Reverse shoulder arthroplasty glenoid fixation: is there a benefit in using four instead of two screws?

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Abstract

BACKGROUND: To allow osseous integration to occur and thus provide long-term stability, initial glenoid baseplate fixation must be sufficiently rigid. A major contributing factor to initial rigid fixation is baseplate screw fixation. Current baseplate designs use a 4-screw fixation construct. However, recent literature suggests adequate fixation can be achieved with fewer than 4 screws. The purpose of the present study was to determine whether a 4-screw construct provides more baseplate stability than a 2-screw construct.

METHODS: A flat-backed glenoid baseplate with 4 screw hole options was implanted into 6 matched pairs of cadaver scapulas using standard surgical technique. Within each pair, 2 screws or 4 screws were implanted in a randomized fashion. A glenosphere was attached allowing cyclic loading in an inferior-to-superior direction and in an anterior-to-posterior direction. Baseplate motion was measured using 4 linear voltage displacement transducers evenly spaced around the glenosphere.

RESULTS: There was no statistical difference in the average peak central displacements between fixation with 2 or 4 screws (P = .338). Statistical increases in average peak central displacement with increasing load (P < .001) and with repetitive loading (P < .002) were found.

CONCLUSION: This study demonstrates no statistical difference in baseplate motion between 2-screw and 4-screw constructs. Therefore, using fewer screws could potentially lead to a reduction in operative time, cost, and risk, with no significant negative effect on overall implant baseplate motion.

Keywords: Basic Science Study; Biomechanics; Cadaver Model; Reverse shoulder arthroplasty; glenoid fixation

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