Diagnosis and Management of the High Ankle Sprain
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I. Introduction/incidence
   i. HAS/Syndesmosis type sprains becoming diagnosed at an increasing rate
      a. 1%-11% of ankle sprains, but likely underestimated
      b. Relationship to artificial surfaces
      c. There is a large variation in the time lost from the sport and return to play

II. Clinical evaluation
   i. There are no reliable reproducible tests in the literature - the following suggest syndesmotic injury
      a. Anterolateral tenderness above ankle
      b. Squeeze test
         i. Compressing the tibia and fibula proximally in the calf; pain at the level of the ankle joint indicates a positive test
      c. External rotation stress test
         i. Placing the ankle in a dorsiflexion position and applying an external rotation force; pain at the ankle is a positive test (can be done with the athlete weightbearing and trying to pivot on a fixed foot)
      d. Fibula translation test
         i. Stabilize the tibia with one hand and translate the fibula in an anterior – posterior direction with the other hand; pain with this maneuver and increased translation compared to the contralateral side indicate a positive test
      e. Single limb heel rise – easy; reproducible
      f. Cotton test – intraop!
      g. Clinical findings do not correlate with cadaver sectioning of ligaments – difficult to predict severity (Beumer et al)

III. Radiographs/Imaging
   i. Assess for asymmetry/diastasis – weightbearing views helpful when feasible; contralateral x-rays to compare
      1. Increased medial clear space (>4mm)
      2. Increased tib-fib clear space (>6mm)
      3. Calcification in the subacute/chronic
      4. Avulsion fractures from ant/post distal tib occur in 50%
   ii. Stress radiographs/flouro helpful when positive
1. AP and lateral view

iii. MRI
1. Identifies location/extent of ligament injury
2. Assesses for intra-articular injury
3. Static test – does not determine unstable patterns
4. Not prognostic

iv. Arthroscopy
1. Probably best diagnostic tool – esp if subtle injury
2. Helpful if prolonged recovery in situation where x-rays and stress imaging normal
3. Takao et al
   a. Compared the accuracy x-rays and MRI with arthroscopy
   b. Sensitivity, specificity and accuracy were poor for radiography. For MRI they were 100%, 93.1% and 96.2% for a tear of the anterior inferior tibiofibular ligament and 100%, 100% and 100% for a tear of the posterior inferior tibiofibular ligament. Based on this work, MRI was useful but arthroscopy was the most accurate diagnostic tool.

IV. Treatment
i. Premise = any “high ankle sprain” or syndesmotic injury with evidence for diastasis/subluxation warrants surgical intervention

ii. Clinical signs of syndesmotic injury without frank diastasis or instability with stress can be treated nonoperatively
   1. WBAT
      a. SLC helpful for 1-2 weeks
      2. Ankle devices to limit external rotation
      3. 15-step single limb hop test and ability to perform SLHR to determine when to return to athletics

iii. Those athletes with instability on stress testing but no diastasis best managed surgically - I find that fixation improves rehab and affords more predictable recovery
   1. Arthroscopy/EUA very helpful in identifying subtle cases
      a. Consider in those athletes failing to improve with nonop care in 8-12 weeks

iii. Any diastasis requires reduction and adequate fixation

iv. Percutaneous vs. open reduction of the syndesmosis
   1. Open if anatomic reduction not obvious (or displaced Maisonneuve)
   2. May require medial incision and decompression/repair of deltoid ligament if syndesmotic reduction not possible
a. Threshold lowering as we identify more “avulsion” injuries benefiting from direct repair to bone

3. Arthroscopic assisted?

v. Protect fibula from future stress fractures thru syndesmotic screw holes with fibular buttress plate
   1. One-third tubular plate with screws proximal and distal and syndesmotic screws or suture button in center

b. Syndesmotic injuries with fractures
   i. Always stress under flouro after fracture(s) fixed
   ii. Have a low threshold to stabilize syndesmosis
   iii. Open medially/repair deltoid if unable to reduce syndesmosis or medial clear space
   iv. Controversies of syndesmotic fixation
      1. Location of screw
         i. 2.0 cm above ankle joint ideal? (McBryde et al, FAI, 1997)
            a. Syndesmosis is a joint – stay out of it!
      2. Compression with ankle in plantarflexion (Toretta, JBJS 2001); can not overtighten
      3. Screw removal
         i. Necessity?
            a. Needleman/Steihl – recommended due to loss of external rotation
            b. Only if 4 cortices and fails to loosen or break
         ii. Timing
            a. 8, 10, 12 weeks?
            b. Ligament injury – needs time
            c. Why remove at all?
               i. OTA literature shows no ill effect of broken syndesmotic screws
      5. Option to screw fixation
         i. Suture button
            a. Can place one or two; can use thru plate hole
            b. No long term studies – conflicting reports

II. Postop management
   a. Surgeon preference
ii. Depends on presence of fracture, size of individual, timing of sport

iii. General program
   1. NWB x 4-6 weeks, then boot
   2. Begin pool rehab when wound sealed – 2 weeks
   3. Sport when symptoms/function allow, based on 15 hop test etc
   4. When used, remove 4 cortices screw after 12 weeks (or after season)
      a. Advantage of suture button – no removal or evidence of failure

III. Failed repair?
   1. Multiple possibilities
      a. Poor technique
         1. Malreduction of fracture/syndesmosis
      b. Premature removal of syndesmotic fixation
      c. Failure of fixation
      d. Too aggressive postop course/noncompliance
      e. DJD of syndesmotic joint
      f. Posterior malleolar malunion/nonunion
   2. Treatment options
      a. “Early” recurrent/persistent widening
         i. Syndesmotic debridement with joint reduction; arthroscopic and medial gutter debridement included
            1. Screw fixation
               a. Controversy – is grafting and fusing joint better than debridement/reduction alone
                  i. Harper: delayed reduction and screw stabilization successful in 5/6
            ii. Use of “biologic” reconstruction of ligaments has been proposed
                1. Peroneus longus
                2. Extensor tendon
                3. Allograft
      b. “Late” failure
         i. My preference is for a syndesmotic fusion (assuming tibio-talar joint salvageable)
         ii. Olsen et al JBJS 2011
      c. Painful syndesmosis
         i. Attempt injection of syndesmosis under flouro
         ii. Debridement vs. fusion
            1. Fuse if significant degeneration/incongruity of syndesmosis or failed prior reconstruction

Bibliography


Olson K et al: Salvage of chronic instability of the syndesmosis with distal tibiofibular arthrodesis. J Bone Joint Surg 2011; 93, 66-72
