

Opening Wedge Osteotomy to Salvage Distal Radius Fractures after a Failed Volar Marginal Fragment



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Introduction

Articular fractures of the distal radius may include a small fragment from the volar margin of the lunate fossa (VMF). While rare, this pattern of comminution carries a worse prognosis. After open reduction and internal fixation (ORIF) of the distal radius fracture, the VMF may require additional fixation. Failure to do so may result in loss of reduction and volar carpal subluxation. When this occurs, salvage is very difficult. We present our experience using a volar opening wedge osteotomy to redistribute the loads towards the intact articular surface.



X-ray of failed volar marginal fragment (AP & lateral view) demonstrating reabsorption of the fragment, volar subluxation and loss of radial length.

Methods

We retrospectively reviewed the records of all patients treated at our facility with a volar opening wedge osteotomy for the management of a collapsed VMF after volar plating a distal radius fracture. Medical charts, x-rays and therapy notes were investigated and all patients were contacted for a final evaluation. The charts were examined for the presence of complications and for functional results. The surgical procedure consisted of a volar opening wedge osteotomy in order to decrease volar tilt, restore radial length and provide volar support to the carpus. Autologous bone graft was used in all cases. We treated three patients, all female, (ages 47-70) 2-5 months post-ORIF with this indication. Cast immobilization had failed to prevent progression in the cases treated with this technique, and patients presented before the third month post-op with either failure of initial reduction or poor progress after the initial surgical treatment. Symptoms included unexpected pain and failure to recover forearm supination. Radiologic findings progressed from collapse of the volar marginal fragment to volar subluxation of the carpus and reabsorption of the VMF.

Results

All three patients underwent a volar opening wedge osteotomy with proximal ulna cancellous autograft. Within two months post-osteotomy all three patients had improved pain and motion. Follow-up X-rays revealed concentric joint reduction. At final follow-up, patient's results were:

- passive and active VAS scores = 0
- QuickDASH scores = 4.5-6.8.
- Grip Strength (% contralateral) = 65-102%
- Pinch Strength (% contralateral) = 76-90%

The results of the patient satisfaction questionnaire:

- 10/10 Satisfaction with results of procedure
- Yes, they would consider the same procedure if they had a similar problem on the contralateral hand
- Yes, they would recommend this procedure to someone with a similar problem



X-ray of salvaged distal radius fracture following volar opening wedge osteotomy after a failed volar marginal fragment. Left: AP and lateral views of wrist 1-week post-salvage. Right: AP and lateral views of wrist 4.5 years post-salvage. Below: Pictures show acceptable wrist function



Discussion & Conclusions

The volar rim of the lunate fossa is the only part of the articular surface responsible for preventing volar carpal translation. When the VMF fails, the stability is lost and joint subluxation occurs. A volar opening wedge osteotomy can be used to salvage a distal radius fracture following a collapsed VMF by redirection of the articular surface and correction of the biomechanical derangement.