

Bone Bruise Patterns Associated with Pediatric and Adult ACL Tears are Different

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BACKGROUND

- Anterior cruciate ligament (ACL) tears are common injuries often resulting from non-contact twisting motions. There is limited data regarding the differences in imaging between adult and pediatric patients with ACL tears.

METHODS

- Retrospective chart review of 52 sex-matched adult (≥ 21 years old) and pediatric (≤ 15 years old) surgical patients at UCSF with ACL tears
- Pre-operative x-rays and MRIs evaluated to determine relative incidence of fractures, bone bruising, cartilage injuries, other ligamentous injuries, and meniscal pathology
- The relative incidence of imaging findings between the two groups compared using two proportions z-test

RESULTS

Variable		Pediatric patients	Adult patients	P value
MRI findings				
Bone bruising#	Any	20 (76.9%)	23 (88.5%)	0.269
	Lateral femoral condyle	19 (73.1%)	10 (38.5%)	0.012
	Medial femoral condyle	4 (15.4%)	12 (46.2%)	0.016
	Lateral proximal tibia	18 (69.2%)	16 (61.5%)	0.560
	Medial proximal tibia	1 (3.8%)	9 (34.6%)	0.005
	Fibular head	3 (11.5%)	2 (7.7%)	0.642
	Inferior patellar pole	0	1 (3.8%)	0.316

DISCUSSION

- Higher rates of MFC bone bruising are associated with non-contact injuries
- Better understanding associated injuries may improve diagnostic accuracy and improve operative planning
- Limitations: modest sample size and inability to determine contact vs. non-contact type injuries

For patients with first-time ACL tears...

Lateral bone bruising was more common among pediatric patients. Medial bone bruising was more common among adult patients

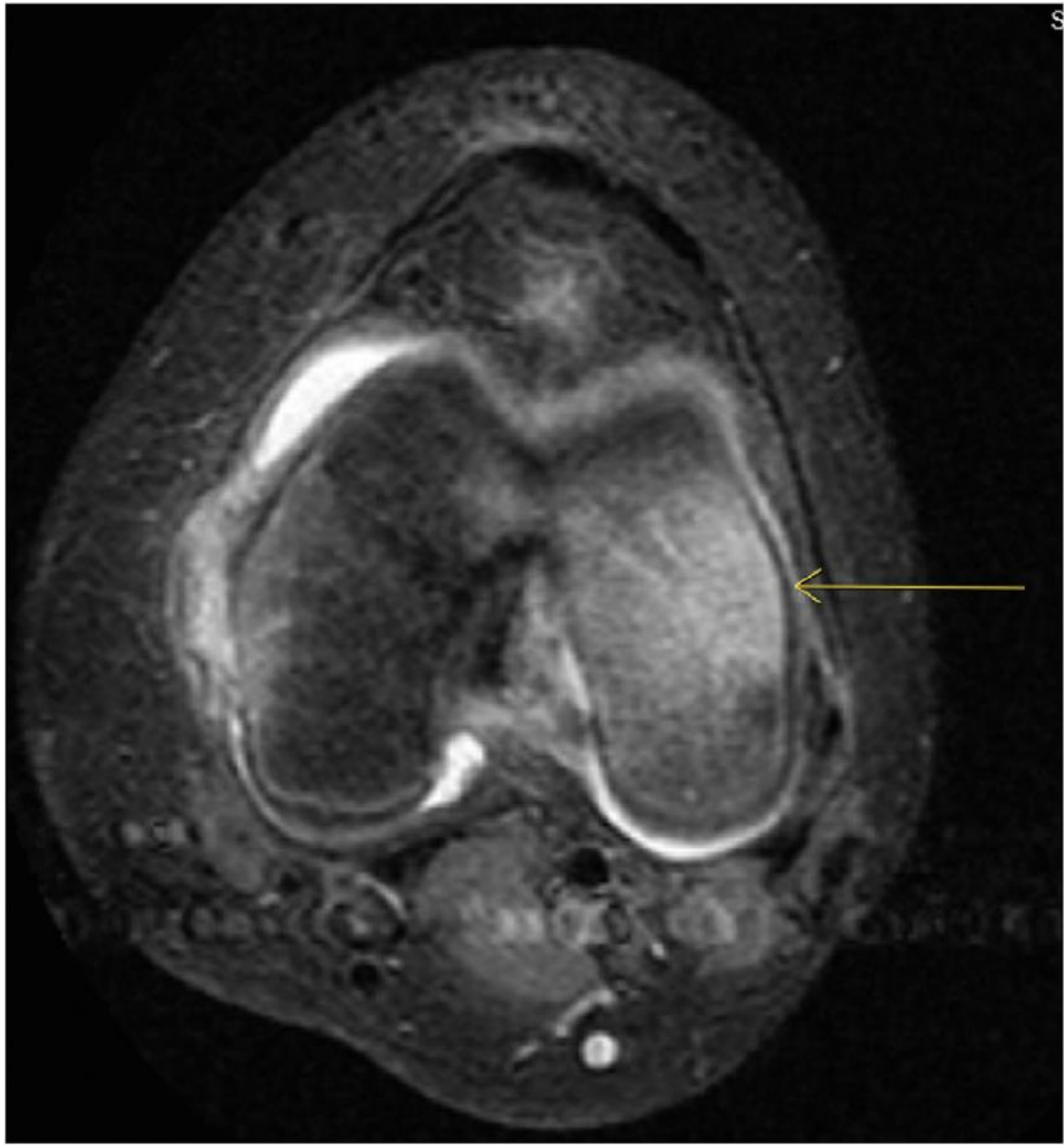


Fig 1. Axial fast spin echo magnetic resonance image of left knee in 10-year-old girl with lateral femoral condylar bone marrow edema (arrow).



Fig 2. Coronal fat-suppressed proton density magnetic resonance image of left knee in 27-year-old man with medial femoral condylar bone marrow edema (arrow).



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Patient Demographics

Variable	Pediatric patients	Adult patients
Sex		
Male	17 (65.4%)	17 (65.4%)
Female	9 (34.6%)	9 (34.6%)
Mean age on date of surgery (SD)	11.8 years (1.8)	34.3 (8.1)
Age range on date of surgery	8-15 years	24-48

Mechanism of Injury

Mechanism of Injury*	Pediatric patients	Adult patients	P value
Skiing	5 (19.2%)	6 (23.1%)	0.731
Soccer	5 (19.2%)	5 (19.2%)	1.000
Other	16 (61.5%)	15 (57.7%)	0.780

*There were no differences in mechanism of injury between the two groups

Other Notable Results

- Adult patients (15.4% vs. 0%) were more likely to have radiographic evidence of popliteal fibular ligament injuries ($p=0.037$)
- Pediatric patients were more likely to have fracture on x-ray (25% vs. 0%) ($p=0.001$)
- No significant differences in rates of meniscal injuries, cartilage injuries, or other ligamentous injuries between the two groups



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