceps strength limb symmetry index (LSI), hamstrings strength LSI and one-leg-hop for distance LSI were assessed. All patients aged 16-40 years at the time of injury were invited to complete the Knee Injury and Osteoarthritis Outcome Score (KOOS), ACL-QOL and EQ-5D 32-37 years after injury. Patients with a non-sporting ACL injury (n=12) and those with incomplete data for mechanism of injury (n=4) were excluded from analyses.

Mann-Whitney U tests compared outcomes following football and non-football related ACL injury for all patients and within sub-groups (ACL treatment (allocated to surgical treatment or non-surgical treatment); ACL-treatment at 32-37 years (surgically or non-surgically treated at long-term follow-up); baseline meniscus injury (yes/no); quadriceps strength LSI (<100% vs. ≥100%); hamstrings strength LSI (<100% vs. ≥100%); and one-leg-hop LSI (<100% vs. ≥100%).

Results

161 out of 209 eligible patients (77%) completed 32-37 year follow-up (age 59±6, range 47-74 years; 28% female). 97 (60%) were injured playing football compared with other sports (12% alpine skiing, 8% handball, 4% floorball, 4% racquet sports, 11% other). 88 patients (54% of footballers, 56% of non-footballers) had initial non-surgical ACL treatment and 58 patients (34% of footballers, 39% of non-footballers) had not received ACL surgery at long-term follow-up. 55% of footballers and 64% of non-footballers had baseline meniscus injury.

There were no statistical differences in PROs 32-37 years following football compared with non-football related ACL injury (Fig 1). KOOS scores were impaired in footballers and non-footballers compared with a Swedish population-based sample [2] (Fig 2).

In people allocated to non-operative treatment, footballers reported better KOOS Sport/Rec scores at follow-up than non-footballers (63(29, 80) v. 44(23, 69)). In people with baseline meniscus injury, footballers reported better KOOS Sport/Rec scores than non-footballers (60(30, 90) v. 40(15, 70)). In people with quadriceps strength and one-legged-hop distance $\geq 100\%$ at 3-7 years, worse EQ5D scores were reported 32-37 years after football compared to non-football related injury (Fig 1).

Conclusions

PROs were impaired 32-37 years after acute ACL injury compared with the Swedish population to a similar degree following football and non-football related ACL injury. Footballers initially treated non-operatively reported better sport/recreation function than non-footballers initially treated non-operatively. In people with baseline meniscal injury, footballers also reported better sport/recreation function than non-footballers at long-term follow-up. On the other hand, people with better mid-term knee function reported worse health-related QOL at 32-37 years if they were injured during football compared to other sports.

References (maximum 3)

- Andersson C, Odensten M, Good L, Gillquist J. Surgical or non-surgical treatment of acute rupture of the ACL - A randomized study with long-term follow-up. *J Bone Joint Surg Am* 1989;71A(7):965-74.
- Paradowski PT, Bergman S, Sundén-Lundius A, Lohmander L.S, Roos E. Knee complaints vary with age and gender in the adult population. Population-based reference data for the KOOS. *BMC Musculoskel Dis* 2006;7(38).

	KOOS Symptoms		KOOS Pain		KOOS Sport/Rec		KOOS QOL		ACL-QOL		EQ-5D	
	Football	Other sport	Football	Other sport	Football	Other sport	Football	Other sport	Football	Other sport	Football	Other sport
ALL PARTICIPANTS	73(54, 89)	71(50, 86)	83(67, 97)	86(61, 97)	60(30, 80)	45(21, 70)	57(44, 69)	56(38, 63)	70(49, 90)	72(47, 88)	.80(.73, .85)	.80(.73, 1.0)
Initial ACL surgery	66(54, 85)	71(51, 86)	82(64, 97)	86(67, 99)	50(30, 83)	65(27, 87)	56(39, 68)	56(38, 67)	72(49, 92)	76(58, 90)	.80(.74, 1.0)	.80(.80, 1.0)
No initial ACL surgery	79(54, 92)	71(50, 86)	85(70, 97)	81(54, 94)	63(29, 80)*	44(23, 69)*	60(44, 69)	56(44, 63)	69(51, 87)	68(40, 83)	.80(.73, .80)	.80(.70, 1.0)
ACL surgery LTFU	71(54, 93)	71(50, 87)	81(64, 97)	86(65, 98)	60(30, 75)	45(20, 70)	58(42, 69)	56(38, 63)	72(48, 91)	73(46, 88)	.80(.73, .85)	.80(.73, 1.0)
No ACL surgery LTFU	79(54, 88)	71(50, 82)	86(68, 99)	78(58, 96)	60(32, 88)	45(23, 73)	56(44, 66)	56(44, 66)	68(52, 87)	68(46, 83)	.80(.73, .90)	.80(.73, 1.0)
BL meniscus injury	68(54, 91)	71(47, 82)	81(71, 99)	82(59, 97)	60(30, 90)*	40(15, 70)*	56(44, 69)	56(38, 63)	73(51, 93)	68(42, 84)	.80(.73, .95)	.80(.73, 1.0)
No BL meniscus injury	75(61, 86)	71(54, 93)	88(64, 97)	86(67, 100)	55(30, 80)	55(31, 90)	63(38, 69)	63(44, 75)	65(47, 87)	81(47, 91)	.80(.74, .85)*	.80(.76, 1.0)*
Quadriceps LSI $\leq 99\%$	79(54, 89)	71(46, 88)	81(67, 97)	89(58, 100)	60(30, 79)	44(18, 73)	63(38, 69)	56(38, 63)	68(48, 87)	73(45, 88)	.80(.73, 1.0)	.80(.73, 1.0)
Quadriceps LSI $\geq 100\%$	68(54, 89)	79(50, 86)	83(61, 99)	86(67, 94)	60(30, 93)	60(25, 88)	63(44, 69)	63(44, 69)	73(51, 94)	67(58, 91)	.80(.73, .80)*	.80(.80, 1.0)*
Hamstring LSI $\leq 99\%$	79(55, 88)	79(55, 88)	81(64, 97)	81(64, 97)	60(25, 75)	60(25, 75)	57(44, 69)	57(44, 69)	71(48, 87)	71(48, 87)	.80(.73, .80)	.80(.73, .80)
Hamstring LSI $\geq 100\%$	71(54, 89)	71(46, 86)	86(76, 99)	86(60, 100)	58(32, 89)	55(20, 85)	63(39, 69)	56(38, 66)	70(52, 93)	72(47, 89)	.80(.77, 1.0)	.80(.80, 1.0)
One-leg-hop LSI $\leq 99\%$	70(54, 86)	61(39, 81)	81(64, 97)	75(53, 94)	50(30, 75)	45(16, 83)	56(43, 69)	56(38, 63)	65(48, 88)	67(41, 85)	.80(.73, .85)	.80(.70, .95)
One-leg-hop LSI $\geq 100\%$	75(54, 93)	79(50, 93)	86(67, 97)	89(67, 100)	60(30, 85)	60(25, 80)	63(42, 69)	56(38, 69)	76(53, 92)	72(55, 91)	.80(.73, .84)*	1.0(.80, 1.0)*

Figure 1. Long-term patient-reported outcome for all participants and subgroups (ACL treatment, baseline meniscus injury and mid-term knee function) 32-37 years following football vs. non-football (other sport) related ACL injury

*p<0.05; scores are median(IQR); ACL, anterior cruciate ligament; LTFU, long-term follow-up (32-37 years); BL, baseline; LSI, limb symmetry index; KOOS, Knee Injury and Osteoarthritis Outcome Score; Sport/Rec, function in sport and recreation; QOL, quality of life

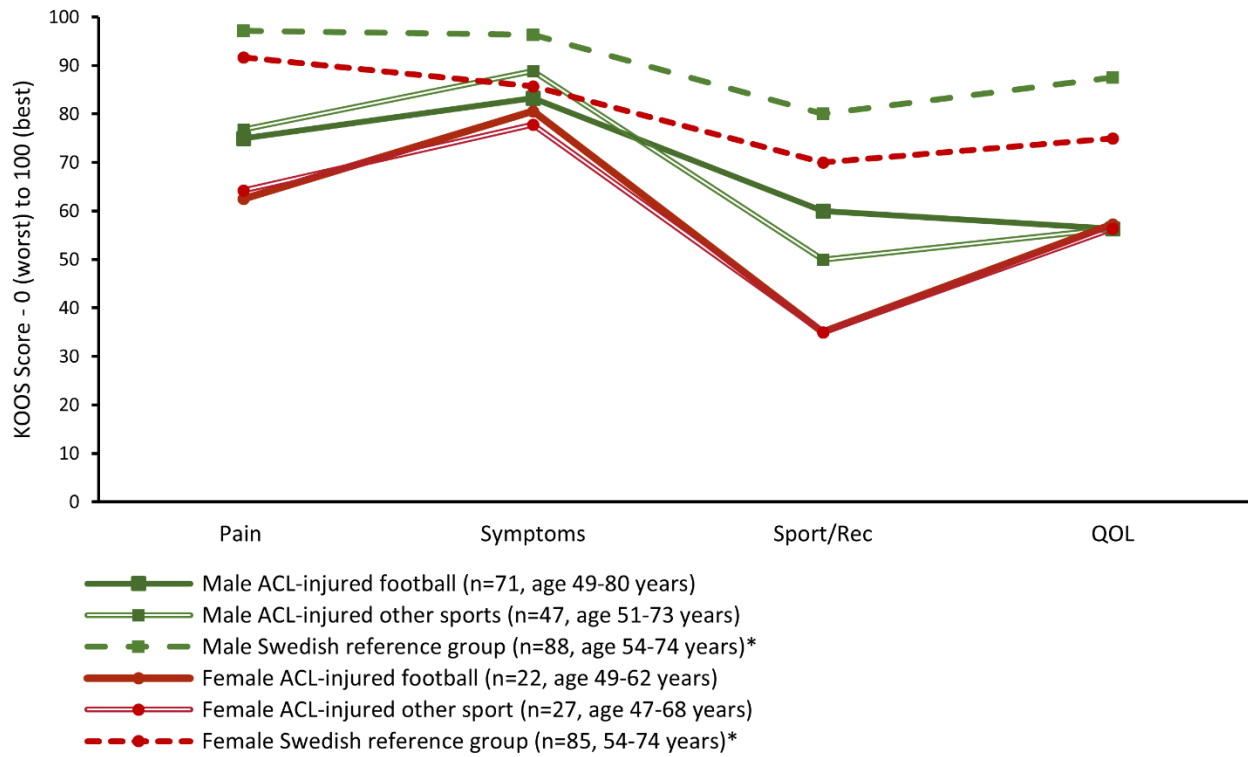


Figure 2. Knee Injury and Osteoarthritis Outcome Score (KOOS) subscale scores 32-37 years following football and non-football (other sports) related ACL injury compared with a Swedish population-based sample

* Paradowski et al. (2006); KOOS subscale scores given as median; Sport/Rec, function in sport and recreation; QOL, quality of life