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Title: Return to play and pattern of injury in a consecutive case series of Elite UEFA soccer players following Anterior cruciate ligament rupture

Author/s:

Amit Meena, MS, DNB, India (Presenting author)

Luca Farinelli, MD, Italy

Elisabeth Abermann, MD, Austria

Peter Ueblacker, MD, Germany

Jochen Hahne, MD, Germany

Christian Fink, MD, Austria





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Disclosures:

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Affiliations:

Clinical Orthopaedics, Department of Clinical and Molecular Sciences, Università Politecnica delle Marche, Ancona, Italy.

Gelenkpunkt–Sports and Joint Surgery, Innsbruck, Austria.

Research Unit for Orthopaedic Sports Medicine and Injury Prevention, Private University for Health Sciences, Medical Informatics and Technology, Innsbruck, Austria.

Fowler Kennedy Sport Medicine Clinic, University of Western Ontario, London, Ontario, Canada.

Orthopedics and Sports Medicine, Munich, Germany.

Football Club FC Bayern Munchen, Munich, Germany.



Methods

A retrospective review of consecutive elite UEFA professional soccer players with a complete ACL injury that underwent ACL reconstruction between September 2018 and May 2022 by the senior author .

Exclusion criteria:

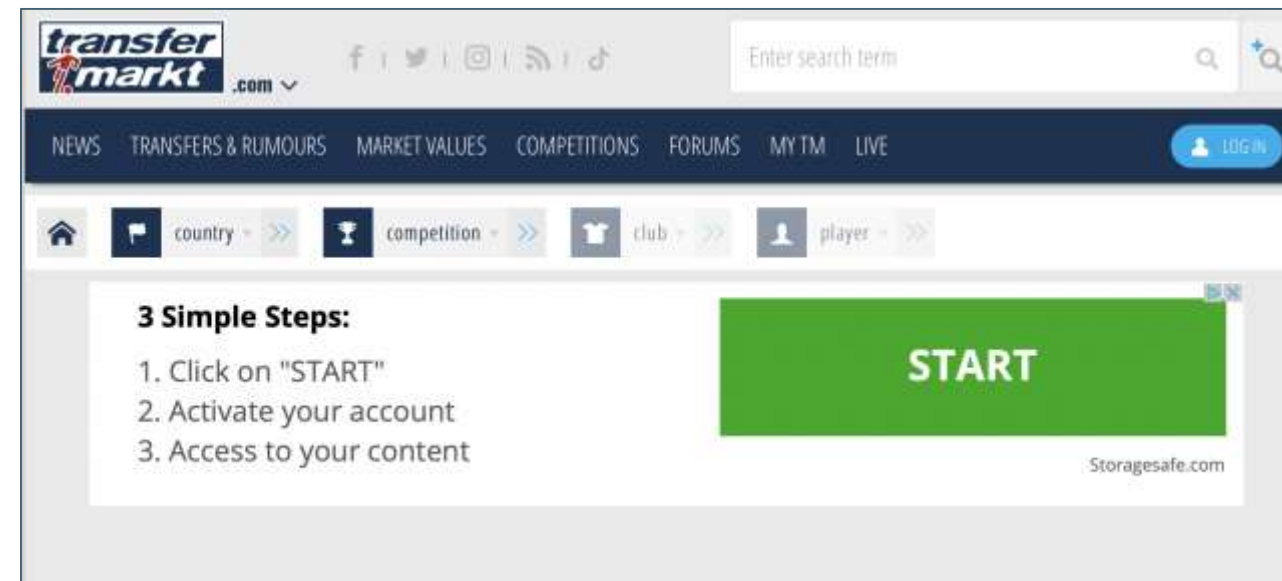
- Multiligament injuries;
- revision ACL surgery;
- those who did not return to sport due to rehabilitation program were excluded.

Inclusion criteria:

- Player belonged to first team of elite UEFA leagues (Bundesliga, Serie A, Premier Ligue) ;
- Surgical report available

Methods

- All demographics and anthropometric characteristics as age, height, weight, body mass index (BMI), position, injury history, affected side, RTP time, minutes played for season (MPS) and percentage of played minutes-per-season (MPS%) before and after ALCR were retrieved from medical records and from the publicly available media-based platforms (i.e transfermarket)



Results

During the study period, **40** consecutive elite soccer players that underwent ACL reconstruction were assessed for eligibility.

- 2 patients excluded due to multi-ligament injuries;
- 3 patients underwent to revision ACL surgery;
- 8 patients were excluded because they had ACL surgery after November 2021.

27 male patients were included in the study

Results

Table 1. Patients characteristics. BMI: body-mass-index.

ACL: anterior cruciate ligament

	Players (N = 27)
Age (years), mean (SD) [range]	23.15 (4.3) [18-34]
Height (cm), mean (SD) [range]	185 (5.2) [175-196]
Body mass (kg), mean (SD) [range]	79.1 (7.3) [70-90]
BMI (kg/m ²), mean (SD) [range]	23.1 (1.4) [20.8 – 25.8]
Position	
Goalkeeper	0 (0%)
Defender	10 (37%)
Midfielder	9 (33.3%)
Forward	8 (29.6%)
Foot dominance	
Right	21 (77.8%)
Left	6 (22.2%)
ACL injuries	
Right	17 (63.0%)
Left	10 (37.0%)
Injury	
Match	24 (88.9%)
Training	3 (11.1%)
Mechanism	
Contact	5 (8.3%)
Non-contact	22 (91.7%)

Results: Injury pattern and concomitant procedures

Table 2. Meniscal injuries pattern in elite soccer players

Type of Meniscal Lesion			
Medial	N= 16 (59.3%)	Lateral	N= 16 (59.3%)
Ramp	5 (31.3%)	Root	4 (25%)
Bucket Handle	3 (18.8%)	Bucket Handle	1 (6.3%)
Radial Tear	1 (6.3%)	Radial Tear	1 (6.3%)
Longi			10 (62.5%)

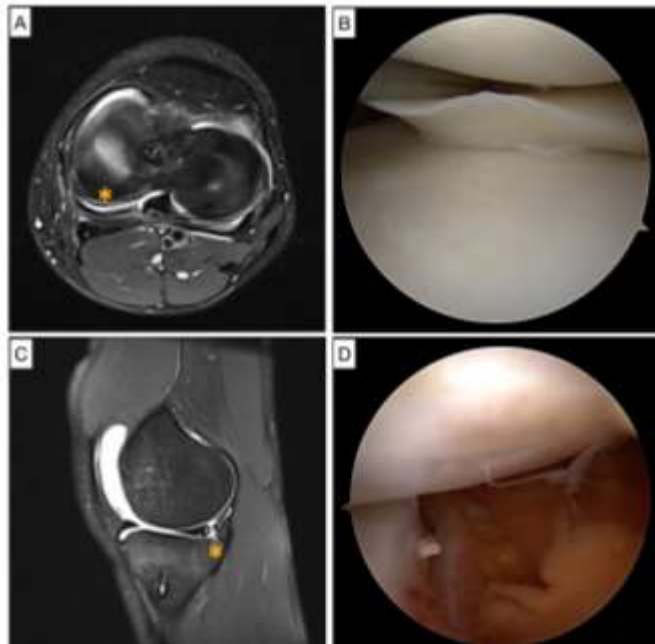


Table 3. Breakdown procedures.

	Patients (N= 27)	Patients affected (%)
Graft		
BPTB	17	63.0%
Soft tissue QT	10	27.0%
Isolated ACL Reconstruction	6	22.2%
Concomitant Procedures	21	77.8%
Meniscectomy		
Medial	3	11.1% *
Lateral	2	7.4% #
Meniscal Repair		
Medial	13	48.1% §
Lateral	14	51.9% ◇
Cartilage Lesions	7	25.9% °
Patella	1	14.3%
MFC/LFC	5	71.4%
Tibial Plateau	1	14.3%
Chondroplasty	4	57.1% (4 of 7)
Nanofractures	1	14.3% (1 of 7)
LET	5	18.5%

Results: Return to Play and performance

- **RTP rate of 92.6% of 27 athletes.** 25 athletes returned to play after ACLR, 2 athletes (7.4%) delayed the return to play due to graft failures occurred both within 6 months post operative.
- **23 (92.0%)** soccer players returned to the same level of professional soccer (first team of elite UEFA leagues), **2 (8.0%)** athletes moved to down league (second division of professional football) after RTP and during the first season after surgery.

Results: Return to Play and performance

Descriptive analysis of age, pitch position, graft type, LET, meniscus and cartilage injuries on RTP			
		RTP time (days, mean (SD) [range])	p-value
Overall RTP time (n=25)		267.6 (66.9) [173-410]	
Age			
	Under 25 years (n=18)	273.3 (74.6) [173-410]	n.s.
	Aged 25 years or older (n=7)	254.1 (44.9) [202-339]	
Pitch position			
	Defender (n=10)	268.2 (68.2) [173-406]	n.s.
	Midfielder (n=8)	262.6 (64.6) [182-410]	
	Forward (n=7)	264.0 (66.0) [210-339]	
Presence or absence of cartilage and/or meniscal injuries			
	Not chondral or meniscal tears (n=6)	249 (82.93) [173-406]	n.s.
Meniscal injuries (n=19)			
	Lateral meniscus repair (n=13)	260.2 (60.4) [182-410]	
	Medial meniscus repair (n=12)	283.6 (69.1) [182-410]	
Graft-type			
	BPTB (n=16)	266.6 (68.8) [173-410]	n.s.
	Soft tissue QT (n=9)	269.2 (67.3) [184-406]	
Lateral extrarticular tenodesis (all grafts)			
	ACL-R with LET (n=5)	278.0 (75.3) [210-406]	n.s.
	ACL-R without LET (n=20)	265.2 (66.6) [173-410]	

Results: Return to Play and performance

Table 5. Player's performance after ACL reconstruction

Players included in the analysis of first season after ACLR (n=25*)	
RTP (25 players)	
Retired	1 Player after RTP
Lower league	2 Players
MP1S (24 players due to 1 retirement), mean (SD)	1108.0 (868.4)
MP1S, mean (SD) %,	29.18 (20.6)
MPS-PRE, mean (SD) %	56.69 (21.71)
Players included in the analysis of second season after ACLR (n=16)	
Retired	1 Player after 1 season post ACL surgery
Lower league	0
MP2S (15 players due to 1 retirement), mean (SD)	2160.1 (841)
MP2S, mean (SD)%	57.76 (22.89)
Players included in the analysis of third season after ACLR (n=5)	
Retired	1 Player after 2 season post ACL surgery
Lower league	0
MP3S (4 players due to 1 retirement), mean (SD)	1625.6 (852.5)

Complications: Return to Play and performance

- **2 (7.4%)** graft re-ruptures both occurred within 6 months from initial ACLR;
- **2 (7.4%)** of patients failed meniscal repairs within 1 year from ACL surgery. Both patients underwent medial meniscal repair with all-inside sutures for longitudinal tears. Both were addressed by arthroscopic partial meniscus resection;
- **1 (3.7%)** patient was affected by a loose body from a cartilage injury of the patella, occurred within 6 months from ACL reconstruction, corrected by arthroscopic removal.

Conclusion: Return to Play and performance

- ACL reconstruction in elite UEFA soccer players using soft tissue QT and BPTB graft is associated to 92.6% rate of RTP and 7.4% rate of re-injury.
- 7.4% of soccer players moved to down league during the first season after surgery. Due to high probability of associated injuries, a systematic and careful inspection of cartilage and menisci must be performed during ACL reconstruction.
- Age, graft selection, concomitant treatments and LET have not been significantly associated with prolonged RTP. However, the design of the study and the sample size made the study underpowered for the multivariate analysis.

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