



## CORR Insights

**CORR Insights®: Revision to Reverse Total Shoulder Arthroplasty Restores Stability for Patients With Unstable Shoulder Prostheses**

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**Where Are We Now?**

The indications for reverse shoulder arthroplasty have increased such that it has become the workhorse for three- and four-part proximal humeral fractures and comminuted fracture dislocations

*This CORR Insights® is a commentary on the article “Revision to Reverse Total Shoulder Arthroplasty Restores Stability for Patients With Unstable Shoulder Prostheses” by Hernandez and colleagues available at: DOI: 10.1007/s11999-017-5429-z.*

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in elderly patients and is currently the favored solution for anterosuperior escape of the shoulder, a hitherto unsolvable dilemma.

There are numerous causes of instability following shoulder arthroplasty including glenoid loosening, glenoid bone erosion, incorrect implant version, soft-tissue imbalance, excessive capsular releases, improper implant height or size, inadequate osteophyte resection leading to abutment, and subsequent cuff tear (including rupture of the subscapularis repair). Most of these can be managed with a revision to reverse shoulder arthroplasty. The current study by Hernandez and colleagues identified obesity as another risk factor for recurrent instability.

It is interesting that the available evidence does not agree on whether this is so, and for that reason among others, the current study is informative. For example, Anakwenze and colleagues [1]

used a large shoulder registry database to assess for complications, but did not find that higher BMI was associated with higher risk of aseptic revision. By contrast, Wagner and colleagues [4] found that “the risk of a revision surgical procedure increased in a linear fashion with increasing BMI” and that “increased BMI was also associated with an increased risk of revision for mechanical failure” which included instability.

**Where Do We Need To Go?**

Delaying surgery for shoulder instability to allow the patient to lose weight generally is unproductive; while a small percentage of patients can lose large amounts of weight, most cannot. For all practical purposes, I believe obesity is a nonmodifiable risk factor in most cases. While shoulders are different than hips and knees, we may do well to consider that shoulder arthroplasty in patients with morbid obesity (BMI > 40) and superobesity (BMI > 50) may offer more risk than reward, particularly when performed despite modifiable risk factors (such as poorly controlled diabetes).

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Certainly this is the case for hip and knee arthroplasty [5]; I suspect the same may be true in the shoulder. Prior work suggests that the complication profile in such patients is a multiple of that observed in patients without obesity [3].

While we can glean important information from the work of Sanchez-Sotelo and colleagues, and realize a viable method for salvaging an unstable arthroplasty, solving the problem of instability after shoulder arthroplasty is complex and multifactorial, and a number of questions remain unanswered. Why do prosthetic shoulders become unstable at variable rates postoperatively, while native shoulders rarely do so? How can we change our surgical techniques or management of the soft tissues to minimize the risks of recurrent instability? Is rotator cuff failure the main culprit here, and if so, because of the changes that occur to the cuff with age, might this be an unavoidable complication in some patients? What can we do to ensure healing of the subscapularis repair? How should obesity factor in to our surgical indications, given its association with recurrent instability?

## How Do We Get There?

Although instability following shoulder arthroplasty can be successfully managed, future studies should

emphasize careful repair of the subscapularis and protection during the healing process.

Assessing postoperative subscapularis integrity following arthroplasty is best done with ultrasound, and a recent study by Gobezie and colleagues [3] showed excellent healing using sutures that pass through the stem. However, that study did not compare sutures that pass through the stem to standard peel or lesser tuberosity osteotomy repair techniques [3]. A study, stratified for patient age, comparing these repair techniques with a standardized rehabilitation technique with ultrasound integrity assessment and functional outcome is needed to determine which approach improves subscapularis integrity postoperatively.

Lateral-offset designs are important as they can tension the remaining cuff musculature appropriately and allow the tendons to work in the proper orientation, facilitating a balanced force couple while reducing notching [2]. Upsizing the glenosphere can also provide improved stability at the expense of ROM; this approach can be considered when the patients have a history of instability prior to reverse total shoulder arthroplasty, the subscapularis integrity is compromised, or if patients are dependent of ambulatory assistive devices

Along with meticulous soft-tissue management, limited capsular releases,

robust repair of the subscapularis, appropriate application of lateral offset designs, increased glenosphere sizes, and semiconstraining polyethylene inserts, a similar narrowing of our surgical indications regarding patients who are morbidly or super obese, may decrease the number of unstable shoulder arthroplasties in our practices.

## References

1. Anakwenze O, Fokin A, Chocas M, Dillon MT, Navarro RA, Yian EH, Singh A. Complications in total shoulder and reverse total shoulder arthroplasty by body mass index. *J Shoulder Elbow Surg.* 2017;26:1230–1237.
2. Chan K, Langohr GDG, Mahaffy M, Johnson JA, Athwal GS. Does humeral component lateralization in reverse shoulder arthroplasty affect rotator cuff torque? Evaluation in a cadaver model. *Clin Orthop Relat Res.* [Published online ahead of print June 14, 2017]. DOI: [10.1007/s11999-017-5413-7](https://doi.org/10.1007/s11999-017-5413-7).
3. Gobezie R, Denard PJ, Shishani Y, Romeo AA, Lederman E. Healing and functional outcome of a subscapularis peel repair with a stem-based repair after total shoulder arthroplasty. *J Shoulder Elbow Surg.* [Published online ahead of print June 5, 2017]. DOI: [10.1016/j.jse.2017.02.013](https://doi.org/10.1016/j.jse.2017.02.013).
4. Wagner ER, Houdek MT, Schleck C, Harmsen WS, Sanchez-Sotelo J, Cofield R, Sperling JW, Elhassan BT. Increasing body mass index is

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associated with worse outcomes after shoulder arthroplasty. *J Bone Joint Surg Am.* 2017;99:929–937.

5. Workgroup of the American Association of Hip and Knee Surgeons Evidence Based Committee. Obesity

and total joint arthroplasty: A literature based review. *J Arthroplasty.* 2013;28:714–721.