

## Galeazzi Fractures: Are Distal Radioulnar Joint (DRUJ) Injuries Predicted by Current Guidelines?

Paul Tornetta, III, MD; Tony Tsismenakis, MD;

Boston University Medical Center, Boston, Massachusetts, USA

**Background/Purpose:** DRUJ injuries occur with isolated radial shaft fractures. Several methods have been proposed for their diagnosis on injury films. Based on biomechanical studies, radial shortening at the wrist of >5mm (positive ulnar variance of >5 mm) is predictive of DRUJ instability. Other authors have used fractures within 7.5 cm of the wrist joint as predictive. However, neither of these guidelines has ever been subjected to an evaluation against actual DRUJ injury in a larger data set, nor has the presence of an ulnar styloid fracture been assessed. The purpose of this study is to evaluate the literature-based predictors of DRUJ injury, as well as the presence of ulnar styloid fracture, against the actual operative findings of DRUJ instability.

**Methods:** All patients with isolated radial shaft fractures with complete radiographs were evaluated over a 10-year period at one Level I trauma center. Demographic, medical records, and radiographic data were tabulated. Radiographs were evaluated for fracture location, radial shortening at the wrist, DRUJ translation, radial angulation, and presence of ulnar styloid fracture. The gold standard of diagnosis of DRUJ instability was any intervention (casting in supination, pinning, direct repair, etc) for DRUJ instability after radial fixation in the operating room or late instability. All patients were specifically evaluated for instability after fixation by the attending orthopaedic surgeon.

**Results:** 66 patients (51 male, 15 female) with an average age of 34 years (range, 18-90) with 28 right and 38 left radial shaft fractures were included. Mechanism of injury was motor vehicle or fall in 45. By thirds, there were 10 proximal (15%), 27 middle (41%), and 29 distal (44%) fractures. 13 (20%) had an associated ulnar styloid fracture. There were 7 (11%) patients with DRUJ instability after radial fixation. Radial shortening averaged 4.43 ± 5.2 mm (range, -2.6 to 22) and 21 were >5 mm. 26 (39%) of fractures were within 7.5 cm of the wrist joint. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of these findings are in Table 1. Even greater shortening did not predict instability with only 3/7 patients with >10 mm shortening having a true injury. However, 4/7 cases with instability had ulnar styloid fractures ( $P = 0.02$ ). In 7 cases, the final radiology report indicated DRUJ "dislocation" rather than other descriptions such as "injury" or "subluxation." Only 2/7 (29%) were actually unstable.

**Table 1. Predictors of Instability**

| Predictor                   | Sensitivity | Specificity | PPV | NPV |
|-----------------------------|-------------|-------------|-----|-----|
| >5 mm radial shortening     | 86%         | 67%         | 27% | 97% |
| Fracture <7.5 mm from wrist | 57%         | 63%         | 15% | 93% |
| Ulnar styloid fracture      | 50%         | 84%         | 31% | 92% |

**Conclusion:** We evaluated a large series of isolated radial shaft fractures to determine the relative importance of previously reported guidelines, as well as the presence of an ulnar styloid fracture, for the diagnosis of DRUJ instability. We found that using radial shortening  $>5$  mm or fractures within 7.5 cm of the wrist had 86% and 57% sensitivity, and only 67% and 63% specificity, respectively. Even cases with  $>10$  mm shortening had only a 43% incidence of injury. The presence of an ulnar styloid fracture had specificity, PPV, and NPV similar to or better than previously published guidelines. In conclusion, using a larger data set than has historically been evaluated, we found that previously reported guidelines for DRUJ injury are only moderately accurate and lack specificity, and that the presence of an ulnar styloid fracture can be helpful. Surgeons should be aware of these associations but rely primarily on intraoperative assessment of the DRUJ after radial fixation to determine treatment.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an “off label” use). For full information, refer to page 600.