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Relevance of Glenoid Version in Reverse Total Shoulder Arthroplasty: Insights from Retrospective Analysis of Patients with Retroverted Glenoids (B1-B3) treated with a monoblock central tapered screw fixation.

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Abstract

Background: Management of deformed glenoids is a challenge in shoulder arthroplasty surgery. How it should be managed is unclear, and there is no universal consensus regarding optimal baseplate position. Posterior osteoarthritic erosion of the glenoid fossa, resulting in glenoid retroversion, is commonly encountered in reverse total shoulder arthroplasty (rTSA), and has previously been seen as a negative predictor of outcomes. Surgical techniques such as bony-increased offset RSA (BIO-RSA) can be used to restore bone stock and allow the glenoid baseplate to be positioned in a more neutral version, thereby, improving bone-implant contact. However, it is important to first establish if this is always necessary; studies thus far do not provide an agreement on if and how retroversion should be corrected. Implant loosening is a known complication of rTSA, yet also not clearly correlated with worse glenoid retroversion.

Methods: This study calculates the degrees of correction used for various degrees of glenoid retroversion in a consecutive series of eight patients who underwent rTSA for osteoarthritis. By determining the amount of intraoperative correction at the level of the glenoid baseplate needed at different degrees of glenoid retroversion, this study seeks to determine if preoperative glenoid retroversion directly correlates with the correction applied, and whether correction was always required. A more neutral baseplate version implies greater bone-implant contact surface area. Cases of loosening are identified and discussed in the context of glenoid version and change applied. Computed tomography (CT) images are used to measure glenoid version preoperatively, and axillary and anteroposterior X-ray views are used to measure glenoid version postoperatively. Pearson's correlation is used to calculate correlation.

Results: Mean preoperative glenoid version was 16.8°. Mean correction applied was 9.7°. Mean postoperative glenoid version was 8.4°. There was a strong correlation between preoperative glenoid retroversion and correction applied (r = 0.86). There was a weak

negative correlation between the preoperative glenoid version and postoperative glenoid version (r = 0.39). Three patients received BIO-RSA to restore bone stock where glenoid retroversion was >20.5°. There was one case of aseptic loosening which occurred in the patient with a preoperative retroversion of 21° who received BIO-RSA where a correction of 19° was applied, resulting in postoperative version of 2.0°.

Conclusions: There is a range of literature looking at the impact of glenoid retroversion in rTSA yet no definitive conclusion to guide surgical technique. Recent research suggests no prognostic implication of glenoid or baseplate retroversion. In this study, the amount of correction applied to the glenoid strongly correlated with the degree of glenoid retroversion preoperatively, indicating that abnormal glenoid morphology is usually addressed, with the glenoid baseplate being placed in a more neutral glenoid version where possible. One case of aseptic loosening was observed where a significant correction of 19° was applied using BIO-RSA. Therefore, correction to a more neutral glenoid version is not always required and reduced bone-implant contact may be acceptable without detriment to implant stability. Without expanding the data set, a correlation cannot be inferred, and an expansion of this study is warranted.

Keywords: Reverse total shoulder arthroplasty | Glenoid version | Glenoid retroversion | Glenohumeral osteoarthritis

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