The O'Driscoll Classification of Coronoid Fractures: Intra and Interobserver Agreement and Clarification

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INTRODUCTION: Classifying coronoid fractures by anatomic location and fracture morphology may help understand the mechanism of injury and guide treatment recommendations. The O'Driscoll classification categorizes coronoid fractures into 3 types, based on fracture location and associated injuries; tip, anteromedial, and basal (Figure 1). A tip fracture involves the tip of the coronoid where the fracture is horizontal or slopes down laterally; it is generally due to a posterolateral rotatory subluxation mechanism and typically associated with a radial head fracture and elbow dislocation. An anteromedial fracture is caused by a varus posteromedial rotatory mechanism, slopes down medially into the anteromedial facet of the coronoid and exits in, or below, the sublime tubercle; it is characterized by a concave shape due to the imprint of the medial trochlea. Often, there is no radial head fracture or elbow dislocation present. A basal fracture involves 50% or more of the height of the coronoid. Previous coronoid classifications have shown only fair to moderate agreement. The purpose of this study was to evaluate the intraobserver and interobserver agreement of the O'Driscoll coronoid classification based on radiographs and computed tomography scans.

METHODS: Three fellowship-trained shoulder and elbow surgeons and 3 fellowship-trained orthopedic trauma surgeons blindly and independently evaluated the radiographs and computed tomography (CT) scans of 90 consecutive coronoid fractures that had presented to a level I trauma center. The inclusion criteria included any coronoid fracture that had a CT scan. Each surgeon classified all fractures according to the O'Driscoll coronoid classification into type and subtype. Intraobserver reliability was determined by randomizing the order of the fractures and having each observer classify all the fractures again after a washout period \geq 6 weeks. Interobserver reliability was obtained to assess the overall agreement between observers. κ Values were calculated for both intraobserver reliability and interobserver reliability.

RESULTS: There was almost perfect intraobserver agreement between reading sessions (average κ 0.82). There was substantial interobserver agreement between observers for the first reading session (average κ 0.74) and the 2nd reading session (average κ 0.68) with an overall substantial interobserver agreement (average κ 0.71) (Table 1). DISCUSSION AND CONCLUSION:

The O'Driscoll coronoid classification was associated with almost perfect intraobserver and substantial interobserver agreement regarding fracture type. Utilization of this classification may increase understanding of the fracture pattern, communication between surgeons, and ultimately guide treatment based on the mechanism of injury and fracture features.



к value	
Intraobserver agreement: time 1 vs. time 2	
Observer 1	0.79
Observer 2	0.83
Observer 3	0.82
Observer 4	0.83
Observer 5	0.87
Observer 6	0.78
Average	0.82: almost perfect
Interobserver agreement: time 1	1, time 2 (mean)
Observer 1 vs. observer 2	0.75, 0.78 (0.77)
Observer 1 vs. observer 3	0.82, 0.77 (0.80)
Observer 1 vs. observer 4	0.83, 0.83 (0.83)
Observer 1 vs. observer 5	0.65, 0.67 (0.66)
Observer 1 vs. observer 6	0.75, 0.67 (0.71)
Observer 2 vs. observer 3	0.73, 0.70 (0.72)
Observer 2 vs. observer 4	0.70, 0.80 (0.75)
Observer 2 vs. observer 5	0.73, 0.68 (0.71)
Observer 2 vs. observer 6	0.70, 0.58 (0.64)
Observer 3 vs. observer 4	0.81, 0.83 (0.82)
Observer 3 vs. observer 5	0.75, 0.68 (0.72)
Observer 3 vs. observer 6	0.81, 0.76 (0.79)
Observer 4 vs. observer 5	0.71, 0.76 (0.74)
Observer 4 vs. observer 6	0.74, 0.74 (0.74)
Observer 5 vs. observer 6	0.67, 0.66 (0.67)
Average	0.74, 0.68 (0.71): substantial