

**FUNCTIONAL OUTCOME AND COMPLICATIONS FOLLOWING ONCOLOGIC RECONSTRUCTION OF THE  
PROXIMAL HUMERUS**

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**ABSTRACT**

**Background:** To date there is no consensus on the best articular reconstruction method for oncologic reconstruction of the proximal humerus. Potential differences in functional outcome, complications and survival of the construct may guide both clinicians and patients in deciding on the reconstruction technique.

**Question/Purposes:** Our primary null hypothesis in this study is that there is no difference in QuickDASH score between osteoarticular allograft (OA), endoprosthesis (EP), and allograft-prosthesis composite (APC) reconstruction of the proximal humerus. The secondary study goal is to investigate differences in complication rates between these methods of reconstruction of the proximal humerus.

**Patients and Methods:** We prospectively collected the functional outcomes in adult patients from 2 institutions that underwent oncologic reconstruction of the proximal humerus. This was established by systematically screening pathology reports from both institutions resulting in 150 eligible patients. Of these 150 patients, we gathered the functional data of 25 patients of the 44 living patients that were

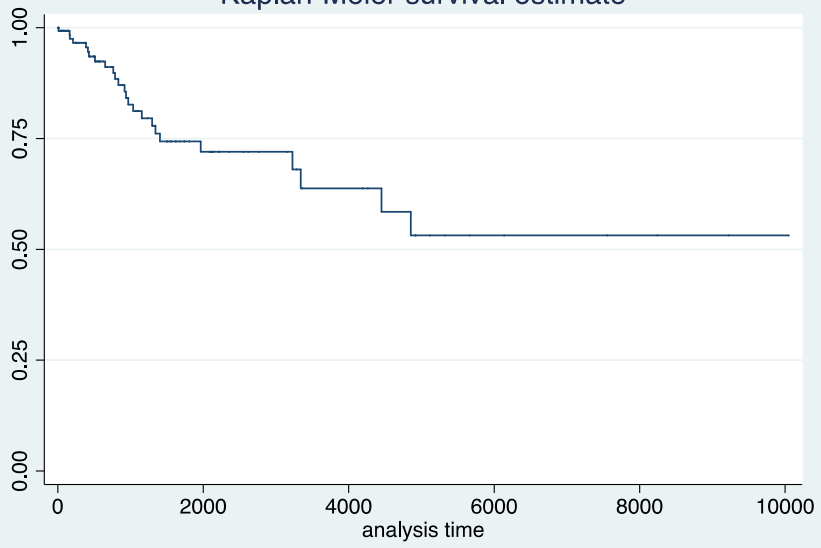
approached. The following 4 questionnaires were assessed: the short version of the Disabilities of the Arm, Hand and Shoulder-questionnaire (QuickDASH), the Computer Adaptive Test (CAT) of the Patient Reported Outcomes Measurement Information System (PROMIS), Physical Function – Upper Extremity, the Upper Extremity Toronto Extremity Salvage Score (TESS) and the upper extremity musculoskeletal tumor society rating scale for upper extremity (MSTS) which we converted to a patient assessable version instead of the original physician rated instrument.

**Results:** There were 150 patients included in this study, of which approximately half were male (49%). The average age was  $53 \pm 19$  year at the time of reconstruction. We did not identify any difference in physical function between the three constructional methods as measured with the QuickDASH in our relatively small cohort. The average QuickDASH score was  $26 \pm 16$  for the 25 patients. Overall the survival of the prosthesis was around 50%. There seems to be a trend for a higher risk for failure in the OA group secondary to fractures ( $p=0.070$ ).

**Conclusions:** Reconstruction of the proximal humerus after oncologic resections is very challenging. Articular oncologic reconstruction such as osteoarticular allografts, endoprosthesis and allograft-prosthesis composites are comparable in terms of function in our series. Complication rates are also comparable in terms of infection, subluxation, dislocation, proximal migration of the humerus and delayed union. This large series confirms a higher fracture rate in the osteoarticular allograft than their counterparts. This explains the observed higher revision rate and apparent lower survival rate when compared to endoprosthesis or allograft prosthesis composites.

**Figure 1.** Kaplan-Meier survival estimate displaying prosthesis survival in days of the 3 constructional methods combined.

Kaplan-Meier survival estimate



**Figure 2.** Kaplan-Meier survival estimate displaying differences in the survival of the 3 constructional methods (1=OA, 2=P, 3=APC),  $P=0.070$ .

