

# Effect of Restoring Lateral Glenohumeral Offset on Patient Outcomes Following Anatomic Total Shoulder Arthroplasty

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## ABSTRACT

We hypothesized that restoring or increasing lateral glenohumeral offset during anatomic total shoulder arthroplasty (aTSA) would lead to improved shoulder function and clinical outcomes. A retrospective review of 71 aTSA patients was performed. Pre- and postoperative radiographs were used to determine the change in lateral glenohumeral offset. **Increased lateral glenohumeral offset led to improved shoulder range of motion and clinical outcome scores.**

## BACKGROUND

- Lateral glenohumeral offset is an important aspect of shoulder function due to the effect on rotator cuff tension and moment arm of the deltoid.
- Anatomic total shoulder arthroplasty (aTSA) should restore near normal anatomic relationships of the glenohumeral joint in order to optimize shoulder function.
- The purpose of this study is to evaluate the effect of restoring lateral glenohumeral offset on patient outcomes and shoulder function following aTSA.

## METHODS

- IRB-approved retrospective review of 71 patients who underwent a primary aTSA by a single surgeon using a modular 4th generation shoulder prosthesis.
- Preoperative and postoperative radiographs were reviewed to measure lateral glenohumeral offset (Fig. 1).
- Patients were divided into two groups based on a mean change in preoperative to postoperative lateral glenohumeral offset of 8.4 mm.

## METHODS

### Primary Clinical Outcomes:

- Shoulder range of motion
- American Shoulder and Elbow Surgeons (ASES) score
- Shoulder Pain and Disability Index (SPADI) score
- Simple Shoulder Test (SST) score
- UCLA Shoulder score

Figure 1: Measurement of lateral glenohumeral offset

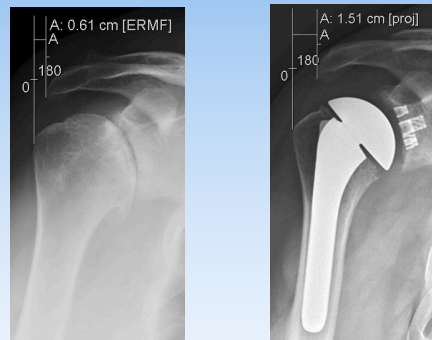


Table 1: Patient Demographics

	Offset change $\geq 8.4$ mm	Offset change $< 8.4$ mm
Sample size	34	37
Age	65.2	66.4
Gender	19M, 15F	17M, 20F
BMI	32.1	31.6
DM	2	6
Tobacco Use	1	2
History of Injection	15	16

## RESULTS

- The mean preoperative lateral glenohumeral offset was  $11.2 \pm 6.6$  mm and the mean postoperative lateral glenohumeral offset was  $19.6 \pm 6.1$  mm.
- The group with a change in offset  $\geq 8.4$  mm had statistically significant higher postoperative ASES, SPADI, and SST scores ( $p=0.03$ ,  $p=0.01$  and  $p=0.02$ , respectively).
- Changes in preoperative to postoperative offset positively correlated with improvements in active abduction ( $r=0.28$ ;  $p=0.03$ ), active forward elevation ( $r=0.259$ ;  $p=0.03$ ), and active external rotation ( $r=0.4$ ;  $p=0.001$ ).

Table 2: Mean clinical outcome scores

	Offset change $\geq 8.4$ mm	Offset change $< 8.4$ mm	
ASES	83	71	$p=0.03$
SPADI	24.3	43	$p=0.01$
SST	10.1	8.4	$p=0.02$
UCLA	30	27.4	$p=0.08$

## CONCLUSION

- A 4<sup>th</sup> generation aTSA allows restoration of lateral glenohumeral offset.
- Increasing lateral glenohumeral offset leads to significant improvements in shoulder range of motion and ASES, SPADI, and SST clinical outcome scores.