

## CASE REPORT

# Persistent Medial Subluxation of the Ulna with Radiotrochlear Articulation

Amir R. Kachooei, MD; David Ring, MD, PhD

*Research performed at Massachusetts General Hospital, Harvard Medical School, Boston, USA**Received: 29 April 2017**Accepted: 2 June 2017*

## Abstract

Two patients—one with a terrible triad fracture dislocation and one with an anterior olecranon fracture dislocation—were treated for maltracking of the elbow (medial subluxation). The radial head articulated with the lateral trochlea while the ulnar trochlear notch was perched over the medial trochlea. The late revision surgery could not correct the subluxation because the joints were accustomed to the new alignment, however the overall function was reasonable.

**Keywords:** Elbow, Fracture dislocation, Jumped runners, Subluxation

## Introduction

Recurrent subluxation or dislocation after surgical treatment of traumatic elbow instability usually reflects inadequate treatment of one or more stabilizing elements, fracture of the coronoid in particular (1). Subluxation usually involves posterior translation of the ulna and the radius with respect to the distal humerus, with abnormal wear of the coronoid on the trochlea leading to articular damage (1, 2).

One disadvantage of unlinked total elbow arthroplasty is the potential for subluxation or dislocation of the articulation (3). It was noted that prostheses that recreate the trochlear and capitlotrochlear grooves in the distal humerus can subluxate medially, leading to articular maltracking. The radial head articulates with the lateral trochlea rather than the capitellum.

To our knowledge, this has not been discussed in the setting of traumatic elbow instability. We therefore report two patients with articular maltracking/medial subluxation in which the radial head articulated with the lateral trochlea.

## Case presentation

### Patient 1

A 58-year-old woman had a terrible triad fracture dislocation of the left elbow after falling at home. Six days after injury, she underwent radial head arthroplasty,

relocation, and reattachment of the lateral ulnar collateral ligament (LCL) to the lateral epicondyle. There was persistent subluxation and a second surgery was done for medial collateral ligament repair, ulnar nerve transposition, and hinged external fixation 21 days after the injury.

She presented to us 4 months after injury with persistent pain and stiffness after removing the EF one month prior. Elbow motion was from a 20-degree flexion contracture to 80 degrees of flexion. Supination was 70 degrees and pronation was 60 degrees. There were 3 healed incisions over the medial, lateral, and posterior elbow.

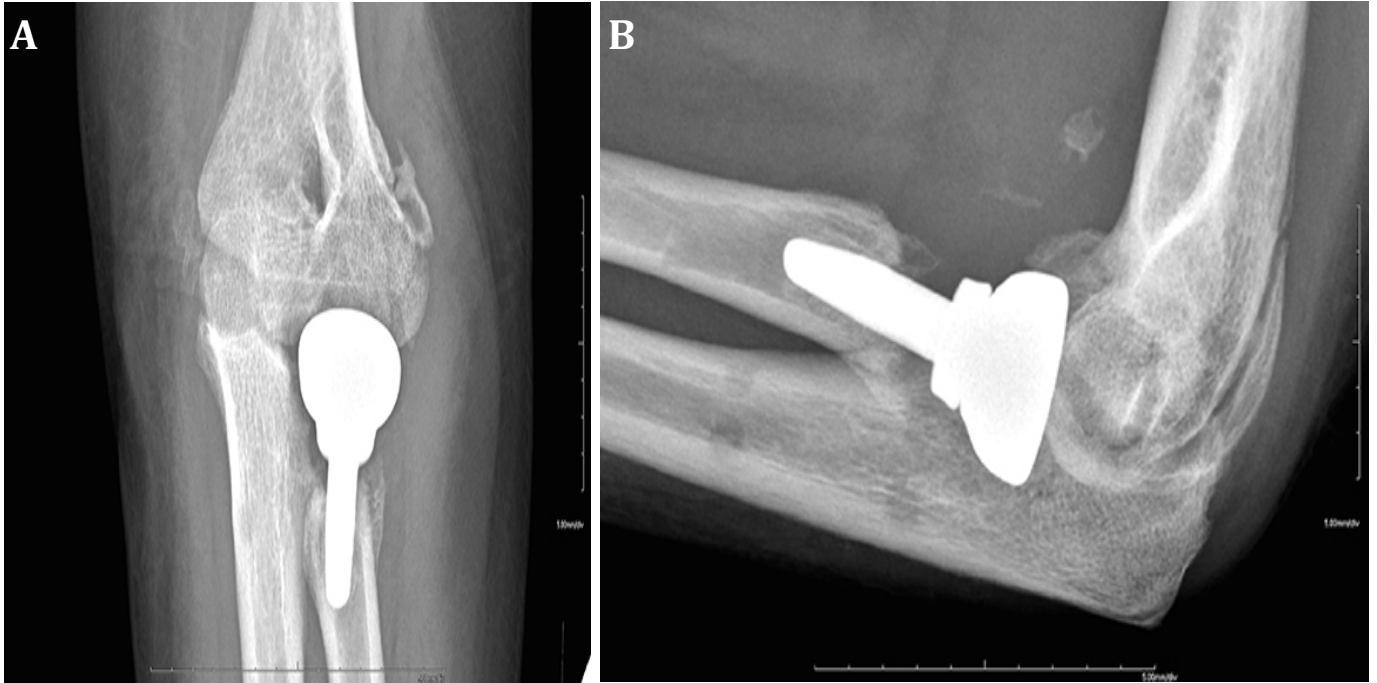
The elbow was aligned on the lateral radiograph, but on the anteroposterior radiograph there was medial subluxation of the ulna and radius with respect to the trochlea and capitellum: the radial head prosthesis was articulating with the lateral trochlea.

Surgery to attempt to realign the elbow included identification and protection of the transposed ulnar nerve, excision of joint capsule and heterotopic ossification, and removal of fibrous tissue from the joint using the prior medial and lateral incisions. The joint was damaged by the abnormal contact with a groove worn in a new position in the trochlea. It was determined that realigning the joint to its normal position might improve elbow function in spite of this damage. The medial-lateral elbow alignment was restored and stabilized

**Corresponding Author:** Amir R. Kachooei, Orthopedic Research Center, Mashhad University of Medical Sciences, Mashhad, Iran  
Email: arkachooei@gmail.com



THE ONLINE VERSION OF THIS ARTICLE  
ABJS.MUMS.AC.IR



**Figure 1. A-** 58 year-old woman fell dislocating her left elbow with fractures of the coronoid and radial head (the so-called terrible triad injury of the elbow).

**Figure 1 (A and B).** Anteroposterior and the lateral radiographs of the left elbow 4 months after two surgeries for a terrible triad fracture-dislocation of the elbow. The radial head prosthesis is articulating with the lateral trochlea rather than the capitellum.

using two 5/64-inch smooth Kirschner wires to maintain the reduction. Positioning was verified under C-arm as well as directly visually in the wound.

The elbow was immobilized in a splint and then a cast for a total of 1 month. The pins were removed in the office 1 month after surgery. Two month after surgery, radiographs showed residual elbow subluxation. The elbow was less painful and moved from a 40-degree flexion contracture to 110 degrees of flexion. At the final evaluation 6 months after the last surgery, motion was a 40-degree flexion contracture to 140 degrees of flexion with near normal forearm rotation, slight varus/valgus instability, and mild pain. Radiographs showed persistent medial subluxation, wear of the trochlea, and osteoarthritis with bone loss. The Broberg-Morrey functional score was 85, with a categorical rating of good [Figure 1 A-F].

### **Patient 2**

A 27-year-old right-hand dominant woman presented to our Emergency Department with a grade I open left olecranon fracture dislocation and ulnar nerve dysfunction after a motor vehicle accident. There was a severely comminuted olecranon fracture with an intact dislocated radial head and preserved radioulnar relationship: an anterior olecranon fracture-dislocation. On the day of injury, the patient was taken to the operating room for irrigation and debridement and open reduction and internal fixation of the fracture using a 3.5 mm dynamic compression plate through a posterior

approach incorporating the traumatic wound. Three days later, the patient returned to the operating room for bone grafting the olecranon bone defect. However, because the defect was such that the graft would be loose in the joint, the decision was made to debride the fracture and not place bone graft.

One month after injury, elbow motion was limited to 15 degrees of flexion-extension arc and 15 degrees of supination and pronation in each direction. Three month after injury, she was referred to the hand clinic because of stiffness, residual malalignment, and subluxation on radiographs. The anteroposterior radiograph showed medial subluxation of the ulna and radius with respect to the trochlea and capitellum: the radial head was articulating with the lateral trochlea. The lateral radiograph demonstrated widening of the trochlear notch with the olecranon fragment secured too posteriorly. There was essentially no flexion-extension motion with very limited forearm rotation. She was very protective and sore. She was offered additional surgery to realign the ulna and the elbow joint, but she declined.

One year after injury she reported persistent stiffness and pain and the radiographs showed persistent malalignment. After extensive counseling about the limitations of additional surgery, she underwent ulnar osteotomy to restore the proper dimensions of the trochlear notch with debridement of osteophytes and heterotopic bone, capsulotomy, and ulnar nerve release and anterior subcutaneous transposition. At the time of

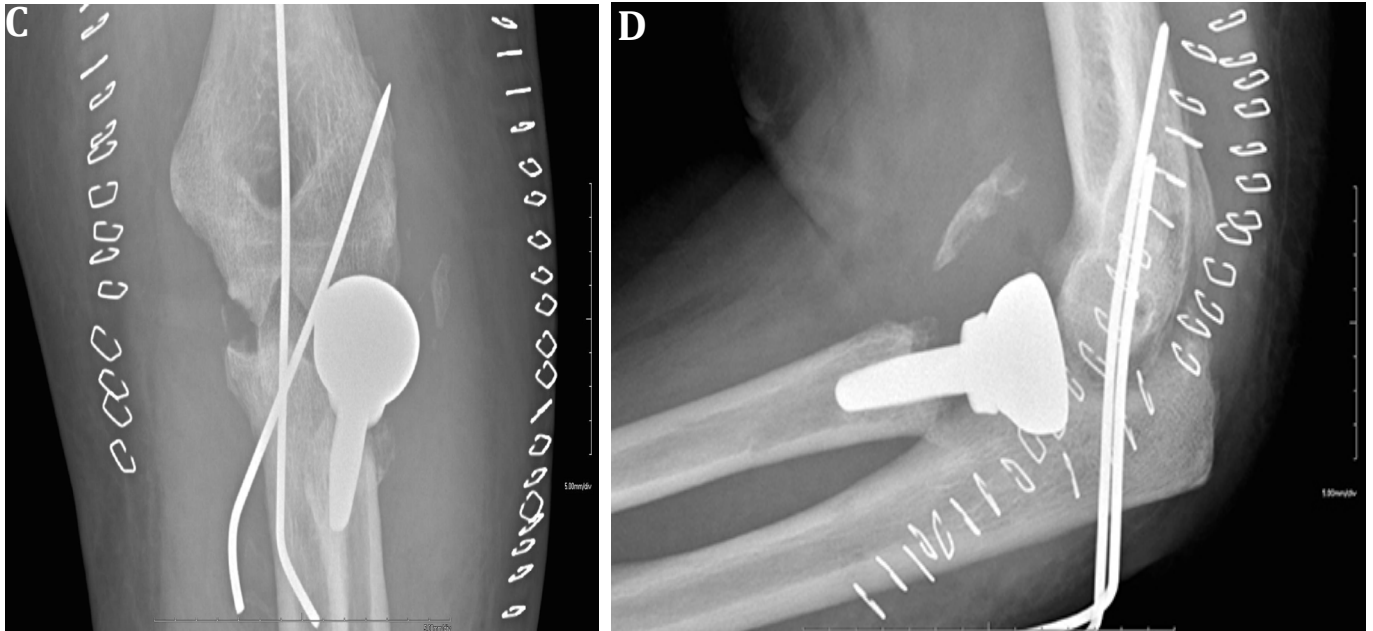


Figure 1 (C and D). Anteroposterior and lateral radiographs of the elbow after the surgery to realign and pin the joint in place. The visible groove in the middle of the trochlea is formed by the radial head prosthesis.

surgery, the joint was subluxated and a new articulation was forming with osteophytes and reasonable cartilage. It was decided that it would be unwise to re-align this

new articulation with the radial head articulating with the lateral trochlear ridge.

Fourteen months after the osteotomy and capsular

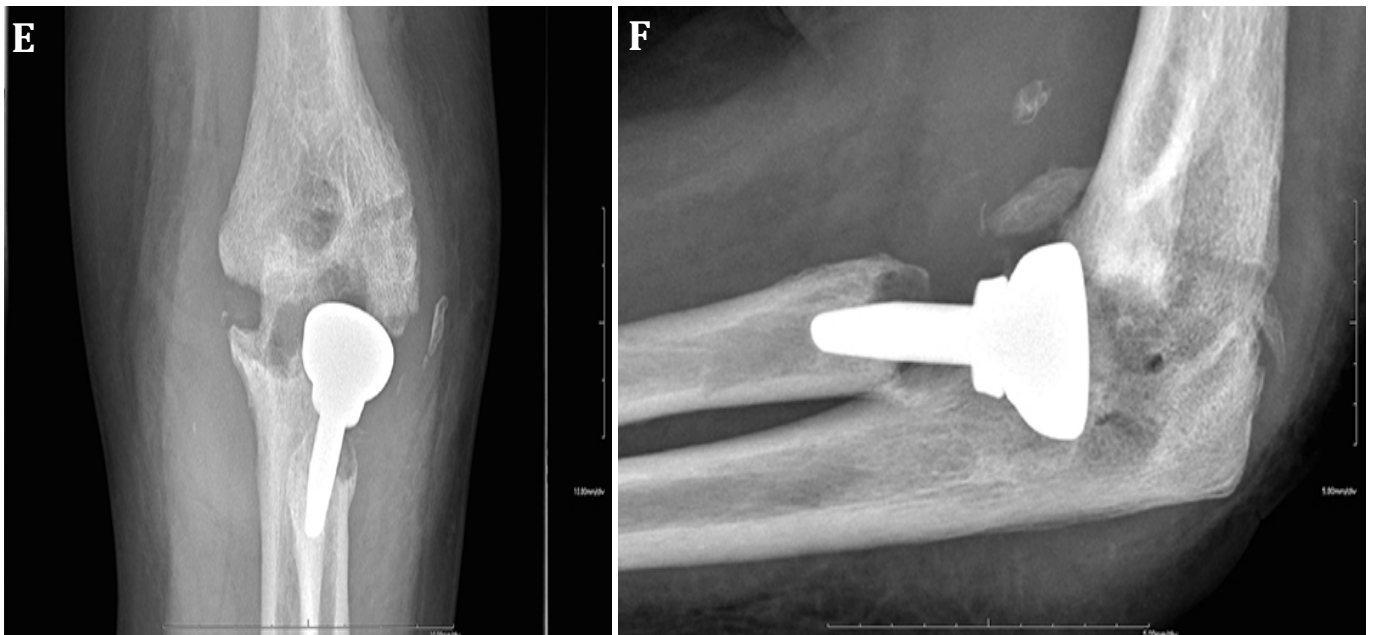
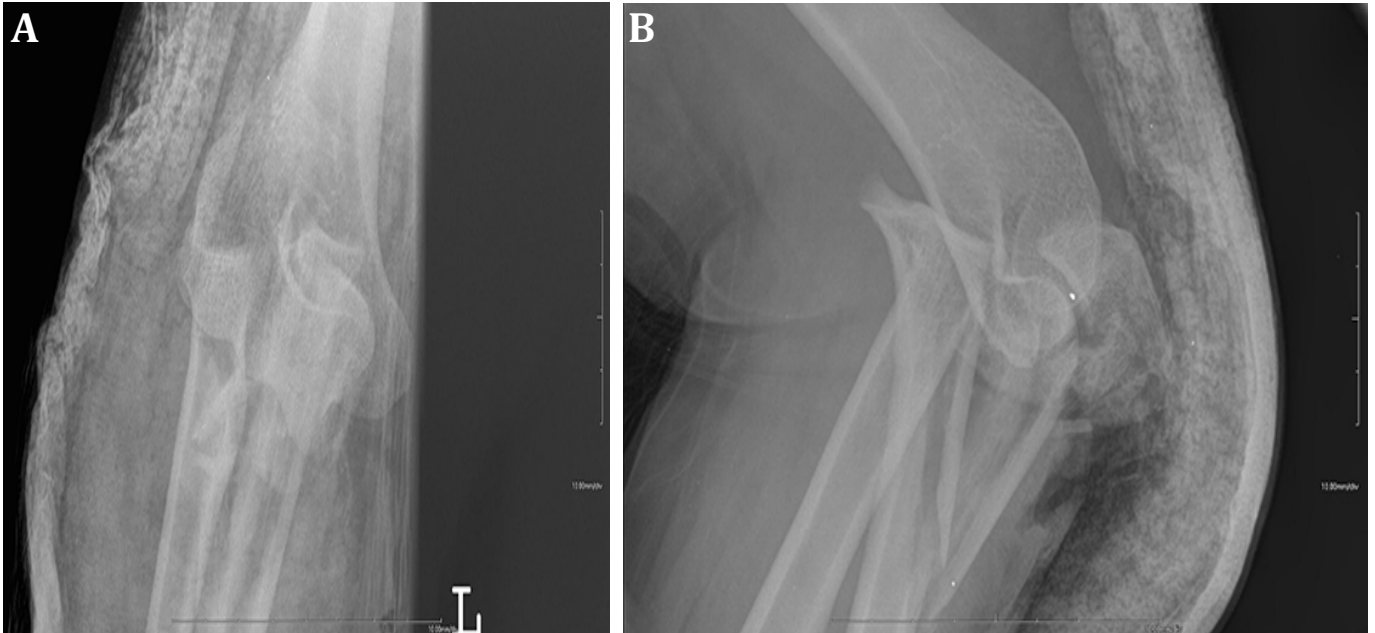


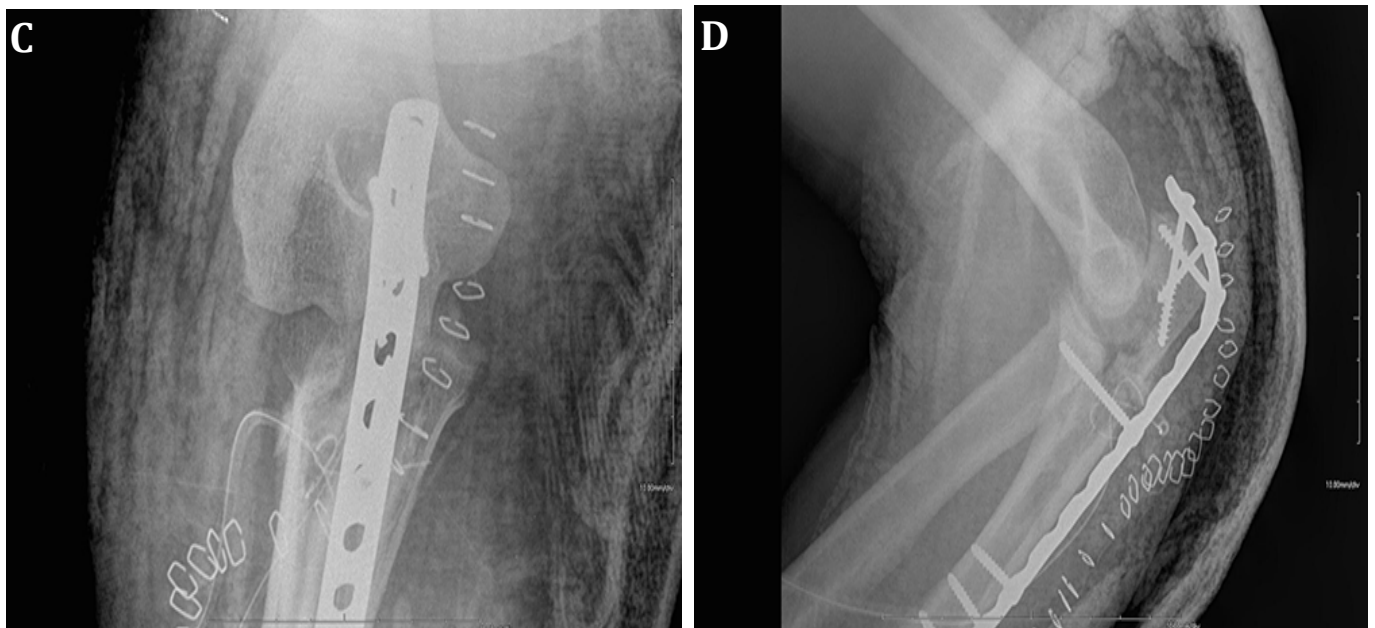
Figure 1 (E and F). Anteroposterior and lateral radiographs of the elbow 6 months after the revision surgery showing persistent medial subluxation, osteoarthritis, and adjustment of the joint in the new alignment.



**Figure 2.** A 27-year-old woman with an open anterior olecranon fracture dislocation after a motor vehicle accident.  
**Figure 2 (A and B).** Anteroposterior and the lateral radiographs of the left elbow at the time of presentation at the emergency room.

release, she had a 40 degree flexion contracture to 130 degrees of flexion with 40 degrees of supination and full pronation. At the last visit after over 6 years after revision surgery, the elbow motion was the same

with occasional pain, crepitance, and slight elbow osteoarthritis, but overall elbow function was good. The Mayo elbow performance score was about 74, with a categorical rating of fair [Figure 2 A-F].



**Figure 2 (C and D).** Anteroposterior and the lateral radiographs of the left elbow after the initial surgery for fixation of the olecranon. The radial head is articulating with the trochlear notch of the distal humerus.

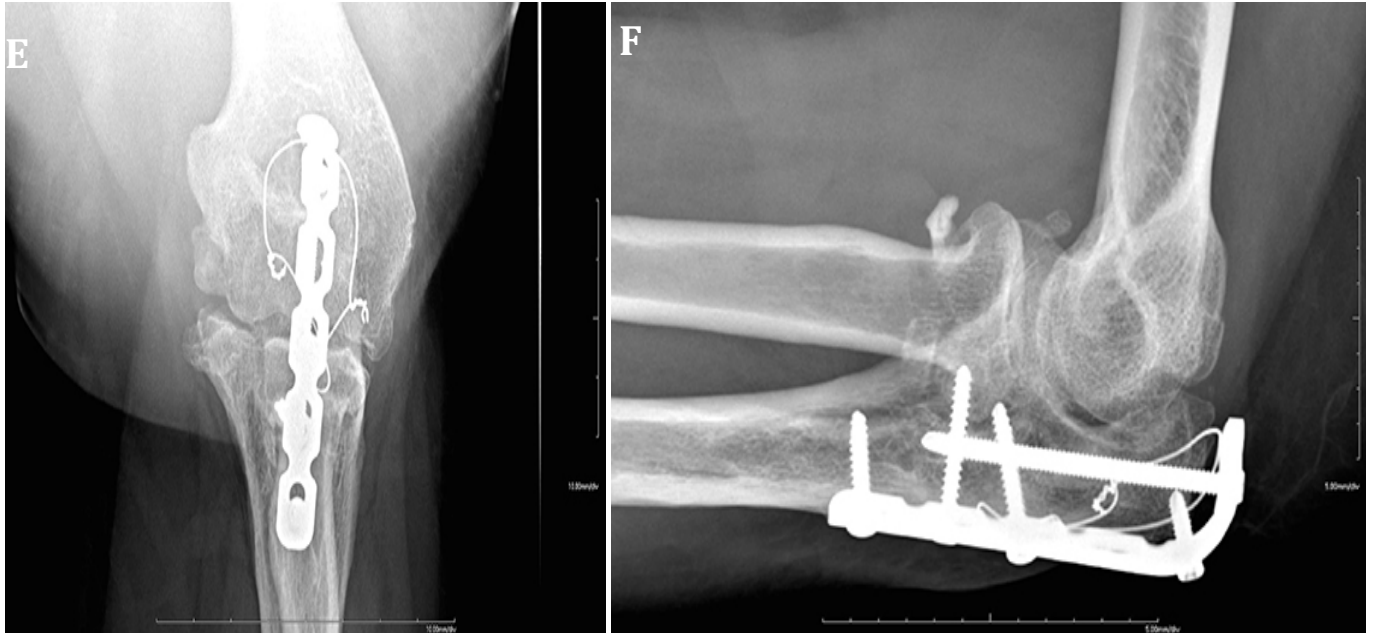


Figure 2 (E and F). Anteroposterior and lateral radiographs of the elbow 6 years after the revision surgery. The narrowing of the trochlear notch is corrected, but there is persistent medial subluxation, osteoarthritis, and adjustment of the joint in the new alignment.

### Discussion

Articular maltracking occurred after a terrible triad and an anterior olecranon fracture dislocation pattern of injury. For the olecranon fracture-dislocation it seems that this might have occurred at the time of internal fixation. In other words, it was secured in the maltracked position. This should be added to the list of pitfalls with this injury. For the terrible triad injury, the maltracking was not recognized and active exercises proceeded, causing joint damage.

The articular maltracking was present for 4 and 12 months, changing the articulation by wearing and deepening a groove between the capitellum and trochlea that becomes the dominant articulation. The trochlear ridge of the ulna and the trochlear groove of the distal humerus become less distinct and less able to maintain elbow alignment. The revision surgery could not correct the subluxation because the joints were accustomed to the new alignment. In spite of persistent medial subluxation, the capsular release and post-operative exercises achieved improved motion with good stability, but progressive arthrosis. The question arises that, given the limited improvements to

the joint itself, would stretching exercises alone have improved the function of these elbow without the need for contracture release and transposition of the ulnar nerve.

We hope these 2 patients with medial subluxation with maltracking will increase surgeon awareness of this potential adverse event after traumatic elbow instability, leading to earlier recognition and more effective treatment.

Amir R. Kachooei MD  
Orthopedic Research Center, Mashhad University of  
Medical Sciences, Mashhad, Iran

David Ring MD PhD  
Department of Surgery and Perioperative Care, Dell  
Medical School at the University of Texas at Austin,  
Austin, TX, USA

### References

1. Chen NC, Jupiter JB, Steinmann SP, Ring D. Nonacute treatment of elbow fracture with persistent ulnohumeral dislocation or subluxation. *J Bone Joint Surg Am.* 2014; 96(15):1308-16.

2. McKee RC, McKee MD. Complex fractures of the proximal ulna: the critical importance of the coronoid fragment. Instr Course Lect. 2012; 61(1):227-33.
3. Wright TW, Wong AM, Jaffe R. Functional outcome

comparison of semiconstrained and unconstrained total elbow arthroplasties. J Shoulder Elbow Surg. 2000; 9(6):524-31.