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Superficial and deep medial collateral ligament injuries associated with bone contusion patterns after ACL injury

Seong Man Jeon, M.D, Republic of Korea

Faculty Disclosure Information

- Nothing to disclosure

Introduction and Background

Background

- Undiagnosed meniscus and ligament injury associated with ACL injury results in poor prognosis of ACL reconstruction. Accurate diagnosis and treatment of concomitant injuries is critical for successful ACL reconstruction.

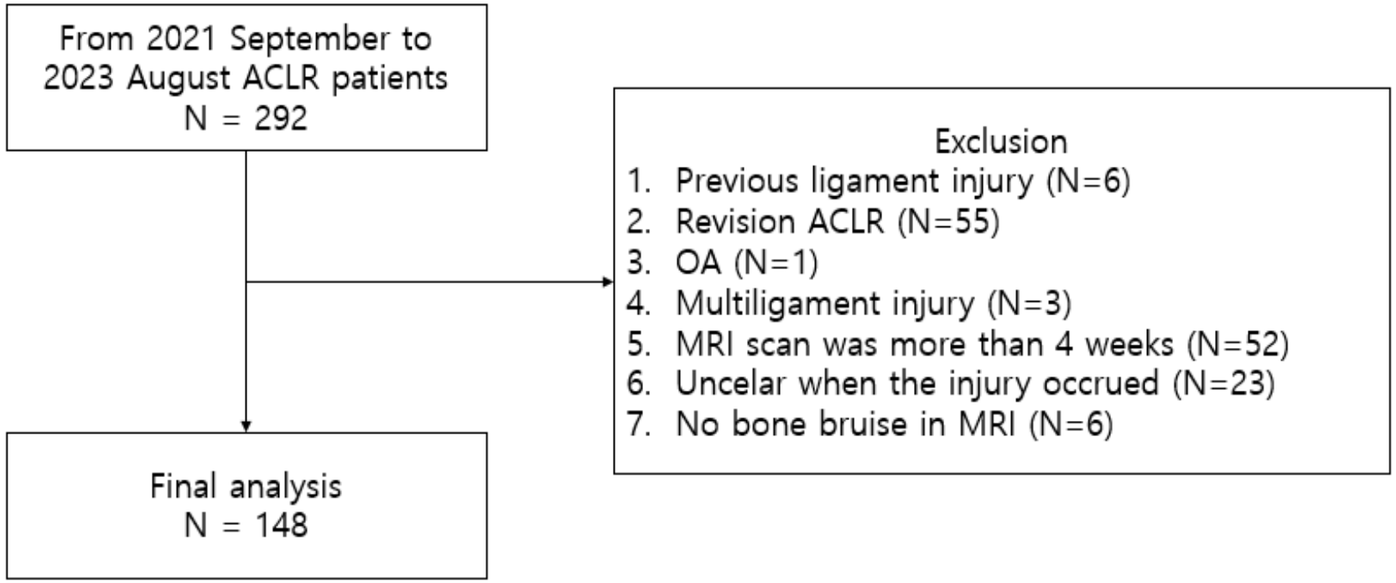
Purpose

- The purpose of this study was to identify correlation between superficial and deep medial collateral ligament injuries and bone contusion patterns which is closely related with ACL injury mechanism.

Method

Patient Selection

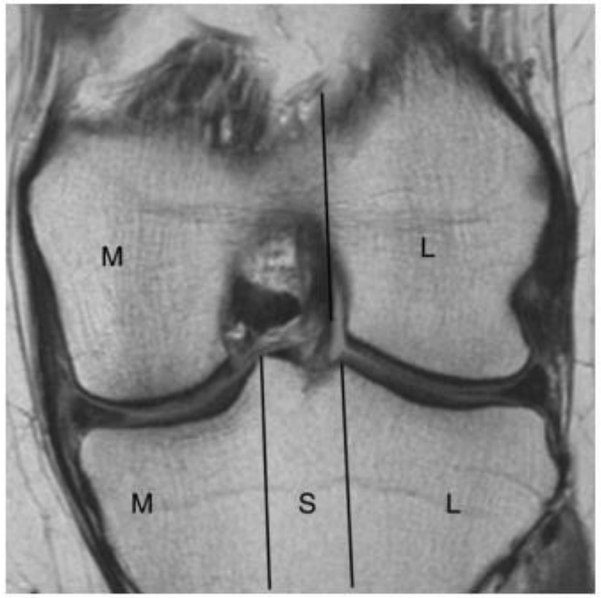
ACLR at SMC from September 2021 to August 2023.



Method

MRI evaluation

- Localizing and quantifying the bone bruise by MOAKS(MRI osteoarthritis knee scrore)



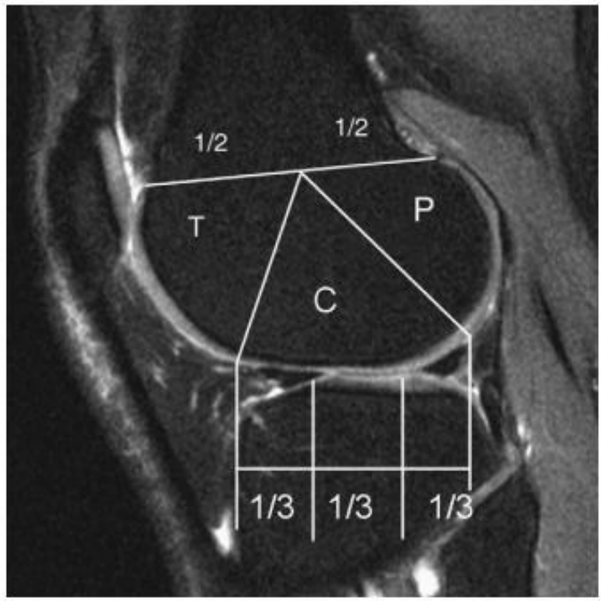


Table I
Scoring system for BMLs

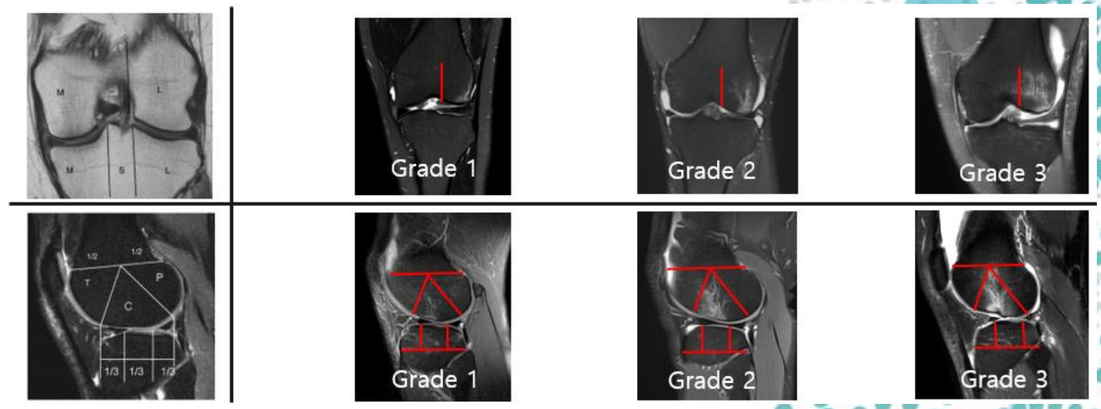
Size of BML (including volume of any associated cysts) by volume	No. of BMLs counted	% of lesion that is BML (vs cyst)
0: none		0: none
1: <33% of subregional volume		1: <33%
2: 33–66% of subregional volume		2: 33–66%
3: >66% of subregional volume		3: >66%

Method

MRI evaluation

- **Bone contusion**
  1. Location: MFC, LFC, MTP, LTP
     - Anterior, Center, Posterior
  2. Size : grade I,II,III
- **Meniscus & ligament injury**
  1. Meniscus tear pattern
  2. Ligament injury
     - None
     - Partial injury
     - Complete injury

MOAKS : MRI osteoarthritis knee score



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Method

Statistical analysis

- **Stepwise forward multiple binary logistic regression analysis between bone contusion pattern and meniscus or ligament injury**

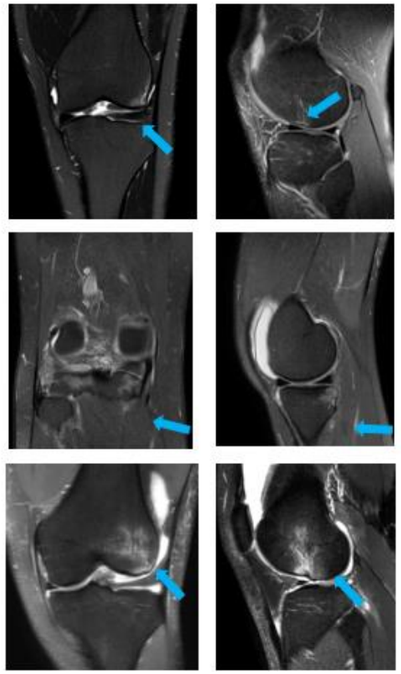
Result

Location

- Lateral compartment bone bruise (LFC or LTP)
- Medial compartment bone bruise (MFC or MTP)

Size

Grade 0
Grade 1
Grade 2
Grade 3



Lateral compartment grade 1, Medial compartment grade 0 (N = 40, 27%)

Lateral compartment grade 1, Medial compartment grade 1 (N = 56, 37.8%)

Lateral compartment grade 2, Medial compartment grade 0 (N = 75, 50.7%)

Result

- According to bone bruise location and size

Minimal bone contusion on lateral compartment (N = 40, 27%)

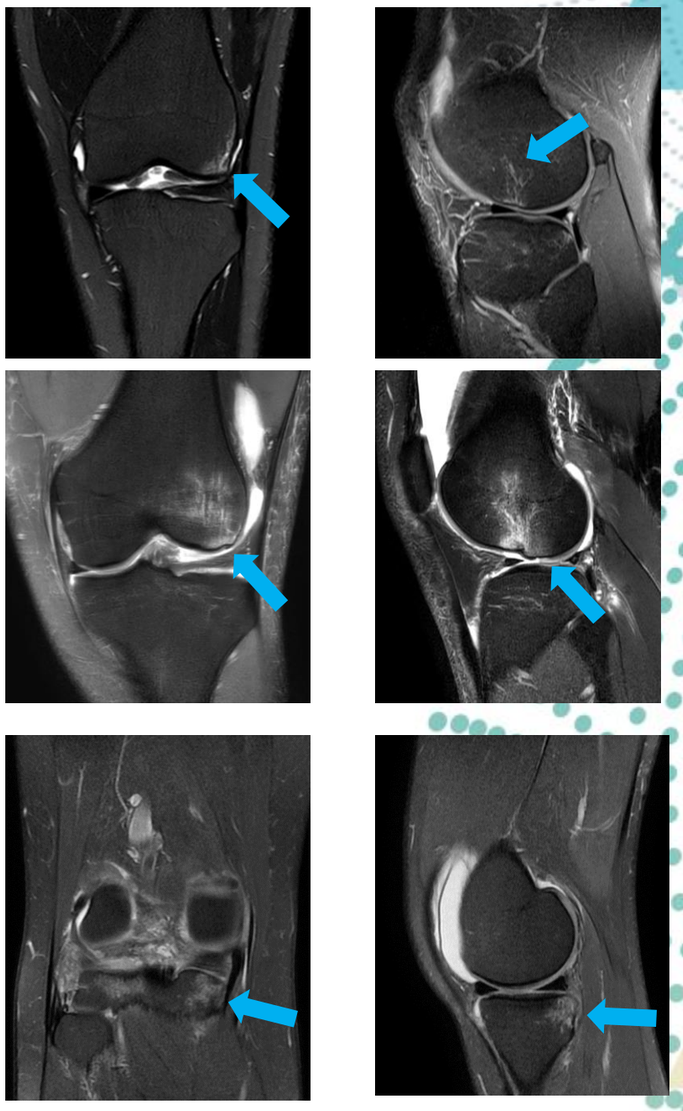
- Small size bone contusion in the lateral compartment

Significant bone contusion on lateral compartment (N = 56, 37.8%)

- Large size bone contusion(MOAKS grade 2 or higher) in the lateral compartment

Bone contusion on both medial and lateral compartment (N = 75, 50.7%)

- Bone contusion in the both medial and lateral compartment



Result

	Minimal bone contusion on the lateral compartment (N = 40)	Significant bone contusion on the lateral compartment (N = 56)	Bone contusion on the both medial and lateral compartment (N = 75)
dMCL			
None	13 (9.5%)	4 (2.9%)	3 (2.2%)
Partial tear	**15 (10.8%)**	9 (6.7%)	7 (5.1%)
Complete tear	**9 (6.6%)**	40 (29.2%)	62 (45.3%)
sMCL			
None	34 (24.8%)	12 (8.8%)	45 (32.8%)
Partial tear	0 (0%)	21 (15.2%)	19 (13.9%)
Complete tear	3 (2.2%)	20 (14.6%)	5 (3.6%)
MPFL			
None	29 (21.2%)	11 (8.0%)	28 (20.4%)
Partial tear	8 (5.8%)	16 (11.7%)	26 (19.0%)
Complete tear	2 (1.5%)	26 (19.0%)	15 (10.9%)
RAMP lesion	6 (4.4%)	16 (11.7%)	30 (21.9%)

Conclusion

- A significant bone contusion in the lateral compartment was associated with sMCL injury, and a bone contusion in the medial compartment was associated with dMCL injury.

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