

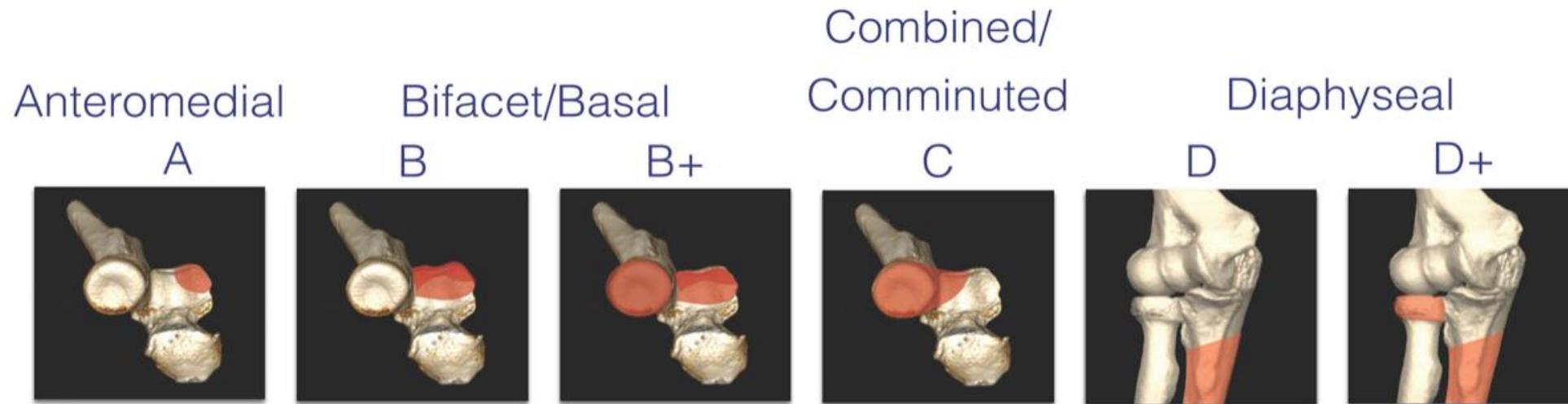


Reliability and validity of the Wrightington classification of elbow fracture dislocation



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AIM

The aim of this study was to assess the reliability and validity of Wrightington classification of elbow fracture dislocations.



Methodology



- A blinded study using radiographs and computed tomography (CT) scans
- All adult patients (>16) with elbow fracture dislocation between 2010 and 2018.
- **Seven observers** reviewed preoperative radiographs and CT scan images **twice** with a minimum **4-week interval**.
- 3 groups were analysed: (1) XR alone, (2) 2D CT only, (3) 2D CT & 3D reconstructions

Primary outcomes:

- Inter-observer and intra-observer reliability (assessed using Fleiss' kappa and Cohen kappa, respectively)
- Validity (assessed as percentage agreement between observers and intra-operative findings being the gold standard)



Intra-observer reliability



- 60 patients were identified and 48 Patients included
- 12 patients excluded because PACS team could not upload the images to CDs due to initial scan performed in different hospitals.

Modality used	Kappa (Median)	IQR	p-value
Radiograph	0.75	0.62-0.79	Radiographs vs 2D CT (p=0.067)
2D CT scan	0.77	0.73-0.94	Radiographs vs 3D CT (p=0.017)
2D + 3D CT	0.89	0.77-0.93	2D CT vs 3D CT (p=0.43)



Interobserver reliability



Modality used	Categorical	Kappa	SE (95% CI)	p-value
First attempt				
Radiograph	Moderate	0.49	0.015 (0.489 to 0.491)	0.000
2D CT	Substantial	0.70	0.020 (0.699 to 0.0702)	0.000
2D and 3D CT	Substantial	0.71	0.021 (0.704 to 0.707)	0.000
Second attempt				
Radiograph	Moderate	0.51	0.016 (0.504 to 0.506)	0.000
2D CT	Substantial	0.71	0.020 (0.709 to 0.712)	0.000
2D and 3D CT	Substantial	0.73	0.021 (0.727 to 0.729)	0.000



Validity



Modality used	Percentage agreement Median	IQR	Difference (p-value)
First round			
Radiograph	73%	48-79	Radiographs vs 2D CT (p= 0.018) Radiographs vs 3D CT (p=0.018) 2D CT vs 3D CT (p=799)
2D CT scan	86%	75-98	
2D + 3D CT	87%	74-100	
Second round			
Radiograph	73%	53-77	Radiographs vs 2D CT (p=0.018) Radiographs vs 3D CT (p=0.028) 2D CT vs 3D CT (p=0.67)
2D CT scan	88%	75-95	
2D + 3D CT	84%	79-97	



Conclusions

- The Wrightington classification system is a reliable and valid method of classifying fracture-dislocations of the elbow.
- CT scans are significantly more accurate than radiographs when identifying the pattern of injury, with good intra- and interobserver reproducibility.