FIFA® MEDICAL CENTRE OF EXCELLENCE

The association between the injuries to anterolateral complex and Kaplan fiber of the iliotibial band and preoperative pivot-shift test in ACL injury

Takeo Tokura, Kanto Nagai, Yuichi Hoshino, Shu Watanabe, Kyohei Nishida, Noriyuki Kanzaki, Takehiko Matsushita, Ryosuke Kuroda

Department of Orthopaedic Surgery,
Kobe University Graduate School of Medicine

ISAKOS CONGRESS 2023

COI Disclosure

There are no COI to disclose

Background

- ✓ Pivot-shift test grade 2,3 anterolateral rotatory instability (ALRI) remains after anterior cruciate ligament (ACL) reconstruction in 0-20% cases [1]
- ✓ ALRI remains in 0-59% cases after ACL reconstruction [2]

Possible injuries to *secondary restraint*

So called 'Anterolateral ligament (ALL)' /Kaplan fibers of the iliotibial band (KF) injuries may contribute to ALRI [3-5]

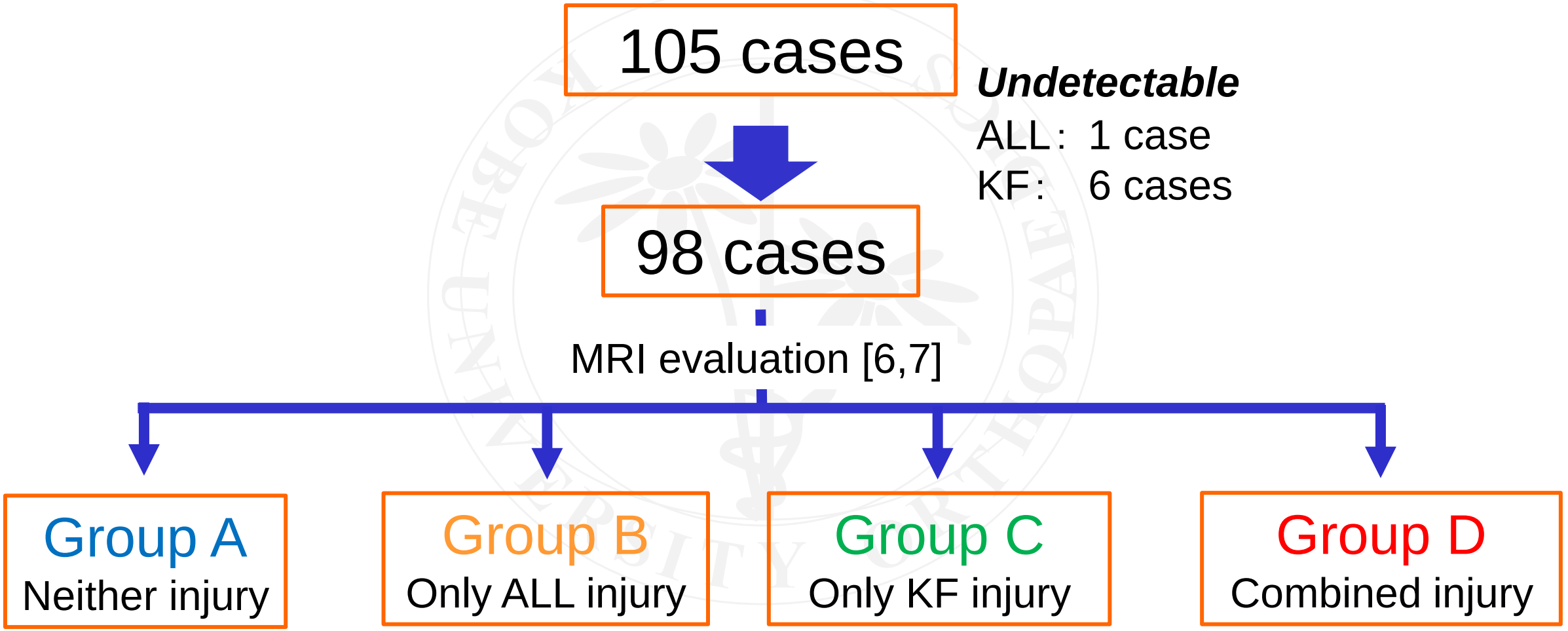
Purpose

- ✓ To investigate the incidence of ALL and KF injuries in ACL-injured patients
- ✓ To investigate the association between the injuries to ALL and KF and preoperative pivot-shift test

Hypotheses

- ✓ Some ACL injuries are associated with ALL and/or KF injuries
- ✓ ACL-injured knees with combined injury of ALL and KF would have greater tibial acceleration of the preoperative pivot-shift test

Method

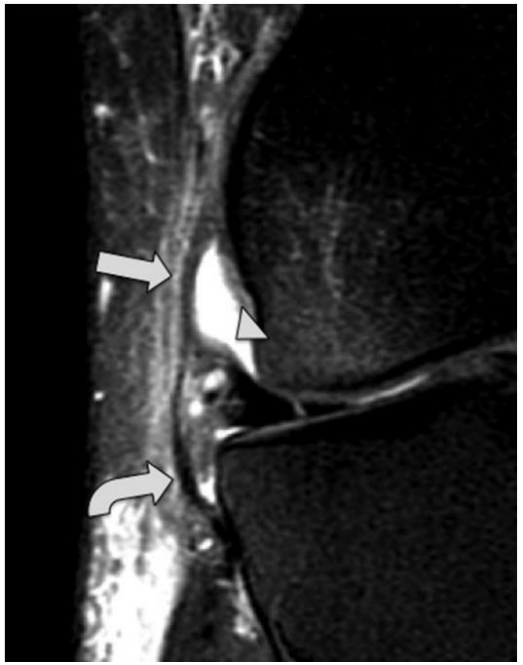

105 cases
Undetectable
ALL : 1 case
KF : 6 cases
98 cases
MRI evaluation [6,7]
Group A
Neither injury
Group B
Only ALL injury
Group C
Only KF injury
Group D
Combined injury

MRI evaluation

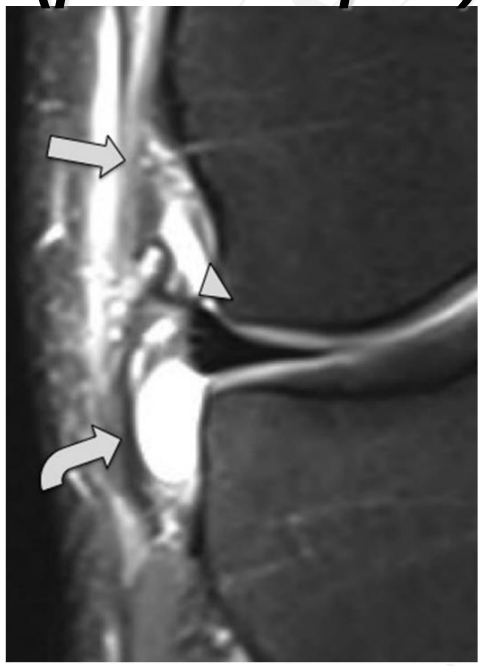
FIFA® MEDICAL CENTRE OF EXCELLENCE

ALL [6]

Intact



Injured (proximal part)

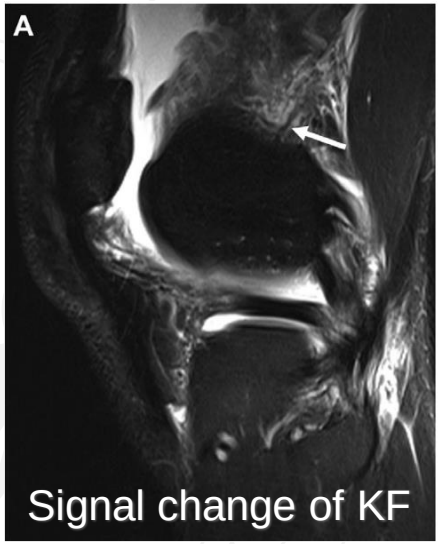


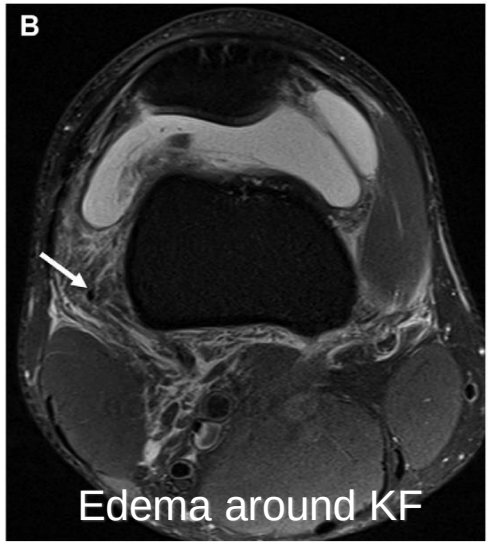
- ✓ Periligamentous edema

or

- ✓ Discontinuity

KF [7]





Direct signs

- ✓ **Discontinuity**
- ✓ **Femoral avulsion**

Indirect signs

- ✓ **Thickening and/ or signal change**
- ✓ **Bone marrow edema at femoral insertion**
- ✓ **Soft tissue edema aroud KF**
- ✓ **Wavy appearance**

1 direct sign or **2 indirect signs**

Demographic Data

FIFA® MEDICAL CENTRE OF EXCELLENCE

	A n=43	B n=32	C n=12	D n=11	P value
Age（years）	21.8* (11-59)	29.1 (12-59)	32.5* (16-52)	26.5 (13-56)	0.019
Sex (M/F)	21/22	16/16	8/4	5/6	0.70
Period from injury to MRI（days）	8.8±10.6	8.8±13.0	6.0±6.7	7.5±18.0	0.78
Period from injury to the surgery（days）	74.2±54.3	82.0±62.2	70.0±32.7	74.9±63.1	0.91
Meniscal injury	18 (41.9%)	20 (62.5%)	6 (50.0%)	6 (54.5%)	0.36
Medial meniscus	9 (20.9%)	14 (43.8%)	3 (25%)	4 (36.3%)	0.18
Lateral meniscus	15 (34.9%)	12 (37.5%)	5 (41.7%)	4 (36.4%)	0.18

Mean ±SD

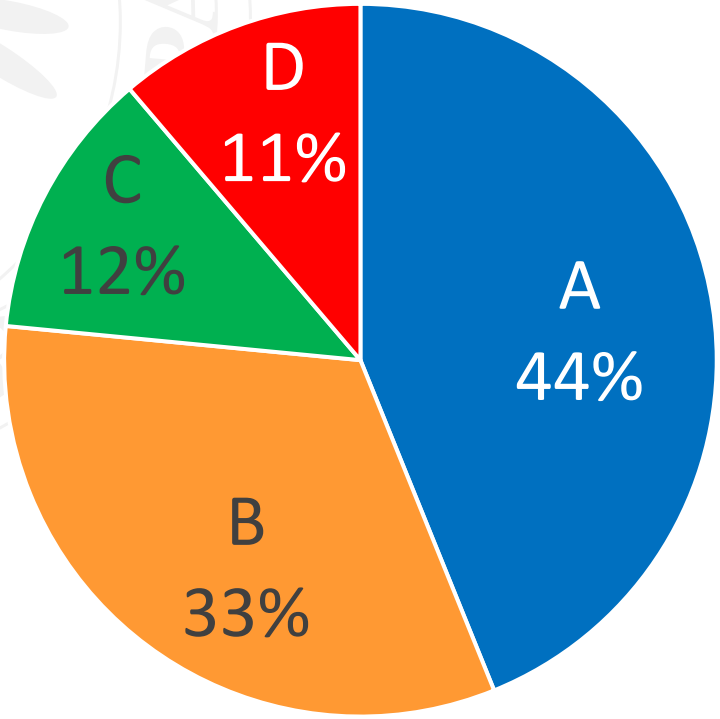
KOBE UNIVERSITY

Results

Group A	Group B	Group C	Group D
Neither injury	Only ALL injury	Only KF injury	Combined injury
43 cases (43.9%)	32 cases (32.7%)	12 cases (12.2%)	11 cases (11.2%)

***ALL* injury**：43 cases（43.9%）

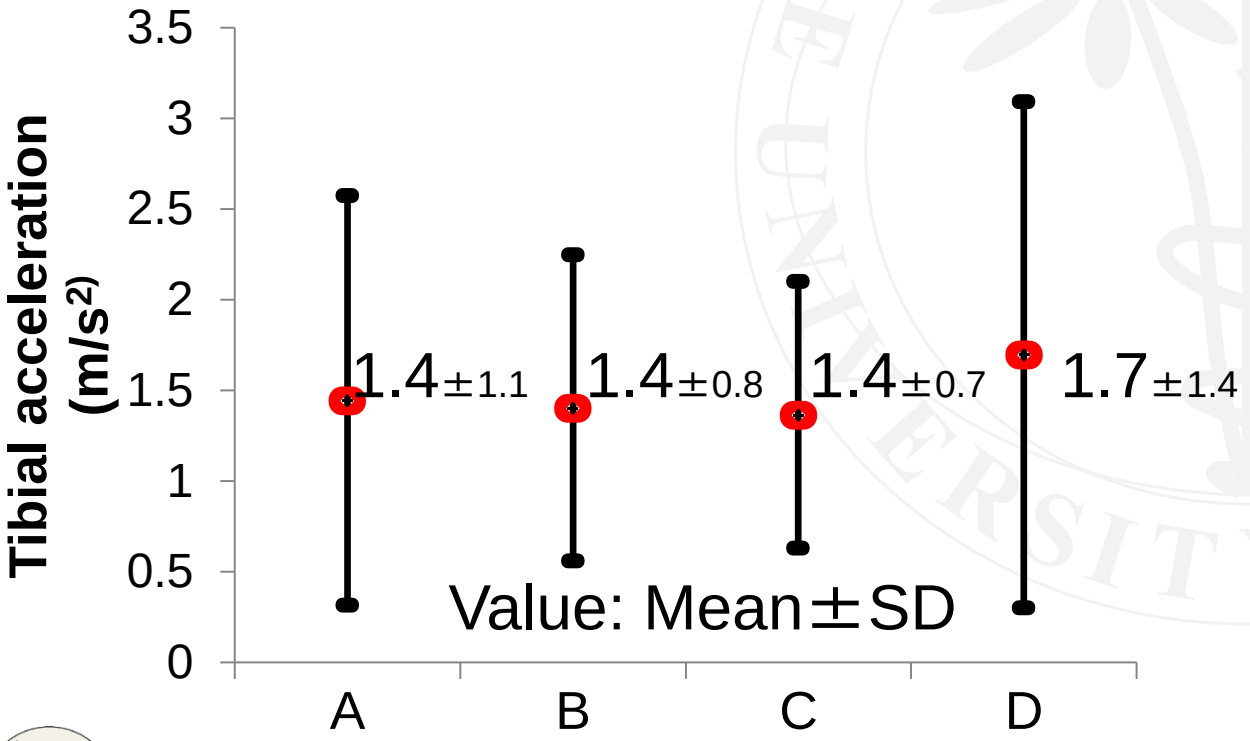
***KF* injury**： 23 cases（23.5%）



Pivot-shift test evaluation

Quantitative evaluation

No significant difference
(P = 0.86, ANOVA)

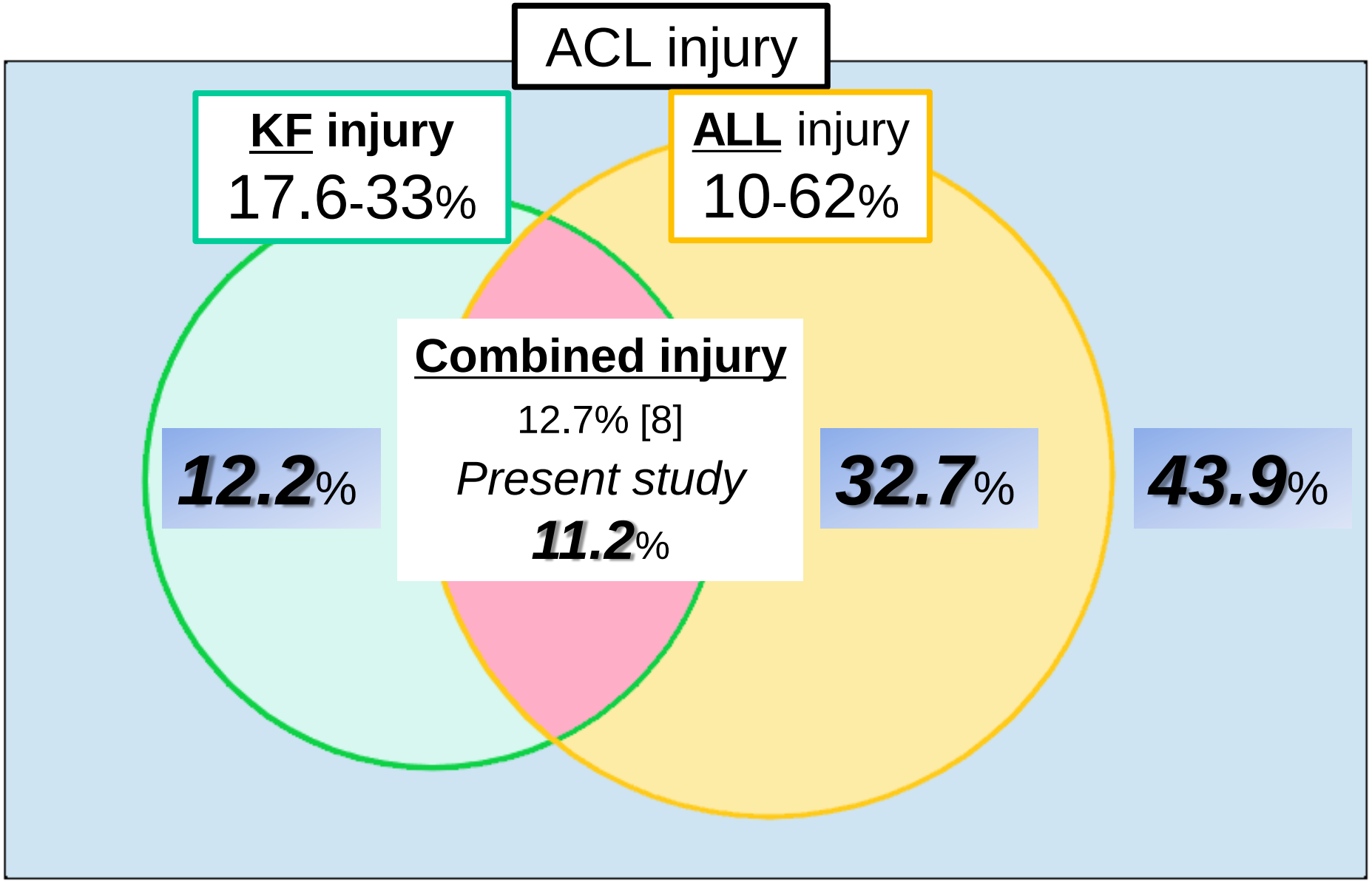


Manual grading

No significant difference
(P=0.25, Pearson's chi-squared test)

		Group A	B	C	D	Total
Pivot-shift test (Grade)	*0*	1	0	0	1	2
	1	31	17	5	4	57
	2	10	14	7	6	37
	3	1	1	0	0	2
Total		43	32	12	11	98

Discussion


ACL injury
KF injury
17.6-33%
ALL injury
10-62%
Combined injury
12.7% [8]
Present study
11.2%
12.2%
32.7%
43.9%

ALL/KF and ALRI

FIFA® MEDICAL CENTRE OF EXCELLENCE

	Not associated	Associated
ALL	➢ *Kittl C. Am J Sports Med 2016* ➢ *Hauser LEN. Arthroscopy 2017* ➢ *Miyaji N. Knee Surg Sports Traumatol Arthrosc 2019* ➢ *Hiroshima Y. Knee Surg Sports Traumatol Arthrosc 2017*	➢ *Rasmussen MT. Am J Sports Med 2016* ➢ *Sonnery-Cottet B. Am J Sports Med 2016* ➢ *Musahl V. Am J Sports Med 2016*
KF	➢ *Devitt BM. AM J Sports Med 2021*	➢ *Musahl V. Am Knee Surg Sports Traumatol Arthrosc 2016* ➢ *Kittl C. Am J Sports Med 2016*

Conclusion

- ✓ More than half of the cases had concomitant injury to either ALL or KF in ACL injury
- ✓ The contribution of ALL and Kaplan fiber injury to anterolateral rotatory instability may be limited in the clinical setting

Reference

[1] Crawford SN, et al. Arthroscopy 2013

[2] Desai N, et al. Knee Surg Sports Traumatol Arthrosc 2011

[3] Vincent JP, et al. Knee Surg Sports Traumatol Arthrosc 2012

[4] Claes S, et al. J Anat 2013

[5] Kittl C, et al. Am J Sports Med 2016

[6] Van Dyck P, et al. Eur Radiol European Radiology. 2016

[7] Batty LM, et al. Am J Sports Med 2020

[8] Runner A, et al. Knee Surg Sports Traumatol Arthrosc 2021