SCIENTIFIC ARTICLE

Bidirectional Dislocation of the Distal Radioulnar Joint After Distal Radius Fracture: Case Report

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We report a patient with bidirectional dislocation of the distal radioulnar joint after malunited distal radius fracture, in which the ulnar head dislocated dorsally during forearm pronation and palmarly during supination without manual compression of the ulnar head. The patient had chronic ulnar wrist pain and experienced a painful clunk during forearm rotation. The distal radioulnar joint ballottement test was positive in both the dorsal and palmar directions. Her distal radius was malunited with a 20° dorsal angulation and 18° pronation deformity. A corrective osteotomy of the radius with open repair of the triangular fibrocartilage complex foveal avulsion yielded success. At the 7-year follow-up, there was almost a normal range of wrist and forearm motion, 83% grip strength, no arthritis, and a stable distal radioulnar joint. *(J Hand Surg Am. 2016;41(2):233–236. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Bidirectional, dislocation, distal radius fracture, distal radioulnar joint, malunion.

Additional material is available online.

MALUNION IS THE MOST COMMON complication after closed treatment of distal radius fracture.[1] The malunited distal radius fracture may cause instability of the distal radioulnar joint (DRUJ) along with pain, decreased range of motion, and decreased grip strength.[1] Clinically, the majority of DRUJ instability is dorsal, when the distal ulna shifts dorsally to the distal radius. Palmar ulnar instability is relatively uncommon.[2,3] Moreover, the majority of DRUJ instability is dynamic and can also be demonstrated by passive volar and dorsal ballottement producing subluxation of the distal ulna. Bidirectional, volar, and dorsal subluxation of the distal ulna, on active pronation and supination, is rare.

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Received for publication June 2, 2015; accepted in revised form November 11, 2015.

No benefits in any form have been received or will be received related directly or indirectly to the subject of this article.

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0363-5023/16/4102-0011$36.00/0
http://dx.doi.org/10.1016/j.jhsa.2015.11.005

We present a case of bidirectional instability of the DRUJ after distal radius fracture in which the ulnar head dislocated dorsally during active forearm pronation and volarly during supination.

CASE REPORT

A 26-year-old woman fell from a snowboard and sustained a distal radius. The initial radiographs showed an extra-articular distal radius fracture (AO type A3) and a dorsally angulated distal fragment. She was treated with a short-arm cast without reduction for 3 weeks. She started to feel apprehension regarding the DRUJ during pronation and supination just after removing the cast. On first examination in our hospital, she noted ulnar-sided wrist pain and a painful clunk during forearm rotation. Her range of motion was 70° in flexion, 80° in extension, 80° in pronation, and 90° in supination. The motion on the normal side was 80° in flexion, 80° in dorsiflexion, 90° in pronation, and 90° in supination. The ulna head dislocated dorsally at 60° of forearm pronation and palmarly at 30° of supination, which was associated with clunk twice in the DRUJ during both pronation and supination (Video 1, available on the *Journal's* Web site at

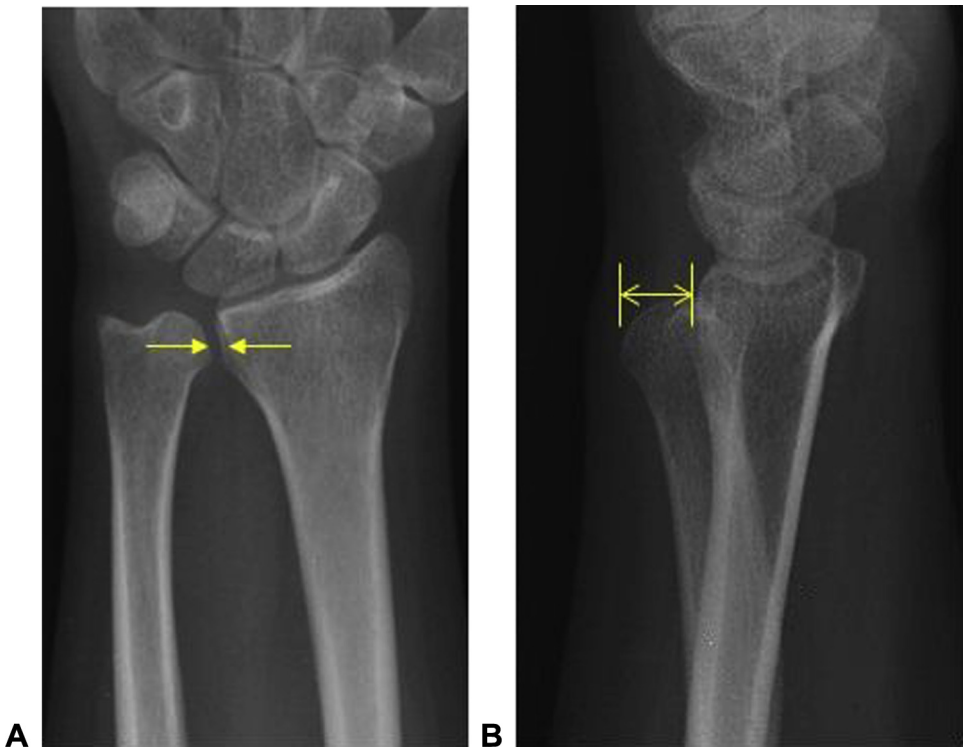

FIGURE 1: The radiograph on the first visit to our hospital indicating **A** a widening of the DRUJ (yellow arrows) and **B** a dorsal tilt and dorsal ulna head shift (yellow arrows) were present.

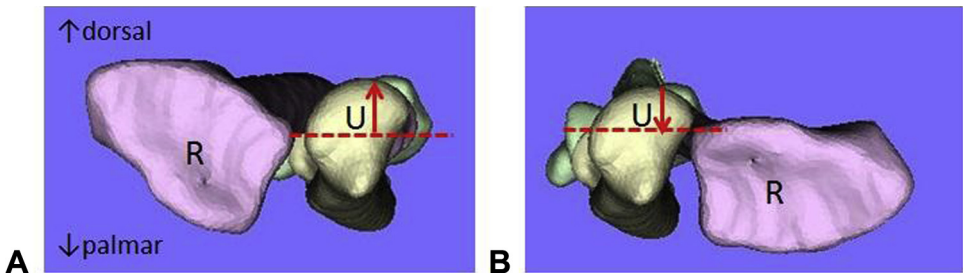

FIGURE 2: Axial view of 3-dimensional bone models of the radius and ulna in forearm **A** pronation and **B** supination. The ulnar head dislocated both **A** dorsally (red arrow) and **B** palmarly (red arrow) beyond the rim of the sigmoid notch of the radius (red dashed line). R: radius, U: ulna.

www.jhandsurg.org). The DRUJ ballottement test[4] was positive on both the dorsal and palmar sides. On the posteroanterior radiograph view, a widening of the DRUJ between the distal radius and ulna was observed (Fig. 1). The lateral radiograph view showed a 15° dorsal tilt of the distal radius and a dorsal ulna head shift. The patient had no ligament laxity or no history of other joint dislocation.

The 0.5-mm slice thickness computed tomography images were done in forearm neutral, pronation, and supination. Three-dimensional bone surface models of the radius and ulna were created using imaging software (Orthopedic Viewer; Osaka University, Osaka, Japan).[5,6] Axial views of the 3-dimensional bone models of the radius and ulna at the level of the DRUJ demonstrated that the ulnar head dislocated dorsally in forearm pronation and palmarly in forearm supination beyond the rim of the sigmoid notch of the radius (Fig. 2). We performed a 3-dimensional analysis for the radius deformity using a computed-tomography-based markerless registration technique, which has been described in detail previously.[5,6] There was a 20° dorsal tilt to the distal radius and a pronation deformity of 18° compared with the contralateral distal radius (Fig. 3). Moreover, the radius was shortened by 8 mm at the tip of radial styloid (Fig. 3) compared with the