Repairing Turf Toe Injuries
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I. Evaluation
a. Exam: assess for gross instability, hallux malalignment, FHL function
b. Radiographs:
   i. A thorough radiological evaluation of the hallux MP joint is mandatory in diagnosing and treating the turf toe injury
   ii. 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.
   iii. Assessment of sesamoid position on standing AP radiographs is critical. It is our recommendation to obtain bilateral AP standing foot views for comparison. We believe that 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.
      i. Sesamoid views include axial and oblique images that further assist in evaluating for diastasis or fracture.
      ii. Arthrography of the hallux MP joint is of historical interest only, being displaced by MRI although may be considered as an adjuvant to MRI. It likely remains the best method for identifying the presence and extent of capsular disruption but must be done fairly early.
   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. We have found that the MRI can assist in grading, identifies subtle injuries, and helps to formulate a treatment plan and prognosis. We therefore have
a very low threshold in performing this study in the elite or professional athlete.

e. **Flouroscopy:** 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. **Historical perspective on treatment**

   a. Little has been written or formalized in the treatment of turf toe injuries. Nonoperative treatment for all grades of turf toe injuries includes the RICE principle of: 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 and 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 (e.g., *Scott* turf toe plate, full length or forefoot only; carbon fiber inserts) 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, particularly when one is attempting to keep an athlete on the playing field. However, one may use an anesthetic injection alone for localized pain in single nerve distribution but with care not to completely anesthetize the toe.

III. **Indications/Contraindications of surgery**

    a. Fortunately, operative treatment is seldom necessary but should be considered for: 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.

    b. 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.

    c. 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.

    d. 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. Often difficult to determine need – sport and position dependent
      i. Consider for:
         1. large capsular avulsion with unstable or malaligned joint
            (especially medial)
         2. progressive diastasis of bipartite or fractured sesamoid
         3. retraction of sesamoids (single or both)
         4. traumatic bunion/progressive hallux valgus
         5. (+) vertical Lachman’s test (gross instability)
         6. loose body or chondral injury
   ii. Indications
      1. Failure of nonoperative treatment
      2. Persistent pain
      3. Loss of push-off ability
      4. Progressive deformity
   iii. Technique
      1. Incision options
         a. Plantarmedial
            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” – plantarmedial 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

iv. 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 7-10 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


