Extraction of Cannulated Percutaneous Screw From Scaphoid: A Simplified Technique

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Removal of a cannulated headless screw following scaphoid fixation, when necessary, can prove to be difficult due to loss of bony integrity and the shape of the screw. This can result in greater exposure and more extensive soft tissue dissection for removal of the hardware. We describe a simple technique for percutaneous extraction of this hardware that can be done reliably with no additional equipment. *(J Hand Surg 2012;37A:1702–1705. Copyright © 2012 by the American Society for Surgery of the Hand. All rights reserved.)*

Key words Fracture, percutaneous, scaphoid screw, technique.

The scaphoid is the most commonly fractured carpal bone in the wrist, with reported incidence of 38 cases per 100,000 people.[1] Open reduction and internal fixation of displaced fracture is well accepted as the treatment of choice to optimize outcome and diminish nonunion rates.[2] Recently, the paradigm has shifted in treatment of nondisplaced fractures of the waist and proximal pole of the scaphoid to minimally invasive techniques of open reduction and internal fixation of these fractures, which reduces immobilization times and returns patients back to activity earlier.[3] The application of cannulated headless screws has been ideal for both open and minimally invasive techniques.

Use of headless screws to repair scaphoid fractures has become popular among hand surgeons since its introduction in the 1980s.[4] To facilitate the use of this hardware, the newer-generation screws are cannulated and can be applied percutaneously when appropriate. The technique of percutaneous screw fixation of the scaphoid is well described through both anatomical and clinical studies.[5–7]

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FIGURE 1: J-shaped hook. The pin is bent and cut to create a slight bend that can hook around the end of the screw as the pin is distracted.

FIGURE 2: Removal of the screw. The hardware is unscrewed by the surgeon while an assistant provides distraction on the pin to provide a pulling force on the screw.

Following percutaneous screw fixation, there is rarely a need for hardware removal. Occasionally, removal of the screw might become necessary if there are complications of fixation or if screws become prominent. This task can prove to be challenging, as some screw designs are tapered and/or require the application of forward pressure to maintain the screwdriver in the head. The challenge is usually overcome through larger exposure and more extensive dissection. In addition a second instrument (eg, a freer elevator) is usually needed to stabilize the hardware and facilitate extraction as it is unscrewed. We describe a simplified tech-

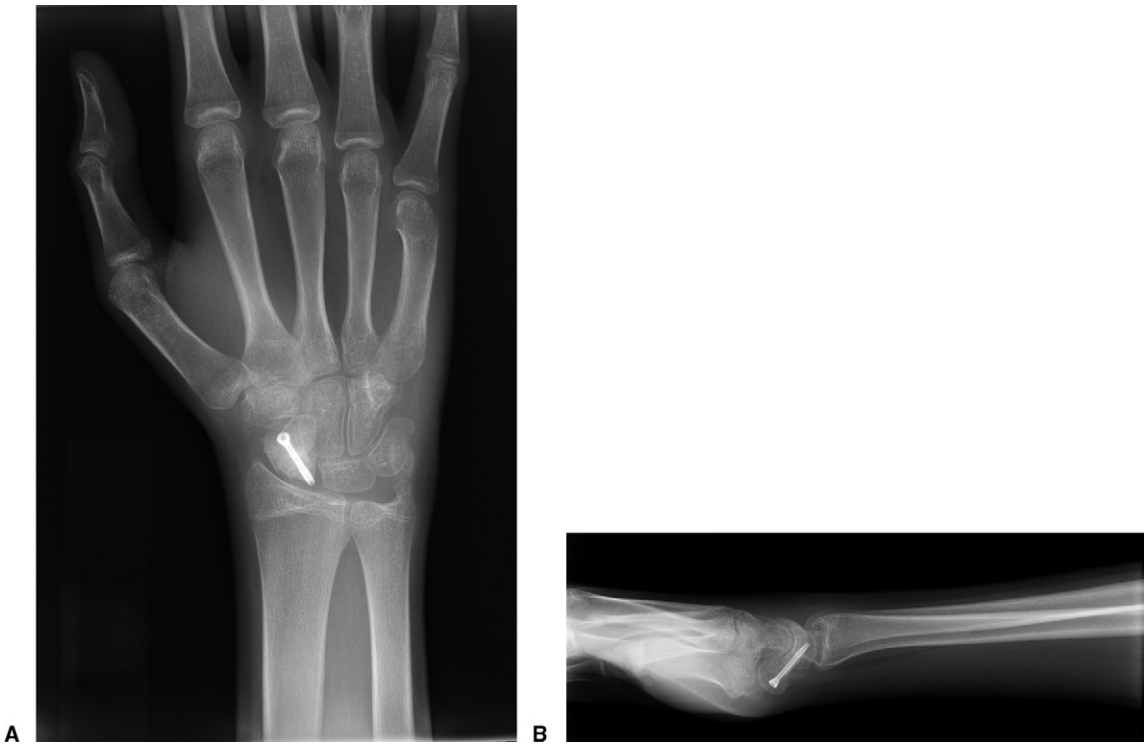

FIGURE 3: Radiographs 8 weeks following repair of subacute scaphoid fracture. **A** Posteroanterior view shows a fractured tricortical graft, with no integration of tricortical iliac bone graft in the scaphoid. **B** Lateral view shows evidence of bone loss around the hardware.

FIGURE 4: Computed tomography scan of the scaphoid at 8 weeks following repair. Protrusion of the screw is evident at the radiocarpal joint.

nique for percutaneous hardware removal following rigid fixation of the scaphoid with a cannulated headless screw.

INDICATIONS

Extraction of a headless screw from the scaphoid is indicated in any circumstance in which either end of the screw is prominent, causing pain, or grinding against an articular surface following fixation. In addition, if the screw must be removed for revision or salvage procedures, this technique might be indicated.

SURGICAL TECHNIQUE

After the patient is anesthetized (regional or general), the extremity is placed on an appropriate arm table. A Steinmann pin or Kirschner wire matching the size of the cannulated guidewire (typically a 1.14-mm or 0.9-mm [0.045-in or 0.035-in] wire, depending on the manufacturer) is percutaneously guided into the cannulated screw and verified under fluoroscopic imaging. This pin is then pushed through the screw, out the opposite side of the wrist, and through the skin. It is important to pass the pin through soft tissue only. For screws placed dorsally, the trapezium must be cleared by the pin to proceed with this technique.

The pin is then bent approximately 60° to 70° with a pin bender and is cut about 2 mm beyond the bend on the pin. This creates a J-shaped hook at the dorsal end of the pin (Fig. 1). The pin is pulled back until the J tip engages the far end of the screw. Fluoroscopic imaging should be used to confirm that the J tip of the pin has cleared all the soft tissue and is hooked against the screw end. A cannulated screwdriver from the