

Do CT scans oriented along the longitudinal scaphoid axis change surgical management of scaphoid fractures?

Cheema, Adnan N. MD, Niziolek, Paul J. MD, PhD, Steinberg, David MD, Kneeland, Bruce MD, Kazmers, Nikolas H. MD, MSE, Bozentka, David MD

Introduction

Reformatting CT scans along the scaphoid longitudinal axis improves the ability to detect scaphoid fractures when compared to reformats along the wrist axis.

However, it remains unclear whether scaphoid axis reformats affect measurements of displacement or deformity, which are factors that drive the clinical decision to perform ORIF.

Our primary null hypothesis was that reformatting CT scans along the scaphoid axis does not affect measurements of fracture displacement and deformity.

Our secondary null hypothesis was that resulting measurements would not lead to different surgical recommendations.

Methods

30 patients with CT scans demonstrating scaphoid fractures were identified and re-formatted along two axes: the longitudinal axis of the scaphoid and the longitudinal axis of the wrist.

The reformatted scans were sent to two musculoskeletal radiologists and two orthopaedic hand surgeons who made the following measurements:

- 1) fracture gap in mm
- 2) displacement of the articular surface in mm
- 3) intrascaphoid angle
- 4) height-to-length ratio

Each scaphoid CT was assigned a designation of “Requires Surgery” if any one of the following cutoffs was met: fracture gap >1mm, articular displacement >1mm, intrascaphoid angle >35, or height-to-length ratio >0.65.

Figure 1. Determination of the longitudinal axis of the scaphoid in the coronal plane

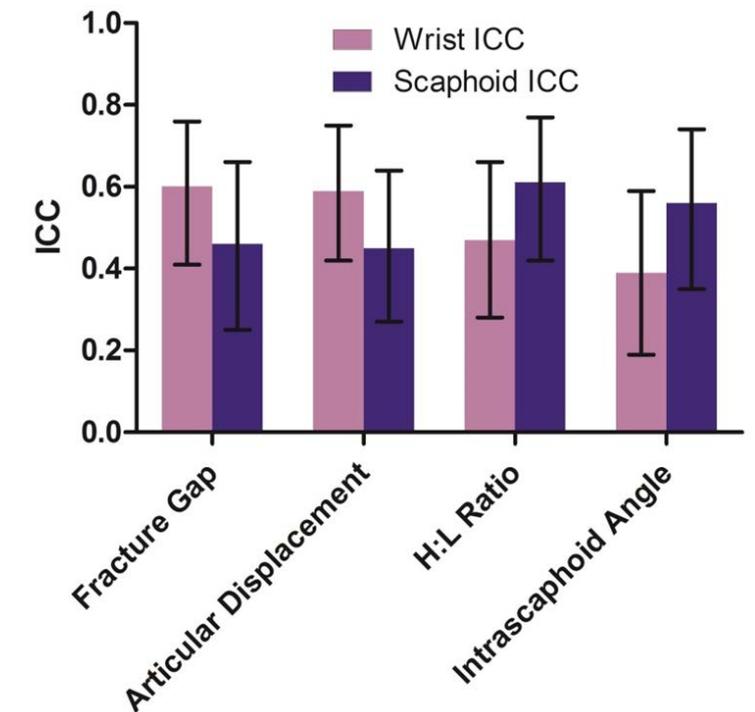


Results

The precision of each of the above measurements was compared for all raters between the two axes using Intraclass Correlation Coefficients (ICC). *No statistically significant difference was found.*

The determination of surgery based on wrist versus scaphoid axes was compared using McNemar’s test and *no statistically significant difference was found.*

Figure 2. Intraclass Correlation Coefficients and associated 95% Confidence Intervals compared between the Wrist and Scaphoid Axes for All Fractures



Conclusion

Reformatting CT scans in line with the axis of the scaphoid does not result in more precise measurements of displacement or deformity in scaphoid fractures.