Percutaneous Scaphoid Fixation: A Volar Approach
Surgical Technique

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Introduction

Scaphoid fractures are common and lead to significant physical and economic morbidity. The great majority occur in young men who may be manual workers or may be involved in athletic activity. The avoidance of plaster immobilization in these patients would be very desirable as conservative treatment can be prolonged and unpredictable, and non union is frequent.

The operative management of scaphoid fractures still generates significant debate. Screw fixation has become an accepted method for the treatment of displaced fractures and for non unions of the scaphoid. The role of surgery for the acute, minimally displaced or undisplaced fractures remains unclear. Acute fixation permits rapid mobilization and consequently an earlier return to full function. The open procedure for fixation of the scaphoid is associated with extensive soft tissue stripping and damage to the anterior radio-carpal ligaments. Scar pain is also a significant post operative problem. A closed procedure allows day case surgery for scaphoid fixation and early mobilization with fewer complications.

The Acutrak screw is a headless, highly polished, tapered, self tapping, fully threaded, cannulated device designed to provide interfragmentary compression.

Surgical Technique

Percutaneous scaphoid fixation using the Acutrak screw can be performed under general or regional anaesthesia. The patient is placed supine on the operating table, the forearm and hand are prepared and draped in a standard fashion (the use of a tourniquet is optional). The thumb is suspended in a Chinese finger trap. This extends the scaphoid and ulnar deviates the wrist to improve access to the distal pole of the scaphoid. It also allows free rotation of the hand and facilitates image intensification during
the procedure. The image intensifier C arm is turned to a horizontal position and remains in a static position throughout the operation.

Ulnar deviation of the wrist allows the scaphoid to slide out from under the radial styloid process. In this position, with image intensifier control, a longitudinal stab incision of 0.5 cm. is made at the most distal radial aspect of the scaphoid, and blunt dissection is carried out using a clip until the distal pole of the scaphoid is accessed. A percutaneous guide-wire is introduced into the scapho-trapezial joint. Care must be taken not to bend the guide-wire.

Once the guide wire is deemed to be in a satisfactory position, a depth gauge is used to assess the length of the screw. The guide wire can be advanced to prevent loss of position and a second wire inserted for extra stability. The drill is then inserted to drill the path for the screw. A drill guide is used to protect the soft tissues. The self tapping screw is then inserted and the wire is removed. Compression can then be confirmed radiographically on the image intensifier. Skin closure can usually be carried out with a single suture which is covered with a sterile dressing. The tourniquet is released and the arm elevated. Plaster immobilization is entirely optional and is not used in our unit when fixation appears stable. The patient is discharged the same day and
reviewed after 10 days for removal of sutures, radiographic follow up and the initiation of formal physio-therapy.

**Post Operative Review**

The arm is elevated immediately post-operatively, and routine post anaesthetic and neurovascular observations recorded. The patients are encouraged to begin active finger exercises prior to discharge. The patients are reviewed ten days post operatively. Sutures are removed at this stage and carpal radiographs taken (to confirm that screw position is satisfactory). At this stage patients are allowed to mobilize gently, but no heavy lifting or weight bearing activity is permitted. They are reviewed again four weeks later and further radiographs taken. Return to sedentary work is allowed as soon as the patient feels ready or when 75% of the contralateral range of movement is achieved. Manual work and athletic activity are deferred until evidence of fracture union is seen. Patients are advised to wear a supportive splint for contact sports.
Instrumentation

• Place guide wire at desired screw placement location.

• Measure wire depth to estimate screw length.

• Advance guide wire to far cortex.
• Drill bone, advancing drill slowly, clearing debris regularly.

• Install implant that is one size smaller than the drill depth so that the screw can be fully buried below the cartilage and cortical surface.

• If excessive resistance is met upon installation, remove screw, and advance the drill one size deeper and reinstall screw.
**Specifications**

**MINI-Acutrak™**

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<th>Length</th>
<th>Specifications</th>
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<tr>
<td>2.8mm</td>
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<td>Ø0.035 (.7mm) cannulation</td>
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**STD. Acutrak®**

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<td>Ø0.045 (1.1mm) cannulation</td>
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**Rules of Acutrak**

1. Always install a screw at least one size smaller than your drill depth. *(This will assure that the screw is fully buried below the bone.)*

2. If resistance is met on insertion: STOP, remove the screw and drill at least one (1) size deeper or install a smaller screw. *(Dense bone can make a screw more difficult to bury.)*

3. When placing a screw through thick cartilage (i.e. the hip or knee) always install a screw at least two sizes smaller than your drill depth. *(This will assure that the screw is below the level of cartilage.)*

4. Before drilling, be sure to advance the guide wire. *(This step will help keep the guide wire in the bone when removing the drill.)*
System Components

**Mini-Acutrak™**

- **Mini-Acutrak™ X-Ray template** FATM-01
- **Guide-wires:**
  - WS-0906ST
  - (Optional) WS-0704ST
- **Screw sizer** ATM-070
- **Cannulated drill tip** ATM-078
- **Long cannulated drill tip** ATM-099
- **Drill handle assembly** ATM-050
- **1.5mm cannulated hex driver assembly** HD-1509
- **Hex wrench** AT-7004
- **1.5mm Solid Hex Driver Assembly** HDM-1500
- **Plunger** ATM-060
- **Mini-Acutrak™ tray** ATM-031

**STD. Acutrak™**

- **X-Ray template** FATR-06
- **Guide wires SS:** WS-1106ST
- **Screw sizer** AT-7010
- **Cannula** AT-7020
- **Tapered cannulated drill tip** AT-7032
- **Drill handle** AT-0003
- **Driver handle hex wrench** AT-7004
- **2.0mm cannulated hex driver assembly** HD-2011
- **2.0mm Solid Hex Driver Assembly** HDL-2000
- **Acutrak® plunger** AT-7060
- **Acutrak® tray** AT-7017