

FLORIDA ORTHOPAEDIC INSTITUTE

fore

Lateralized Design Rationale

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CSSES 2018 • Tampa, FL • Reverse Shoulder Arthroplasty: How & Why



The Idealized Reverse Shoulder Prosthesis

01 Provides Greatest Impingement-Free ROM

02 Restores optimal Muscle Length-Tension Relationships



What RSA design provides the greatest impingement-free ROM?

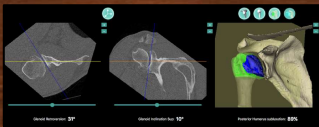
#1: JSES 2018

J Shoulder Elbow Surg, 2018 Feb 27(2):338-349 doi: 10.1016/j.jse.2017.05.011

Optimizing reverse shoulder arthroplasty component position in the setting of advanced arthritis with posterior glenoid erosion: a computer-enhanced range of motion analysis.

Keener JD¹, Patterson BM², Civello NJ³, Alessi AW³, Chamberlain AJ²

- Glenoid component lateralization
 - Greatest single factor related to increased ROM
- Varus (135°) neck shaft angle
 - Better adduction, ER, & extension
 - Less abduction
- Humeral lateralization
 - No effect on ROM



CONCLUSION #1:

“Optimal ROM is achieved with 10-mm baseplate lateralization & neutral to 5° of retroversion mated to a humeral implant with a varus (135°) inclination angle.”


#2: JSES 2017

J Shoulder Elbow Surg, 2017 Oct 26(10):1726-1731 doi: 10.1016/j.jse.2017.03.032 Epub 2017 May 17

The influence of humeral neck shaft angle and glenoid lateralization on range of motion in reverse shoulder arthroplasty.

Keener BS¹, Chahal J², Wang J³

- Varus (135°) neck shaft angle
 - Increased extension, adduction, & ER
 - Decreased abduction
- Glenoid component lateralization combined with varus neck shaft
 - Increased abduction
 - Increased forward flexion



CONCLUSION #2:

“Lower humeral neck shaft angle and glenoid lateralization are effective for improvement in range of motion after RSA. The use of the 135° model with 5 mm of glenoid lateralization provided the best results in impingement-free range of motion”

#3: JBJS 2008

JBJS J Bone Joint Surg Am. 2008 Dec 9;90(12):2006-15. doi: 10.2106/JBJS.H.00012.

Range of impingement-free abduction and adduction deficit after reverse shoulder arthroplasty. Hierarchy of surgical and implant-design-related factors.

Gutiérrez S¹, Comstock CA 2nd, Luo ZP, Punello DS, Franke MA.

- Glenoid component lateralization
 - Largest effect on impingement free abduction ROM
- Varus (130°) humeral neck shaft angle
 - Largest effect on impingement free adduction deficit

ROM Achieved with Lateralized Glenosphere

Effect on Rotator Cuff

- Joint center of rotation distalized in relation to line of pull of cuff muscles
- Vector of pull no longer anatomic
- Inability to repair subscapularis
- Effect on posterior cuff unknown

Effect on Muscle Function

Muscle contraction depends on sliding of Actin over Myosin

Blix Curve: The greatest contractile force is exerted when a muscle is at **resting length**

The effect of deltoid lengthening on functional outcome for reverse shoulder arthroplasty

Musculoskelet Surg (2016) 100:127–132

V. J. Sobesan¹ · D. Lombardo¹ · D. Josserrand² · D. Buzas¹ · T. Jebena¹ · G. R. Petersen-Fitch¹ · J. M. Walter²

Conclusions:

- Deltoid lengthening does not correlate with improvements in active FE or ER.
- Change in deltoid length is less important than previously thought.
- The negative correlations seen could indicate that there is over-tensioning of the deltoid in specific cases.

Basic Principle



Restore Normal Anatomy Whenever Possible

Conclusion

oThe idealized reverse shoulder prosthesis that provides the greatest impingement-free ROM & restores optimal muscle length-tension relationships

- Lateralized Glenosphere
- Varus Neck Shaft angle
- Inset Humeral component



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Thank You

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