

Medial Ankle Instability/Deltoid Ligament Injuries in the Athlete

Robert B. Anderson, MD
Chief, Foot and Ankle Service
Carolinas Medical Center
OrthoCarolina
Assistant Team Orthopaedist,
Carolina Panthers
Charlotte, North Carolina

Disclosures

Wright Medical/Arthrex:
Consultant, Royalties, Research
Amniox: *Consultant*
DJO: *Royalties*

*No off-label uses of materials are
presented during this lecture*

Sprain Types

- Types/mechanism
 - Lateral ankle sprains
 - Inversion/plantarflexion mechanism
 - *Medial ankle sprains*
 - *Deltoid ligament injury*
 - *Eversion injury mechanism*
 - "High ankle sprain"
 - Syndesmotic injury
 - Ext rotation mechanism
 - Increasing incidence



Xray Analysis

- Usually normal
 - Assess for occult fractures, tarsal coalition, OCD
- Syndesmotic injuries
 - Only helpful if diastasis noted
 - Static test – encourage WB to accentuate
 - Single limb if feasible
 - Compare to contralateral



Xray Analysis

Need to induce stress to determine instability

- Stress views
- Fluoroscopic = dynamic



Stress Ankle Radiographs

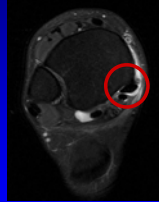
- Flouro very helpful (*if positive...*)
 - Can be performed in office setting but difficult to get patient relaxed



Imaging

- MRI

- Use to determine the degree and extent of the ligament/tendon injury and intra-articular lesions
- *Static test – does not assess instability*



PTT dislocation

Arthroscopy

- Probably the best diagnostic tool
 - *To assess medial = anterior drawer with ext rot*
- Very helpful in cases of negative xray, positive MRI and protracted recovery with vague pain
- Lu et al. found that arthroscopic evaluation was superior to fluoro
 - *Arthroscopy 2005*



Treatment: Acute Medial Ankle Sprain

- I prefer to place a cast for one week – WBAT
 - *Cast insures compliance*
 - *Calms things down*
 - *Keeps trainers away*



Treatment: Acute Medial Ankle Sprain

- Injection?
 - PRP/BMAC?
 - Cortisone?
 - 2 NFL studies have shown that it can improve RTP in stable syndesmotic injuries
 - Mansour et al:
 - Inject the AITFL within 72 hours of injury
 - RTP hastened by 11 day avg (44% improvement)

Medial Ankle Sprains

Treatment

- *Nonoperative vs. Operative*
 - Eversion sprains: always start conservative
 - Take twice as long to recover...
 - R/O syndesmotic involvement
 - Operative if present in association with deltoid



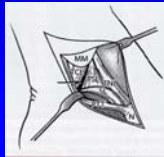
Medial Ankle Sprain

- Bad injury - can develop chronic symptoms and dysfunction
 - Swelling, calcific changes around medial malleolus
 - Tibial neuritis
 - Posterior tib tendinitis
 - Instability (*tendon, ligament*)



Chronic Medial Ankle Instability

- What is it?
 - B Hintermann
 - Articles, chapters
 - *Advanced Reconstruction of the Foot and Ankle (AAOS)*
 - Tib-navic portion of deltoid is most often injured
 - Spectrum of severity
 - Relationship to progressive flatfoot; spring ligament



Chronic Medial Ankle Instability

- What is it?
 - Very vague presentation = “giving way”; pain; feeling of collapse

Table 1 Stages of Medial Instability of the Ankle

	Giving Way	Valgus/Pronation of Foot	Pain in Medial Gutter	Pain in Anterior Border of Fibula	Posterior Tibial Tendinitis	Deformity Fully Correctable
Stage 1	+	+	(+)	(+)	–	Yes
Stage 2	++	+	+	+	–	Yes
Stage 3	+++	++	++	++	+	No
Stage 4	++++	+++	+++	+++	++	No

Chronic Medial Ankle Instability

- What is it?
 - Players just can't get back after appropriate treatment
 - Feeling of “giving way”
 - Difficulty cutting and decelerating
 - *Pain descending stairs is a hallmark!*



Chronic Medial Ankle Instability

- Exam often “vague”
 - Chronic swelling
 - Tender over anterior/inferior medial malleolus
 - Anterior drawer with external rotation
 - Rarely eversion laxity
 - Assess PTT for stability



Majority are Subtle...

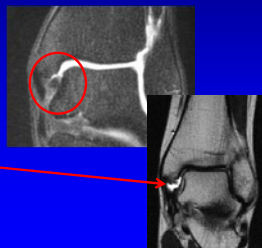
- Diagnosis not just about images
- Need to also consider clinical/functional exam
 - Inability to perform heel rise
 - Persistent pain with activity
 - Lack of improvement



May point to subtle instability pattern

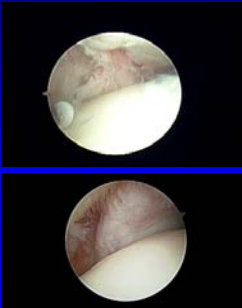
Chronic Medial Ankle Instability

- Imaging
 - Get xrays, MRI and CT
 - Will see medial edema and possible avulsed fragment
 - Superficial or deep deltoid rupture
 - Spring ligament difficult to assess



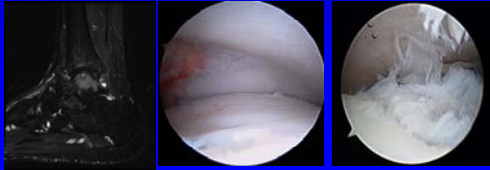
Medial Ankle Instability

- Intraop pathology
 - Scope best to confirm laxity
 - Drawer with external rotation
 - May see defect along anterior margin of medial malleolus



Missed/Neglected Medial Instability

- Concern = chronic/persistent instability can lead to progressive chondral injury and joint degeneration
- Serial MRIs helpful = look for worsening



Medial Ankle Instability

- Open Treatment
 - Repair the defect
 - A medial "Brostrom"
 - Anchor to bone
 - Add a medial displacement calcaneal osteotomy if early midfoot collapse
 - Often global instability - may need to address lateral side as well



Medial Ankle Instability

- Postop – *protracted course*
 - Splint, NWB x 2 weeks
 - SLWC x 4 weeks
 - Boot x 4-6 weeks
 - Gentle DF/PF until 12 weeks; strenghten PTT, work out in brace
 - Run at 4 months; RTP usually 5-6 months



Medial Ankle Instability

- Consider this diagnosis with vague symptoms, inability to decelerate, anteromedial tenderness and prior/failed scope
 - Or progressive flatfoot deformity *but with the ability to perform a single limb heel raise*
 - Superficial deltoid/spring ligament combination
 - *Fortunately deep deltoid rarely requires reconstruction*

And the acute deltoid ligament injury...

I was taught that deltoid ruptures were mid-substance and did not require repair – *will heal in like an MCL of the knee*



Cal Harper – 80's *Deltoid Repair not Needed*

Orthopedics Today, 1989 Jan;22(9):156-66.

The deltoid ligament. An evaluation of need for surgical repair.

Harper, M.D.

@ Author information

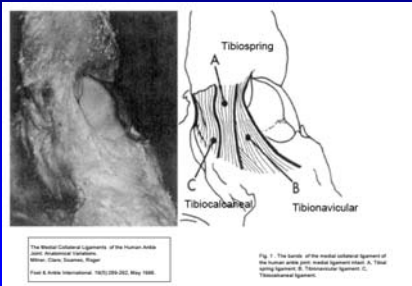
Abstract

Forty-two patients were treated surgically for ankle injuries, including complete disruption or incompetency of the deltoid ligament, without any surgical repair as part of the initial operation. In a retrospective study, 36 patients were followed for one year or longer. The functional results appeared satisfactory provided surgical reductions of the medial joint space and lateral malleolus were accurate and maintained until bone repair was complete. No evidence of ligamentous instability of the foot or ankle was noted.

Dogma vs myth: deltoid ruptures
are not repairable... *open only if
irreducible joint to remove
interference*



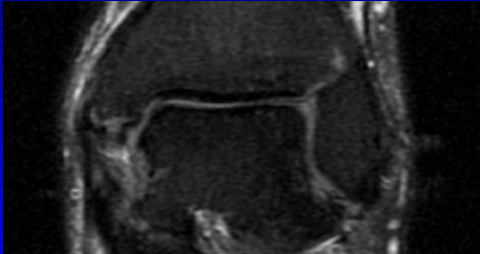
There is more to the deltoid
than just the deep component



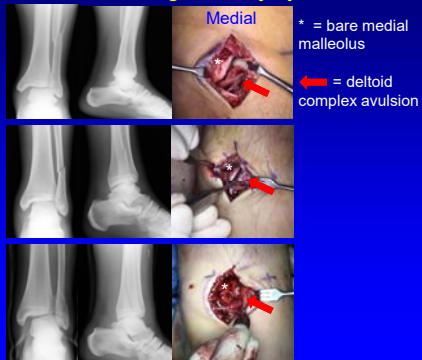
The Medial Collateral Ligaments of the Human Ankle Joint. Anatomical Variations. Wilson, Charles, Dumas, Roger. Foot & Ankle International 16(3):209-212, May 1995.

Fig. 6. The limits of the medial collateral ligament of the human ankle joint: tibial ligament (A), Tibial spring ligament (B), Tibionavicular ligament (C), Tibiocalcaneal ligament.

Deltoid Injury on T2 MRI = often difficult to determine which part is injured or avulsed



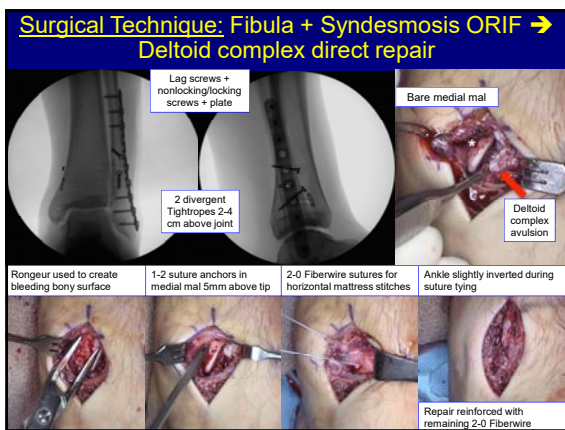
Acute deltoid complex avulsion off of the medial malleolus is an under-recognized injury in athletes

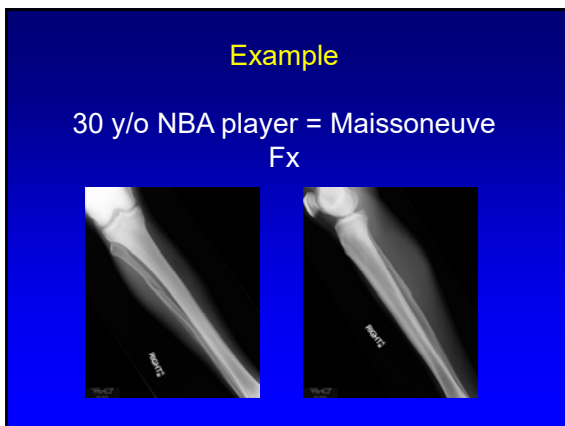


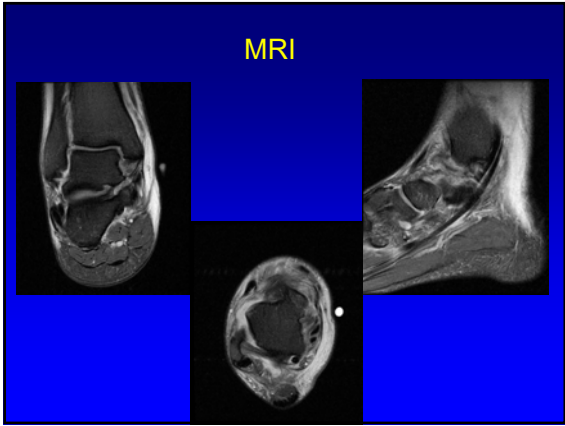
Acute deltoid complex avulsion off of the medial malleolus is an under-recognized injury in athletes

















10 year review of NFL players

Repair of Acute Superficial Deltoid Complex Avulsion During Ankle Fracture Fixation in National Football League Players

Andrew R. Hsu, MD¹, Craig R. Lareau, MD¹, and Robert B. Anderson, MD¹

Outcomes	NFL Players (n = 14)
Ave age (years)	25 ± 2
Ave BMI	34.4 ± 4.0
Ave f/u (years)	1.8 ± 0.6
Injury to surgery (days)	7.5 ± 6.6
Operative time (min)	101 ± 32
Return to play (RTP)	83%

*No significant differences in playing experience before vs. after surgery

Deltoid Ligament Injuries

As a result of this study and my experience, I now openly explore every deltoid in the athlete with a Weber C/Maissoneuve/unstable syndesmotic injury

Chronic Instability

Deep Deltoid Ligament Injuries

- Repair not feasible; reconstruction?
 - Hamstring allograft with endobutton on lateral tibia
 - Two arms: one to medial talus and the other to calcaneus
 - Low threshold to add medial displacement calcaneal osteotomy



Thank You!