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## Conversion of Anatomic to Reverse Total Shoulder Arthroplasty Comparing Modular vs. Nonmodular Glenoid Components

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### Introduction and Background

Conversion of anatomic total shoulder arthroplasty (aTSA) to reverse total shoulder arthroplasty (rTSA) is increasingly performed, particularly when glenoid or rotator cuff failure occurs in the setting of shoulder arthritis. Modular hybrid and metal-backed glenoid components may facilitate conversion compared with nonmodular all-polyethylene implants, but studies are limited.

### Material and Method

A retrospective review was conducted of patients who underwent conversion from aTSA to rTSA between 2014 and 2024 using modular hybrid/metal-backed glenoid components or cemented all-polyethylene glenoids. Demographics, operative time, revision indications, American Shoulder and Elbow Surgeons (ASES) scores, range of motion (ROM), and radiographic outcomes were analyzed. Between-group differences were assessed using ANOVA, Kruskal-Wallis, and dependent-samples t-tests as appropriate.

### Results

Twenty-seven patients (mean age  $65.7 \pm 8.7$  years, 37% female) were included, with 17 modular and 10 nonmodular conversions. The most common revision indication was atraumatic rotator cuff tear (41%). Median operative time was similar between groups (75 min modular vs 81 min nonmodular,  $p = 0.59$ ). At 1-year follow-up, forward elevation averaged  $141.8^\circ$  ( $142.7^\circ$  modular vs  $140.0^\circ$  nonmodular,  $p = 0.71$ ) and external rotation averaged  $23.0^\circ$  ( $30.0^\circ$  modular vs  $21.0^\circ$  nonmodular,  $p = 0.07$ ). Final ASES scores were excellent in both groups (90.1 modular vs 79 nonmodular,  $p = 0.42$ ), and visual analog scale (VAS) pain scores were low (modular 1.1 vs. 2 nonmodular,  $p=0.49$ ).

### Conclusions

Conversion from aTSA to rTSA using modular versus nonmodular glenoid components yielded comparable short-term functional outcomes, pain relief, and operative times. While modular components offer theoretical benefits of bone preservation and implant retention, these advantages were not clearly demonstrated in this cohort. Larger studies with longer follow-up are needed to further clarify the role of modular glenoid components in revision shoulder arthroplasty.



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Figure & Table 1.

Variable	Nonmodular			p
	Overall N = 27	Modular N = 17	Nonmodular N = 10	
	141.76	142.73		
1-Year ROM FE (mean (SD))	(13.38)	(14.20)	140.0 (11.54)	0.710
1-Year ER (mean (SD))	23.01 (7.21)	30.00 (5.38)	21.00 (8.16)	0.065
1-Year IR (%)				0.252
L5	13 (65.0)	8 (61.5)	5 (71.4)	
Back Pocket	4 (20.0)	4 (30.8)	0 (0.0)	
L4	1 (5.0)	0 (0.0)	1 (14.2)	
Greater Troch	1 (5.0)	1 (7.7)	0 (0.0)	
Unable	1 (5.0)	0 (0.0)	1 (14.2)	
1-Year Rotation 90 Abd = 0-70 (%)	8 (88.9)	6 (100)	2 (66.7)	0.736
Last VAS (SD)	1.3 [2.5]	1.1[2.1]	2.0 [3.5]	0.491
Last ASES (SD)	87.1 [24.4]	90.1 [19.4]	79.0 [35.9]	0.422
Time from Surgery (Years) (median [IQR])	5.00 [3.00, 6.00]	5.50 [4.25, 6.00]	1.00 [1.00, 1.00]	0.143

Figure & Table 2.

Variable	Overall			p
	N = 27	N = 17	N = 10	
Age (mean (SD))	65.70 (8.69)	66.65 (8.67)	65.10 (8.50)	0.482
BMI (mean (SD))	31.06 (5.91)	30.11 (6.50)	32.66 (4.30)	0.298
Sex = Female (%)	10 (37)	5 (29)	5 (50)	0.472
Operative Time (median [IQR])	80 [65, 99]	75 [63, 97]	81 [73, 99]	0.593
Diabetes = Yes (%)	2 (7.4)	2 (11.8)	0 (0.0)	1.000
Smoker = Yes (%)	3 (11.1)	2 (11.8)	1 (10)	0.277
Preop ROM FE (mean (SD))	98.89 (27.26)	100.00 (15.72)	97.00 (39.76)	0.792
Preop IR (%)				0.358
L5	17 (68.0)	8 (50.0)	7 (77.8)	
Back Pocket	4 (16.0)	4 (25.0)	0 (0.0)	
L4	1 (4.0)	0 (0.0)	1 (11.1)	
Greater Troch	1 (4.0)	1 (6.3)	0 (0.0)	
Unable	2 (8.0)	1 (6.3)	1 (11.1)	
Preop ER (mean (SD))	22.62 (10.32)	23.67 (10.93)	20.00 (8.94)	0.516
Preop Rotation 90 Abd (%)				0.251
0-70	13 (54.2)	8 (57.1)	5 (50.0)	
0-60	4 (16.7)	2 (14.3)	2 (20.0)	
0-90	3 (12.5)	2 (14.3)	1 (10.0)	
0-80	1 (4.2)	1 (7.1)	0 (0.0)	
0-30		3 (12.5)	1 (7.1)	2 (20.0)

Note. P-values are from t-tests (age, BMI), Mann-Whitney tests (operative time), and Fisher exact tests (categorical variables).