



**2º CURSO INTERNACIONAL DE
RECONSTRUÇÃO OSTEO-ARTICULAR**

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PRECONTOURED PLATES IN OLECRANON FRACTURES

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The goals of olecranon fixation are to provide a stable and congruent ulnohumeral articulation that will permit to initiate rehabilitation treatment to regain full restoration of motion and function of the elbow. The articular surface of the ulnohumeral joint may be templated against the trochlea for accurate reduction which can be tricky in comminuted cases. The plate must provide adequate fixation in the proximal fragment which can be sometimes small and osteopenic and must permit stable fixation between the proximal fragment and the coronoid and the shaft. Plating usually fails due to avulsion of the proximal fragment and locking screws do not seem to prevent this. Contouring of the plate around the olecranon permits the insertion of a long screw into the distal fragment or into the anterior cortex of the ulna and creates an interlocking structure that greatly enhances the stability of the construct.

In a study made at our institution (Villanueva et al., 2006), 86 % of fractures treated with tension band wiring (TBW) were rated as satisfactory overall but there was a trend towards worse results in the presence of comminution, associated radial head fractures, fracture extension into the coronoid and associated elbow instability (Mayo type III fractures). Hardware removal was necessary on 46% of the patients. Simple non-comminuted fractures are well fixed with tensión-band wiring.

More complex patterns do not respond well to this kind of stabilization due to axial loads through the comminuted area and should be fixed with plating. Tension band wiring has shown high rates of minor complications associated with hardware. Various tips can aid in reducing these complications.

Bailey et al. reported on the use of plates and showed satisfactory results with no differences between Mayo type II and Type III olecranon fractures. Hardware removal was required in 20 % of the cases. In a comparative study, Hume and Wiss compared TBW and plate fixation and observed less loss of reduction and better clinical and radiologic results in the group treated with plating.

Patients and methods

A retrospective review of complex olecranon fractures was performed of cases operated by two of the surgeons (R.B.; S.A). Indications for the use of plates were considered olecranon fractures Mayo type IIB and higher.

11 Mayo II B and type III olecranon fractures were treated operatively in between 2005-2007 treated with precontoured olecranon plates. 5 cases with anatomic modular non-cemented radial head prostheses (Anatomic Radial Head and Evolve) Union was achieved by 8 week in all cases except one that is pending conversion to a linked elbow prostheses. Mean elbow range of motion is 125° and all elbows are stable on static x-rays and clinical evaluation.

Discussion

Simple olecranon fractures appear to have a good outcome independent of the method of treatment (Karlsson et al. 2002). TBW offers a simple, cheap and fast method of fixation at the cost of a high incidence of hardware related problems. Comminuted fractures and complex olecranon fractures are probably treated better with plating to neutralize axial loads occurring at the fracture site that can potentially collapse the ulnohumeral joint. Associated injuries to the LCL and the radial head should be treated at the index procedure. Stable reconstruction of the radial head or otherwise radial head substitution seem logical in the context of an unstable complex olecranon fracture. Plating seems to be favorable in the context of the more complex cases (Simpson et al. 1996). Precontoured plates are at least as effective as self contoured plate (Anderson et al. 2007).

To maximize the fixation in the proximal fragment at least three screws should be placed. Every screw should be as long as possible. The posterior to anterior screw should create an interlocking structure inside the bone. In revision cases screw fixation can be augmented with bone cement. Precontoured plates will reduce operating time and are congruent with the proximal olecranon. As they are applied dorsally they buttress against anterior pull of elbow flexors and comminuted fragments within fracture site. They provide stable fixation of the ulnar shaft, they permit stable fixation of the coronoid, they can apply compression across the fracture site, if needed, and they are strong and stiff enough as to not break or bend. Coronoid integrity seems important to obtain a congruent ulnohumeral joint and to prevent residual instability and should be fixed. Anterior fracture-dislocation usually associate a coronoid fracture in 50 % of the cases and fracture of the radial head is rare. Posterior fracture-dislocation are comparable to Monteggia type IIB and they typically associate a triangular or cuadrangular fracture involving the coronoid, a radial head fracture and injury to the LCL (Jupiter et al. 1991, Doornberg et al. 2004). Failure to recognize or treat this injuries will hoinder our results of the more complex olecranon fractures.

Literature

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Figures

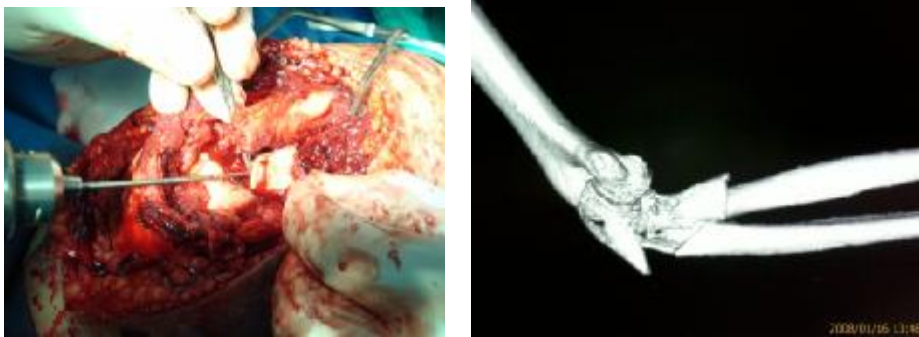


Figure 1. Coronoid reconstruction is key to achieve a stable ulnohumeral joint. In modified posterior fracture dislocation a quadrangular fragment involving the coronoid is often encountered.

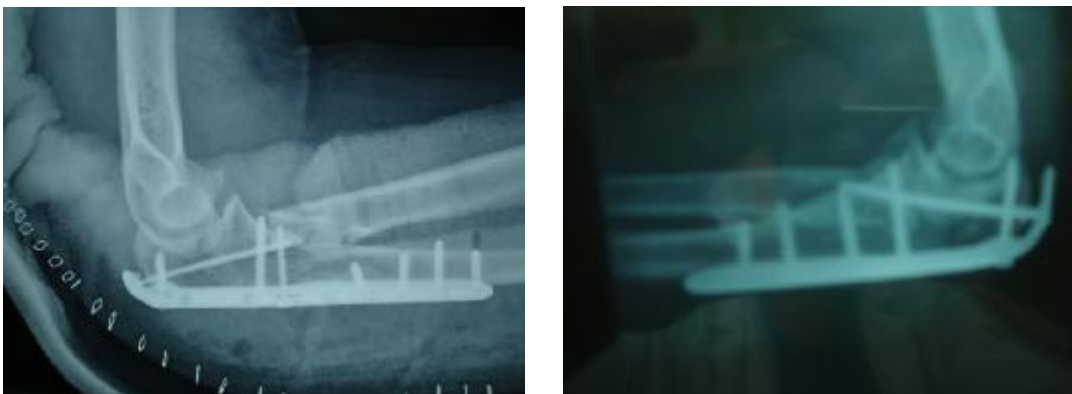


Figure 2. Different pattern configurations can be used. The posterior to anterior screw creates an interlocking structure inside the bone that enhances the structural stability of the construct. (Figure on the left corresponds to operative image on Figure 1)



Figure 3. Stable repair of the radial head must be obtained. If fixation does not provide a stable fixation a radial head prosthesis should be strongly considered. Repair of the lateral collateral ligament is obtained through drill holes at its origin where it usually fails by avulsion.