

Minimum Three-Year Outcomes for Patients Undergoing Acetabular Labral Repair with Bone Marrow Aspirate Concentrate Augmentation

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INTRODUCTION: Bone marrow aspirate concentrate (BMAC) has been utilized as an adjuvant therapy during hip arthroscopy to treat osteoarthritis (OA) and halt the progression of chondral degeneration. Despite promising initial results evidenced by patient-reported outcome measures (PROMs), the long-term effects of BMAC in the hip joint remain largely unknown due to a lack longitudinal follow-up in the literature beyond two years post-surgery. Thus, the purpose of this study was to present minimum three-year functional outcomes in patients undergoing acetabular labral repair with BMAC augmentation to add to the growing body of literature describing the orthobiologic's full effect as an adjuvant therapy in the hip.

METHODS: This is a case series of prospectively collected data on patients who underwent acetabular labral repair with BMAC augmentation between August 2017 and July 2020. Inclusion criteria consisted of patients 18 years or older who underwent arthroscopic acetabular labral repair with BMAC augmentation performed by the senior author and completed PROMs at baseline and at minimum three years post-arthroscopy. Data analysis consisted of examining baseline demographics, intraoperative variables, and radiographic measurements as well as postoperative outcomes and complications.

RESULTS SECTION: A total of 74 hips were included for data analysis preoperatively, at each follow-up timepoint, and at three years post-surgery. Patients had a mean age of 33.3 (33.2–35.4) years with a mean body mass index of 24.8 (24.1–25.6) kg/m². 40 hips had combined cam and pincer deformities that were treated with both femoral neck and acetabular osteoplasty, while the other 34 hips presented with isolated pincer deformities that were treated with acetabuloplasty concomitant to labral repair. There were significant improvements in mean enrollment compared to final follow-up scores for mHHS [63.6 (60.1–67.1) vs. 88.7 (85.5–91.8)], HOS-ADL [71.9 (67.5–76.2) vs 91.2 (88.1–94.2)], HOS-Sport [43.9 (38.6–49.1) vs. 77.5 (71.8–83.2)], and iHOT-33 [43.7 (39.7–47.6) vs. 78.1 (73.0–83.2) (p<0.001 for all). Additionally, mean scores continued to improve between two and three years for all PROMs.

DISCUSSION: To our knowledge, this is the longest follow-up reported in patients undergoing BMAC augmentation during hip arthroscopy. The intraoperative use of BMAC concomitant to acetabular labral repair resulted in significant functional improvements after three years with no incidences of infection or pudendal neurapraxia. Additionally, scores continued to improve after two years, suggesting the potential for continued healing beyond two years.

SIGNIFICANCE/CLINICAL RELEVANCE: BMAC offers a potential solution to heal chondral damage in the hip and possibly halt further degeneration of acetabular and femoral neck cartilage. This study adds longer term evidence to the literature to better understand the full scope of BMAC's healing potential.

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IMAGES AND TABLES:

Table 1. Baseline Characteristics, Radiographic Measurements, and Intraoperative Findings*

Variable	N = 74 Hips
Age, years	33.3 (33.2–35.4)
Sex	
Male	43 (58.1)
Female	31 (41.9)
BMI, kg/m ²	24.8 (24.1–25.6)
Laterality	
Right	43 (58.1)
Left	31 (41.9)
Radiographic Measurements	
Tönnis Grade	
0	33 (44.6)
I	40 (54.0)
II	1 (1.4)
Tönnis Angle, degrees	3.1 (1.4–4.7)
LCEa, degrees	34.6 (33.0–36.1)
Alpha Angle, degrees	50.9 (47.7–54.0)
Intraoperative Findings	
Labrum (Beck)	
Stage 0	0 (0.0)
Stage 1	2 (2.7)
Stage 2	47 (63.5)
Stage 3	25 (33.8)
Outerbridge Grade	
0	2 (2.7)
I	2 (2.7)
II	20 (27.0)
III	41 (55.4)
IV	9 (12.2)
Chondrolabral Junction (Beck)	
0	0 (0.0)
I	1 (1.4)
II	25 (33.8)
III	41 (55.4)
IV	7 (9.5)
Type of FAI	
None	0 (0.0)
Pincer	34 (45.9)
Cam	0 (0.0)
Combined	40 (54.0)
FAI Prevalence	
None	0 (0.0)
Acetabuloplasty Only	34 (45.9)
Femoroplasty Only	0 (0.0)
Femoroacetabuloplasty	40 (54.0)

*Data are reported as n (%) or mean (95% CI). BMI, body mass index; kg/m², kilogram per meter squared; LCEa, lateral center edge angle; FAI, femoroacetabular impingement.

Table 3. Complications From Acetabular Repair with Bone Marrow Aspirate Concentrate

Complication	n	%
None	61	82.4
Early postoperative complications		
Transient Neurapraxia –pudendal	0	0
Transient Neurapraxia –peroneal	2	2.7
Infection	0	0
Deep vein thrombosis	1	1.4
Late postoperative complications		
Heterotopic ossification	9	12.2
Trochanteric Bursitis	0	0
Total Hip Arthroplasty	1	1.4

Table 2. PROMs Over Time*

	n	mHHS	P	n	HOS-ADL	P	n	HOS-Sport	P	n	iHOT-33	P
Enrollment	73	63.6 (60.1–67.1)	–	74	71.9 (67.5–76.2)	–	74	43.9 (38.6–49.1)	–	73	43.7 (39.7–47.6)	–
3-month follow-up	62	81.65 (78.0–85.3)	<.001	63	80.8 (76.7–84.8)	.007	61	43.0 (35.9–50.2)	.747	62	61.5 (57.2–65.8)	<.001
6-month follow-up	64	83.6 (80.1–87.0)	<.001	64	87.6 (84.6–90.5)	<.001	64	61.4 (54.6–68.2)	<.001	63	68.3 (63.5–73.0)	<.001
12-month follow-up	67	87.6 (84.4–90.8)	<.001	67	91.0 (88.5–93.5)	<.001	65	70.9 (64.1–77.6)	<.001	67	73.7 (68.7–78.6)	<.001
24-month follow-up	71	86.4 (83.4–89.3)	<.001	71	91.0 (88.5–93.5)	<.001	71	76.4 (70.7–82.0)	<.001	71	76.4 (71.7–81.1)	<.001
36-month follow-up	73	88.7 (85.5–91.8)	<.001	74	91.2 (88.1–94.2)	<.001	74	77.5 (71.8–83.2)	<.001	71	78.1 (73.0–83.2)	<.001

*P values indicate a statistically significant difference compared with baseline (P < .05). PROM, patient-reported outcome measure; mHHS, modified Harris Hip Score; HOS-ADL, Hip Outcome Score–Activities of Daily Living; HOS-Sport, Hip Outcome Score–Sports Specific Subscale; iHOT-33, 33-Item international Hip Outcome Tool.

