Scaphoid Fracture Fixation with an Acutrak® Screw

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We report a case of fixation of a scaphoid fracture using an Acutrak® screw. This screw is cannulated and headless, which allows it to be implanted below the surface of the bone. It uses the same concept of variable thread pitch as the Herbert screw, but unlike the Herbert screw, is fully threaded, with continuously varying pitch along its length. This variable pitch creates constant compression across a fracture as the screw is advanced, and gives the screw its unique appearance. This feature may improve internal holding power, as well as allow a fracture or osteotomy site to lie anywhere along the length of the screw.

Case Report

We report a 33 year old male with persistent left wrist pain after a fall onto his outstretched hand. Physical exam demonstrated swelling and point tenderness at the anatomic snuffbox. Wrist radiographs confirmed a comminuted, mildly displaced fracture of the distal scaphoid (Figure 1).

Internal fixation of the fracture was performed utilizing an Acutrak® screw ([Acumed, Beaverton, Oregon](#)) (Figures 2 and 3). During follow-up visits at 4 and 8 weeks, the patient reported progressively decreased pain and improved left wrist function. Follow-up radiographs demonstrated continued healing of the fracture, and the remainder of the patient's recovery was uneventful.

Discussion

Scaphoid fractures are the most commonly fractured carpal bone, and frequently occur following a fall on an outstretched hand, as in this case. These fractures are reported to represent 2 – 7% of all fractures and over 70% of all hand fractures presenting to emergency departments (1). Cast immobilization has long been the time-honored

treatment for stable scaphoid fractures, with surgery reserved for unstable fractures (2). While the majority of scaphoid fractures heal uneventfully with conservative management, the prevalence of scaphoid nonunion may range from 5 – 12% (3). Therefore, there has been increased interest in percutaneous screw fixation for stable fractures. Recent studies suggest that internal fixation of these fractures results in shortened recovery time over cast

Figure 1. Anteroposterior (AP) radiograph of the left wrist demonstrates a comminuted fracture of the distal pole of the scaphoid with minimal angulation.

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Abbreviations: AP, anteroposterior

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Figure 2. Intraoperative oblique radiograph of the left wrist demonstrates an Acutrak® screw advanced over a guide-wire, bridging the scaphoid fracture.

and early mobilization without adverse effects on fracture healing (4, 5). Another advantage of internal fixation is the constant compression it provides in treating scaphoid fracture nonunion (6).

A number of screws have been used to provide compression across scaphoid fractures, including the Herbert screw (Figure 4), which is cannulated and threaded at both ends (7, 8). In the Herbert screw, these threads run in the same direction, but the proximal portion has a wider pitch to its thread. Thus, when the proximal threads engage in the bone, they tend to move through the bone faster than the threads at the distal end, causing the two ends of the bone to compress together. This screw is used where a standard screw would impinge on adjacent tissues, such as in the treatment of scaphoid or osteoarticular fractures.

Orthopedists at our institution are now using the Acutrak® screw for the treatment of most scaphoid fractures. This screw, like the Herbert screw, is cannulated, allowing insertion over a percutaneous guide wire, which results in extremely accurate screw placement. The Acutrak® screw is tapered, which forces the screw threads to engage fresh bone as it is inserted. It is also self-tapping – that is, it cuts its own threads as it is inserted into the bone. It uses the same concept of variable thread pitch as the Herbert screw,

Figure 3. Postoperative scaphoid view demonstrates the Acutrak® screw bridging the scaphoid fracture.

Figure 4. A Herbert screw bridging a scaphoid fracture in another patient.

but unlike the Herbert screw, is fully threaded, with continuously varying pitch along its length. This feature may improve internal holding power, as well as allow a fracture or osteotomy site to lie anywhere along the length of the screw. The Acutrak® screw is also headless, which allows it to be implanted below the surface of the bone. The headless nature of these screws also allows them to be left in place once the fracture has healed. In our institution, Acutrak® screws are only removed in cases of failed fixation.

Studies comparing the Acutrak® screw to various other screws have shown it to be equal or better in maintaining compression and resisting bending stress with movement (9, 10). In addition, its headless design helps to avoid motion interference. Our case provides a radiographic demonstration of the Acutrak® screw as it is becoming more common in orthopedic practice.

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