4 Complex elbow injuries

4.1 Anterior or transolecranon fracture dislocation

This complex injury occurs when a direct high-energy blow is applied to the posterior aspect of the forearm with the elbow in 90° flexion. It must be distinguished from anterior Monteggia lesions because both radius and ulna dislocate anteriorly leaving the proximal radioulnar joint intact (Fig 6.3.1-11). The proximal ulna is often multifragmented with a large coronoid fragment. Associated radial head fractures are uncommon.

The instability occurs due to disruption of the trochlear notch rather than by dislocation of the humeroulnar joint. The dislocation of the humeroulnar joint. The collateral ligaments might remain intact, but will be stretched.

A posterior approach is performed and an indirect reduction of the ulna is accomplished as described for complex olecranon fractures. Fixation of the coronoid process with a screw will enhance stability. Occasionally, the coronoid process is intact but the anterior capsule is avulsed and, if there is instability, will need to be reattached with suture anchors. A posteriorly placed, precontoured reconstruction plate or LCP 3.5 to buttress the intercalated articular fragment as well as a tension band cerclage are the methods of choice of fixation.

Fig 6.3.1-11a–d  Transolecranon fracture—dislocation.

a  Initial lateral x-ray.
b  Initial AP x-ray.
c  Lateral x-ray, postoperatively.
d  AP x-ray, postoperatively. The K-wire retains the intercalated articular key fragment.

4.2 Posterior Monteggia fracture dislocation

The mechanism of this injury is similar to that of a posterior elbow dislocation. However, this failure occurs through the proximal ulna, resulting in a multifragmentary fracture with a triangular or quadrangular fragment that can involve the coronoid process or be located more distally (Fig 6.3.1-12). Usually, the radial head is fractured and dislocated posterolaterally. The lateral collateral ligament may be avulsed or torn, but the medial ligament remains intact.
Reconstruction of the proximal ulna with a posterior plate, as described above, will reduce the dislocation of the proximal radioulnar joint. Direct fixation of the coronoid process with a lag screw is usually achieved through the posterior approach. Occasionally, as distraction is applied, the fragment will reduce. Reconstitution of the anterior ulnar cortex is essential to allow the plate to function as a tension band. Fixation of the head and reattachment of the lateral ligamentous complex will provide adequate stability to the lateral column.

4.3 Elbow dislocation with radial head and coronoid fractures

The “terrible triad” in the elbow involves an elbow dislocation with associated radial head and coronoid fractures (Fig 6.3.1-13). Recent publications have emphasized the need for a careful and staged reconstruction of the damaged bony and ligamentous structures. The choice of approach will depend upon the individual case and the structures that need to be repaired. An extended posterior approach is the preferred method because it provides access to both lateral and medial structures. First, the stripping of the lateral capsule and ligaments is inspected: in more than 50% of cases the common extensor origin will be disrupted. If possible, the coronoid fracture should be addressed first, before fixing or replacing the radial head. If this is not possible through the lateral side, then an extended dissection should be done medially, reflecting or splitting the flexor-pronator mass. Three types of fractures can be found:

- **Type I**: The coronoid avulsions are too small to be fixed, therefore the anterior capsule with the attached fragment may be repaired through drill holes to the proximal ulna. This may help to restore adequate stability.
- **Type II and III**: The avulsions comprise larger fragments and they should be routinely fixed with screws, usually from posterior to anterior, often in lag position through a plate. A dental pick or a small pointed reduction forceps will hold the reduction while small K-wires are inserted.

Recently, an anteromedial coronoid fracture pattern has been described in association with a varus/posteromedial mechanism of injury. This fragment must be anatomically fixed with a small plate in order to avoid incongruity of the medial ulnohumeral joint. The radial head fracture is fixed or replaced, and the lateral ligamentous complex reattached. If instability persists consideration must be given to a hinged external fixator.

4.4 Essex-Lopresti injury

This complex injury involves a fracture dislocation of the elbow associated with a distal fracture dislocation of the radius or disruption of the distal radioulnar joint (Fig 6.3.1-14). A segmental or “floating” radial diaphysis is present and this,
associated with the disruption of both proximal and distal radioulnar joints, can lead to severe disability. The same fixation tactics as recommended for Monteggia and Galeazzi lesions are applicable in this most difficult injury.

**Fig 6.3.1-13a–e**  The “terrible triad”: elbow dislocation with radial head and coronoid fractures.

- **a**  Lateral x-ray before reduction.
- **b**  Attempted AP x-ray before reduction.
- **c**  Lateral x-ray after reduction.
- **d**  AP x-ray, intraoperatively.
- **e**  Lateral x-ray, intraoperatively.

**Fig 6.3.1-14a–c**  Essex-Lopresti injury.

- **a**  Lateral x-ray before reduction.
- **b**  Lateral x-ray after reduction.
- **c**  Ulnar positive wrist with shortening of the radius as a result of radial head injury.