Orthopaedics for Family Physicians: Management and Referral Guidelines

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1. **Clavicle**
   a. Tx: Sling for comfort: 2-4 weeks, ROM exercises at 2 weeks
   b. Indications for surgery: open fracture, vascular injury, non unions, initial displacement > 2 cm

2. **AC joint injury**
   a. Grading:
      i. I: incomplete tear of AC capsule, no subluxation of joint
      ii. II: subluxation AC, intact CC
      iii. III: complete AC dislocation with disruption of joint capsule and CC ligaments torn
      iv. IV: displacement of clavicle posteriorly into trapezius
      v. V: marked superior displacement with disruption of deltoid and trapezius insertion
      vi. VI: inferior dislocation of clavicle under coracoid process
   b. Tx: grade I-III: sling for comfort x 7-10 days, then ROM exercises
   c. Indications for surgery: grade IV-VI injuries

3. **Shoulder dislocation**
   a. Tx: reduction in emergency department under analgesia, sling for comfort followed by active ROM exercises at 2-3 weeks post injury
   b. Indications for surgery: recurrent dislocation and first time dislocation in teenagers.

4. **Rotator Cuff injury**
   a. Tx: conservative if chronic
   b. Indications for surgery: Acute(<3 months) rotator cuff tear

5. **Proximal Humerus Fracture**
   a. Tx: R/O dislocation. If the fracture is impacted or minimally displaced (<1cm), apply sling for comfort and begin assisted ROM exercises at 7-14 days
   b. Indications for surgery: marked (>1 cm) displacement of tuberosity fragments, varus angulation of head, dislocated humeral head, head splitting fracture or open fracture

6. **Humeral Shaft Fracture**
   a. Tx: closed reduction and application of sugar tong splint and swathe. Begin ROM exercises for shoulder and elbow in 2 weeks post injury
   b. Indications for surgery: Open fracture, non union

7. **Distal Humerus Fracture**
   a. Tx: initial long arm splint after documenting neurovascular status
   b. Indications for surgery: Any displacement of the joint surface greater then 2 mm, open fracture
8. Elbow Dislocation
   a. Tx: reduction under sedation in ED- longitudinal traction with elbow slightly flexed- post reduction stability examination and radiographs. If elbow has good stability, start ROM exercises at 7-10 days
   b. Indications for surgery: Unstable elbow after reduction. Intraarticular fragments, associated fractures, especially of the coranoid process or radial head/neck.

9. Proximal Ulna Fracture
   a. Tx: splint initially, then generally ORIF
   b. Indications for surgery: Displacement of fracture more then 2 mm or any persistent angulation, especially when associated with radial head dislocation

10. Radial Head Fracture
    a. Classification:
       i. Mason 1: displacement <1 mm
       ii. Mason 2: displaced fracture involving less then 1/3 of the articular surface and reconstructable
       iii. Mason 3: comminuted and displaced
       iv. Mason 4: Radial head fracture associated with dislocation of the elbow
    b. Tx: posterior splint, early ROM in first 3-5 days
    c. Indications for surgery: Displacement of >3 mm, Mason 2 fracture that inhibits pronation and supination, or a displaced Mason 3 fracture

11. Forearm shaft fractures
    a. Classification
       i. Galeazzi: fracture of the junction of the middle and distal third of the radius and is combined with a subluxation of the distal radioulnar joint (5% of forearm fractures)
       ii. Monteggia: dislocation of the radial head and a fracture of proximal ulna.
       iii. Isolated ulna
       iv. Isolated Radius
    b. Tx: Undisplaced single bone fractures and isolated ulna with minimal shortening (<1-2 mm) and at least 50% apposition of bone fragments and no angulation- treated with long arm cast.
    c. Indications for surgery: ORIF for any displaced forearm fracture shaft fracture in adult (with the above exception)

12. Distal radius fractures
    a. Normal angles:
       i. Radiocarpal joint on lat- angulated palmward 0-15 degrees.
       ii. Radiocarpal joint on AP- radial deviation of 16-28 degrees
b. Classification:
   i. Colles: Fracture of distal radius with dorsal angulation, +/- dorsal, radial or proximal displacement. Splinted/casted in neutral (we no longer use ulnar deciation and wrist flexion.)
   ii. Smith: fracture of the distal radius with volar displacement of the distal fragment and accompanied carpal row. Cast in supination and wrist in extension.
   iii. Barton’s: Fracture-dislocation in that the triangular fragment of the volar surface of the distal radius is sheared off. Displacement of the anterior portion of the articular surface.

c. Tx: closed reduction under sedation, IV block with short arm cast. F/U radiographs in 3-7 days to ensure reduction maintained. Reduction must be neutral on the lateral with <4 mm loss of radial length on AP

d. Indications for surgery: intrarticular fractures with >2 mm displacement, Barton’s fracture.

13. Scaphoid fractures
   a. Tx: short arm cast for 4-6 weeks or until clinically and radiographically united. If unsure at initial assessment, xray at 10-14 days.
   b. Indications for surgery: displaced fracture or non-union in an active adult
   c. Indication for bone scan- none

14. Carpal fractures
   a. Tx: short arm splint followed by short arm cast for 6 weeks for minor avulsion fractures
   b. Indications for surgery: marked displacement of main body of carpal bone

15. Wrist ligament injuries
   a. Tx: short arm splint followed by short arm cast 4-6 weeks
   b. Indications for surgery: Major instability in active, high-demand wrist

16. Metacarpal fractures
   a. Tx: closed reduction and splinting – casting at 1-2 weeks; total immobilization 6-8 weeks
   b. Indications for surgery: open fractures, multiple metacarpal shaft fractures, shortening >4-6 mm or malrotation that is not corrected with closed reduction

17. Thumb metacarpal fractures
   a. Tx: short arm thumb spica splint 1-2 weeks followed by thumb spica casting for 6-8 weeks
   b. Indications for surgery: Intrarticular fractures with subluxation of the metacarpal shaft (Bennett’s) or major articular (>2 mm) displacement, ulnar collateral ligament injury with instability (Gamekeeper’s thumb)

18. Phalangeal fractures
19. Interphalangeal dislocation
   a. Tx: closed reduction, splinting for 2-3 days, the Active Rom with buddy taping
   b. Indications for surgery: intraarticular fractures with displacement >1 mm, irreducible dislocation

20. Mallet finger
   a. Tx: splint in hyperextension for 6-8 weeks leaving PIP joint free to move
   b. Indications for surgery: displaced large dorsal intraarticular fragment with DIP subluxation

21. Pelvic ring fracture
   a. Tx: management of hemorrhage, full weight bearing for lateral compression fractures that do not have significant deformity, follow up radiographs for late instability.
   b. Indications for surgery: ongoing hemorrhage, displaced posterior pelvic injury, symphysis widening >2.5 cm, unacceptable pelvic deformity

22. Hip dislocations
   a. Tx: reduction in ED with sedation and analgesia
   b. Indications for surgery: irreducible dislocation, intraarticular loose bodies diagnosed on post-reduction radiographs/CT

23. Femoral head fractures
   a. Tx: non displaced, stable fractures- limited weight bearing with crutches for 6 weeks
   b. Indications for surgery: displaced (>2mm) large head fragment or displaced fracture associated with femoral neck fracture or acetabular fracture

24. Acetabular fracture
   a. Tx: non weight bearing for 6-8 weeks for nondisplaced fracture
   b. Indications for surgery: displaced (>2 mm) intraarticular fracture

25. Femoral neck fracture
   a. Tx: ORIF for all
   b. Indications for surgery: all femoral neck fracture
26. Intertrochanteric hip fracture
   a. Tx: ORIF for all
   b. Indications for surgery: all intertrochanteric hip fracture

27. Subtrochanteric femur fracture
   a. Tx: ORIF for all
   b. Indications for surgery: all subtrochanteric femur fracture

28. Femoral shaft fracture
   a. Tx: closed reduction, Thomas splint and IM nail
   b. Indications for surgery: all femoral shaft fractures

29. Distal femur fracture
   a. Tx: internal fixation
   b. Indications for surgery: all distal femur fractures

30. Knee dislocation
   a. Tx: closed reduction and careful assessment of the arterial supply, Zimmer splint
   b. Indications for surgery: unstable knee (nearly all) in a patient with moderate functional demand

31. Patella fracture
   a. Tx: extrarticular and undisplaced- Zimmer for 4 weeks, weight bearing as tolerated, quads isometrics prn and gentle passive ROM prn.
   b. Indications for surgery: displaced fracture involving the articular surface, comminuted fractures, inadequate extensor mechanism

32. Patella dislocation
   a. Tx: if no fracture or continued subluxation- treat with crutches and knee sleeve x 4-6 weeks with gentle ROM and quads exercises
   b. Indications for surgery: none

33. Ligamentous knee injury
   a. Tx:
      i. MCL- nonoperative progressive weight bearing from crutches to brace to limiting valgus stress x 4-6 weeks
      ii. PCL- non operative, extensive strengthening exercises
      iii. ACL- in acute situation: ROM limited brace, weight bearing as tolerated. Long term: modify activity, custom brace or surgical reconstruction

34. Patellar tendonitis
   a. Tx: conservative overuse injury management, maximize quad strength and hamstring flexibility
b. Indications for surgery: Debridement for significant and chronic disease not responding to treatment

35. Patellofemoral pain syndrome
   a. Tx: anti-inflammatory, improve quad, pelvic/hip muscle strength and endurance
   b. Indications for surgery: none

36. Iliotibial band syndrome
   a. Tx: stretching of IT band, treat foot pronation with an orthotic, treat a tight lateral patella retinaculum with manual therapy.
   b. Indications for surgery: none

37. Tibial plateau fracture
   a. Classification: (Schatzker)
      i. Split – non displaced
      ii. Split with depression
      iii. Depression
      iv. Medial condyle
      v. Bicondylar
      vi. Bicondylar with shaft extension
   b. Tx: for non displaced, stable fractures treat with splint, elevation for 24-48 hours, non weight bearing for 6-8 weeks and gentle ROM
   c. Indications for surgery: displacement > 2 mm, >10 degrees of instability in extension.

38. Tibia - fibula diaphyseal fracture
   a. Tx: non operative long leg splint for 2-3 weeks for isolated fractures, not shortened followed by below knee cast for 4-6 weeks
   b. Indications for surgery: fractures close to the joint, shortened > 1 cm, failure to control angulation, open fracture

39. Ankle fractures
   a. Classification (Weber):
      i. A- transverse fracture of distal malleolus
      ii. B- spiral fracture at the level of the mortis
      iii. C- fractures above the mortis with disruption of the syndesmosis
   b. Tx: splint acutely, followed by walking boot at 1-2 weeks with progressive weight bearing for stable fractures
   c. Indications for surgery: trimalleolar (posterior malleoli of tibia, fracture of medial and lateral malleoli, disruption of the anterior capsule of ankle joint) or bimalleolar fractures, Weber B with widening of the syndesmosis

40. Pilon fracture
   a. Tx: stabilization of fibula to establish length and indirect reduction of articular surface
b. Indications for surgery: open fractures, fractures with > 2cm joint gap or impaction

41. Ankle sprains
   a. Tx: ice acutely, followed by active ROM with progressive weight bearing prn
   b. Indications for surgery: unstable ankle with recurrent sprains

42. Calcaneal fractures
   a. Tx: non weight bearing for 6 weeks with early subtalar motion where non operative treatment is selected.
   b. Indications for surgery: significant widening of heel with lateral wall “blow out”, depression or gapping of subtalar joint > 2 mm.

43. Talus fractures
   a. Tx: ORIF for any displaced fracture
   b. Indications for surgery: fractures with > 2 mm gapping, loose osteochondral body

44. Subtalar dislocation
   a. Tx: closed reduction with follow up radiographs +/- CT scan, short leg Jones compression splint followed by active ROM exercises
   b. Indications for surgery: irreducible dislocation, significant debris in subtalar joint

45. Tarsometatarsal (Lisfranc’s) fracture/dislocation
   a. Tx: ORIF of displaced fracture
   b. Indications for surgery: displacement of 1st, 2nd, 3rd metatarsal bases with ligament disruption or major displacement of the base of the 1st, 2nd, 3rd metatarsal

46. Metatarsal fracture
   a. Tx: 4 weeks of no weight bearing in below knee cast followed by limited weight bearing in walking cast. Jones fracture (5th metatarsal proximal neck shaft junction fracture) is prone to delayed and non-union, but there is no role for non weight bearing and full weight bearing is expected. They may be slow to heal.
   b. Indications for surgery: open fracture, shortening/comminution or displacement > 2 mm of 1st or 5th metatarsal, multiple metatarsal fractures

47. Toe fractures
   a. Tx: protective orthosis or shoe wear for 6-8 weeks, progressive weight bearing prn, buddy taping
   b. Indications for surgery: open fractures, displaced intrarticular fracture of great toe.
48. Spinal injuries

a. Tx: Treatment should include local application of heat or cold packs, pain medication, +/- muscle relaxants for MSK injuries of the spine involving only mild to moderate discomfort, no neurologic impairment, no abnormal radiographical findings, and no other injuries requiring hospitalization.
   i. Isolated spinous process fracture not associated with neurologic deficit or instability on flexion/extension views on xray- treat conservatively
   ii. Isolated, simple cervical wedge fractures with no neurologic change- manage as an outpatient
   iii. Isolated, thoracolumbar wedge fracture- hospitalize for pain management, possible intrathoracic or abdominal injuries, and possible prolonged/delayed ileus.

b. Indications for surgery: Acute bony or ligamentous injuries with actual or suspected neurologic deficits are best referred to spinal surgeon and remain in spinal immobilization.