

# Proximal Humerus Resection and Reconstruction With Modular Reverse Prostheses

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## Background

After proximal humerus resection for bone tumors, restoration of anatomy and shoulder function is demanding because muscles and bone are removed to attain tumor-free surgical margins. Current modes of reconstruction, such as anatomic modular prostheses, osteoarticular allografts, or allograft-prosthetic composites and arthrodeses, are associated with relatively poor shoulder function that is related to loss of the deltoid and rotator cuff muscles. Newer prosthetic designs, such as reverse total shoulder arthroplasty implants, are thought to be useful in other reconstruction procedures in which rotator cuff function is compromised; therefore, reverse total shoulder arthroplasty implants may aid in tumor reconstruction and in patients in whom the deltoid muscle and its innervation can be preserved.

This video presents the results of prosthetic reconstruction of the proximal humerus after resection for bone tumors using a modular reverse total shoulder arthroplasty implant with different designs. A step-by-step technique is shown, including the innovative use of glenoid navigation and a patient-specific surgical approach.

## Material and Methods

The authors of this video performed a retrospective case series analysis. All the patients who underwent proximal humerus resection and reconstruction with modular reverse total shoulder arthroplasty implants between 2011 and 2021 were included in the analysis. Thirty-nine patients (21 females, 18 males) with a mean age of 52 years (range, 17 to 71 years) were included. Patients were clinically assessed according to oncologic protocol. Complications and function were evaluated at final follow-up by the treating surgeon. Complications were evaluated according to the Henderson classification. Functional results were assessed using the Musculoskeletal Tumor Society score, Constant assessment score, and American Shoulder and Elbow Surgeons score. Statistical analysis was performed using Kaplan-Meier curves. An additional evaluation was performed comparing the results with a new prosthetic design in seven patients treated between April 2022 and December 2022.

## Results

Function in these patients based on the outcome scales generally was satisfactory. The mean Musculoskeletal Tumor Society score was 28, the mean Constant assessment score was 60, and the mean American Shoulder and Elbow Surgeons score was 80. Complications occurred in six patients, with prosthetic dislocation (type I) most frequently observed (25%).

## Conclusions

Patients who underwent reverse total shoulder arthroplasty achieved reasonable shoulder function after resection and reconstruction of a proximal humerus tumor. The procedure may not be valuable for all patients who undergo tumor resection; however, the procedure appears to reasonably restore shoulder function in patients in whom the deltoid can be partly spared. Additional larger studies with longer follow-up are necessary to confirm these findings.