

## KING TONGS: Fracture Reduction in Lower Extremity Surgery

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### INTRODUCTION

Use of reduction forceps in bone and joint surgery is commonplace, and adequate access to placement of reduction forceps is often limited by soft tissue constraints and bony confinements. The hindfoot and ankle remain difficult areas to gain access to from a cross-foot or cross-ankle approach. Certain fracture locations or configurations make traditional fractures difficult to reduce, and there is a need for a large reduction forcep that can span a fracture line while not becoming encumbered by the leg and foot.

The author will present 2 cases where traditional fracture reduction was complicated by fracture location and configuration, necessitating the use of the Synthes King Tong reduction forcep (Synthes, Paoli, PA) to gain adequate fracture reduction leading to the placement of internal fixation hardware. The King Tong reduction forcep is a unique device that allows the reconstructive and trauma foot and ankle surgeon flexible options for fracture reduction unencumbered by the confinements of the contours of the hindfoot and ankle.



Figure 1. Lateral radiograph demonstrating intra-articular joint depression fracture of the left calcaneus, with significant displacement and dislocation of the lateral half of the posterior facet.

### Case 1

A 59-year-old man (6'1" 272 pounds) was referred 6 weeks after sustaining a closed fracture of the left calcaneus after missing a step descending a ladder. The injury was initially evaluated by a local emergency room and the fracture was not identified until 4 weeks following the injury. A radiograph (Figure 1) and magnetic resonance image (MRI) demonstrated a comminuted intra-articular joint depression fracture of the calcaneus with 1.5 cm lateral displacement of the lateral half of the posterior facet of the calcaneus. The fragment was dislocated superiorly abutting the lateral malleolus.

Intraoperative reduction of the lateral half of the posterior facet was attempted after temporary reduction of the middle facet fracture line; however, the fragment was resistant to lateral-to-medial reduction (Figure 2). Two King Tong reduction forceps were then used to gain lateral-to-medial reduction of the primary fracture line (Figure 3). Toggling and compression of the fracture to a reduced position was achieved using the King Tong reduction forceps. The proximal reduction forcep was then left in place while the distal one was removed. The tong's tip was placed in the desired location of the internal

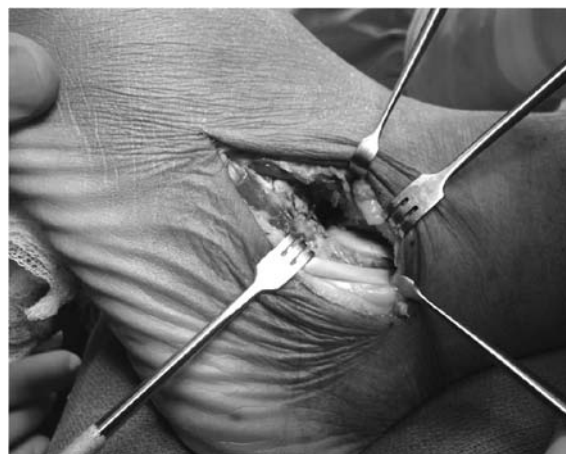


Figure 2. Intraoperative attempt at reduction of the lateral half of the posterior facet. After curettage of the fibrous organized hematoma, lateral-to-medial reduction of the primary fracture line was resistant to reduction.



Figure 3. Intraoperative reduction of the posterior facet using the King Tong forceps.



Figure 4. Screw fixation of the lateral facet fracture while maintaining fracture reduction with one of the King Tong forceps. The tip of the forcep has a puncturing tip which acts as a pre-drill hole for screw fixation.



Figure 5. One year postoperative lateral radiograph demonstrating stable alignment of the fracture line which is well-reduced and consolidated, with no loss of joint space and no evidence of traumatic arthritis.



Figure 6. Appearance of patient upon arrival with open pilon fracture.

fixation screw, which was used to direct the compression screw from lateral to medial (Figure 4). Four partially-threaded screws were placed from lateral to medial, maintaining the reduction across the posterior and middle facets. The patient was followed for one year following the surgery and remains pain-free with normal joint motion and no evidence of traumatic arthritis (Figure 5).

## Case 2

A 36-year-old woman (5'6" 320 pounds) was involved in a motor vehicle accident and sustained an open pilon fracture of her right lower extremity. The patient was admitted to the hospital and underwent surgery within 4 hours of the time of injury. Upon arrival, the foot was 90 degrees externally rotated on the leg and the medial malleolus was extruded out the skin through the medial

aspect of the ankle. Neurovascular status to the foot was not impaired with normal doppler examination to the arteries into the foot, and intact sensation to the major nerves of the foot (Figure 6). Radiographs demonstrated the severe comminution of the ankle joint with a high fibula fracture (Figure 7).

Surgery started with aggressive pulsed lavage of the open fracture site and debridement of nonviable tissue, followed by intraoperative culture of the wound. The medial malleolus was reduced and temporarily pinned to the proximal tibia. A lateral approach was then used to reduce and plate the fibula with a locking plate. The King Tong reduction forcep was then employed to reduce the syndesmosis diastasis, inserting one arm of the forcep into a hole in the plate and the opposite arm capturing the tibia just proximal to the medial malleolar fracture line (Figure 8). With the reduction forcep in place, intraoperative

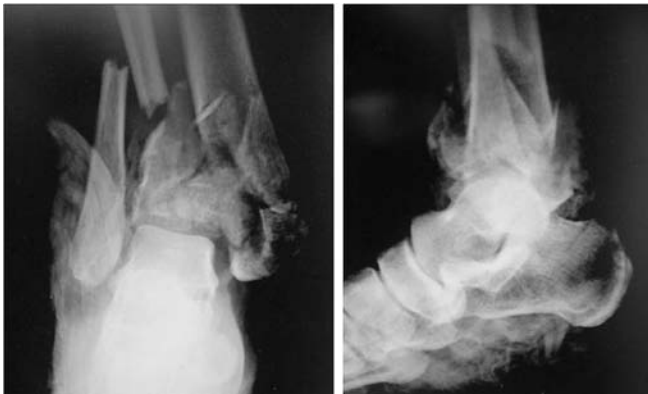


Figure 7. AP and lateral radiographs prior to surgery.



Figure 8. Reduction of the syndesmosis using the King Tong forcep.



Figure 9. Three month postoperative radiograph showing good fracture alignment and consolidation and stable hardware placement.

fluoroscopy was used to direct the realignment of the syndesmosis, and trans-syndesmotic screw fixation was placed through the plate into the tibia. A medial plate was placed on the medial tibia spanning the malleolar fracture. Primary closure of the open laceration and incisions was performed. The patient was observed in the hospital for several days prior to discharge. Intraoperative wound cultures failed to reveal any growth and the wounds healed uneventfully. The patient was dispensed an ultrasound bone stimulator for daily use, and was managed nonweight bearing for 3 months, in addition to anticoagulant therapy. Adequate bone consolidation and alignment was noted at the 3-month visit (Figure 9).