

# Olecranon Fractures



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## KEYWORDS

• Olecranon fracture • Review • Outcomes • Locking plate • Tension band • Intramedullary nail

## KEY POINTS

- A majority of olecranon fractures occur from a low-energy mechanism, such as a fall from standing height in a middle-aged patient, and result in a displaced yet noncomminuted fracture.
- Goals of olecranon fracture fixation are to restore joint stability, articular congruity, and the triceps extensor mechanism with stable fixation to allow for early range of motion.
- Tension band wiring (TBW) acts essentially only as a static compression device and not a dynamic compression device. Recent trends have seen an increased use of locking plate and intramedullary nail fixation.
- A majority of olecranon fractures heal uneventfully with good/excellent results with a small loss of motion to be expected. Due to the subcutaneous nature of the olecranon hardware, irritation continues to be a potential postoperative issue.

## INTRODUCTION

Olecranon fractures are common upper extremity injuries that are usually the result of a direct blow onto the elbow after a fall from standing height. Less commonly they result from an indirect tension injury from the triceps attachment. Although a majority are treated surgically, there still is some debate regarding the optimal surgical fixation technique. This has led to a shift from TBW to locking plate fixation and, more recently, intramedullary fixation. Although most patients can expect a good outcome, there are some well-known complications, including loss of motion, hardware irritation, and wound healing problems. This article reviews the available evidence and current understanding of olecranon fractures.

## ANATOMY

The elbow is a trochoid joint with various contributions to stability from osseous and soft tissue

structures. The olecranon and coronoid processes compose the greater sigmoid notch and are separated by an area of the articular surface devoid of hyaline cartilage, commonly referred to as the “bare spot.” More recently there has been better understanding of the unique anatomy of the proximal ulna. The sagittal anatomy of proximal ulna is variable but 96% of patients have dorsal angulation, known as the proximal ulnar dorsal angulation, which averages 5.7°.1–3 The proximal ulna also has on average 14° of varus angulation.4 This is important because it pertains to implant selection, especially with precontoured locking plates.4

## EPIDEMIOLOGY

Olecranon fractures represent approximately 10% of all upper extremity fractures. From retrospective data collected through a trauma database in Edinburgh, Scotland, fractures of the olecranon

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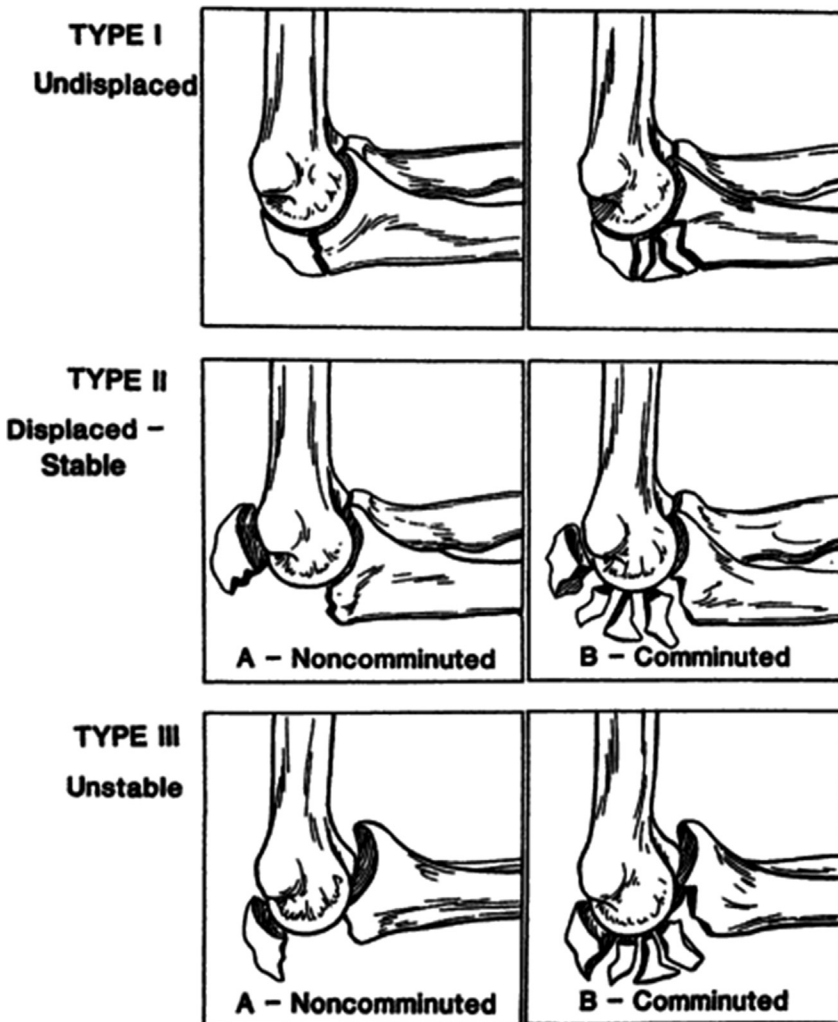
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accounted from 0.9% of all fractures and 18% of all proximal forearm fractures and have an overall incidence of 12 per 100,000 people. By far the most common mechanism was a fall from standing height, representing 70% of all olecranon fractures. Less commonly, high-energy mechanisms, such as those resulting from sporting event or motor vehicle accidents, result in direct trauma whereas an indirect avulsion fracture can result due to the triceps attachment; 22% of all olecranon fractures resulted in an associated ipsilateral upper extremity injury, with fractures of the radial head and neck the most common. The mean age of all olecranon fractures was 50 years for men and 63 years for women.

The most common fracture seen was a simple, displaced fracture representing 73.5% of all such injuries.<sup>5</sup>

## CLASSIFICATION

Three main classification schemes exist for olecranon fractures. The Mayo classification was described by Morrey<sup>6</sup> and is based on several factors, including displacement, comminution, and elbow stability. Type I is nondisplaced, type II is displaced but the elbow is stable, and type III is displaced with elbow instability. Groups are further subclassified into groups A and B based on the presence of comminution<sup>6</sup> (Fig. 1).



**Fig. 1.** Mayo classification of olecranon fractures as described by Morrey. Type I fractures are nondisplaced, type II fractures are displaced, and type III fractures represent elbow instability. Fractures are further subclassified into types A and B, indicating the presence or absence of comminution. (Modified from Cabanela ME, Morrey BF. Fractures of the olecranon. In: Morrey BF, editor. The elbow and its disorders. 3rd edition. Philadelphia: WB Saunders; 2000. p. 400; with permission.)

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