Severity of Additional Injuries Associated with Primary ACL Injuries in Professional and Amateur Soccer Athletes

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Disclosures

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- Kyle Borque
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Background

- ACL injuries may vary between professional and amateur soccer athletes due to
  - Differences in training/game intensity
  - Timely access to medical care
  - Injury mechanisms

- The impact of an ACL injury extends beyond the ligament itself, often involving concomitant damage to
  - Menisci & cartilage

- These concomitant injuries can significantly affect an athletes' return to play and long-term joint health

Purpose

- This purpose of this study is to evaluate the differences in ACL injury characteristics between professional and amateur soccer athletes, focusing on
  - Incidence of meniscal and chondral lesions
  - Time from injury to surgery

Methods

- Retrospective cohort study at 2 centers
- Inclusion criteria
  - Primary ACL reconstruction
  - No other ligament needing surgical intervention
  - Soccer related mechanism of injury
  - ACL reconstruction between July 2005 and December 2023
- Professional defined as an athlete under contract with a pro team at the time of ACL injury
- All other athletes were considered amateur

Data collected from Operative Reports

- Chronic ACL – injury to ACL reconstruction is greater than 1 year
- Meniscal tears
  - Tear location – medial or lateral meniscus
- Chondral lesions
  - Severity according to ICRS grading system
  - Lesion location - medial and lateral femoral condyles, medial and lateral tibial plateaus, patella, and trochlea

Athlete Characteristics

	Amateur (n=206)	Professional (n=252)	P-value
Age at ACLR (years)	25.1 ±9.5	24.2±4.3	.170
Female gender (%)	39 (19%)	19 (9%)	<.001
Chronic ACL injury (%)	29 (14%)	2 (1%)	<.001
Days to ACLR (non-chronic)	74.3±78.0	21.5±28.0	<.001



Meniscus Pathology

	Amateur (n=206)	Professional (n=252)	P-value
Medial meniscus tear (%)	84 (40%)	72 (29%)	.031
Lateral meniscus tear (%)	103 (50%)	147 (58%)	.083
Any meniscus pathology (%)	65 (32%)	63 (25%)	.120

Chondral Lesions

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Table. Location, number, and severity of chondral lesions between professional and amateur soccer athletes.

ICRS grade	Patella	Trochlea	Medial Femoral Condyle	Medial Tibial Plateau	Lateral Femoral Condyle	Lateral Tibial Plateau
Amateur						
Intact	197 (95.6%)	203 (98.5%)	180 (87.4%)	197 (95.6%)	186 (90.7%)	192 (93.7%)
1	4	1	5	7	6	6
2	5	1	13	1	8	5
3	0	1	8	1	3	1
4	0	0	0	0	2	1
Pro						
Intact	229 (90.9%)	232 (93.2%)	197 (79.1%)	238 (95.6%)	204 (81.9%)	232 (93.2%)
1	7	5	11	8	13	13
2	8	8	21	3	21	3
3	5	2	15	0	10	1
4	1	2	5	0	1	0
P	.047	.002	.010	.562	.005	.643

Chondral Lesions

- Chondral lesions, graded ICRS ≥ 3, were more prevalent in professional athletes (16%) than in amateur athletes (6%; p=.002)
- Professional athletes had a higher incidence of lesions at
  - Medial femoral condyle (p=.010)
  - Lateral femoral condyle (p=.005)
  - Patella (p=.047)
  - Trochlea (p=.002)
  - No significant difference at the medial or lateral tibial plateaus

Conclusion

- Professional soccer players had a 2.5 times higher incidence of severe chondral injuries.
- Amateur athletes had a 1.4 times higher incidence of medial meniscus tears.

- These findings might suggest that professional athletes experience more severe articular cartilage injuries, likely due to the higher amount of force at the time of injury. Amateur athletes were at greater risk for a medial meniscus tear, possibly due to increased time between injury and ACLR.

References

- Brambilla L, Pulici L, Carimati G, Quaglia A, Prospero E, Bait C, et al. Prevalence of Associated Lesions in Anterior Cruciate Ligament Reconstruction: Correlation With Surgical Timing and With Patient Age, Sex, and Body Mass Index. Am J Sports Med. 2015;43(12):2966-73.
- Cance N, Erard J, Shatrov J, Fournier G, Gunst S, Martin GL, et al. Delaying anterior cruciate ligament reconstruction increases the rate and severity of medial chondral injuries. Bone Joint J. 2023;105-B(9):953-60.
- Giurazza G, Saithna A, An JS, Lahsika M, Campos JP, Vieira TD, et al. Incidence of and Risk Factors for Medial Meniscal Lesions at the Time of ACL Reconstruction: An Analysis of 4697 Knees From the SANTI Study Group Database. Am J Sports Med. 2024;52(2):330-7.
- Potter HG, Jain SK, Ma Y, Black BR, Fung S, Lyman S. Cartilage injury after acute, isolated anterior cruciate ligament tear: immediate and longitudinal effect with clinical/MRI follow-up. Am J Sports Med. 2012;40(2):276-85
- Szymski D, Achenbach L, Zellner J, Weber J, Koch M, Zeman F, et al. Higher risk of ACL rupture in amateur football compared to professional football: 5-year results of the 'Anterior cruciate ligament-registry in German football'. Knee Surg Sports Traumatol Arthrosc. 2022;30(5):1776-85.