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

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Disclosures:

Andrew R. Hsu, MD: None

Craig R. Lareau, MD: None


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Is acute deltoid complex avulsion off of the medial malleolus an under-recognized injury in athletes?

* = bare medial malleolus

= deltoid complex avulsion
Level IV Study: 12 active NFL players who underwent ankle ORIF with deltoid complex repair

- 2004-2014: All active NFL players undergoing ankle ORIF
- Excluded: chronic deltoid injuries, ankle fractures >2 mo old
- Surgical protocol:
  1.) Ankle scope with extensive debridement
  2.) Fibula ORIF with plate and screws (Ortholoc 3Di, Wright Medical)
  3.) Syndesmosis fixation with suture button devices (TightRope, Arthrex, Inc.)
  4.) Open deltoid complex repair (SutureTak with 2-0 Fiberwire, Arthrex, Inc.)

- Min 12 month f/u: serial clinical exams

- Variables: demographics, position played, time from injury to surgery, playing experience before and after surgery, ability to return to play (RTP, 1 regular season game), complications
Surgical Technique: Stress exam ➔ Scope with debridement (5 min, no OCD microfractures)
Surgical Technique: Fibula + Syndesmosis ORIF ➔

Deltoid complex direct repair

- Lag screws + nonlocking/locking screws + plate
- 2 divergent Tightropes 2-4 cm above joint
- Rongeur used to create bleeding bony surface
- 1-2 suture anchors in medial mal 5mm above tip
- 2-0 Fiberwire sutures for horizontal mattress stitches
- Ankle slightly inverted during suture tying
- Repair reinforced with remaining 2-0 Fiberwire
Post-operative rehabilitation:

- **Weeks 0-2**: non-weight bearing (NWB) splint
- **Weeks 2-4**: suture removal, NWB cast
- **Weeks 4-6**: partial-weight bearing in tall CAM boot
- **Week 6**: initial physical therapy, range of motion exercises
- **Weeks 6-12**: wean out of CAM boot, lace-up ASO, WBAT
- **Weeks 12-16**: increasing impact activity
- **5-6 months**: return to running, cutting, RTP
*83% (10/12) of NFL players able to RTP

**Positions:**
- 1 wide receiver
- 1 tight end
- 1 safety
- 1 running back
- 1 linebacker
- 7 offensive linemen

<table>
<thead>
<tr>
<th>Outcome</th>
<th>NFL Players (n = 12)</th>
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<tbody>
<tr>
<td>Ave age (years)</td>
<td>25 ± 2</td>
</tr>
<tr>
<td>Ave BMI</td>
<td>34.4 ± 4.0</td>
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<tr>
<td>Ave f/u (years)</td>
<td>1.8 ± 0.6</td>
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<tr>
<td>Injury to surgery (days)</td>
<td>7.5 ± 6.6</td>
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<tr>
<td>Operative time (min)</td>
<td>101 ± 32</td>
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<tr>
<td>Return to play (RTP)</td>
<td>83%</td>
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*No significant differences in playing experience before vs. after surgery

• No post-op complications
• No residual medial pain or instability
Summary:
• Complete avulsion of the superficial and deep components of the deltoid complex off of the medial mal during high-energy ankle fractures in athletes is relatively common

• Acute deltoid complex avulsion may benefit from direct repair with suture anchors

• **Limitations:** retrospective, small cohort, ave f/u 9 months, no clinical or functional outcomes, no control group, many factors influencing RTP

• The majority (83%) of NFL players with this injury pattern are able to RTP with min pain and no medial ankle symptoms

• Future studies needed to evaluate the benefits of deltoid repair during ankle ORIF in the general population
References:


