I. Evaluation
   a. Exam: assess for gross instability, hallux malalignment, FHL function
   b. Radiographs:
      i. Routine radiographs of the foot are often negative other than for soft tissue swelling. However, close examination may show small avulsion fractures of the plantar aspect of proximal phalanx or at the distal pole of sesamoid. Capsular avulsions may also be noted along the periphery of the joint.
      ii. Assessment of sesamoid position on standing AP radiographs is critical. Obtain bilateral AP standing foot views for comparison. Proximal migration of the sesamoid(s) signifies plantar complex disruption. An attempt has been made to quantify this migration and relationship to plantar soft tissue disruption. Absolute measurements are being defined: >10.4mm from tip of tibial sesamoid to phalanx or >13.3mm for fibular sesamoid equates to a 99.7% chance of plantar complex rupture.
   c. Forced (stress) dorsiflexion lateral views have been quite helpful in eliciting plantar complex injury. The patient passively hyperextends both hallux MP joints which is followed by an assessment and comparison of distal migration of tibial sesamoid as should normally occur with dorsiflexion. This view may also delineate diastasis of a bipartite or fractured sesamoid.
   d. MRI is recommended for any patient with radiographic abnormalities, and in all grade 2 and 3 injuries. This study best defines the degree of soft tissue injury, as well as osseous and articular damage. The technique includes T2-weighted images in coronal, axial and sagittal planes.
   e. Fluoroscopy: excellent diagnostic and educational tool. If the sesamoids fail to travel distal with dorsiflexion of the hallux one presumes complete plantar plate disruption. Can also be used to assess for vertical instability.

II. Nonoperative Treatment
   a. RICE principle applies: rest, ice, compression, and elevation. Analgesics and anti-inflammatory medication are utilized. A boot or cast can be applied and is recommended for the first week after injury in more severe injuries. A toe spica extension with the hallux MP joint in mild plantarflexion removes tension from the injured plantar complex. Weightbearing is instituted as tolerated.
   b. Taping regiments provide compression while limiting movement at the MP joint. This is most helpful in milder injuries, as are orthoses and...
shoewear modifications. Off-the-shelf rigid insole devices can be placed in an accommodative shoe as a cost-minded alternative to a custom-made device made with a Morton’s extension to limit hallux MP motion. The shoe itself can be stiffened with a plate incorporated into sole of shoe, but tends to be heavy and not accepted by the athlete.

c. Corticosteroid and/or anesthetic injections are not advised in any injury.

III. Indications/Contraindications of surgery

a. Often difficult to determine need – sport/position dependent

b. Fortunately, operative treatment is seldom necessary but should be considered for: gross instability, large capsular avulsion with unstable joint (especially medial); diastasis of bipartite sesamoid or sesamoid fracture; retraction of sesamoids (single or both); traumatic bunion/progressive hallux valgus; a positive vertical Lachman’s test; and the presence of a loose body or chondral injury.

c. Diastasis of bipartite sesamoids and proximal migration of these structures can be progressive and serial examinations with radiographs are necessary. Surgery is indicated for progressive changes as they are likely followed by the development of a cock-up toe deformity or hallux valgus/varus.

d. Late sequelae to undiagnosed and neglected or under treated turf toe injuries may also require surgery. This not only includes the cock-up deformity alluded to but hallux rigidus as well.

e. The contraindications to surgery in the athlete with a turf toe injury are quite basic. Most obvious is the lack of symptoms or dysfunction. This situation will arise more in a non-sprinter in which toe push-off is not necessary for performance. However, that same individual needs to understand that late sequelae, including fixed deformity, may occur.

IV. Operative treatment

a. Technique

1. Incision options

a. Plantar medial
   i. If isolated medial FHB injury

b. Medial and plantar
   i. My preferred
   ii. Improved wound healing
   iii. Better visualization of lateral FHB

c. “J” – plantar medial that extends along flexor crease at base of hallux
2. Always identify plantarmedial digital nerve and protect
3. In general, identify/assess of soft tissue injury and repair anatomically
   a. Assess FHL for longitudinal split tears
   b. All are distal ruptures: require primary repair of remnants from lateral to medial (nonabsorbable suture)
   c. Usually stump of tissue remains on base of phalanx – direct repair.
      i. If soft tissues inadequate, use suture anchors/drill holes to base of proximal phalanx
      ii. If sleeve avulsion from sesamoid use drill hole in distal sesamoid
4. Diastasis or fracture of sesamoid requires excision of one or both poles and repair of soft tissue defect
   a. Option for transfer of abductor hallucis tendon to plantar defect
      i. serves as a new flexor
      ii. plantar restraint to dorsiflexion
5. Traumatic bunion/progressive hallux valgus
   a. Injury to plantarmedial complex and medial collateral ligament
   b. Manage with modified McBride bunionectomy – release adductor hallucis tendon and repair medial structures
   ii. Postoperative management
      1. Delicate balance between soft tissue protection and early range of motion
      2. General guidelines
         a. begin gentle passive motion under supervision at 5-7 days
         b. NWB in removable splint or boot with hallux protected for 4 weeks
         c. At 4 weeks increase active motion and allow ambulation in boot
         d. modified shoewear at 2 months
         e. return to contact activity with protection from excessive dorsiflexion at 3-4 months
         f. expect 6-12 months for full recovery

REFERENCES


Clanton TO, Butler JE, Eggert A: Injuries to the metatarsophalangeal joints in athletes. Foot Ankle 7:162-176, 1986


