TITLE: Distal Radius Malrotation as Assessed by CT and Correlation to Common Radiographic Features

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ABSTRACT

Background
Malrotation from distal radius fractures can lead to distal radioulnar joint (DRUJ) instability and block to forearm rotation. Rotational deformity is difficult to assess on standard radiograph. Subsequent rotational malunion can result in significant functional limitations. This study aims to quantify rotational deformity on CT in distal radial fractures and identify correlations with common radiograph parameters.

Methods
We performed a retrospective review of 42 adult patients presenting to Wellington Hospital between February 2021 and July 2022 who had undergone CT scans for distal radius fractures after cast application. AO classification was used to classify each fracture. Common plain film radiographic features including dorsal tilt, radial inclination, ulnar variance and radial height were measured of the same wrist in cast. Axial CT images were used to calculate the degree of rotational deformity based on a standardized method (Filer et al). Statistical analysis was carried out to identify any correlations between malrotation and each radiographic measure.

Results
A total of 42 distal radius fractures were included for analysis. Over 80% were of the AO 2R3C classification. Median radial rotation angle measured 8.4 degrees of pronation with median absolute rotation angle of 9 degrees. Results showed high concordance across 2 independent observers. We observed no significant correlation between the amount of tilt, ulnar variance, inclination or height on x-ray with rotation seen on CT.

Conclusions
Radiographic features of distal radius fractures have not been found to correlate with CT demonstrated malrotation. This study supports the view that malrotation is an independent deformity that is often under-appreciated and therefore poorly corrected based on two dimensional images alone. Open surgical reduction of the volar cortex should be considered to address malrotation in at-risk groups.

BIOGRAPHY

Dr Sean Gerlach completed his MBChB from Otago university in 2016. He has worked as an orthopaedic registrar in Wellington Regional, Hutt Valley and Hawkes Bay Fallen Soldiers Memorial Hospitals.

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