

The Safety of Volar to Dorsal Percutaneous Screw Fixation of Bennett's Fracture-Dislocation: A Cadaveric Study

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INTRODUCTION: Bennett's fractures are traditionally fixed with percutaneous K-wires from dorsal to volar, or with a volar to dorsal screw via a volar open approach. We propose a new technique which is mechanically advantageous compared to the dorsal to volar instrumentation while avoiding extensive dissection required for the open volar approach. This technique involves placing a percutaneous guidewire from dorsal to volar, then placing a cannulated screw through the guidewire from volar to dorsal, hence achieving fracture compression. We aim to show safety and feasibility of this approach in a cadaveric study.

METHODS:

Fifteen fresh frozen forearm and hand specimens were obtained from the University of Auckland human cadaver laboratory. The median nerve is dissected from the carpal tunnel. The motor branch of the median nerve (MBMN) was dissected from its origin to where it supplies the thenar musculature. A guidewire is placed under image intensifier from volar to dorsal with the thumb held in traction, abduction, and pronation. The wire is passed through the skin volarly, then the relationship with the carpal tunnel is recorded and the distance to the MBMN is measured.

RESULTS: In 14 of 15 specimens, the wire was superficial and radial to the carpal tunnel. The mean distance to the origin of the MBMN is 6.2mm (95% CI 4.1 to 8.3) with the closest specimen 1mm away. The mean closest distance the wire gets to any part of the MBMN is 3.7mm (95% CI 1.6 to 5.8); in 2 specimens the wire was through the MBMN.

DISCUSSION AND CONCLUSION: Wire placement, although done under image intensifier, is subject to significant variation in exiting location. While research has shown the thenar portal in arthroscopic thumb surgery is safe, our guidewire needs to exit ulnar to the midline to pass orthogonal to most fracture lines, placing the MBMN at risk. This cadaveric study has demonstrated the proposed technique places the MBMN at risk, particularly if the volar fragment is more ulnar.

