Strut Allograft Proximal Ulna Reconstruction in Revision Total Elbow Arthroplasty

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Background

The increasing frequency of joint arthroplasty has led to an increasing requirement for revision surgery. When treating an aseptically failed elbow arthroplasty one of the main issues is poor or absent proximal ulna bone stock, due to osteolysis. We report our experience with the use of strut allograft reconstruction of the proximal ulna, as an adjunctive procedure to non-custom revision total elbow arthroplasty. Our aim was to better define indications, outcomes, and complications of this specific technique in an aseptically failed prosthetic elbow arthroplasty population.

Materials and Methods

Twenty two total elbow replacements with aseptic failure and proximal ulna bone deficiency treated with allograft bone struts were reviewed. The patients in this group had an average of 2.5 (range 1 to 4) prior osseous procedures. In addition to revision of the prosthetic components, the deficient bone stock was treated in one of four ways with allograft struts. 1) Discrete cortical defects were contained, 2) periprosthetic fractures were splinted, 3) triceps attachment deficiency was reconstructed, and 4) expanded segments were augmented with struts and filled with impaction graft. The average follow-up was 4 years (range 2 to 11 years).

Results

The Mayo Elbow Performance Scores improved from an average of 34 (range 15 to 55) to 79 (range 30 to 100). Pain, stability and the activities of daily living scores improved most, with little change in motion. Complications occurred in 8 cases (36%), consisting of 4 (18%) soft-tissue and 4 (18%) osseous problems. Graft incorporation of upto 50% was present in 3 cases, 75% in 5 cases, 100% in 11 cases, and 100% bony cross-trabeculation was present in 2 cases.

Discussion

Most proximal ulna bone stock deficiencies and fractures complicating total elbow revision surgery can be treated with allograft struts. Discrete cortical lesions, periprosthetic fractures, and expanded proximal ulnae, which require augmentation with impaction grafting, are most suitable. The technique has been unreliable at restoring deficient olecranon bone stock, although the moment in triceps function is maintained. Although this technique can help improve elbow function considerably, the complication rate should be considered.