SURGICAL TECHNIQUE

Radial Head Fracture Fixation Using Tripod Technique With Headless Compression Screws

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Radial head and neck fractures are one of the most common elbow fractures, comprising 2% to 5% of all fractures, and 30% of elbow fractures. Although uncomplicated Mason type I fractures can be managed nonsurgically, Mason type II–IV fractures require additional intervention. Mason type II–III fractures with 3 or fewer fragments are typically treated with open reduction and internal fixation using 2 to 3 lag screws. Transverse radial neck involvement or axial instability with screw-only fixation has historically required the additional use of a mini fragment T-plate or locking proximal radius plate. More recently, less invasive techniques such as the cross-screw and tripod techniques have been proposed. The purpose of this paper is to detail and demonstrate the proper implementation of the tripod technique using headless compression screws. *(J Hand Surg Am. 2018;■(■):1.e1-e6.*

Key words Tripod technique, radial head fracture, open reduction internal fixation, headless compression screws.

Online Exclusive

RADIAL HEAD AND NECK FRACTURES ARE one of the most common elbow fractures, making up approximately 2% to 5% of all fractures, and 30% of elbow fractures.[1] Although uncomplicated Mason type I fractures can be managed nonsurgically, Mason type II–IV fractures require additional intervention. Mason type II–III fractures with 3 or fewer fragments are typically treated with open reduction and internal fixation using 2 to 3 lag screws. Transverse radial neck involvement or axial instability with screw-only fixation has historically required the additional use of a mini fragment T-plate or locking proximal radius plate. More recently, less invasive techniques such as the cross-screw and tripod techniques have been proposed.[2]

The purpose of this paper is to detail and demonstrate the proper implementation of the tripod technique using headless compression screws. In addition to being a quick, simple, and less invasive technique than plating, the buried nature of headless compression screws avoids interference with the proximal radioulnar joint and allows for fixation outside of the safe zone—the 100° arc of the lateral radial head between the radial styloid and Lister tubercle. The 3-screw approach also allows for more perpendicular compression of transverse radial neck fractures than a 2-screw approach, which is typically employed for more obliquely oriented fractures. Several studies have shown screw-only approaches to be comparable in strength and efficacy to traditional plate and screw fixation.[3–5] For these reasons, we believe the tripod

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Arthrex provided access to cadaver lab and donated screws for demonstration and illustration of tripod technique.

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FIGURE 1: Lateral right elbow marked for the Kocher approach from the posterior lateral epicondyle to the posterior olecranon 6 cm distal to tip.

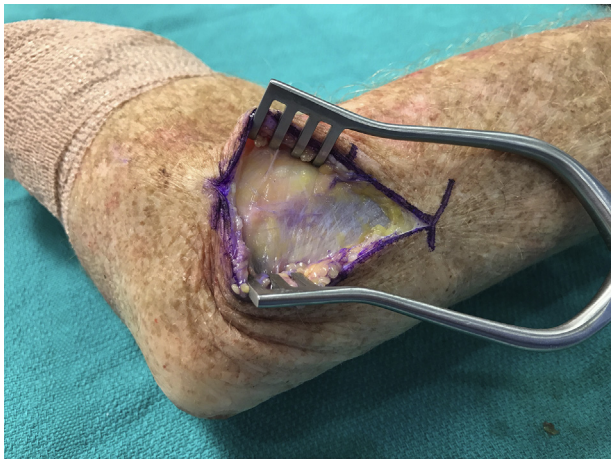

FIGURE 2: Identification of the interval between the anconeus and the extensor carpi ulnaris.

technique to be a useful construct worthy of being used and studied further as an alternative to plate fixation of radial head and neck fractures.

INDICATIONS AND CONTRAINDICATIONS

Indications

The primary indication for the tripod technique is a Mason type II radial head fracture, and it may be used with both articular fractures and extra-articular transverse radial neck fractures. Mason type III fractures with 3 or fewer fragments and Mason type I fractures with mechanical block on physical examination may also be appropriate indications. The procedure may be performed in conjunction with repair of additional bony fractures or ligamentous injuries.

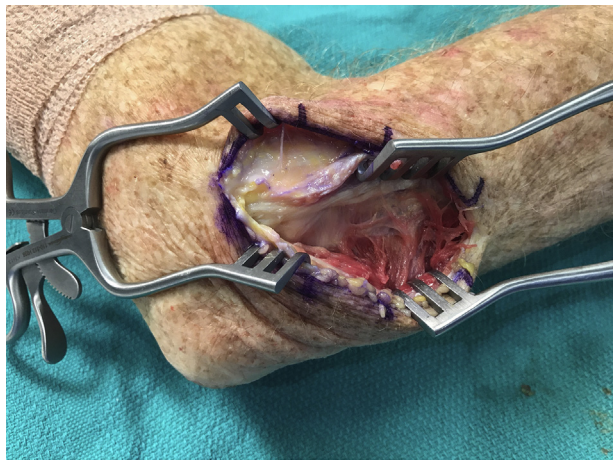

FIGURE 3: Incision of the elbow joint capsule.

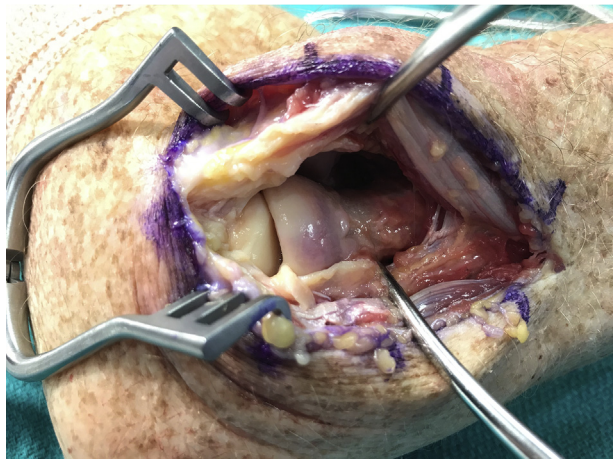

FIGURE 4: Exposure of radial head and neck, before osteotomy in this demonstration.

Contraindications

Severe comminution with greater than 3 fragments is a contraindication to open reduction and internal fixation, and would be an indication for a radial head arthroplasty.[6] Mason type I fractures without a mechanical block are also contraindicated, given the excellent outcomes achievable with nonsurgical management.[7,8]

SURGICAL ANATOMY

The standard posterolateral or Kocher approach to the elbow is used. The patient is positioned supine on the operating table. The affected extremity may be placed over the chest or on a hand table, with the forearm in a pronated position. The lateral epicondyle and radial head are palpated. An incision is made extending from the posterior lateral epicondyle