4:34 – 5:00 pm

AOFAS / AANA Session:

Symposium:

Ankle Instability and Peroneal Tendon Tears:
Is There an Arthroscopic Alternative to Open Treatment?

Moderator:

Thomas O. Clanton, MD
Vail, Colorado
2 (Arthrex, Inc; Small Bone Innovations);
3B (Arthrex, Inc);
3C (Wright Medical Technology, Inc.)

Panelists:

Robert B. Anderson, MD
Charlotte, North Carolina
1 (Arthrex, Inc; DJ Orthopaedics; Wright Medical Technology, Inc.)
3B (Wright Medical Technology, Inc.)
5 (Wright Medical Technology, Inc.)
7 (Wolters Kluwer Health - Lippincott Williams & Wilkins)
8 (Wolters Kluwer Health - Lippincott Williams & Wilkins)
9 (American Orthopaedic Foot & Ankle Society)

Gregory C. Berlet, MD
Westerville, Ohio
1 (Bledsoe Brace; Wright Medical Technology, Inc.)
2 (Wright Medical Technology, Inc.)
3B (Wright Medical Technology, Inc.)
4 (Bledsoe Technologies; Wright Medical Technology, Inc.)
5 (DJ Orthopaedics)
7 (Foot and Ankle specialist ( SAGE )
8 (Foot and Ankle specialist ( SAGE )
9 (AAOS; American Orthopaedic Foot & Ankle Society)

V. James Sammarco, MD
Cincinnati, Ohio
8 (Journal of Bone and Joint Surgery - American; Foot and Ankle International; Journal of the American Academy of Orthopaedic Surgeons);
9 (AAOS)
Introduction to Symposium Topic
This section will explore the current state-of-the-art in the care of lateral ankle instability and peroneal tendon pathology with special reference to the role of arthroscopy/tendoscopy. A case presentation format will offer opportunity for noted experts to render their opinions and generate discussion. Both open and endoscopic methods will be presented with regard to their advantages and disadvantages.

I. Lateral Ankle Instability
   A. Epidemiology
      1. Most common time-loss injury in sports
      2. 1 per 10,000 person-days
      3. 2 million/yr in USA
      4. Persistent symptoms in 15-20%

II. Surgical techniques for chronic lateral ankle instability
   A. Options for surgical treatment
      1. Anatomical
         a) Brostrom type or Brostrom + Gould
         b) Tendon graft with anatomically placed attachments
      2. Non-anatomical/tenodesis
         a) Watson-Jones
         b) Evans
         c) Chrisman-Snook
   B. Principles of Ligament Reconstruction
      1. Basics
         a) Graft selection
            (1) Graft and graft fixation should be stronger than the ligament being reconstructed
               (a) ATFL – 138.9 ± 23.5 N
               (b) CFL – 345.7 ± 55.2 N
            (2) Tissue Graft Source
               (a) Peroneus brevis - ~800 N (½PB=400)
               (b) Peroneus longus - 1342 ± 135 N
               (c) Semitendinosus – 1216 ± 50 N
               (d) Gracilis – 838 ± 30 N
               (e) Allograft
                  (i) Ant tib – 1706 N
                  (ii) Post tib – 1695 N
         b) Positioning – anatomical
            (1) Key to successful long-term outcome
            (2) Avoids
               (a) Capturing joint and thereby restricting subtalar and tibiotalar motion
               (b) Stretching out reconstruction over time
         c) Fixation – must be strong enough
         d) Tensioning – must be tight enough
   C. Surgical technique – traditional open methods
      1. Brostrom + Gould modification
         a) Outpatient surgery under general or regional block anesthesia
b) Supine on the operating table with a bump under the ipsilateral hip

c) If only Brostrom planned, incision is made at the level of the tibial plafond along the anterior border of the distal fibula, curving in a J-shape posteriorly, and stopping at the level of the peroneal tendons.

d) If there is more pathology, e.g. peroneal tendons, then incision is more utility type such as incision over peroneals curved at tip of fibula to sinus tarsi area and raise the flap at retinacular level up to the lateral joint.

e) The dissection proceeds to the anterolateral ankle joint capsule. The capsule is identified and entered at the level of the joint. Carefully dissect the ATFL within the anterolateral capsule. If the ATFL fibers appear stretched but not torn, the capsule/ligament can be divided and the ATFL imbricated.

f) The CFL can be identified deep to the peroneal tendons, running obliquely. If it appears stretched, it too can be divided, leaving a small cuff attached to fibula, and imbricated. A fibular avulsion of the CFL can be repaired through drill holes or with anchors. Bioabsorbable anchors are preferable because they avoid later imaging or hardware removal problems as well as difficulties with drill holes for future reconstructions.

g) The ligaments are now shortened and repaired. Repair can proceed end to end, pants over vest, into a trough, through drill holes, or using suture anchors. The ankle must be in a reduced position while tensioning the repairs of the ligaments. Placing a small stack of towels under the distal tibia allows the heel to float freely can be useful to avoid forward displacement of the ankle in a pseudo-drawer position during repair.

h) The extensor retinaculum should now be identified and mobilized. It is imbricated or sutured over the ATFL repair with absorbable sutures to the periosteum of the distal fibula. This reinforces the primary repair.

i) The stability of the ankle is carefully examined and the incision is closed in layers. The patient is sent home in a walking boot or splint and allowed to weight-bear with crutches until the first post-operative visit.

2. Anatomically placed tendon graft
   a) Similar positioning and exposure to above
   b) Semitendinosis or gracilis graft harvest as for ACL or use allograft tendon – patient discussion point.
   c) Size the graft – should be around 5mm
   d) Create bone tunnel in talus for graft that is 0.5mm larger than graft size
   e) Fix tendon in tunnel with interference fit screw that is within 0.5mm of graft size
   f) Test security of fixation & if necessary increase screw size
   g) Drill holes made in fibula for anatomical placement of ATFL & CFL origins – V-shaped tunnels that exit posterior fibula are easiest for securing graft with or without interference fit screws
   h) Drill hole in calcaneus placed at site of insertion of CFL under the peroneal tendons – 25-30mm depth
i) Pass tendon graft through fibula front to back through more proximal tunnel on anterior fibula and then from back to front through more distal tunnel just anterior to tip of fibula
j) Tension graft and suture ATFL portion to periosteum to anchor or fix with interference fit screw
k) Measure remaining length of tendon graft and cut so total length will not bottom out in calcaneal tunnel & suture graft end with large absorbable suture to use for passing the tendon
l) Use Beath pin to pass tendon through calcaneus so you can pull on passing suture placed in tendon for final graft tensioning
m) Confirm that all sections of graft are tensioned and ankle joint is reduced (as noted above for Brostrom)

n) Anchor graft with interference fit screw in calcaneus

D. Surgical technique – arthroscopically-assisted methods

1. General
   a) Open technique remains the standard
   b) Small series of scope technique for modified Brostrom-Gould have been reported
   c) Reported results good to date with few complications
   d) Further studies warranted

2. Secondary anatomical repair (Mangone technique)
   a) Lateral gutter debrided
   b) Two bioabsorbable suture anchors placed in anterior inferior distal fibula – 1st distal and 2nd slightly superior
   c) 1st anchor run through inferior extensor retinaculum
   d) 2nd through ATFL, capsule, & IER
   e) Sutures passed with sharp-tipped suture passer & brought out through skin over anterolateral ankle/foot
   f) Small incision made to tie down sutures
   g) Ankle taken out of distraction & held in slight DF & eversion while sutures tied down
   h) Postop, 4-6 wks in SLC PWB

3. Anatomical reconstruction with an autograft/allograft tendon
   a) Not in common use
   b) Arthroscopically-assisted placement of bone tunnels – fibular tunnel easiest, calcaneal & talar harder (may be done with separate small incisions
   c) Interference fit screws &/or endobutton for fixation to bone
   d) Looped tendon graft fixed in fibula first. Proximal limb of graft then passed through talus with Beath pin, tensioned and fixed. Separate inferior loop passed under peroneal tendons, drawn through calcaneal tunnel with Beath pin, & fixed
   e) Tensioning and fixation must be done out of distraction with ankle in neutral DF & slight eversion.
   f) Imbrication of IER can be added as per above
   g) Postop, 6 wks in SLC PWB
III. Peroneal Tendon Pathology

A. Open treatment

1. Indications
   a) Tenosynovectomy
   b) Repair of tears
   c) Debridement of tears
   d) Repair of dislocating peroneal tendons

2. Primary risks
   a) Scar formation
   b) Sural nerve injury

B. Tendoscopy treatment – what can you see/what can you do?

1. Indications
   a) Diagnostic procedure post-surgery
   b) Diagnostic procedure post-fracture
   c) Diagnostic procedure in association with lateral ankle ligament repair or reconstruction
   d) Snapping sensation
   e) Removal of exostosis
   f) Release of adhesions
   g) Tenosynovitis
   h) Tendon tear

2. Technique
   a) 2 main portals
      (1) Directly over tendons 1.5-2cm distal to posterior edge of lateral malleolus
      (2) Directly over tendons 2-2.5cm proximal to posterior edge of lateral malleolus
      (3) Allows visualization from superior peroneal retinaculum to cuboid turn
   b) Instruments
      (1) 2.7mm or smaller scope
      (2) 2mm shaver
      (3) Small cautery/ablator
      (4) Small bur
      (5) Small probe
      (6) Small arthroscopy knives
      (7) 18 ga spinal needle
   c) Procedures
      (1) Tenosynovectomy
      (2) Resection of distal muscle fibers of p. brevis
      (3) Resection of p. quartus
      (4) Deepening of fibular groove for peroneal tendon subluxation using a bur
      (5) Release of inferior peroneal retinaculum for stenosis
      (6) Excision of enlarged, symptomatic peroneal tubercle on calcaneus
      (7) Excision of adhesions
      (8) Define location of tear to permit limited open repair
Lateral ankle instability

16. Liu TH. Arthroscopic-assisted lateral ligamentous reconstruction in combined ankle and subtalar instability. Arthroscopy 23:554, 2007
17. Mangone PG. Arthroscopically assisted lateral ligament reconstruction. Presented at 26th Annual Summer Meeting, American Orthopaedic Foot and Ankle Society, National Harbor, Maryland, July 8, 2010
22. Prisk VR et al. Lateral ligament repair and reconstruction restore neither contact mechanics of the ankle joint nor motion patterns of the hindfoot. JBJS 92A:2375, Oct 2010
23. Rodeo SA et al. Tendon-healing in a bone tunnel. A biomechanical and histological study in the dog. JBJS 75A:1795, 1993

Peroneal tendon