

**Background and rationale:** Supracondylar humerus fractures in children are among the most common pediatric injuries with various management options and high potential for long-term disability. Timely and appropriate care can prevent disability. **Inclusion:** Skeletally immature patients with a supracondylar humerus fracture. **Exclusion:** Patients with a pathologic fracture or intraarticular extension.

## Standards of Care

1. A primary and secondary trauma survey, including the ABCD resuscitation protocol, should be undertaken on arrival. This must comprise a documented history, clinical examination, including an assessment of the limb, the status of radial pulse, digital capillary refill time, and the individual function of the radial, median (including anterior interosseous nerve) and ulnar nerves, and soft tissue status (swelling, blister, open wound, and forearm compartment syndrome).
2. Appropriate analgesia should be administered and documented.
3. Radiological diagnosis must include Anterior, Posterior, and lateral radiograph focusing on the elbow joint.
4. Patients with ischemia or compartment syndrome of the limb require surgery within 2 hours of diagnosis. Patients with open fractures should be operated on within 24 hours. If not available locally, patients should be referred immediately to a hospital with appropriate capacity to treat. Any delays in obtaining the radiographs should not compromise this emergency management.
5. A limb without clinical signs of ischemia does not require brachial artery exploration, whether or not the radial pulse is present. For limbs that are ischemic, fracture reduction is the first step. If ischemia persists, brachial artery exploration must be performed by a surgeon competent to perform arterial repair.
6. For an undisplaced fracture with no significant swelling, a back slab should be applied, with the elbow at 90 degrees of flexion. The back slab should be removed 3 weeks after the injury. Caregivers and the child should be advised to self-mobilize the elbow, with no requirement for routine follow-up radiographs, or clinical examinations.
7. For a displaced fracture, the initial management should be the application of an above-elbow back slab applied in a safe position, avoiding flexion of the elbow (30 degrees of flexion from full extension).
8. Definitive management of displaced fractures can be either nonoperative or operative. The decision should be based on local protocols relating to local capacity and expertise.
9. Nonoperative management of displaced fractures should be lateral straight-arm skin traction for a minimum of 5 days. The final duration is dictated by the swelling and the ability to place the elbow in a back slab at 90 degrees of elbow flexion.
10. If operative management is undertaken, it should be carried out within 48 hours of presentation. An out-of-hours surgical intervention is not recommended unless there are indications for urgent surgery.
  - a. The WHO Surgical Safety Checklist must be completed, and a single dose of appropriate prophylactic antibiotics should be given at the start of surgery.
  - b. Closed reduction and percutaneous pinning with intraoperative fluoroscopy is the preferred surgical option. If a medial wire is inserted, measures should be taken to protect the ulnar nerve, which is at risk of injury. Open reduction may be performed when required.
  - c. Surgical stabilization should be with at least two 1.6 to 2.0 mm diameter K-wires, engaging the proximal cortex.
  - d. Intraoperative assessment of satisfactory stability and clinical alignment should be performed and documented. All patients require saved intraoperative or postoperative imaging within 24 hours of surgery.
11. Monitoring for neurovascular status and compartment syndrome should continue after either lateral arm traction or operation. When there is concern about an iatrogenic nerve injury, an assessment documented with input from an experienced orthopedic surgeon is required to decide if nerve exploration is needed before discharge.
12. Patients who present more than 7 days after injury require an individualized management plan by a specialist, based on the skin condition, displacement of the fracture, and evidence of early fracture healing. In these patients, nonoperative management should be considered to avoid the risks of late surgery.
13. K-wires should be removed after 3-4 weeks. For all treatment methods, avoid immobilization for more than 4 weeks.
14. The child and caregivers should be given information about expected functional recovery, possible complications, and rehabilitation, including advice on return to pre-injury activities. This should be in their own language and/or in a pictorial format.
15. Routine long-term follow-up is not usually required. Any indications for further review should be documented.
16. All cases should be audited against the above standards and reported complications. The audit should be presented at the departmental meeting. This should be done quarterly and then annually once established.