The Impact of Coronal Alignment on Distal Radioulnar Joint Stability Following Distal Radius Fracture

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Objectives

• Newly discovered distal oblique bundle (DOB) of the interosseous membrane (IOM) present in 40% of specimens
• Our objective was to investigate the contribution of the DOB to DRUJ stability after a distal radius fracture

Methods

• 10 fresh-frozen above-elbow specimens
• Transverse distal radius osteotomy at base of sigmoid notch + oblique osteotomy through base of ulnar styloid
• Distal radius plate modified to create shifts of 0, 2, and 4mm in coronal plane
• Specimen attached to exact replica of the testing apparatus by Arimitsu, et al.
• 20N translational force in both directions in neutral, 60° of pronation + supination
• Post-testing dissection to evaluate for distinct DOB (thickness >0.5mm)

Results

• All specimens (n=10): DRUJ volar-dorsal displacement was significantly affected by presence of DOB (p<0.001) and forearm rotation (p<0.001) but not coronal shift
• Specimens with DOB (n=5): DRUJ displacement significantly increased with 2mm coronal shift (p=0.015) and forearm rotation (p<0.001)
• Specimens without DOB (n=5): No significant differences

Conclusions

• A 2mm “coronal shift” adversely impacts DRUJ stability in the setting of ulnar styloid fracture
• This effect is more pronounced in specimens with a distinct DOB
• Reduction of shift is a critical factor in stabilization of DRUJ and may be particularly important in the 40-50% of patients with a DOB
• Coronal shift should be considered alongside other traditional reduction criteria

References


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1.4mm coronal shift