

Volar-Ulnar Approach for Fixation of the Volar Lunate Facet Fragment in Distal Radius Fractures: A Technical Tip

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The volar Henry approach is most commonly used for surgical fixation of distal radius fractures. However, this approach is limited in achieving adequate exposure for the fixation of the volar-ulnar portion of the distal radius, rendering it difficult for the ideal placement of the fixation construct. We propose the use of the extensile volar-ulnar approach for fixation of distal radius fracture involving a small volar-ulnar fragment. This approach allows optimal reduction of the sigmoid notch and the volar lunate facet, which anatomically reduces both the radiocarpal joint and the sigmoid notch. In addition, extension of this approach may safely be performed if concomitant carpal tunnel release is necessary. (*J Hand Surg Am. 2016;41(12):e491–e500. Copyright © 2016 by the American Society for Surgery of the Hand. All rights reserved.*)

Key words Articular fracture, distal radius, locked plating, volar lunate facet, volar-ulnar distal radius approach.



THE VOLAR HENRY APPROACH is the most commonly used approach in distal radius fracture repair.¹ However, this approach may limit adequate exposure of the volar-ulnar articular portion of the distal radius.² It requires forceful retraction of the flexor tendons and the median nerve, and fixation may be nonetheless technically challenging owing to poor visualization. Optimal reduction is necessary to avoid poor functional outcomes and to minimize

potential radiocarpal or distal radioulnar joint (DRUJ) arthritis.³ Isolated volar-ulnar corner fractures are rare with a high risk of secondary displacement and volar radiocarpal subluxation when treated without fragment specific fixation.⁴

SURGICAL ANATOMY

The palmar cutaneous and the recurrent motor branches of the median nerve as well as the palmar cutaneous branch of the ulnar nerve are not at risk in this approach.⁵ Connections between the median nerve and the ulnar nerve are not infrequent in the forearm. In an anatomical study, Kazakos et al⁶ described connections between the median and ulnar nerves in 10%. The connections to the ulnar nerve were, on average, 11 cm distal to the medial epicondyle. These are located too proximal to be encountered in this approach. Distally in the hand, the Berrettini connection was found in 43% of cadavers with an average distance from the distal transverse carpal ligament of 8.5 mm in type I and 2 mm in types

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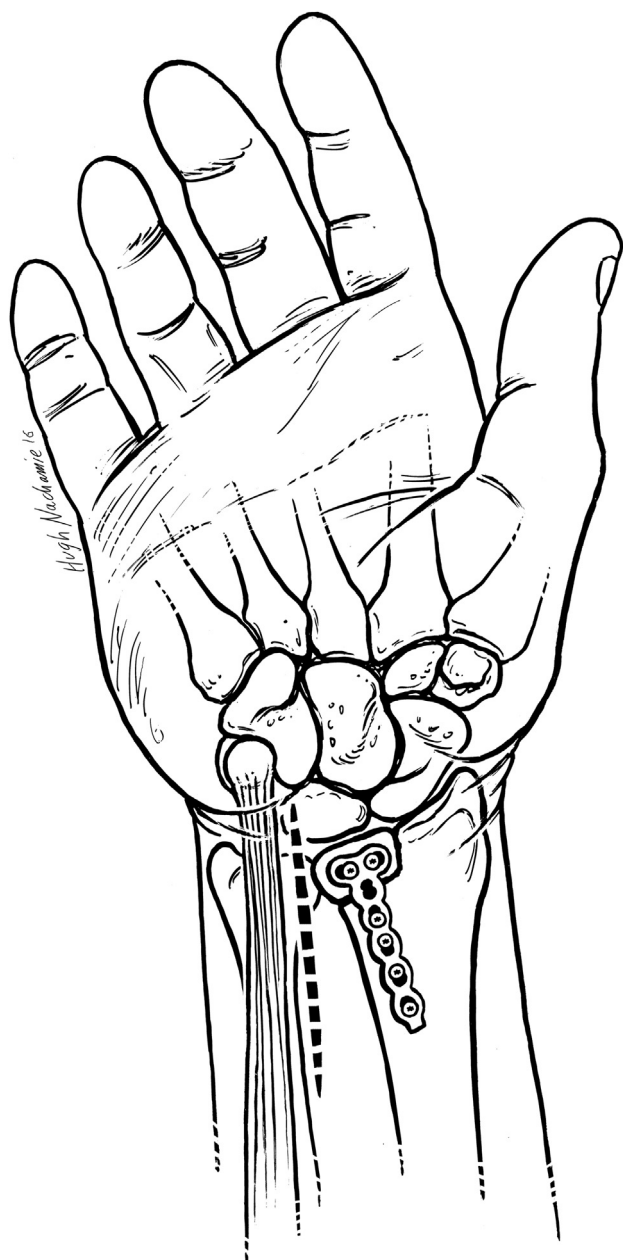


FIGURE 1: Volar-ulnar approach (no carpal tunnel release). The incision is made radial to the flexor carpi ulnaris (FCU), ending at the distal volar wrist crease.

II and III.⁷ Nevertheless, if carpal tunnel decompression is performed with concurrent distal radius fracture reduction and fixation via the volar-ulnar extensile approach, it should be an open release to allow direct visualization.

In a cadaveric study by Uzel et al,⁸ the authors performed a volar-ulnar approach and did not find any nerve connections between the ulnar neurovascular bundle and the median nerve. Pourgiezis et al⁹ report an extensile ulnar approach performed for a variety of pathologies in a series of 51 patients, with no substantial

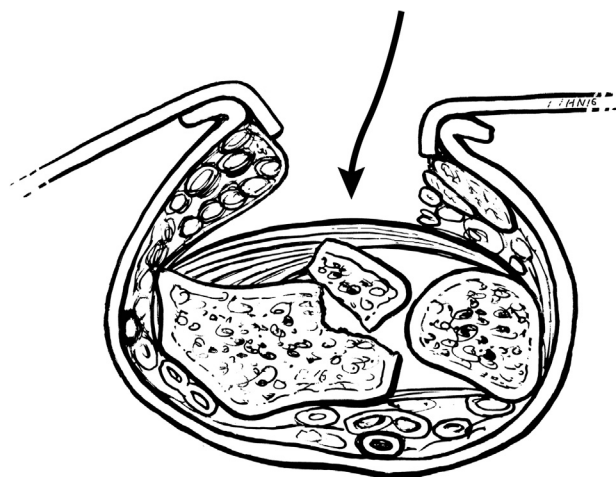


FIGURE 2: The ulnar neurovascular bundle and the FCU are retracted ulnarly and the flexor tendons and median nerve are retracted radially *en bloc*.

complications. This approach is different from the direct volar midline approach that requires direct median nerve mobilization. This approach has been associated with a high rate of temporary and persistent postoperative nerve irritation.¹⁰ Accessory origin of the abductor digiti minimi muscle from the palmaris longus may also rarely be encountered.¹¹ It is then necessary to either retract this muscle radially or transect it as it courses obliquely across Guyon's canal. This accessory muscular origin was found in 1 of the 10 cadaveric specimens in the study.⁸

INDICATIONS

This described technique may be used for fixation of distal radius fractures involving the volar-ulnar or ulnar portion of the distal radius corresponding to the AO type B3.1 (single small volar rim fragment including a portion of the articular surface), B3.2 (large volar ring fragment), B3.3 (volar shearing fracture), and C1.2 (complete simple articular fracture). In addition, complex fractures that have an associated volar-ulnar fragment as well as distal radius fractures with severe median nerve compression or perilunate dislocations may be addressed using this exposure.

SURGICAL TECHNIQUE

The patient is positioned supine with the arm resting supinated on a hand table with an upper arm tourniquet.

Volar-ulnar approach (no carpal tunnel release)

A 5-cm longitudinal incision is made beginning at the midpoint between the flexor carpi ulnaris (FCU) and the palmaris longus, ending at the distal volar wrist

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