

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

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*J Shoulder Elbow Surg.* 2018 Feb;27(2):339-349.

The abstract can be found at: <https://doi.org/10.1016/j.jse.2017.09.011>

Arthritic shoulders with severe glenoid retroversion present a treatment challenge as those with large amounts of glenoid retroversion in combination with posterior head subluxation and joint line medialization, present a challenge to optimize Range of Motion (ROM) post Reverse Total Shoulder Arthroplasty (RTSA). The aim of this study was to evaluate the effects of ROM in Reverse Total Shoulder Arthroplasty RTSA utilizing different positions of both baseplate and humeral components in severely retroverted glenoids utilizing BLUEPRINT™ Preoperative Planning software.

This retrospective diagnostic Computed Tomography (CT) scan study of 10 severely retroverted glenoids measured ROM with baseplates placed in 0°, 5°, 10°, 15° and 20° degrees of component retroversion in addition to 0, 5 and 10 mm of baseplate lateralization. To measure the impact of humeral components on RTSA ROM, the Angle of Inclination (AOI) was measured at 135°, 145° and 155°. Study conclusions indicated an optimal ROM to be achieved with a baseplate positioned at neutral or 5° of retroversion with 10 mm lateralization and a 135° humeral inclination angle.

## KEY TAKEAWAYS

- 10 total shoulders with Walch classifications of B2, B3 and C and having > 25° of glenoid retroversion and > 80% humeral head posterior subluxation, were planned as a primary RTSA.
- This study utilized BLUEPRINT™ 3D Planning Software and AEQUALIS ASCEND™ FLEX Convertible Shoulder System in addition to use of 29 mm baseplate and a 36 mm glenosphere no offset.
- Baseplate positioning consisted of 0° retroversion and medialization to 50% baseplate backside coverage. The reaming depth was noted and replicated for baseplates positioned at 5°, 10°, 15° and 20° degrees of retroversion.
- Humeral positioning consisted of locating the medial aspect of the humeral tray against the medial cortex and at a height of where the medial calcar and anatomical neck intersect. The various trays (0 mm and 3.5 mm medial offset) were then placed at an inclination angles of 135, 145 and 155 with medial neutral and lateral offsets.
- Results indicated glenoid retroversion had some effects on ROM but glenoid lateralization through bone grafting, use of an augmented baseplate or use of a lateralized glenosphere, had the largest net ROM effect.
- Humeral results also indicated that a more varus 135° vs 155° inclination angle had significantly positive effects on all motions except abduction, in which ROM decreased slightly.
- This diagnostic study doesn't take into account soft tissue constraints.
- In conclusion, this study suggests ROM is maximized when the glenoid component is placed in a neutral or slight retroversion position with 10 mm of baseplate lateralization and a 135° humeral shaft neck angle for those with severely arthritic glenoid retroversion.

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