PERCUTANEOUS PINS VS VOLAR PLATES FOR UNSTABLE DISTAL RADIUS FRACTURES: A BIOMECHANICAL STUDY USING A CADAVER MODEL
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Background: Distal radius fractures are very common fractures, comprising 15-20% of all fractures. There are many options available to the surgeon to treat distal radius fractures including percutaneous pinning and internal plate fixation. While percutaneous pin fixation requires less soft tissue trauma and low complication rates, plate fixation allows for early active movement and very good clinical results. To investigate the stability of each method of treatment for dorsally comminuted intra-articular fractures, a biomechanical study using a cadaver model was done.

Methods: This study was performed on 7 fresh frozen cadaver arms in which an unstable intra-articular fracture with dorsal comminution was created. The fracture was first fixed with 1.27mm Kirschner wires inserted in a crossed fashion and tested in a pneumatic loading device. Testing was then repeated after removal of pins and fixation with a DVR volar plate (Hand Innovations). Testing was done in flexion up to 68N and extension up to 100N and the distance across the fracture site was measured.

Results: Volar plating was found to be significantly more stable than pinning with an average movement across the fracture site of 1.07mm +/- 0.47mm compared to 2.51mm +/- 1.27mm when pins were attached (P=0.024). The pins also demonstrated a significant degree of slipping after repeated stressing, while the plates remained stable.

Conclusion: These results demonstrate the superior stability of internal fixation using plates in fixing dorsally comminuted intra-articular distal radius fractures. This improved stability allows patients to start active motion early while providing a stable fixation with a decreased need for immobilization.