

CLINICAL CASE REVIEW:

RADIAL HEAD DEFICIENCY WITH ESSEX-LOPRESTI LESION

Small Bone Innovations UNI-Elbow™ Radio Capitellum System



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UNI-ELBOW *PGT*[™]
RADIO CAPITELLUM SYSTEM WITH PRECISE
GUIDANCE TECHNOLOGY

HISTORY

Patient is a 73 year-old, active, right hand-dominant female who sustained a Mason Type III radial head fracture 12 years prior to presentation. Treatment for this injury consisted of radial head excision. There were no complications in the early postoperative period. Over the course of the past 10 years, the patient experienced progressive pain in the lateral aspect of her elbow, as well as in the ulnar side of her wrist with activities of daily living. In September 2006, she presented with a four-month history of severe lateral elbow pain with all activities of daily living, which markedly affected use of her left arm.

PREOPERATIVE

Preoperative physical examination revealed an elbow range of motion from 10 degrees of full extension to 135 degrees of flexion, with forearm rotation from 80 degrees pronation to 60 degrees supination. There was tenderness over the lateral and posterior capitellum with crepitus throughout the range of motion. There was negative posterolateral drawer and posterolateral pivot shift tests. Patient was tender in the ulnar snuff box with a positive ulnocarpal grind.

Preoperative imaging studies revealed absence of the radial head with proximal radial migration and isolated capitellar wear. Wrist radiographs revealed distal radioulnar joint (DRUJ) incongruity with a 3mm ulnar positive variance, which was asymmetric to the contralateral neutral variance. MRI confirmed severe irregularity at the capitellar articular surface with a relatively well-preserved ulnotrochlear joint space (Fig. 1-3).

The patient was diagnosed with:

1. Radioulnar instability with proximal radial migration (Essex-Lopresti lesion)
2. Secondary capitellar erosive wear
3. Distal radioulnar joint (DRUJ) incongruity
4. Ulnocarpal impaction syndrome secondary to ulnar positive variance

Prior to availability of the UNI-Elbow™ System, the patient's prior surgical treatment options consisted of the following:

1. Total elbow arthroplasty
2. Radial head replacement with anconeus arthroplasty

However, the above options would not adequately restore forearm stability or DRUJ congruity and would lead to permanent functional restrictions postoperatively.

The ideal procedure for this patient was radiocapitellar implant arthroplasty utilizing the UNI-Elbow™ Radio Capitellum System, and this was performed on 11/6/2006.



Fig. 1a-1b: Preoperative Elbow XR:

Preoperative AP and lateral radiographs of the affected elbow demonstrating reduction in the space between the radial neck and capitellum, irregularity of the capitellum, a relative preservation of ulnotrochlear joint surfaces.

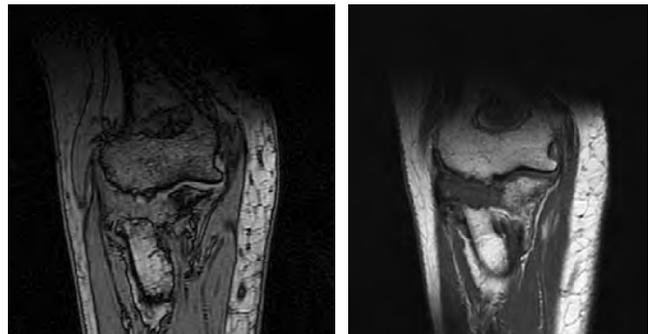


Fig. 2a-2b: MRI (1 and 2):

Preoperative elbow MRI demonstrating severe irregularity of capitellar articular surface with preservation of ulnotrochlear joint surfaces.



Fig. 3: Preoperative Wrist XR:

Preoperative neutral PA radiograph of the wrist demonstrating proximal radial migration, distal radioulnar joint (DRUJ) incongruity and 3mm ulnar positive variance.

INTRAOPERATIVE

The procedure was performed supine with a sterile upper arm tourniquet. Access was obtained via a 7cm lateral incision with dissection through Kocher's interval. The lateral ulnar collateral ligament was detached from its humeral origin and later repaired through drill holes after final implantation. Noted were intact ulnotrochlear articular surfaces with severe erosive wear of the capitellum. The space previously occupied by the radial head was filled with hypertrophic synovium and fibrous tissue, which was debrided (Fig. 4).

The axis of rotation locator clamp was used to target a 0.062" K-wire into the capitellum through the center axis of rotation of the elbow (Fig. 5). The PGT™ resection guide was aligned appropriately and the anterior and distal capitellar cuts were made and confirmed with the capitellar trial. The radial neck was broached to size 2 and trialed. The capitellum was then prepared by drilling and broaching to size 2. Final size 2 capitellum and size 2 radial stem and head were cemented in position. The lateral ulnar collateral ligament was reattached isometrically to restore posterolateral stability. Excellent contact and tracking through a full range of motion was obtained (Fig. 6). Wounds were closed in a usual fashion.

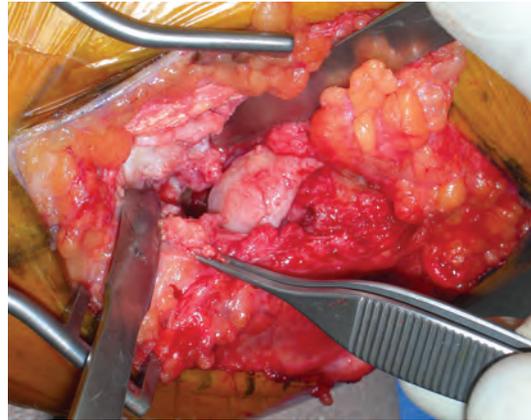


Fig. 4: Capitellar Erosion Clinical:
Intraoperative photograph demonstrating erosion and eburnation of the severely destroyed capitellar articular surface.

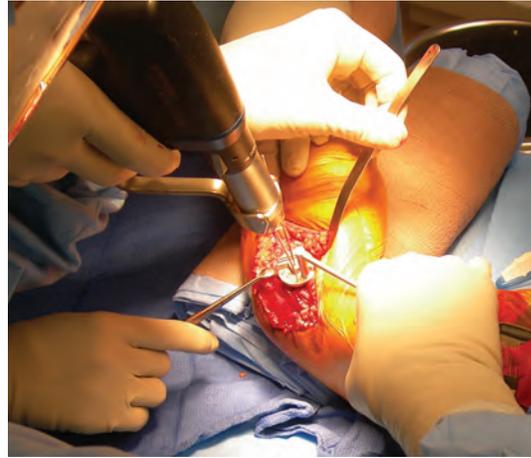


Fig. 5: Intraoperative Photo:
Intraoperative photograph demonstrating application of the PGT™ resection guide.

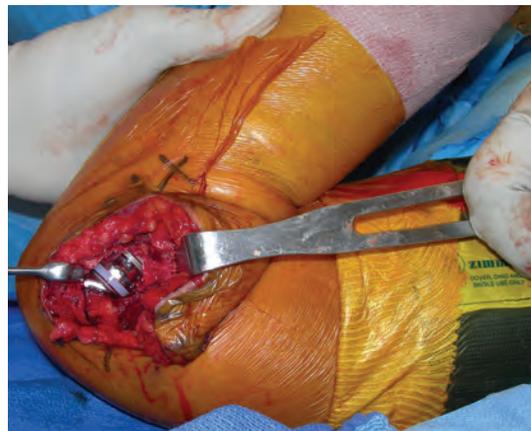


Fig. 6a-6b: Intraoperative Flexion and Extension:
Intraoperative photograph demonstrating congruency of articulation between final implants (after cementation).

POSTOPERATIVE

Early protected range of motion was begun immediately postoperatively with use of a hinged elbow brace and a 45 degree extension block to protect the lateral ligament. Rotation was allowed in elbow flexion only. Progressive increases in extension and supination were allowed over the first two months after surgery. The brace was discontinued at two months. Controlled strengthening was begun at three months postoperatively, and unrestricted activities were allowed at four months.

Latest follow-up was on 3/7/2007 (four months post-op). At this point, the patient is extremely satisfied with her results and has returned to all activities of daily living and avocations, including gardening and weight-lifting up to 30 lbs. Wrist pain and elbow pain have completely resolved. Physical examination revealed a painless and congruent range of motion from five degrees of full extension to 140 degrees of flexion, and 85 degrees pronation to 75 degrees supination. There was no clinical evidence of posterolateral rotatory instability, and the patient had no pain or apprehension with supinated chair push-off. Postoperative radiograph confirmed excellent implant positioning and stability with well-aligned radiocapitellar articulation and restoration of neutral ulnar variance and DRUJ congruity (Fig. 7-9).

In this complex and multifactorial condition, the Small Bone Innovations UNI-Elbow™ Radio Capitellum System has solved both chronic elbow pain and forearm instability, and has prevented ulnar-sided wrist degeneration and instability from long-standing secondary ulnocarpal impaction.

Potential indications other than those listed above for the Small Bone Innovations UNI-Elbow™ Radio Capitellum System include the following:

1. Painful capitellar wear after radial head replacement
2. Inflammatory arthritis of the radiocapitellar joint
3. Irreparable shearing fractures of the capitellum
4. Deformity after osteochondritis dessicans of the capitellum



Fig. 7a-7b: Postoperative Elbow AP and Lateral: Postoperative AP and lateral radiographs of the elbow demonstrating excellent hardware position and size, with congruent radiocapitellar, ulnotrochlear, and proximal radioulnar articulations.



Fig. 8a-8b: Postoperative Flexion and Extension: Clinical photographs of patient 4 months after surgery demonstrating excellent range of motion.



Fig. 9: Postoperative Wrist XR: Postoperative neutral PA radiograph of the wrist demonstrating restoration of DRUJ congruity and neutral ulnar variance. Note the unloaded ulnocarpal articulation.

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