



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8-11

Risk Factors for Patellofemoral Cartilage Lesions in Patients with Trochlear Dysplasia in the Setting of Patellar Instability

Dr. Jakob Ackermann and Berfin Caliskan*
Balgrist, Switzerland

*shared first authorship



Faculty Disclosure Information

- Nothing to disclosure



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8-11



Introduction

- Trochlear dysplasia is a known risk factor for patellar instability ^{1,2}
- Associated with patellofemoral cartilage damage, and ultimately osteoarthritis ^{3,4}
- Patients with high-grade trochlear dysplasia show other pathological patellofemoral anatomical parameters.
- There is paucity in the literature regarding risk factors for patellofemoral cartilage lesions in patients with trochlear dysplasia in the setting of patellar instability.
- Purpose was to identify risk factors in this patient cohort to guide surgical decision-making when surgical correction is indicated.



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8-11

Material and Methods

- 363 knees with trochlear dysplasia, scheduled to undergo surgery for the treatment of patellar instability at a single institution.
- All patients presented with a true lateral radiograph and preoperative MRI.
- Assessed patellofemoral parameters:
 - I. Patella morphology (Wiberg type, patella width, thickness, angle), patella height and axial positioning (Caton-Deschamps index, patellotrochlea index (PTI), patella tilt, Merchant's congruence angle)
 - II. Trochlea morphology (Dejour type, trochlea sulcus angle and depth, supratrochlear spur height)
 - III. Quadriceps vector (TTTG, tibial-tubercle-posterior cruciate ligament distance (TTPCL), sagittal TTTG)
 - IV. Femorotibial rotation
 - V. Full-thickness cartilage lesions in the patellofemoral joint



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8-11

Results

Of 363 knees

- 91 (25.1%) showed full-thickness cartilage defects on the patella
- 21 (5.8%) had trochlea cartilage damage
- Wiberg type 1 had more often patella defects than other types of patella morphology (39.6% vs. 24.3% vs. 17.2%, $p=0.023$)
- Even more pronounced in patients with high-grade trochlear dysplasia (44.2% vs. 25.6% vs. 17.0%, $p=0.011$)
- Trochlear cartilage lesions did not show any association with patella morphology (n.s.).
- Recurrent patella dislocations were not associated with the incidence of patellofemoral defects (n.s.)

Patient characteristics

	n=363
Age, y, mean \pm SD	22.5 \pm 7.9
BMI, mean \pm SD	24.9 \pm 5.4
Female Sex, n (%)	238 (65.6)
Dejour type, n (%)	
<i>A</i>	62 (17.1)
<i>B</i>	122 (33.6)
<i>C</i>	94 (25.9)
<i>D</i>	85 (23.4)
Wiberg type, n (%)	
<i>I</i>	74 (20.4)
<i>II</i>	229 (63.1)
<i>III</i>	60 (16.5)
Full-thickness cartilage defect patellar, n (%)	91 (25.1)
<i>Medial</i>	26
<i>Central</i>	64
<i>Lateral</i>	38
Full-thickness cartilage defect trochlear, n (%)	21 (5.8)
<i>Medial</i>	3
<i>Central</i>	3
<i>Lateral</i>	18
Dislocation, n (%)	330 (90.9)
Number of dislocations, n (%)	
<i>1</i>	49 (14.9)
<i>2</i>	38 (11.6)
<i>>2</i>	241 (73.5)



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8–11

Results – Dejour Classification

Prevalence of cartilage defects based on Dejour type

Full-thickness Cartilage Defect	Dejour type				p-Value
	A N=62	B N=122	C N=94	D N=85	
Patellar, n (%)	10 (16.1)	35 (28.7)	19 (20.2)	27 (29.7)	0.082
Trochlear, n (%)	0 (0)	8 (6.6)	2 (2.1)	11 (12.9)	0.003

Patients with trochlear dysplasia type B and D showed the highest prevalence of patellofemoral cartilage among all patients (patella defect: A: 16.1%, B: 28.7%, C: 20.2% and D: 29.7%, $p=0.082$; trochlear defect: A: 0%, B: 6.6%, C: 2.1% and D: 12.9%, $p=0.003$)



Results

Comparison of patellofemoral parameters between knees with and without cartilage defects on the patellar and trochlear

	Patellar			Trochlear		
	Yes (n=91)	No (n=272)	p-Value	Yes (n=21)	No (n=342)	p-Value
Age, y	25.8 ± 8.8	21.4 ± 7.3	<0.001	27.6 ± 9.4	22.2 ± 7.7	0.008
BMI	26.3 ± 5.9	24.4 ± 5.2	0.007	25.4 ± 4.6	24.9 ± 5.5	0.377
Patellar width, mm	40.4 ± 4.4	38.9 ± 3.6	0.003	40.7 ± 3.9	39.2 ± 3.9	0.073
Patellar thickness, mm	17.5 ± 2.6	17.4 ± 2.3	0.857	17.5 ± 2.6	17.4 ± 2.4	0.942
Patellar angle, °	128.0 ± 14.7	123.3 ± 11.8	0.004	134.6 ± 14.7	123.9 ± 12.3	0.002
Patellar tilt, °	27.3 ± 11.6	26.1 ± 10.7	0.335	35.3 ± 9.7	25.9 ± 10.8	<0.001
Caton-Deschamps Index	1.2 ± 0.2	1.2 ± 0.2	0.648	1.2 ± 0.2	1.2 ± 0.3	0.569
Patellotrochlea Index, %	43.6 ± 15.6	39.6 ± 15.1	0.023	44.1 ± 15.1	40.4 ± 15.3	0.214
Trochlear sulcus angle, °	161.0 ± 8.6	161.3 ± 6.9	0.718	161.8 ± 10.1	161.2 ± 7.2	0.352
Trochlear sulcus depth, mm	2.1 ± 0.8	2.0 ± 0.9	0.445	1.9 ± 1.0	2.0 ± 0.9	0.297
Supratrochlear spur height, mm	5.6 ± 1.8	4.9 ± 1.5	0.001	6.1 ± 1.8	5.0 ± 1.5	0.015
Merchant's congruence angle, °	46.5 ± 28.8	36.5 ± 27.3	0.004	59.6 ± 23.8	37.7 ± 27.7	<0.001
TT-TG, mm	14.8 ± 4.9	14.1 ± 5.0	0.171	16.9 ± 4.7	14.1 ± 5.0	0.013
TT-PCL, mm	19.8 ± 4.4	19.6 ± 3.6	0.643	18.8 ± 3.6	19.6 ± 3.8	0.286
Sagittal TT-TG, mm	9.2 ± 5.7	8.8 ± 5.5	0.584	11.4 ± 4.0	8.7 ± 5.6	0.009
Femorotibial rotation, °	5.1 ± 7.3	4.3 ± 7.6	0.377	9.3 ± 7.2	4.2 ± 7.5	0.002

Bolded values indicate statistically significant associations at $p < .05$



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8-11

Results

Odds ratios for patellar and trochlear cartilage lesions based on literature thresholds

	Patellar Cartilage Defect			Trochlear Cartilage Defect		
	OR	95% CI	p-Value	OR	95% CI	p-Value
Patellar angle $\geq 125^\circ$	1.5	0.9 – 2.4	0.096	2.3	0.9 – 5.9	0.075
Patellotrochlear Index ≥ 0.28	0.6	0.3 – 1.1	0.098	4.6	1.3 – 15.8	0.016
Supratrochlear spur height ≥ 5 mm	1.6	1.0 – 2.7	0.048	1.7	0.6 – 4.5	0.308
Merchant's congruence angle $\geq 40^\circ$	1.8	1.1 – 2.9	0.020	5.6	1.8 – 16.9	0.002
TT-TG ≥ 15 mm				3.0	1.2 – 7.6	0.021
Sagittal TT-TG ≥ 9 mm				4.2	1.5 – 11.9	0.006
Femorotibial rotation $\geq 5.9^\circ$				4.5	1.6 – 12.4	0.004

Bolded values indicate statistically significant associations at $p < .05$



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8–11

Conclusion

- Only a minority of patients with trochlear dysplasia, particularly with Dejour type B and D, present with full-thickness patellofemoral cartilage lesions whereby most occur on the patella.
- Both patellar and trochlear defects are associated with patella and trochlear morphology, and patella positioning.
- Trochlear lesions seem to be affected by the coronal and sagittal quadriceps vector as well as femorotibial rotation.



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8-11

References

- 1 Dejour D *Méd Hyg* ; 56 : 1466-1471. 1998.
- 2 Steensen RN. *Am J Sports Med.* 2015;43(4):921-927.
- 3 Mehl J, *Knee Surg Sports Traumatol Arthrosc.* 2016;24(3):838-846.
- 4 Ambra LF, *Am J Sports Med.* 2019;47(10):2444-2453.



ISAKOS
CONGRESS
2025



MUNICH
GERMANY
June 8–11