A COMPARISON BETWEEN SUBJECTIVE OUTCOME SCORE AND MODERATE RADIAL SHORTENING FOLLOWING A FRACTURED DISTAL RADIUS IN PATIENTS OF MEAN AGE 69 YEARS

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Radial shortening has been associated with a poor functional outcome following a fractured distal radius. This paper reports the results of evaluation by the patient rated wrist evaluation (PRWE) score of 60 patients (mean age 69) who underwent closed reduction and K-wire fixation of distal radial fractures. In this patient group, no association was found between moderate radial shortening, either at injury or fracture union, and this subjective outcome score. A significant association was found between the assessment of these fractures by the Frykman classification and the PRWE score ($P = 0.01$).

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Following a fracture of the distal radius, radial shortening is the variable most commonly reported to be associated with a poor functional outcome (Dixon et al., 2005; Frykman, 1967; Jenkins and Mintowt-Czyz, 1988; Lidstrom, 1959; McQueen and Casper, 1988; Stewart et al., 1985). This evidence is derived from surgeon-based outcome measures, such as the Gartland and Werley (1951) scoring system.

The aim of this study is to compare a validated patient-based outcome scoring system, viz. the patient rated wrist evaluation (PRWE) (MacDermaid, 1996; MacDermaid and Richards, 2000) with the Frykman classification of the fracture and radial shortening, both at injury and at fracture union.

PATIENTS AND METHODS

Patients over 55 years old who underwent closed reduction and K-wire fixation of distal radial fractures between August 2000 and August 2003 were identified retrospectively. A total of 112 patients were contacted, of whom 60 (54%) agreed to be reviewed in clinic. Each patient completed a PRWE questionnaire assessing current function, and had anteroposterior and lateral radiographs taken of the injured wrist.

These fractures underwent closed manipulation and K-wire fixation followed by plaster cast immobilisation. K-wiring involved the insertion of a dorsal and radial styloid 1.6 mm wire through two cortices of the radius. An additional wire was required in 18 cases. The mean period of immobilisation was six weeks.

Radiographs were assessed at the time of injury and at fracture union. The Frykman classification (Frykman, 1967) was recorded (Fig 1) as well as measurements of radial length, dorsal angulation and radial inclination. Radial shortening was defined as the axial difference between the distal radial and ulnar articular surfaces on an anteroposterior radiograph of the wrist (Fig 2) (Warwick et al., 1993).

The PRWE questionnaire (Fig 3) is a subjective outcome measure consisting of 15 questions answered on a scale of 1 to 10 (MacDermaid, 1996). Five questions focus on wrist pain, and ten questions focus on function. A score out of 150 is obtained with zero being asymptomatic and 150 implying complete functional loss with severe pain. The score achieved on each patient's questionnaire was correlated with the measured radiographic variables.

Statistical analysis was performed with SPSS software. Spearman Rank correlation was used to analyse the association between radiological measurements and outcome, and the Kruskal–Wallis test was used to assess correlation between the fracture classification and outcome.

RESULTS

Sixty patients, 50 women and ten men, were reviewed with a mean age of 69 years. The mean age of the women was 70 (range 55–80) years and of the men was 65 (range 57–70) years. Follow-up ranged from 10 to 46 (mean 29) months.

Of the 60 patients, 26 (44%) scored zero out a possible 150 in the PRWE questionnaire (Table 1).

There was a statistically significant correlation between the Frykman classification rating and the PRWE score ($P = 0.01$) (Table 2, Fig 4).

At fracture union, mean radial shortening was 2.6 mm, with a range of 0 to 8 mm.The mean dorsal angulation was 2° (range from 9° to −22°), and the mean radial inclination was 18° (range from 5° to 31°). Correlations between age, radial shortening, dorsal

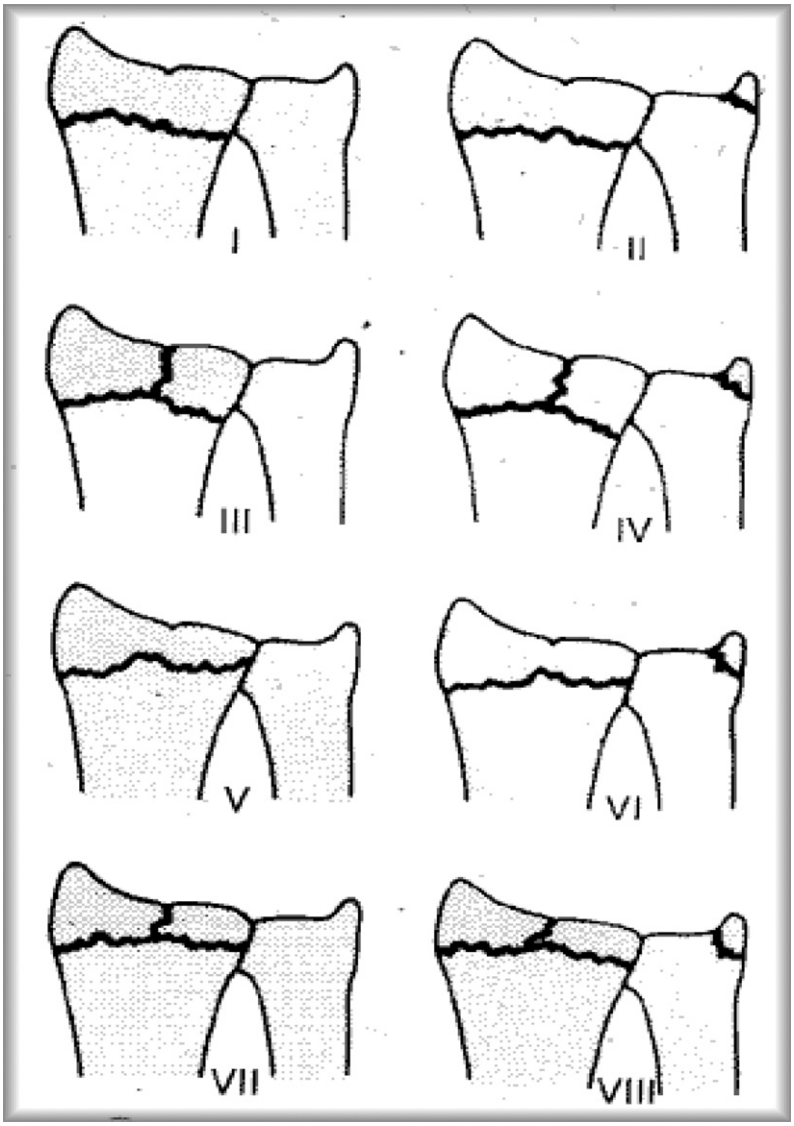

Fig 1 The Frykman classification of distal radius fractures (even numbers describe additional fracture of the ulna styloid). Types I and II, Extra-articular, Types III and IV, Intra-articular (radiocarpal joint), Types V and VI, Intra-articular (distal radioulnar joint), Types VII and VIII, Intra-articular (both radiocarpal and distal radioulnar joints) (Frykman, 1967).

angulation, or radial inclination at injury or fracture union with the PRWE score were not statistically significant (Table 3).

DISCUSSION

Scoring of functional outcome following a fractured distal radius has primarily been a doctor-based measure. Such scoring systems have principally been based on the Gartland and Werley (1951) Point System, which was modified to include grip strength and range of pronation by Sarmiento et al. (1975). Other studies have devised their own outcome scores (Kopylov et al., 1993; McQueen and Casper, 1988), but a common feature of

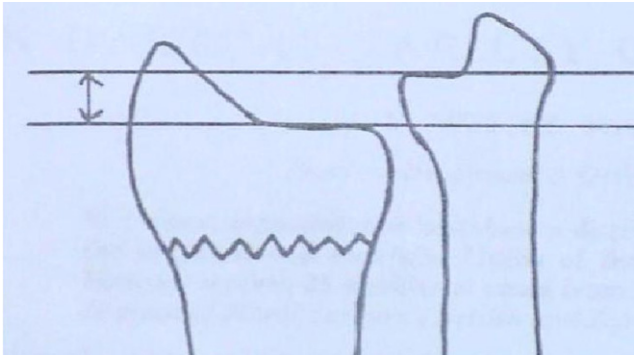

Fig 2 Illustrating the technique for measurement of radial shortening (Warwick et al., 1993).