CHRONIC DELTOID INSUFFICIENCY AS A CAUSE NOT A RESULT OF FLATFOOT: Is a Grade IV Really a Bad Grade III?

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DISLCOURES
• Wright Medical- Royalty, consulting
• Amniox Medical- consulting, research support
• DJD- royalty
• Arthrex- royalty

CASE: RB
70 YO MULTIPLE ANKLE SPRAINS, NOW SEVERE ANKLE PAIN

Grade IV AAFF/PTTI ???
CASE: RB
WHAT ABOUT THE FEET?

Does he really have a grade 3 FF??

CLINICAL STAGES

I  PT tenosynovitis/tendinitis/tendinosis
   Normal foot posture

II PT attenuation/rupture
    Supple planovalgus foot (peritalar subluxation)

   Johnson, 1985

III PT attenuation/rupture
    Fixed planovalgus foot (DJD Hindfoot)

   Johnson, 1985
CLINICAL STAGES

- IV PT
  - attenuation/rupture
  - fixed planovalgus/foot
  - Valgus ankle
    - Deltoid insufficiency

Myerson, 1997

STAGE IV PTTD


STAGE IV

Update on Stage IV Acquired Adult Flatfoot Disorder
When the Deltoid Ligament Becomes Dysfunctional

Jeremy T. Smith, MD, Eric M. Bluman, MD, MD*
STAGE IV PTTD IS A MYTH

Proposal?

CLEARLY THIS CLINICAL ENTITY IS PRESENT

Has Been Called The UN Solvable Problem?

WHY UNSOLVABLE?
THE SURGICAL TREATMENT OF STAGE IV HAS POOR RESULTS

- Pain relief
- Stability
- Maintain motion to maximize surface accommodation in ambulation
- Must hold up over time
OPERATIVE TREATMENT OPTIONS

- Options
  - Pantalar fusion
  - Tibio-talo-calcaneal fusion
  - Ankle fusion with hindfoot osteotomy
  - Triple with TAR
  - Triple with deltoid repair or distal tibial osteotomy
  - Triple or osteotomies with allograft Deltoid reconstruction

IS THIS A DEGENERATIVE FLATFOOT WITH AN INCOMPETENT DEEP AND SUPERFICIAL DELTOID?

- Valgus ankle
- Valgus hindfoot
- Progressive degenerative deformity
- +/- degenerative ankle

OR IS THIS AN UNSTABLE ANKLE THAT DEVELOPS IN SOME CASES A COMPENSATORY FLATFOOT?
ANKLE INSTABILITY

- Understand lateral instability
- Have a concept of what happen in syndesmotic injuries
- Ubiquitous
- Studies 92-99% success with lateral reconstruction

ANKLE INSTABILITY

- Always told Medial side was not issue in chronic condition

THE SUPERFICIAL DELTOID/MEDIAL ANKLE AND HINDFOOT ANATOMY
DELTOID LIGAMENT WITH FUNCTION

- Multiple described “bands” of the deltoid
  - Superficial – crosses 2 joints
    - Tibionavicular (constant)
    - Tibiospring (constant)
    - Tibiofibular
    - Superficial posterior tibiotalar
    - Resist valgus deformity
  - Deep – crosses the ankle only
    - Anterior tibiotalar
    - Intermediate
    - Posterior tibiotalar
    - Prevents MAL rotation

CASE: 58 YO COLLEGE BASKETBALL COACH. HISTORY OF SPANS. PAIN AND “ARCH COLLAPSE”
IS STAGE IV A PROGRESSION OF A DIFFERENT DISEASE?
DELTOID INSTABILITY

Hinterman

Table 1: Stages of Medial instability of the foot

<table>
<thead>
<tr>
<th>Stage</th>
<th>Talus rotation</th>
<th>Valgus/lateral offset</th>
<th>Pain in Medial Bar</th>
<th>Pain in Front of Tibia</th>
<th>Pronation Tibial Instability</th>
<th>Posteromedial Tibial Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage 1</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Stage 2</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
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<td>+++</td>
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<tr>
<td>Stage 3</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
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<td>+++</td>
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<tr>
<td>Stage 4</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
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</table>

The RAM Classification
A Novel, Systematic Approach to the Adult-Acquired Flatfoot

Steven M. Raikin, MD*, Brian S. Winters, MD, Joseph N. Daniel, MD

June 2012 Volume 17, Issue 2 Pages 169–181

Foot and Ankle Clinics

RANKIN: RAM CLASSIFICATION ANATOMIC

<table>
<thead>
<tr>
<th>Stage</th>
<th>Ankle</th>
<th>Midfoot</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>Talar plane at PT + PTT</td>
<td>Normal alignment</td>
</tr>
<tr>
<td>b</td>
<td>Plus sign</td>
<td>Maximal supination/supination</td>
</tr>
<tr>
<td>1a</td>
<td>Flexible planovalgus (&lt;90° medial talar plane, &lt;30°</td>
<td>Valgus with deltoid insufficiency, no instability</td>
</tr>
<tr>
<td>1b</td>
<td>Flexible planovalgus (&lt;90° medial talar plane, &lt;30°</td>
<td>Valgus with deltoid insufficiency with tibial arthritis</td>
</tr>
<tr>
<td>2a</td>
<td>Fixed planovalgus (&lt;90° medial talar plane, &lt;30°</td>
<td>Valgus, supination to bony loss on the lateral talus, lateral deltoid normal</td>
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<td>Fixed planovalgus (&lt;90° medial talar plane, &lt;30°</td>
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</table>
STAGE IV POSTERIOR TIBIAL TENDON INSUFFICIENCY: THE TILTED ANKLE

OBSERVATIONS: CASE 1

OBSERVATIONS: CASE 1
OBSERVATIONS: CASE 2

CASE 3:  
VALGUS WITH FLATFOOT DEFORMITY  
- 67 yo with progressive flat foot  
  and hx of fibula stress fx
CASE 3

- 67 yo with progressive flat foot and hx of fibula stress fx

NOW WHAT??
GRADE 4 IS NOT A BAD 3
ANATOMIC APPROACH TO FLAT FOOT
- Ankle, Hindfoot, Midfoot
- Slotted by the etiology
- Not all from PTTD
- May be able to prevent collapse with early stage reconstruction
- Do fewer triples if approach ankle first??

ANKLE FLATFOOT

HINDFOOT FLATFOOT

I  PT tenosynovitis/ tendinitis/tendinosis
   Normal foot posture
II  PT attenuation/rupture
   Supple planovalgus foot
      (peritalar subluxation)
III  PT attenuation/rupture
    Fixed planovalgus foot (DJD
    Hindfoot

Johnson and Strom
MIDFOOT FLATFOOT

FLATFOOT

- All can have posterior tib pathology
- All most often have equinous contractures
- All later grades hard
- Different etiologies and different presentations

STAGE IV PTTD IS A MYTH

SUMMARY

- The Ankle in the Grade 4 flatfoot is most definitely a clinical entity
- I suggest it is not a bad Grade 3
- An anatomic approach to the etiology can make treatment more specific and may have is treating the problem in the early stages
STAGE IV PTTD IS A MYTH

SUMMARY

References

• Raiken SM, Winters BS, Daniel JN. The RAM Classification. Foot Ankle Clin June 2012; Vol. 17(2)

THANKS