

CAPITELLAR FRACTURE

Vasu Pai

Nearly all of these fractures are displaced, given the paucity of soft tissue attachments.

Nonsurgical management is fraught with complications including chronic pain, mechanical symptoms, and instability and is not recommended.

Good to excellent outcomes can be achieved in the majority of patients with open reduction internal fixation.

When coronal shear extends medial or comminuted the outcome is worst.

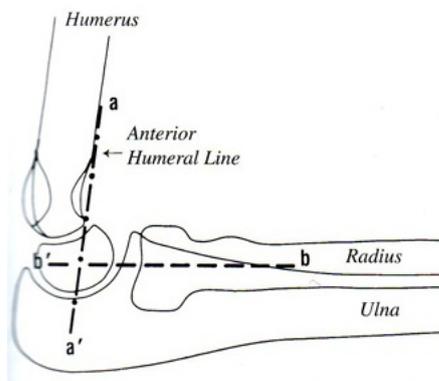
Computed tomography is highly recommended to guide surgical planning.

Those not amenable to fixation might do better with total elbow arthroplasty in a select population.

Long-term data demonstrate the durability of these elbows following open reduction internal fixation. Complications other than **stiffness** are rare.

Radiographic avascular necrosis does not appear to affect outcome. Radiographic mild to moderate arthritis was observed in half of patients at 17-year follow-up.

Anatomical consideration



Anterior humeral line passes through the middle third of the capitellum.

Weight bearing is mainly through the trochlea and not through the capitellum

Epidemiology

These fractures are rare and often the result of a low-energy falls.

These fractures are a result of direct compression from the radial head in a semiflexed or hyper-extended elbow.

Half occur in isolation; half are either part of a complex elbow injury or occur in association with ipsilateral injuries proximal or distal to the elbow.

Nearly all of these fractures are displaced, owing to the paucity of soft tissue attachments.

40% of these fractures have an associated lateral collateral ligament disruption, and up to 30% have an associated radial head fracture.

A higher incidence among women has been attributed to anatomical differences in carrying angle and osteoporosis.

CLASSIFICATION

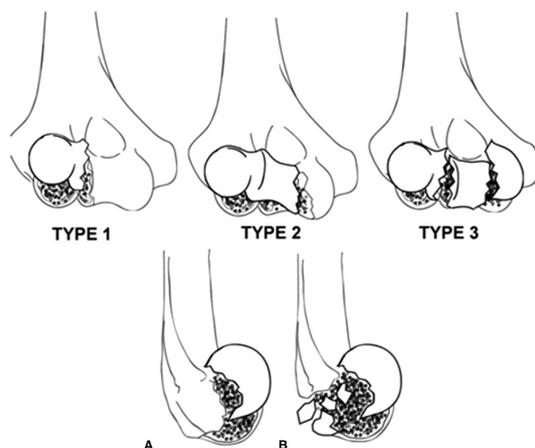
Bryan and Morrey

I : Hahn Steinthal: # in coronal plane with osseous segment

II: Kocher Lorenz: Sleeve fracture with little osseous bone

III: Comminuted

Dubberley



Type I



Type II



Dubberley's type 1 fracture is a capitellar fracture with or without the lateral trochlear ridge. Types 2 and 3 are fractures of the capitellum extending into the trochlea as a

single piece or as separate pieces. Further classified A and B depending on comminution.

NONSURGICAL TREATMENT

With advances in surgical fixation and a better understanding of the fracture with posterior trochlea com complexity, nonsurgical treatment is no longer recommended.

SURGICAL TREATMENT

The goals

1. Restore articular congruity
2. Obtain stable fixation
3. Early motion
4. Minimize the risk for posttraumatic squeal, including arthritis, pain, stiffness, and instability.

Good to excellent outcomes with ORIF are expected in the majority of patients.

Total elbow arthroplasty might be a better option for those fractures deemed irreparable for select elderly patients.



Posterior Fixation

APPROACHES

The lateral extensile approach provides adequate visualization for most fractures extending to the medial trochlea as well as the radial head.

Incision is made over the anterior aspect of the lateral column and is extended distally to the Kocher or Kaplan interval.

When intact, the lateral collateral ligament can be spared, and care should be taken to

preserve the posterior blood supply to the capitellum and trochlea.

FIXATION

A variety of variable-pitch, headless compression screws have been used with success. Biomechanical analysis has demonstrated that Acutrak screws placed anterior to posterior are superior to cancellous screws placed posterior to anterior or anterior to posterior.

Placing screws anterior to posterior disrupts the articular surface and subchondral bone, whereas screws placed posterior to anterior can disrupt the posterior blood supply to the capitellum and trochlea [Mehdian].



Supplemental fixation with bone grafting might be necessary when posterior comminution is present.

OUTCOMES

Good to excellent outcomes have been reported for more than 90% of patients with ORIF, particularly when the fracture is isolated to the radio-capitellar compartment. Mean flexion contractures post-surgical is 20°.

Fractures with considerable medial extension or comminution do worse than simple capitellar fractures, with non-unions.

Distal humerus coronal shear fractures are often more complex than radiographs suggest. Preoperative computed tomography scans are highly recommended.

The medial extent of the fracture and the absence or presence of posterior comminution will dictate the approach and need for supplemental fixation and bone

grafting. Fractures with considerable medial extension and comminution do worse. Complications other than stiffness are rare.

REFERENCES

1. Lee. J Hand Surg 2012;37A:2412–2417
2. Guitton, Ring. J Bone Joint Surg 2009; 91A:390–397.
3. Ruchelsman J Bone Joint Surg 2008;90A:1321–1329.
4. Mehdian. Orthop Clin North Am 2000;31:115–127.
5. Sabo. J Shoulder Elbow Surg 2010;19:670 –680.
6. Elkowitz. Capitellum fractures: a biomechanical evaluation of three fixation methods. J Orthop Trauma 2002;16:503–506.