

Eccentric Anterior Reaming for Partial Correction of Glenoid Retroversion in Stemless Total Shoulder Arthroplasty: A Comparative Analysis of Outcomes and Implant Survival

Kapil Kumar, Devansh Goyal, David Cairns, L A Kashif Khan, Scott Lawson Barker

INTRODUCTION: Glenoid retroversion and posterior subluxation of the humeral head are commonly encountered challenges in anatomic total shoulder arthroplasty (TSA). Excessive retroversion may compromise component longevity, alignment, and functional outcomes. While reverse shoulder arthroplasty, augmented components, or bone grafting are often considered in these cases, eccentric anterior reaming offers a simpler, bone-preserving approach for partial correction of retroversion. This study aims to compare clinical, radiographic, and survivorship outcomes of stemless anatomic TSA in retroverted versus non-retroverted glenoids, with partial correction achieved using eccentric anterior reaming.

METHODS: A retrospective comparative study included 102 shoulders treated with stemless anatomic TSA from 2010 to 2019. Patients were stratified into retroverted ($>10^\circ$ retroversion, $n=44$) and non-retroverted ($\leq 10^\circ$, $n=58$) groups based on preoperative radiographs (Table 1). All retroverted glenoids underwent partial correction using eccentric anterior reaming. Clinical outcomes were assessed using the Oxford Shoulder Score (OSS) at a minimum of two years postoperatively. Radiographic analysis included glenoid version, humeral head subluxation, and Lazarus grading for radiolucency. Kaplan-Meier analysis was used to evaluate implant survivorship.

RESULTS: In the retroverted group, mean glenoid retroversion improved from $-21.6^\circ \pm 7.5$ to $-16.5^\circ \pm 7.0$ ($p<0.001$) (Table 2). Mean humeral head subluxation improved from $54.5\% \pm 6.8$ to $50.7\% \pm 7.2$ ($p=0.008$) (Table 3). In the non-retroverted group, subluxation improved from $51.2\% \pm 5.4$ to $49.2\% \pm 4.8$ ($p=0.041$). Postoperative subluxation values were not significantly different between groups ($p=0.197$). Severe subluxation ($>55\%$) in the retroverted group decreased from 50% to 15.9% postoperatively (Table 4). At a mean clinical follow-up of 8.1 years, OSS was 44.3 ± 3.7 in the retroverted group and 42.4 ± 6.9 in the non-retroverted group ($p=0.294$). Radiolucency rates did not differ significantly ($p=0.604$). At final follow-up, implant-related complications were low. Three patients (2.9%) experienced rotator cuff failure; two of these (non-retroverted group) underwent revision to reverse shoulder arthroplasty. One patient in the retroverted group developed a prosthetic joint infection, requiring a two-stage revision. No revisions were due to glenoid loosening or mechanical failure. Kaplan-Meier survival at 10 years was 97.6% in the retroverted group and 94.2% in the non-retroverted group ($p=0.46$) (Figure 1).

DISCUSSION AND CONCLUSION:

Partial correction of glenoid retroversion using eccentric anterior reaming in stemless TSA led to significant improvement in humeral head subluxation and restoration of joint alignment. Despite residual retroversion, postoperative subluxation and functional outcomes were comparable to those in non-retroverted glenoids. Importantly, implant survivorship at 10 years was high and similar between groups (97.6% vs. 94.2%), with no revisions due to glenoid loosening. All revision surgeries were related to soft-tissue complications, not implant failure. These findings support eccentric reaming as a safe, bone-preserving technique for managing moderate retroversion. When performed judiciously, it offers reliable functional outcomes and long-term durability without the need for augmented components or reverse arthroplasty.

	Retroverted glenoid		Non-retroverted glenoid		p-value
	Mean \pm SD	Range	Mean \pm SD	Range	
N	44		58		
Age (years)	70.1	54-83	67.9	42-83	
Gender	31		27		
Male	31		27		
Female	13		10		
Mean	27.9 \pm 5.2	21.4-39.6	28.8 \pm 6.4	19.9-39.2	
SD	5.2		6.4		
Range	21.4-39.6		19.9-39.2		
Classification					
I	0		2		
II	0		4		
III	0		9		
IV	0		0		
Glenoid type					
SI	0		15		
S2	0		36		
S3	0		14		
S4	0		2		
S5	0		0		
S6	0		0		
Follow-up (years)	8.3 \pm 2.5	2.1-10	8.9 \pm 2.3	2.1-10	

Table 1. Baseline characteristics and demographics of the study cohorts

	Retroverted glenoid		Non-retroverted glenoid		P-value
	Pre-op	Post-op	Pre-op	Post-op	
Glenoid Version (Mean \pm SD)	$-21.6^\circ \pm 7.5$	$-16.5^\circ \pm 7.0$	$-16.5^\circ \pm 7.0$	$-16.5^\circ \pm 7.0$	0.001
SD	7.5	7.0	7.0	7.0	
P-value					0.001

Table 2. Pre and post-operative values of glenoid version in the 2 groups. Negative values indicate retroversion (Pre and Post-operative Test used).

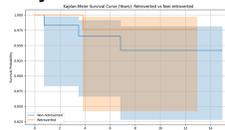


Figure 1. Kaplan-Meier Curve (Years) showing implant survival in the retroverted and non-retroverted group

	Retroverted Group		Non-retroverted Group		P-Value
	Pre-op	Post-op	Pre-op	Post-op	
Humeral Head Subluxation % (Mean \pm SD)	$54.5\% \pm 6.8$	$50.7\% \pm 7.2$	$51.2\% \pm 5.4$	$49.2\% \pm 4.8$	0.197
SD	6.8	7.2	5.4	4.8	
P-Value					0.197

Table 3. Pre and post-operative values of humeral head subluxation in the 2 groups. (Pre and Post-operative Test used)

	Retroverted Group		Non-retroverted Group		P-value
	Pre-op	Post-op	Pre-op	Post-op	
% Subluxation categories					
>55%	50%	15.9%	50%	15.9%	0.001
50-55%	25%	25%	25%	25%	
45-50%	25%	25%	25%	25%	

Table 4. Comparison of Pre and post-operative humeral head subluxation in the retroverted glenoid group