

SUPRACONDYLAR FRACTURES

Demographics

Supracondylar fracture is the most common type of elbow fracture in children

It accounts for 3% of all pediatric fractures.

Aged between 5 and 7 years.

Most fractures occur on the left or nondominant side

Equal incidence between males and females.

Extension fractures account for approximately 98% of these injuries

Usually occur as the result of a fall on an outstretched hand with the elbow in full extension.

Assessment

Pain and swelling about the elbow.

Active elbow motion is limited

May have gross deformity of the arm

Soft tissues for severe swelling, skin lacerations, or abrasions

Fractures of the distal radius are the most common ipsilateral fractures

Nerve injury [11%]: Anterior interosseous nerve injury is most common

The distal radial pulse is palpated to determine flow.

In some cases, Doppler ultrasonography may be necessary.

The child with an ischemic limb may experience significant forearm pain, loss of motor function, pain with passive stretch of the digits, and/or paresthesias. The vascular status of the injured extremity is categorized as normal, pulseless with a pink hand, or avascular, which is sometimes described as pulseless with a white hand.

Supracondylar fracture with a avascular hand constitutes a surgical emergency.



Normal lateral radiograph in a pediatric patient demonstrating placement of the anterior humeral line, which lies along the anterior humeral cortex.

A second line is drawn perpendicular to the first line at the base of the capitellum ossific nucleus. This second line is divided into thirds to determine where the intersection takes place, if at all. This line intersects the middle third of the capitellum in most

Radiographic Evaluation

AP and lateral radiographs centered on the elbow.

When no fracture is visible, the presence of the posterior fat pad, which is seen on the lateral radiograph as lucency along the posterior distal humerus and the olecranon fossa, is highly suggestive of occult elbow fracture.

In one study, 76% of children with a negative initial radiograph and a visible posterior fat pad were shown on repeat radiographs obtained several weeks later to have a fracture, as evidenced by periosteal changes about the distal humerus, proximal radius, or olecranon.

Classification [Gartland classification]

Type I fractures are non-displaced,

Type II fractures have an intact posterior hinge; Wilkins: II a: No rotational abnormality

IIb: With rotational abnormality

Type III fractures involve complete displacement.

Type I and II a are stable

Type IIb and III are unstable even after reduction and require pin stabilization.

Type IV [Leitch] recently proposed: are unstable in both flexion and extension because of complete loss of a periosteal hinge.

Flexion Type

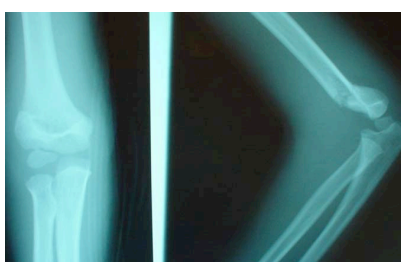


Extension types

Type I



Type IIa



Type IIb



Type III



Periosteal Hinge

Anterior periosteum: may prevent complete reduction

Periosteal hinge: Recently failed to confirm presence of medial and lateral periosteal hinge

Importance: ? Surgical approach

? Pronation or supination [discarded].

Not significant

Posteromedial displacement 75%

Medial periosteum intact

Tension band effect Forearm in pronation

Medial structures tightens on pronation

Management

Type I 3 weeks of long arm cast immobilization with the elbow flexed to 90° and the forearm held in neutral rotation.

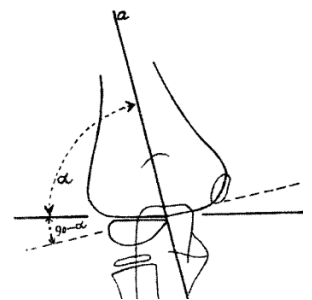
Type IIa MUA and casting; however, close observation is required to monitor for loss of reduction.

Type IIB Fractures are best managed with closed reduction and pinning. Removal of pins after 3 weeks.

Type III Closed reduction and pinning is the initial management choice.

Type IV Fractures are managed with a modified pinning technique. Rather than rotating the arm to obtain orthogonal views during pin insertion, the fluoroscopy unit can be rotated or two fluoroscopy units can be used simultaneously.

Adequacy of reduction: The mean Baumann angle was 7 degrees (SD 4 degrees), and 95% of normal elbows had Baumann angle of 64 degrees-81 degrees.



Open reduction and internal fixation is indicated predominantly for fractures that cannot be adequately reduced with closed methods and for open fractures. The anterior approach to the elbow provides the best exposure of the neurovascular structures and the soft-tissue obstacles anteriorly that prevent reduction. This approach is performed through either a transverse or an oblique incision made across the elbow flexion crease.

