Pronator-Sparing Technique for Volar Plating of Distal Radius Fractures

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Acute distal radius fractures are commonly treated by volar locking plate fixation and typically involve reflection of the pronator quadratus for adequate exposure of the fracture. Recently, attention has been centered on the role and repair of the pronator quadratus. This article presents an alternative approach to fixation of distal radius fractures with a pronator-sparing technique that offers similar short-term radiographic outcomes to the conventional volar plating approach. *(J Hand Surg Am. 2014;39(12):2506–2511. Copyright © 2014 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Distal radius fracture, pronator-sparing technique, volar locking plate.

The conventional approach for volar plating of distal radius fractures involves release of the insertion of the pronator quadratus (PQ).[1] After fracture fixation, some authors recommend repairing the PQ muscle,[1,2] but this repair is difficult and often incomplete owing to the contused and friable condition of the muscle.[3,4] Postoperative scarring around the PQ can lead to decreased pronation strength[5] and impede forearm rotation.[4] In addition, the muscle has other functions that may be disrupted, including its robust blood supply from the anterior interosseous artery and its stabilizing effect on the distal radioulnar joint. These problems have led some authors to conclude that sparing the PQ during surgery is desirable.[3,6,7] A recent cadaveric study concluded that satisfactory fracture fixation could be achieved for most distal radius fractures through a pronator-sparing approach.[4] The pronator-sparing approach in this study is similar to that described by Dos Remedios et al.[7] It involves preserving the PQ insertions and requires only minimal elevation of the undersurface of the muscle. This technique creates a pocket underneath the pronator quadratus to insert the volar plate. The intended purpose is to preserve function and possibly prevent tendon injury.

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INDICATIONS AND CONTRAINDICATIONS

Indications for pronator-sparing fixation of distal radius fractures included fractures meeting at least 3 factors of instability: dorsal angulation more than 20°, dorsal comminution, intra-articular radiocarpal fractures, associated ulna fractures, and age greater than 60 years.[8] The pronator-sparing approach was used for both acute extra-articular and intra-articular distal radius fractures. Malunions, nonunions, and patients with delayed presentation for which reduction required extensive soft tissue release were excluded from pronator-sparing fixation. Furthermore, fractures requiring fragment-specific plating and stable distal radius treated nonsurgically by immobilization were also contraindications for the pronator-sparing approach.

SURGICAL TECHNIQUE

A longitudinal incision is made over the flexor carpi radialis (FCR) tendon. The tendon is identified and mobilized ulnarly. The floor of the flexor carpi radialis tendon sheath is incised in line with the skin incision. The flexor pollicis longus muscle belly is bluntly swept to the ulnar side and the fracture

FIGURE 1: Exposure of the PQ.

FIGURE 2: Transverse incision along the distal aspect of the PQ.

fragments are identified along with the PQ (Fig. 1). A transverse incision is made along the distal edge of the PQ (Fig. 2), and a Freer elevator is used to form a path for the plate (Fig. 3). The selected plate is laid on top of the PQ in estimation of its final position

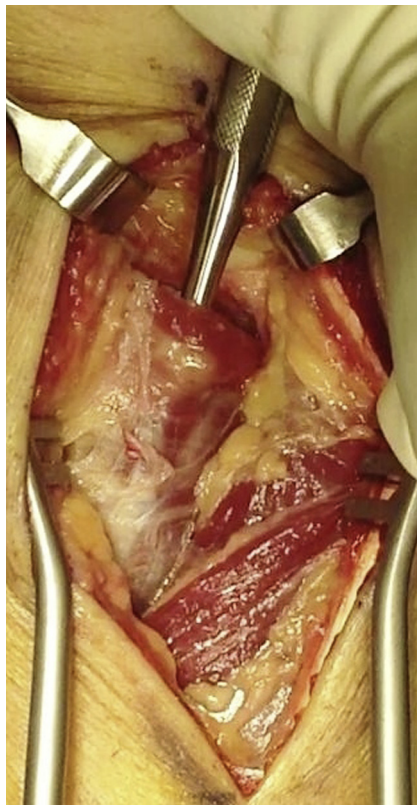

FIGURE 3: The PQ is elevated with a Freer elevator.

(Fig. 4), and fluoroscopic images are obtained to confirm satisfactory plate size and location. The plate is then slid in a retrograde direction underneath the PQ to its preferred position (Fig. 5). A large reduction bone-holding tenaculum reduces the fracture to the plate (Figs. 6, 7). For provisional fixation after fracture reduction, K-wires are placed through the distal and proximal aspects of the plate. A transverse stab incision is made in PQ in the area over the oblong hole (Fig. 8). The plate is fixed proximally with a bicortical screw through this hole. Fracture reduction may be fine-tuned under fluoroscopic guidance and then the fracture is fixed distally with locking screws. The holes in the shaft of the plate are accessed via gentle retraction of the PQ either proximally or distally, or by retraction through the stab incision already made in the PQ muscle belly. The K-wires are removed and final x-rays confirm satisfactory reduction and implant positioning. A simple absorbable suture can be placed to repair the stab incision in the PQ before wound closure (Fig. 9).

POSTOPERATIVE MANAGEMENT

All patients were managed postoperatively with a volar resting orthosis or velcro wrist brace worn for patient comfort until sutures were removed. Active