

Demographic and Clinical characteristics of patellar instability patients from prospective JUPITER (Justifying Patellar Instability Treatment by Early Results) cohort.

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INTRODUCTION: The purpose of this study is to provide an objective analysis of patient demographics and clinical features for the young patients with patellar instability. **JUPITER (Justifying Patellar Instability Treatment by Early Results)** is a hypothesis-driven, multi-center, multi-armed, prospective cohort study developed to better describe demographic and clinical characteristics and predictors of clinical outcomes in the young patellar instability population.

METHODS: 21 surgeons from 12 institutions enrolled patients between 10-30 years of age who presented with at least one documented patellar dislocation episode. Radiographs and MRI were evaluated for all patients at baseline to confirm patellar dislocation and skeletal maturity status. Patient demographics, dislocation history, physical exam characteristics and baseline validated patient reported outcome (PRO) scores were collected and analyzed. Conservative versus operative treatment was based on treating physician's preference following standard of care guidelines. The cohort was divided between first-time vs recurrent dislocators and between conservative vs operative treatment.

RESULTS: By end of enrollment in December 2021, a total of 2,105 knees with patellar instability were enrolled. The mean age of the cohort was 19.1 years, 61.8% were female. 609 were skeletally immature. 57% of knees reported that they had more than 1 dislocation. 70% knees were enrolled in the operative group and 30% in the conservative group. For patients with recurrent dislocation, 84.5% were treated operatively and 15.5% were treated conservative ($p < 0.001$). Operative treatment was indicated in 33.1% of first-time dislocators; 38.6% were due to presence of an osteochondral fracture. The recurrent and operative group patients were noted to have a higher percent of positive physical exam findings than first-time and conservative group patients on the affected knee (J-sign [$p < 0.001$], apprehension [$p < 0.001$], crepitus [$p = 0.006$]) and the contralateral knee. The recurrent group was nearly twice as likely to be ligamentously lax (Beighton score of 5 or greater) compared to first-time dislocators ($p = 0.08$). Baseline PROs varied with the recurrent group having lower Pedi-FABS ($p < 0.001$) scores and higher Kujala (0.034), KOOS ADL (< 0.001), KOOS Sports (< 0.001), KOOS Pain (0.006), KOOS Symptoms (0.015) and Pedi-IKDC (0.002) scores than the first-time dislocator group.

DISCUSSION AND CONCLUSION: Based on large prospective cohort of JUPITER group, operative management was indicated in 33.1% of first-time dislocators and 84.5% of recurrent dislocators. Besides osteochondral fracture, recognition of risk factors (young age, contralateral dislocation, anatomic risk factors) may account for higher rates of operative treatment after first-time dislocation. Recurrent dislocators were more likely to have positive physical exam findings on both knees and lower activity scores. However, the knee specific outcome scores were higher in patients with recurrent dislocations which may reflect adaptive mechanisms to improve function. This prospective study provides insights related to demographic information, clinical presentation and baselines PROs of patients with patellar instability. These baseline characteristics would help to identify the at-risk population and compare outcomes in a longitudinal fashion.

Exam test and knee tested	Recurrent Dislocators		P-value	Non-op Group		P-value
	%	%		%	%	
J-sign affected knee						
None	36%	60%	<0.001	62%	38%	<0.001
Mild=Slides out	43%	36%		32%	44%	
Severe=Jumps out	21%	4%		6%	18%	
J-sign contralateral knee						
None	51%	68%	<0.001	67%	55%	<0.001
Mild=Slides out	38%	29%		27%	37%	
Severe=jumps out	11%	3%		6%	8%	
Apprehension test affected knee						
Neg	19%	26%	<0.001	31%	18%	<0.001
Pos	81%	74%		69%	82%	
Apprehension test contralateral knee						
Neg	62%	80%	<0.001	74%	67%	0.023
Pos	38%	20%		26%	33%	
Patellofemoral crepitus affected knee						
No	79%	89%	<0.001	92%	80%	<0.001
Yes	17%	8%		8%	16%	
Yes with pain	4%	3%		1%	5%	
Patellofemoral crepitus contralateral knee						
No	90%	95%	0.007	94%	92%	0.536
Yes	9%	5%		6%	8%	
Yes with pain	1%	0%		0%	1%	

PROM	Recurrent Dislocators		First Time Dislocators		P-value	Non-Op Group		Op Group		P-value
	Mean	SD	Mean	SD		Mean	SD	Mean	SD	
BANNF-BPII 2.0	43.1	19.1	44.2	20.3	0.947	48.7	23.2	41.1	17.6	<0.001
HSS Pedi-FABS	12.0	10.2	15.6	10.4	<0.001	16.2	10.3	12.7	10.3	<0.001
KOOS Jr	67.9	17.6	62.8	17.8	<0.001	67.3	18.4	65.7	18.5	0.14
KOOS Daily Living	77.9	21.2	70.6	22.6	<0.001	76.6	21.9	74.7	22.6	0.23
KOOS Pain	71.0	21.2	65.4	21.9	0.003	71.5	21.7	68.5	21.9	0.108
KOOS Quality of Life	35.3	23.0	37.7	23.9	0.304	44.6	25.4	33.1	22.5	<0.001
KOOS Sports / Rec	35.3	23.0	34.6	32.9	<.001	44.4	34.5	42.0	31.3	0.646
KOOS Symptoms	66.7	18.9	62.3	20.2	0.010	67.6	19.2	64.8	19.5	0.11
Kujala	54.3	24.5	61.4	21.2	0.018	62.4	23.8	57.7	22.2	0.085
Pedi-IKDC	48.2	22.1	54.5	20.2	<0.001	55.9	22.7	51.5	20.5	0.057