Turf Toe: An Update

Robert B. Anderson, MD
Carolinas Medical Center
OrthoCarolina
Carolina Panthers
Charlotte, NC
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“Turf Toe”

Term first used in 1976 for hyperextension hallux injury on an artificial field surface

» Astrodome, Houston TX
– Now seen with all sports and on any surface
– Effect of shoes? Cleat/surface interaction?
Mechanism of Injury

- Classic scenario
  - Foot fixed in equinus
  - Axial load
  - Forefoot progresses into dorsiflexion
Classic Pathology

- Soft tissue injury
  - Disruption of FHB and plantar complex distal to sesamoids
  - Variable in degree and extent = complete vs partial
Another Pathology

- Can also present as a diastasis of bipartite or fractured sesamoids = weak link
Result of Hyperextension Injury

- Soft tissue injury
  - Loss of plantar restraints
  - If unrecognized can lead to joint damage and deformity
“Turf Toe” = Not all “Classic”

- Can also occur on grass and with any sport
- Dislocation the most severe form
Other Mechanisms of Injury

- Turf toe injuries can be highly variable
  - Not all axial load
  - Can be non-contact
  - Some chronic “attritional”
“Turf Toe”: Variable Injury Patterns

- Direction of force
  - Unlike classic turf toe (pure hyperextension) → valgus or varus component can occur
“Turf Toe”: Variable Injury Patterns

- Consider force and what is ruptured
  - *Valgus force common*
  - MCL/Abd Hall rupture
    » Loss of tendon balance
    » Leads to traumatic bunion/progressive hallux valgus
Clinical Examination

- Standing alignment and toe posture
- FHL function
- Lachman exam
  - Vertical instability = lack of plantar restraints
Radiographic Evaluation

- Mandatory in the evaluation of turf toe
- Comparison AP of opposite side recommended
- Assess for proximal migration of sesamoids
Radiographic Evaluation

Forced dorsiflexion lateral view
- Assess distance from distal tibial sesamoid to base of phalanx (nl avg: 8mm)
n Assess trailing motion of the sesamoids with dorsiflexion of the hallux

- Educational to patient
Flouro: Assess for Complete Rupture/Instability

Example: post-reduction hallux mp dislocation; vertical stress testing (*toe Lachman/drawer test*)
MRI

- Consider intra-articular injuries that can occur at time of incident

- Useful with subtle injuries
  - Identifies osseous and articular damage
Most can be treated nonoperatively

- R.I.C.E.
- Walker boot or short leg cast with toe spica
  » Plantarflex hallux
- Turf toe plate/tape
Surgical Treatment – Who Needs It?

n “A Gestalt”

n Failure to respond to conservative measures
  – Loss of push-off strength
  – Gross instability
    » + Lachman
    » Excessive DF
  – Progressive clawing
Other indications for surgical intervention

- Progressive proximal migration of sesamoids
- Progressive diastasis of a bipartite sesamoid
Surgical Goal

- Restoration of anatomy is necessary for restoration of function
Surgical Technique

- Exposure through medial or J-incision
Surgical Technique

- Exposure through both medial and plantar incisions
  - Less traction on nerve
  - Improved lateral exposure
  - Better wound healing
Extensile vs 2-Incision Approach = Identify and Protect the Nerves!
Surgical Technique

- Transect abductor tendon - identify defect in plantar capsule, condition of the FHL tendon and sesamoids
Primary repair to soft tissue on base of proximal phalanx usually possible.
Surgical Technique

- Advance capsule and repair
  - 2-0 nonabsorbable
  - 10-15° plantarflexion

- Work from lateral to medial
  - Avoid nerve
Direct Repair
Case Example

n Intraop view
  – Medial incision used to identify extent of rupture/condition of the FHL tendon with plan to debride and repair primarily
Case Example

- **Intraop view**
  - Plantar incision used to directly repair the lateral FHB/plate rupture
    - Beware of digital nerve
  - Secure with toe in 10-15 degrees of plantarflexion and then complete medial repair
If no soft tissue attachments for primary repair

- Distal: suture anchors in proximal phalanx
- Proximal: transverse drill hole in distal sesamoid
Surgical Technique

Technique Tip: suture anchors in proximal phalanx
  – Must avoid supination
  – Be central – use flouro
Surgical Technique

n Complete repair with advancement of medial capsule

– Repair abductor hallucis tendon
Surgical Technique

Check nerve one last time prior to closure
Surgical Technique

Preop (injured)  Compare to Contralateral (normal)
Case – Turf Toe Variant

- 27 y/o lineman
- Valgus stress with axial load
- Progessive hallux valgus
  - Can not “cut” or push-off
  - MRI: medial capsular rupture
Case: Traumatic hallux valgus

Treatment

- Modified McBride bunionectomy with adductor tenotomy and repair of medial defect
Postoperative Management

- Delicate balance between protection and early ROM
  - Immobilize for 5-7 days → passive plantar flexion (keep sesamoids moving)
- 4 weeks NWB then walker boot
- Active plantar flexion at 4 wks, dorsiflexion at 6-8 wks
- Accommodative shoe with insert/plate at 8 weeks and initiate active ROM
Postoperative Management

- Run at 3 months; play after 4 months
- Taping, shoewear modifications
- “Sore” for a year – risk for hallux rigidus

Prevent Dorsiflexion
Late Presentation: Cock-up Deformity

- MP hyperextension deformity (often IP flexion contracture)
Surgical Technique

- Late cock-up deformity
  - Consider FHL tendon transfer
    » Girdlestone-Taylor
    » Thru drill hole in proximal phalanx
      - 4 mm biotenodesis screw
Case Example

- 33 y/o wide receiver
- Turf toe injury 3 years ago
  - Tibial sesamoidectomy
  - Cock-up deformity

(normal X-ray image of foot)
Old Turf Toe/Sesamoidectomy

- Sudden plantar pain while cutting
- Cock-up deformity gone
- Hallux elevated off ground – no push off strength
Old Turf Toe/Sesamoidectomy

- Intraop
  - Plantar medial incision
    - Used old incision and extended across plantar flexion crease
Intraop
– FHL rupture
Old Turf Toe/Sesamoidectomy

- Intraop
  - Tenodesis at master knot
Old Turf Toe/Sesamoidectomy

- Intraop
  - Tenolysis at master knot performed
  » Restored excursion
Old Turf Toe/Sesamoidectomy

- Intraop
  - FHL tendon recession/transfer to proximal phalanx
    » Fixed with interference screw
Old Turf Toe/Sesamoidectomy

- Intraop
  - FHB advancement
  - Hallux IP fusion

- Returned to pro football after 6 months…
Turf Toe Summary: Beware of these hallux mp plantar plate injuries and their variations = best to treat early; appreciate long term risk for hallux rigidus
Thank you
Lachman/Drawer test = Stabilize 2\textsuperscript{nd} MPJ to test hallux
“Turf Toe”: Variable Injury Pattern

- Medial based injury = progressive hallux valgus
- Modified McBride bunionectomy
Turf Toe with Bad Sesamoids?

- Tibial sesamoid pain with instability
- Failed cast/toe spica in plantarflexion
Solution = Tibial Sesamoidectomy with Abductor Hallucis Transfer

- Transfer fills plantar defect
- Provides flexion power
- Need to release adductor hallucis tendon to balance