

Better Patient-Reported Outcomes following Staged Bilateral Total Hip Arthroplasty Compared to Simultaneous Bilateral Total Hip Arthroplasty at 6 Weeks after Surgery

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INTRODUCTION:

Patients with bilateral hip arthritis can be treated with bilateral total hip arthroplasty (bTHA) in either a staged or simultaneous fashion. While prior studies have compared the perioperative outcomes and short-term complication rates of staged and simultaneous bTHA, there is limited data regarding patient-reported outcome measures (PROMs) in staged and simultaneous posterior bTHA patients. Therefore, the goals of this study were to 1) compare postoperative PROMs for patients who underwent staged or simultaneous bTHA using the posterior approach, and 2) compare 90-day complication rates following staged and simultaneous bTHA.

METHODS: Patients who underwent a staged or simultaneous bTHA using the posterior approach at our institution between February 2016 and January 2021 were identified. Baseline demographic data and PROMs were collected preoperatively and at six weeks, three months, and one year postoperatively. Patients were included in our study if they underwent a staged bTHA (within 12 months) or a simultaneous posterior bTHA and completed preoperative and 1-year postoperative Hip Disability and Osteoarthritis Outcome Score for Joint Replacements (HOOS JR) surveys. Staged surgeries were included only if both procedures were conducted using the posterior approach. For staged bTHA patients, PROMs data following the second procedures were used in our analyses. Chart review was performed to evaluate for postoperative complications.

RESULTS: After applying our inclusion and exclusion criteria, 266 eligible patients (179 patients who underwent a staged bTHA and 87 patients who underwent a simultaneous bTHA) were included (**Table 1**). Patients who underwent simultaneous bTHA were significantly younger ($p = 0.008$) and had a lower mean BMI ($p = 0.009$) compared to the staged bTHA cohort. No significant differences were observed between treatment groups for sex or race. Staged bTHA patients had higher HOOS JR, Lower Extremity Activity Scale (LEAS), and Veterans Rand 12-Item Health Survey (VR-12) physical component scores compared to simultaneous bTHA patients at 6 weeks after surgery (all $p < 0.05$), but no significant differences were observed at 3 months and 1 year after surgery (**Table 2**). Visual Analog Scale (VAS) for pain and VR-12 mental component scores did not differ between the two cohorts at any timepoint. Both staged and simultaneous bTHA patients reported significant improvements in HOOS JR, VAS-Pain, and VR-12 physical component scores at all postoperative timepoints (all $p < 0.05$) (**Table 3**). Simultaneous bTHA were associated with higher risk of periprosthetic fractures ($p = 0.034$) (**Table 4**). No differences between groups were noted for other 90-day complications.

DISCUSSION AND CONCLUSION:

The current study included a large sample of patients who underwent a staged or simultaneous bTHA using the posterior approach and found better PROMs at 6 weeks postoperation for patients treated with staged bTHA compared to simultaneous bTHA. Simultaneous bTHA were associated with greater periprosthetic fracture risk compared to staged bTHA, though no differences were observed for other 90-day complications. Surgeons who are considering simultaneous bTHA as a treatment option should be aware of the lower early patient-reported outcomes and higher fracture incidence observed in our cohort. Further research is necessary in order to determine which patients are most likely to benefit from simultaneous

bTHA.

Variable	Surgery Type		p-value ¹
	Staged (n=179)	Simultaneous (n=87)	
Age (years), mean (SD)	62.8 (11.2)	59.0 (9.4)	0.008
BMI (kg/m ²), mean (SD)	30.4 (6.9)	28.3 (5.4)	0.009
Male sex, n (%)	70 (39.1%)	44 (50.6%)	0.063
Race, n (%)			0.478
White/Caucasian	151 (84.4%)	77 (88.5%)	
Black/African American	14 (7.8%)	8 (9.2%)	
Asian	4 (2.2%)	1 (1.1%)	
Other	8 (4.5%)	1 (1.1%)	
Patient Declined	2 (1.1%)	0 (0%)	

¹Bold denotes statistical significance
SD: standard deviation

Questionnaire	Surgery Type				p-value ¹
	Staged (n=179)		Simultaneous (n=87)		
HOOS JR	Mean	SD	Mean	SD	
Baseline	47.6	14.5	41.4	16.7	0.077
6 weeks	79.3	11.8	73.9	16.4	0.019
3 months	85.9	12.7	84.0	14.0	0.391
1 year	91.4	11.6	89.3	13.5	0.181
LEAS	Mean	SD	Mean	SD	
Baseline	9.3	3.2	8.8	2.9	0.225
6 weeks	8.6	2.1	7.6	2.5	0.006
3 months	10.0	2.9	10.5	3.1	0.385
1 year	11.2	3.2	12.0	2.9	0.076
VAS Pain	Mean	SD	Mean	SD	
Baseline	68.8	23.8	69.7	16.0	0.323
6 weeks	14.7	16.0	19.2	22.4	0.177
3 months	9.8	15.9	11.7	15.8	0.496
1 year	7.6	14.3	9.4	18.7	0.460
VR-12 Physical	Mean	SD	Mean	SD	
Baseline	39.0	7.9	39.1	8.1	0.348
6 weeks	39.9	8.6	37.5	9.5	0.008
3 months	44.4	9.4	43.6	8.7	0.013
1 year	47.7	9.8	45.0	8.5	0.794
VR-12 Mental	Mean	SD	Mean	SD	
Baseline	52.5	11.4	51.9	12.2	0.733
6 weeks	57.1	8.4	56.2	9.3	0.502
3 months	56.4	9.3	57.3	7.8	0.576
1 year	56.3	8.3	57.6	6.9	0.239

¹Bold denotes statistical significance
SD: standard deviation

Questionnaire	Surgery Type				p-value ²
	Staged		Simultaneous		
HOOS JR	Mean Δ	SD	Mean Δ	SD	
6 weeks	30.0	16.8	<0.001	26.1	<0.001
3 months	37.5	16.8	<0.001	37.7	<0.001
1 year	43.9	15.1	<0.001	49.9	<0.001
LEAS	Mean Δ	SD	Mean Δ	SD	
6 weeks	-0.9	3.4	0.015	-1.1	<0.001
3 months	0.7	3.7	0.113	2.2	0.401
1 year	1.8	4.7	<0.001	3.9	<0.001
VAS Pain	Mean Δ	SD	Mean Δ	SD	
6 weeks	-48.1	30.1	<0.001	-50.9	<0.001
3 months	-49.7	26.9	<0.001	-48.3	<0.001
1 year	-45.0	24.9	<0.001	-51.4	<0.001
VR-12 Physical	Mean Δ	SD	Mean Δ	SD	
6 weeks	11.9	10.4	<0.001	7.7	0.1
3 months	15.7	10.1	<0.001	14.9	0.5
1 year	18.2	10.5	<0.001	18.4	0.2
VR-12 Mental	Mean Δ	SD	Mean Δ	SD	
6 weeks	4.1	10.9	<0.001	6.5	0.039
3 months	3.6	10.8	0.002	6.1	0.113
1 year	3.7	10.9	<0.001	5.8	0.1

¹All statistical analyses conducted as paired comparisons.
²Bold denotes statistical significance

Complication ¹ , n (%)	Surgery Type		p-value ²
	Staged (n=179)	Simultaneous (n=87)	
Stroke/Myocardial Revascularization	3 (1.7%)	3 (3.4%)	0.396
Periprosthetic Joint Infection	0 (0%)	1 (1.1%)	0.327
Blood Transfusion	18 (10.1%)	7 (8.0%)	0.180
Periprosthetic Fracture	0 (0%)	3 (3.4%)	0.034
Dislocation	2 (1.1%)	1 (1.1%)	0.999
Clavicle/Trunk Infection	0 (0%)	2 (2.3%)	0.166
Emergency Department Visit	2 (1.1%)	1 (1.1%)	0.999
Pulmonary Embolism	1 (0.6%)	0 (0%)	0.999
Reoperation	1 (0.6%)	2 (2.3%)	0.250

¹Patients who had multiple complications (e.g. fracture and reoperation) were counted for both complications.
²P-value calculated using chi-square or Fisher's exact test as appropriate. Bold denotes statistical significance.