Radiologic Risk Factors for Osteochondral Fractures in First-Time and Recurrent Patellar Instability Patients: A JUPITER Study

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Disclosures

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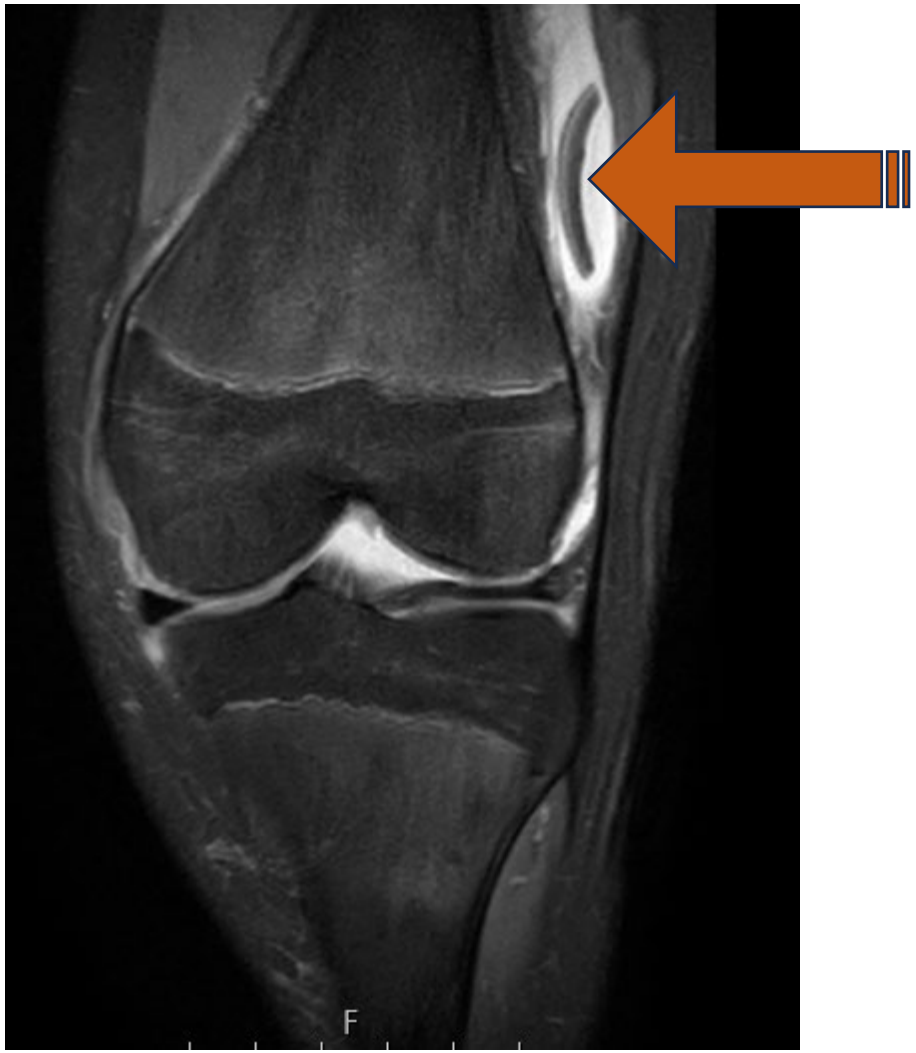
Background

- Risk factors for patellar instability are multifactorial and include:
  - Patella alta
  - Trochlear dysplasia
- Presence of an osteochondral fracture increases injury severity and often necessitates surgical stabilization.[1]



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Purpose

Identify specific radiologic characteristics which relate to increased prevalence of osteochondral fractures associated with patellar instability.

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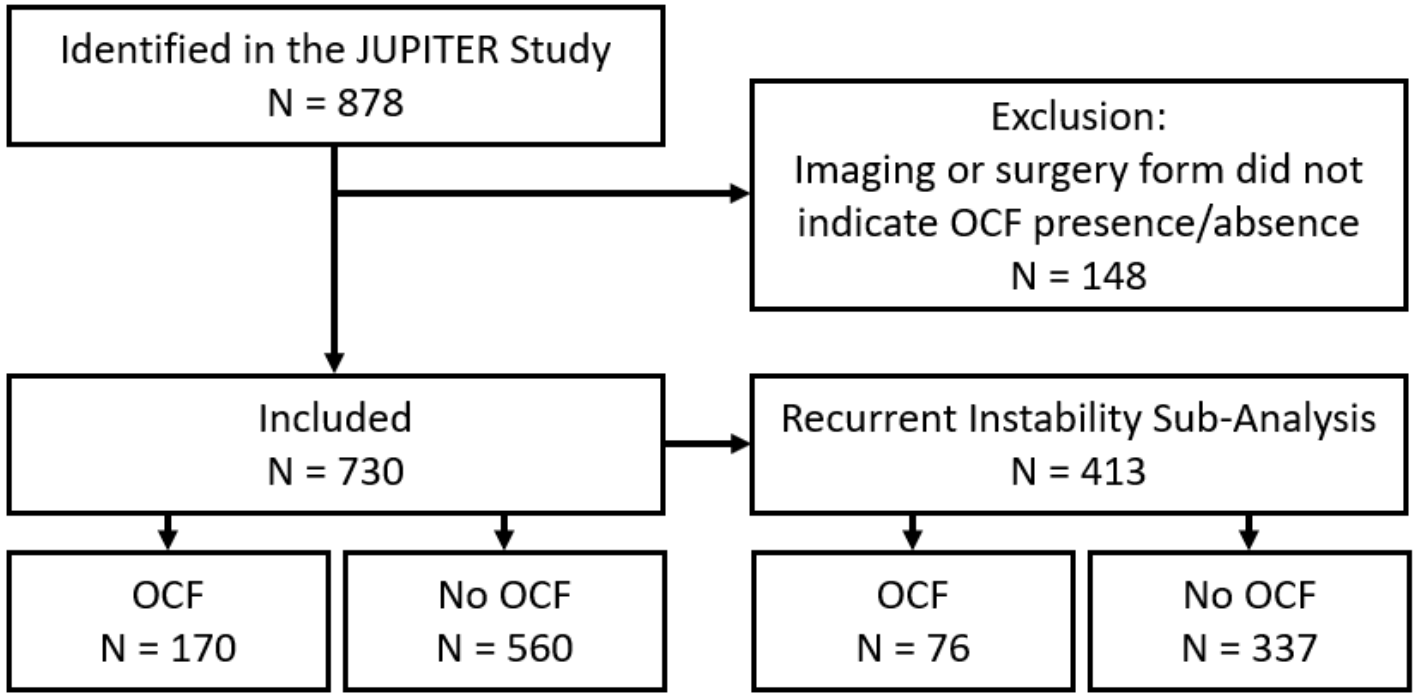
Methods

- Review of the Justifying Patellar Instability Treatment by Results (JUPITER) multi-center study
  - Patellar dislocation or subluxation
  - ≤ 35 years
  - 12/2016 – 12/2021
- Osteochondral fracture (OCF) identified on imaging forms or surgical forms.



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Methods

- Potential radiologic risk factors were classified as At-Risk or Not At-Risk based on pathologic thresholds for general patellar instability.
- Patients were grouped according to presence or absence of an osteochondral fracture.
- Analysis included Mann-Whitney tests, Chi-Square tests, and multivariate regression modeling with a 95% confidence interval.

Radiologic Characteristics	Pathologic Cutoff
Trochlear Crossing Sign	Positive
Caton-Deschamps Index	>1.2
TT-TG Distance	≥ 13 mm
Patellar Tilt	≥ 16 mm
Trochlear Depth	≤ 3 mm
Sulcus Angle	>150 degrees
Trochlear Bump	≥ 3.95 mm
Patellar Subluxation	Positive

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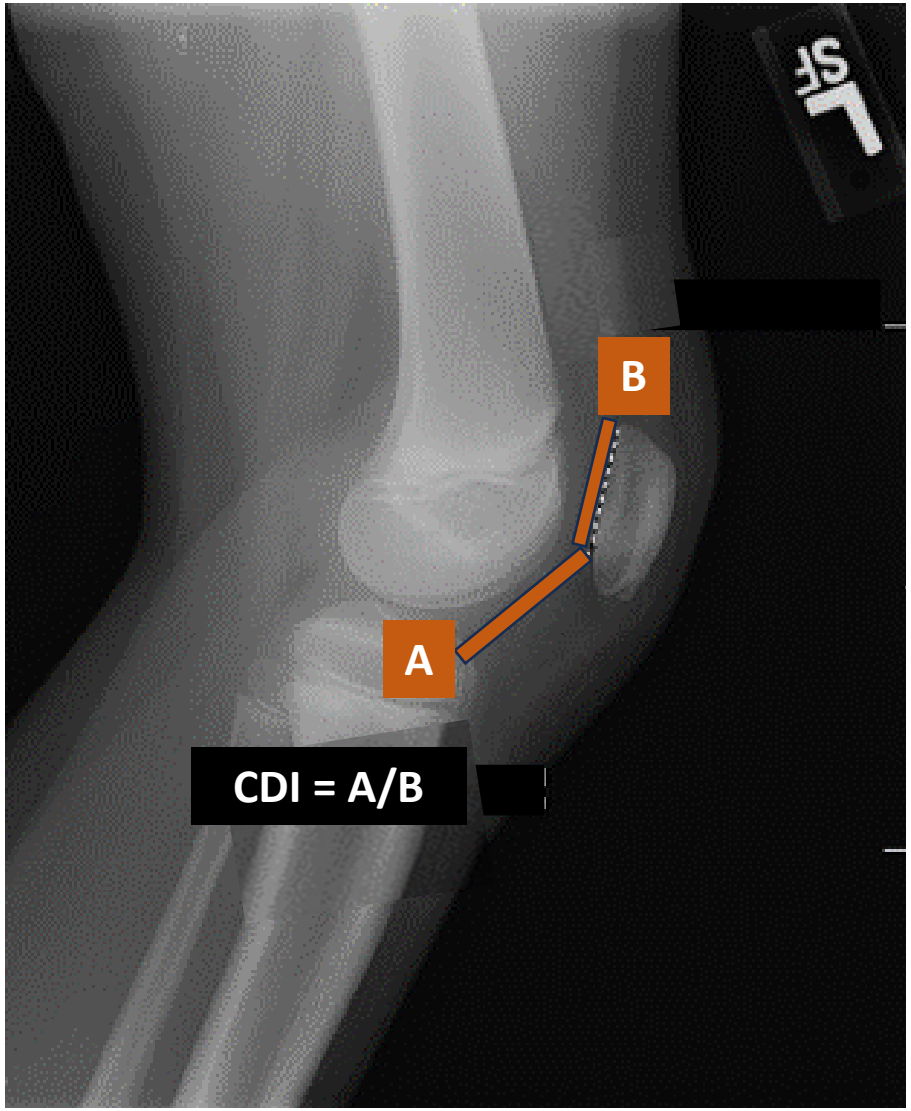
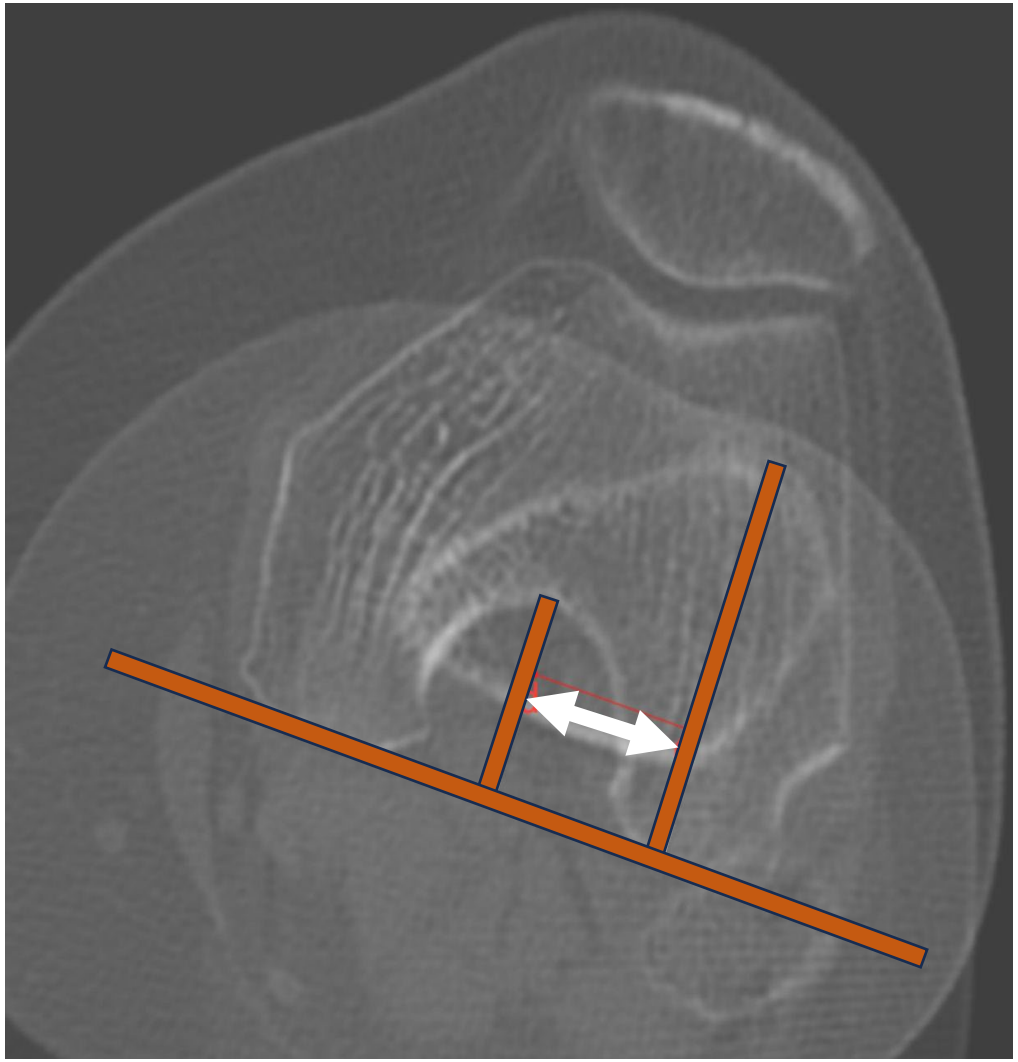
Caton-Deschamps Index (CDI)



Tibial Tubercle-Trochlear Groove (TT-TG) Distance



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Results - Patients

	OCF	No OCF	*p*-value
N	**170 (23.3)**	**560 (76.7)**	
Age (years)	17.3 ± 4.6	16.9 ± 4.4	0.436
Height (cm)	168.2 ± 11.0	166.7 ± 12.1	0.156
Weight (kg)	69.8 ± 17.7	69.0 ± 21.0	0.490
Gender (Female)	86 (58%)	332 (65%)	0.142
First-Time Instability Event (Yes)	74 (49%)	179 (35%)	**0.001***

Recurrent Dislocators	OCF	No OCF
	76 (18%)	337 (82%)

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Multivariate Regression

All Patients

- **Caton-Deschamps Index (>1.2, OR 0.43)**
- **TT-TG Distance (≥13mm, OR 2.17)**
- **First-Time Instability (OR 4.27)**
- *Patellar Subluxation*
- *Trochlear Crossing Sign*
- *Patellar Tilt*
- *Trochlear Depth*
- *Sulcus Angle*
- *Trochlear Bump*

Recurrent Instability

- **Caton-Deschamps Index (>1.2, OR 0.32)**
- **TT-TG Distance (≥13mm, OR 2.26)**
- *Patellar Subluxation*
- *Trochlear Crossing Sign*
- *Patellar Tilt*
- *Trochlear Depth*
- *Sulcus Angle*
- *Trochlear Bump*

Bold included in final model.

Italicized included in initial model.

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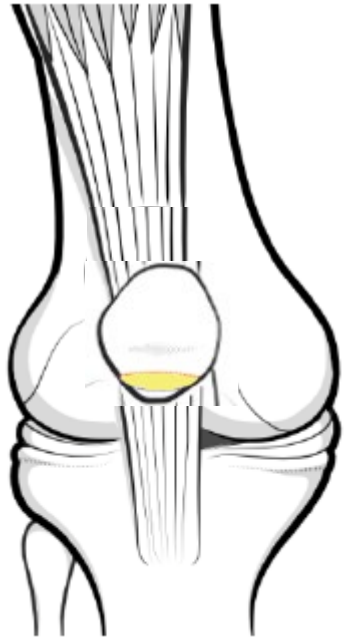
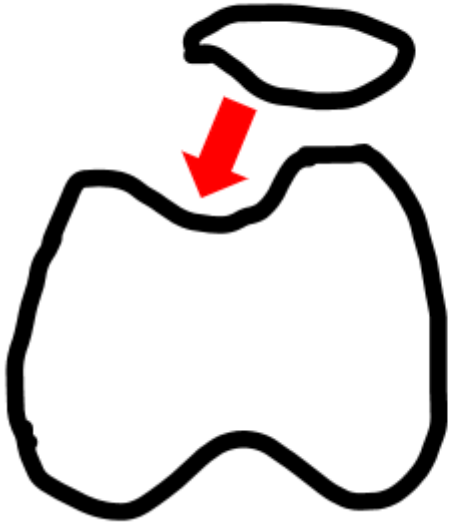
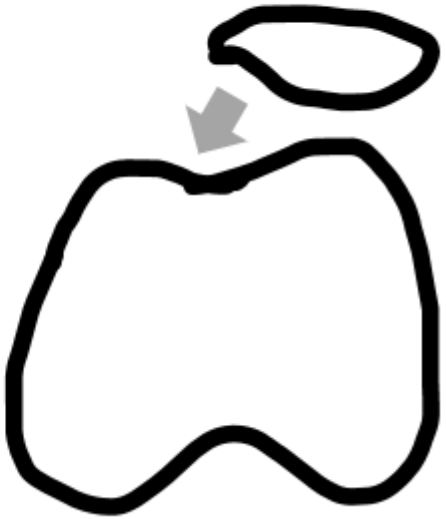
Patella Alta

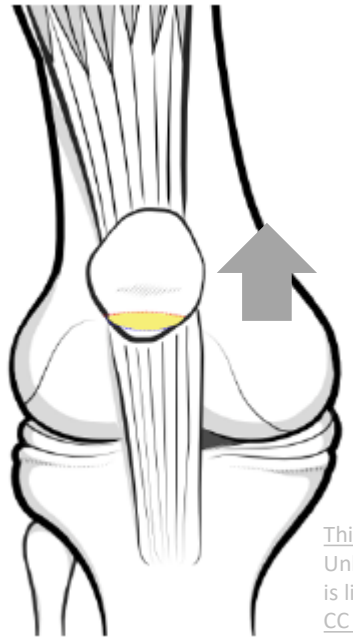
Caton-Deschamps Index > 1.2

- ↓0.43 times decrease of OCF risk in all patients
- ↓0.32 times decrease of OCF risk in recurrent patients









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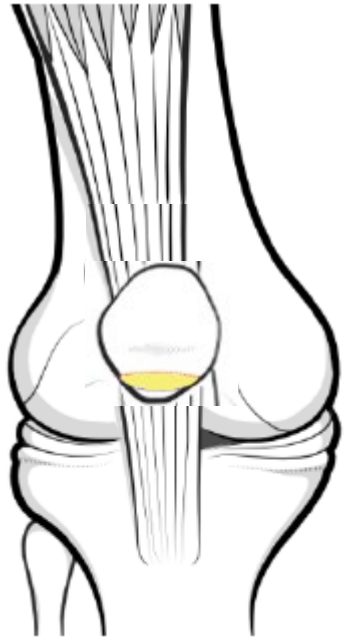
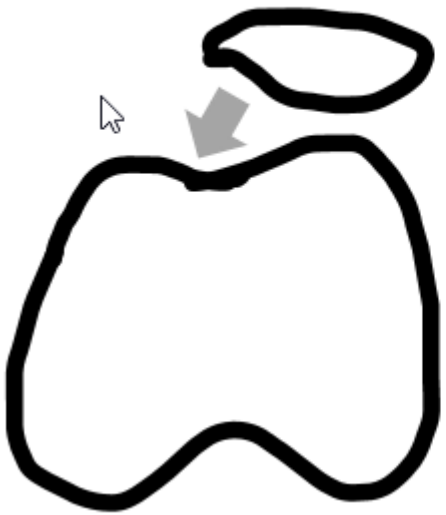
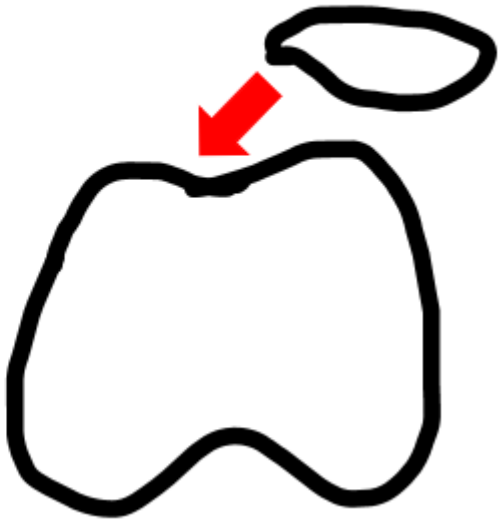
Tibial Tubercle Lateralization

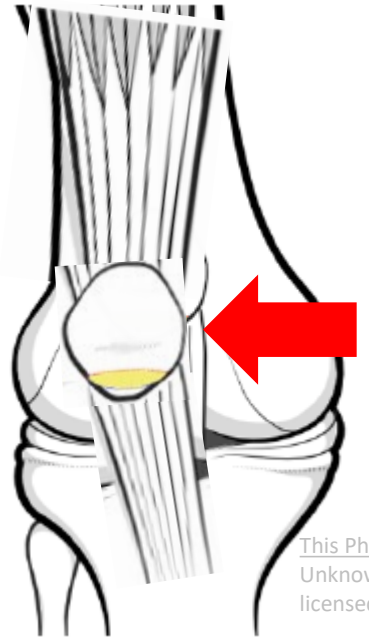
TT-TG Distance ≥ 13 mm

- ↑2.17 times increase of OCF risk in all patients
- ↑2.26 times increase of OCF risk in recurrent patients









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Conclusions

- Nearly 25% of those with patellar instability may have an OCF.
- In those with recurrent instability, risk of future OCF without surgical stabilization is ~20%.
- Patella Alta (CDI >1.2) is protective of OCFs.
- Tibial Tubercle Lateralization (TT-TG ≥ 13mm) is a risk factor for OCFs.
- First-time instability event is a risk factor for OCFs.

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References

1. *Khan, Shehzaad A. MB ChB (Hons), MRCS, FRCS (Tr & Orth); Baghdadi, Soroush MD; Carey, James L. MD, MPH; Moores, Thomas S. BSc (Hons), MB ChB, MRCS, MMed Sci, FRCS (Tr & Orth); Sheth, Neil P. MD; Ganley, Theodore MD. Osteochondral Fractures After Patellar Dislocation: Current Concepts. JAAOS: Global Research and Reviews 5(12):e21.00155, December 2021.*

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