

# Chapter 21

## Coronoid Fractures

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### Description

Fractures of the coronoid process are almost always secondary to impaction with the trochlea, occurring in 33 % of patients with elbow dislocation. They may also result after an avulsion of the brachialis muscle insertion. A common problem associated with this injury is stiffness, as also post-traumatic degenerative joint changes [1, 2].

Regan and Morrey in 1989 classified coronoid process fractures into three types, based on the lateral radiographic view (Fig. 21.1). The classification system of Regan and Morrey refers to the degree of coronoid involvement and resulting instability [3].

### *Regan and Morrey Classification* [3]

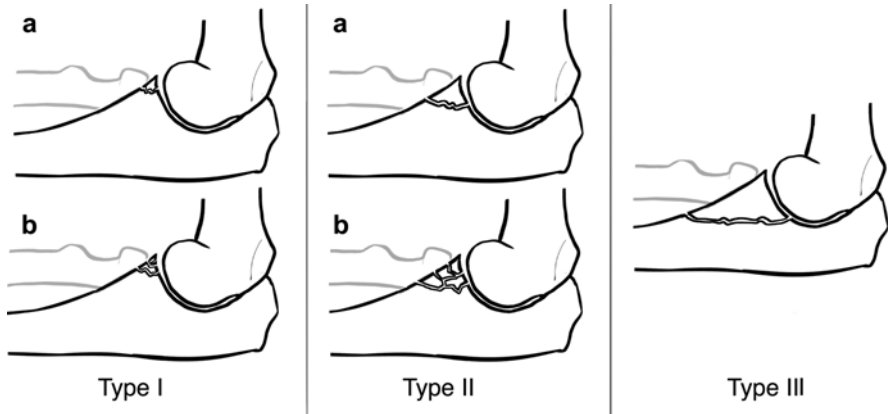
**Type I** Tip avulsion fractures that are frequently associated with elbow dislocation.

- A. Comminuted
- B. Non-comminuted

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**Fig. 21.1** The three types of coronoid fractures according to the Regan Morrey classification: type Ia tip avulsion non-comminuted fractures; type Ib tip avulsion comminuted fractures; type IIa non-comminuted fractures of <50% of the coronoid; type IIb comminuted fractures of <50% of the coronoid; type III fractures of >50% of the coronoid

**Type II** Fractures involve less than half (50 %) of the coronoid process and have varying degrees of stability.

- A. Comminuted
- B. Non-comminuted

**Type III** Fractures involve greater than 50 % of the coronoid and are almost always unstable.

## Treatment Strategy

### Type I

Type I fractures represent small shear fractures of the tip of the coronoid process.

This is also an indicator that the elbow has dislocated or displaced significantly.

Non-operative treatment with early mobilisation shall be applied for avoidance of stiffness.

### Type II

In type II fractures, the elbow is considered unstable unless proven otherwise.

If flexion of 45° produces posterior dislocation, the articulation is considered inadequate and joint stabilisation is needed. The type of fixation varies according to the size of the fragment. Small fragment can be sutured in situ with a heavy suture that can be passed through drill holes in the ulna and tied. Larger fragments can be fixated by the use of an anteroposterior lag screw or a Steinmann pin. The elbow can be also stabilised by the use of a hinged external fixator laced either alone or as an enhancer of the stability of the internal fixation.

**Type III**

Type III fractures are the most difficult to treat since they are associated with gross instability of the joint. If the coronoid fracture produces a large and not comminuted fragment it may be fixed with an anteroposterior lag screw or plate and screws. The role of a hinged external fixator remains important for additional stability.

Coronoid fractures – evidence according to Regan and Morrey classification

Classification	Meta-analysis	Systematic review	Cochrane library
Type I-II-III	Not available	Repair the injured structures and initiation of early motion; fixation of the coronoid fragment again depends on location and size [4, 5]	Not available

**References**

1. Adams JE, Hoskin TL, Morrey BF, Steinmann SP. Management and outcome of 103 acute fractures of the coronoid process of the ulna. *J Bone Joint Surg Br.* 2009;91(5):632–5.
2. Bousselmame N, Boussouga M, Bouabid S, Galuia F, Taobane H, Moulay I. Fractures of the coronoid process. *Chir Main.* 2000;19(5):286–93.
3. Regan W, Morrey B. Fractures of the coronoid process of the ulna. *J Bone Joint Surg Am.* 1989;71(9):1348–54.
4. Manidakis N, Sperelakis I, Hackney R, Kontakis G. Fractures of the ulnar coronoid process. *Injury.* 2012;43(7):989–98.
5. Steinmann SP. Coronoid process fracture. *J Am Acad Orthop Surg.* 2008;16(9):519–29.