

Chondrolabral Junction Breakdown Predicts Inferior Functional Outcomes at Minimum Two Years after Hip Arthroscopy for Symptomatic Acetabular Labral Tears

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DISCLOSURES: None

INTRODUCTION: Despite focus on surgical preservation of the chondrolabral junction (CLJ), the transition zone between the acetabular cartilage and labrum, the association between severity of CLJ breakdown and functional outcomes following hip arthroscopy remains unexplored. The purpose of the present study was to assess the influence of CLJ breakdown on patient-reported outcome measures (PROMs) at 24-month follow-up after hip arthroscopy for symptomatic labral tears.

METHODS: A retrospective review of prospectively-collected data identified patients ≥ 18 years with minimum 24-month follow-up who underwent hip arthroscopy by a single surgeon for treatment of symptomatic labral tears secondary to femoroacetabular impingement (FAI). The Beck classification of transition zone cartilage was used to grade CLJ damage; patients with grades 0-2 were stratified into the “mild CLJ damage” cohort, and those with grades 3-4 were stratified into the “severe CLJ damage” cohort. PROMs were collected at baseline and at 3, 6, 12, and 24 months postoperatively. Linear mixed effects models were used to compare PROMs. Rates of achieving clinically meaningful thresholds and subsequent surgery rates were also compared.

RESULTS: Overall, 198 patients met inclusion criteria, with average follow-up of 3.55 years. 95 patients with severe CLJ damage (34.9 ± 10.5 years) were compared to 103 patients with mild CLJ damage (38.2 ± 11.9 years). Hip Outcome Score-Activities of Daily Living (HOS-ADL), Non-Arthritic Hip Score (NAHS), and visual analog score (VAS) for pain were inferior in the severe CLJ group at enrollment and all time points ($P \leq 0.05$). However, patients with severe CLJ breakdown exhibited greater improvements in HOS-ADL and NAHS at 24-month follow-up, and achieved clinically meaningful thresholds at equivalent rates to patients with mild CLJ breakdown. Subsequent surgery rates were 6.8% and 12.6% in patients with mild versus severe CLJ damage, respectively ($P > 0.05$).

DISCUSSION: Severe CLJ breakdown is associated with increased pain and decreased functional level preoperatively and up to 24 months after hip arthroscopy. Despite this, patients with severe CLJ breakdown experienced greater improvements in functional outcomes at 24-month follow-up and achieved clinical thresholds at similar rates to patients with mild CLJ damage.

SIGNIFICANCE/CLINICAL RELEVANCE: While worse baseline pain and functional levels may indicate severe CLJ breakdown, the present study suggests that these patients still benefit substantially from hip arthroscopy.



Figure 1. Various degrees of chondrolabral junction damage on arthroscopic assessment, per the Beck classification of transition zone cartilage.

(Top-left) Stage 1 (Malacia): depicts roughening of the surface and fibrillation.

(Top-right) Stage 2 (Debonding): depicts a classic wave sign.

(Bottom-left) Stage 3 (Cleavage): depicts loss of fixation to subchondral bone with a chondral flap.

(Bottom-right) Stage 4 (Defect): Large, full thickness chondral defect of the acetabulum extending through the chondrolabral junction.

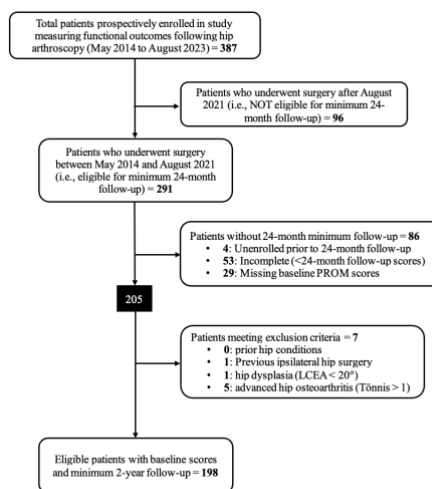


Figure 2. Flowchart detailing patient selection criteria.

Abbreviations: PROM, patient reported outcome measure; LCEA, lateral center edge angle.

Table 1. Mean PROM/Pain Scores and Interval Improvements at Baseline Through 24-Month Follow-Up*

Characteristic	Mild CLJ damage (n=103)		Severe CLJ damage (n=95)		Significance	
	Mean	Improvement ^b	Mean	Improvement ^b	P _{mean}	P _{improvement}
Preoperative						
iHOT-33	61.0 (52.4 to 69.6)	-	57.3 (49.1 to 65.6)	-	0.160	-
HOS-ADL	84.5 (78.6 to 90.4)	-	79.2 (73.5 to 84.8)	-	0.003^c	-
HOS-SSS	56.9 (46.1 to 67.7)	-	51.4 (41.1 to 61.8)	-	0.095	-
mHHS	78.2 (72.2 to 84.2)	-	75.1 (69.3 to 80.8)	-	0.086	-
NAHS	79.7 (73.9 to 85.5)	-	74.8 (69.2 to 80.4)	-	0.006^c	-
VAS pain	2.6 (1.8 to 3.5)	-	3.2 (2.4 to 4.1)	-	0.031^c	-
3 Months						
iHOT-33	62.7 (54.1 to 71.3)	15.5 (3.8 to 27.2)	59.1 (50.9 to 67.4)	18.9 (7.8 to 30.1)	0.160	0.312
HOS-ADL	85.4 (79.5 to 91.2)	5.7 (-3.9 to 15.4)	80.2 (74.6 to 85.8)	12.5 (3.3 to 21.7)	0.003^c	0.015^c
HOS-SSS	59.0 (48.3 to 69.8)	2.1 (-12.2 to 16.4)	53.7 (43.4 to 64.0)	8.6 (-5.1 to 22.3)	0.097	0.127
mHHS	79.1 (73.2 to 85.1)	13.8 (5.3 to 22.3)	76.1 (70.3 to 81.9)	17.3 (9.2 to 25.3)	0.066	0.160
NAHS	80.8 (74.9 to 86.6)	9.2 (-0.2 to 18.6)	76.0 (70.5 to 81.6)	15.0 (6.0 to 24.0)	0.006^c	0.033^c
VAS pain	2.5 (1.67 to 3.4)	-1.5 (-3.0 to 0.0)	3.1 (2.3 to 3.9)	-2.1 (-3.5 to -0.7)	0.029^c	0.199
6 Months						
iHOT-33	64.5 (55.9 to 73.0)	16.4 (4.8 to 28.1)	61.0 (52.8 to 69.1)	20.0 (8.9 to 31.1)	0.162	0.290
HOS-ADL	86.2 (80.3 to 92.0)	6.2 (-3.4 to 15.9)	81.3 (75.7 to 86.9)	13.1 (3.9 to 22.3)	0.004^c	0.013^c
HOS-SSS	61.2 (50.4 to 71.9)	3.9 (-10.3 to 18.2)	56.0 (45.8 to 66.3)	10.6 (-3.1 to 24.2)	0.101	0.113
mHHS	80.1 (74.1 to 82.7)	14.2 (5.7 to 22.7)	77.0 (71.4 to 82.7)	17.6 (9.6 to 25.7)	0.082	0.159
NAHS	81.8 (76.0 to 87.6)	9.8 (0.3 to 19.2)	77.2 (71.7 to 82.7)	15.6 (6.6 to 24.6)	0.007^c	0.031^c
VAS pain	2.4 (1.6 to 3.3)	-1.6 (-3.1 to -0.1)	3.0 (2.2 to 3.8)	-2.1 (-3.5 to -0.7)	0.028^c	0.198
12 Months						
iHOT-33	67.9 (59.4 to 76.4)	18.3 (6.7 to 29.9)	64.6 (56.4 to 72.7)	22.1 (11.0 to 33.2)	0.174	0.250
HOS-ADL	87.9 (82.0 to 93.7)	7.2 (-2.4 to 16.9)	83.4 (77.9 to 89.0)	14.3 (5.1 to 23.5)	0.008^c	0.010^c
HOS-SSS	65.5 (54.8 to 76.2)	7.5 (-6.7 to 21.7)	60.7 (50.5 to 70.9)	14.4 (0.9 to 28.0)	0.115	0.090
mHHS	82.0 (76.0 to 87.9)	15.0 (6.6 to 23.5)	79.0 (73.4 to 84.7)	18.4 (10.4 to 26.5)	0.084	0.158
NAHS	83.8 (78.1 to 89.6)	11.0 (1.5 to 20.4)	79.6 (74.1 to 85.1)	16.9 (7.9 to 25.9)	0.011^c	0.027^c
VAS pain	2.2 (1.3 to 3.0)	-1.7 (-3.1 to -0.2)	2.7 (1.9 to 3.5)	-2.2 (-3.6 to -0.8)	0.029^c	0.196
24 Months						
iHOT-33	74.8 (66.2 to 83.4)	22.0 (10.4 to 33.6)	71.8 (63.7 to 80.0)	26.3 (15.3 to 37.4)	0.233	0.193
HOS-ADL	91.2 (85.4 to 97.1)	9.3 (-0.3 to 18.9)	87.7 (82.2 to 93.3)	16.7 (7.5 to 25.8)	0.041^c	0.007^c
HOS-SSS	74.1 (63.3 to 84.8)	14.7 (0.5 to 28.9)	69.9 (59.7 to 80.1)	22.2 (8.7 to 35.7)	0.181	0.065
mHHS	85.7 (79.8 to 91.7)	16.7 (8.3 to 25.1)	83.0 (77.3 to 88.7)	20.0 (12.0 to 28.1)	0.114	0.168
NAHS	88.0 (82.2 to 93.8)	13.3 (3.9 to 22.7)	84.4 (78.9 to 89.9)	19.4 (10.4 to 28.4)	0.035^c	0.023^c
VAS pain	1.7 (0.9 to 2.6)	-1.8 (-3.3 to -0.3)	2.1 (1.4 to 3.0)	-2.3 (-3.8 to -0.9)	0.049^c	0.204

*Patient-reported outcome scores and interval improvements are reported as mean (95% CI). CLJ, chondrolabral junction.

HOS-ADL, Hip Outcome Score-Activities of Daily Living; HOS-SSS, Hip Outcome Score-Sports Specific Subscale; iHOT-33, International Hip Outcome Tool-33; mHHS, modified Harris Hip Score; NAHS, Non-Arthritic Hip Score; PROM, patient reported outcome measure; VAS, visual analog scale. Dashes indicate not applicable.

^bMean improvement at each time point reported relative to preoperative, baseline score.

^cA significant difference between groups.