CHRONIC DELTOID INSUFFICIENCY AS A CAUSE NOT A RESULT OF FLATFOOT:

Is a Grade IV Really a Bad Grade III?

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DISLCOSURES

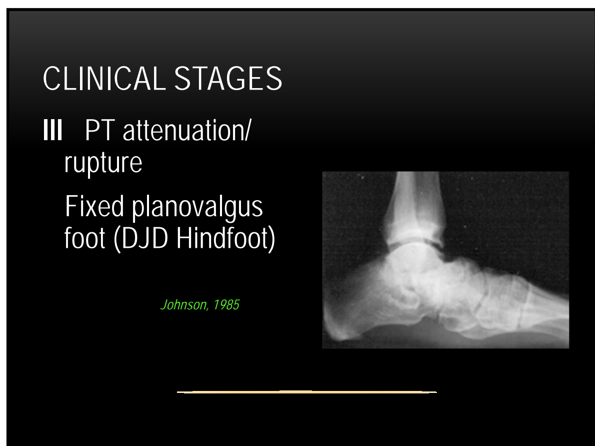
- Wright Medical- Royalty, consulting
- Amniox Medical- consulting, research support
- DJO- royalty
- Arthrex- royalty

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

Grade IV AAFF/PTTI ???

CASE: RB
WHAT ABOUT THE FEET?
STANDING
Does he really have a grade 3 FF??

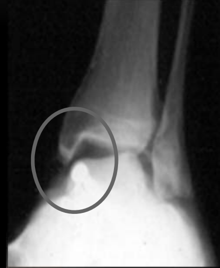
CLINICAL STAGES
I PT tenosynovitis/ tendinitis/tendinosis
Normal foot posture
II PT attenuation/rupture
Supple planovalgus foot
(peritalar subluxation)
Johnson, 1985


CLINICAL STAGES
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

- Myerson MS. Adult acquired flatfoot deformity: treatment of dysfunction of the posterior tibial tendon. Instr Course Lect 1997:46:393– 405.
- Bluman EM, Myerson MS. Stage IV posterior tibial tendon rupture. Foot Ankle Clin 2007:12(2):341– 62.
- Bluman EM, Title CI, Myerson MS. Posterior tibial tendon rupture: a refined classification system. Foot Ankle Clin 2007:12(2):233–49.

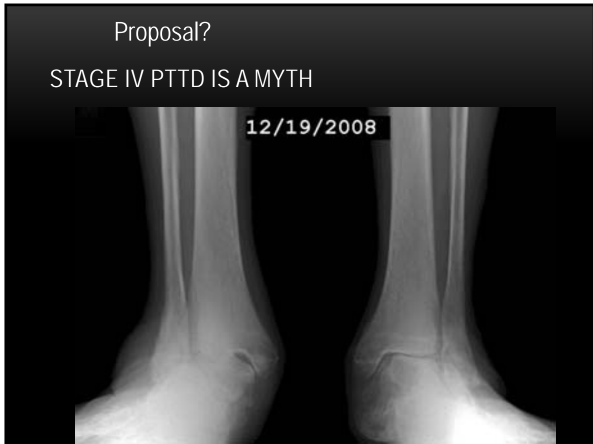
STAGE IV

Update on Stage IV Acquired Adult Flatfoot Disorder

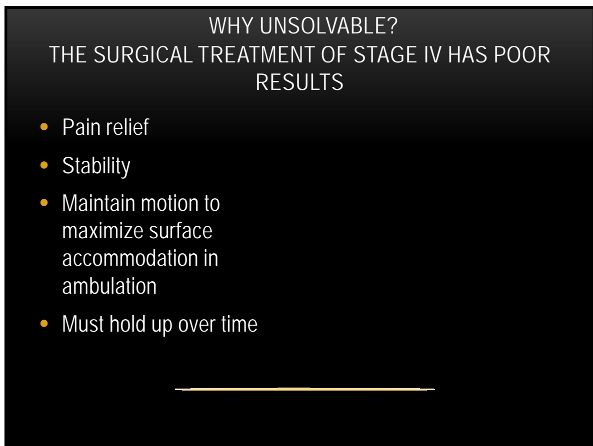
When the Deltoid Ligament Becomes Dysfunctional

Jeremy T. Smith, MD, Eric M. Bluman, MD, PhD*

Most patients with stage IV AAFD have progressed through stage III disease, although a subset of patients develop valgus talar tilt without a rigid flatfoot deformity, suggesting a possible progression directly from stage II to stage IV AAFD. As described by Bluman and colleagues[4] in 2007, stage IV AAFD may present with or without lateral ankle instability, tibiotalar arthritis, and/or a rigid valgus ankle deformity.


Proposal?
STAGE IV PTTD IS A MYTH
12/19/2008

CLEARLY THIS CLINICAL ENTITY IS PRESENT
R
Has Been Called The UN Solvable Problem?

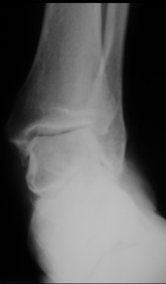

WHY UNSOLVABLE?
THE SURGICAL TREATMENT OF STAGE IV HAS POOR RESULTS
Pain relief
Stability
Maintain motion to maximize surface accommodation in ambulation
Must hold up over time

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?

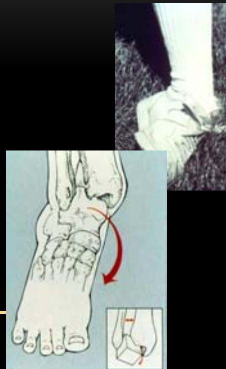
- Valgus ankle
- Valgus hindfoot
- Progressive degenerative deformity
- +/- degenerative ankle



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

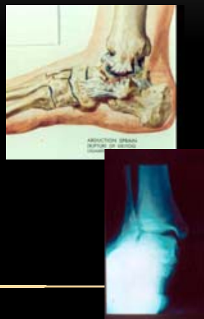
ANKLE INSTABILITY

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

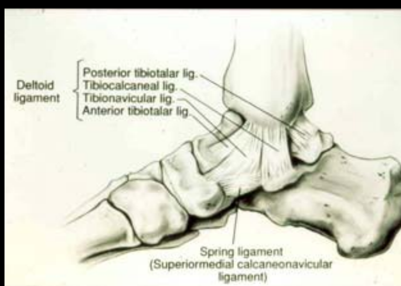


ANKLE INSTABILITY

- Always told Medial side was not issue in chronic condition

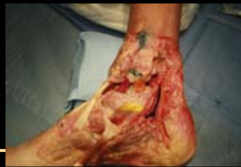


THE SUPERFICIAL DELTOID/MEDIAL ANKLE AND HINDFOOT ANATOMY

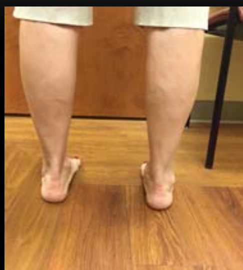


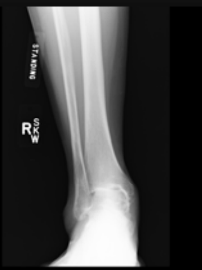
DELTOID LIGAMENT WITH FUNCTION

- Multiple described "bands" of the deltoid
  - Superficial – crosses 2 joints
    - Tibionavicular (constant)
    - Tibiospring (constant)
    - Tibiocalcaneal
    - 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 SPAINS. PAIN AND "ARCH COLLAPSE"





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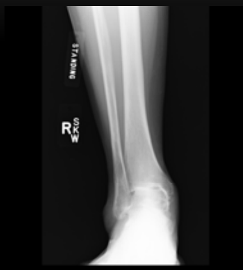
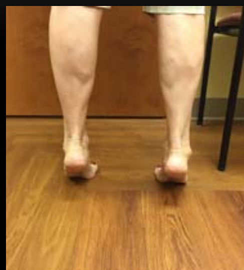




IS STAGE IV A PROGRESSION OF A DIFFERENT DISEASE?
DELTOID INSTABILITY

Hinterman

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	++	+	+	[illegible]	[illegible]	[illegible]
Stage 3	+++	++	++	++	+	No
Stage 4	++++	+++	+++	+++	++	No

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

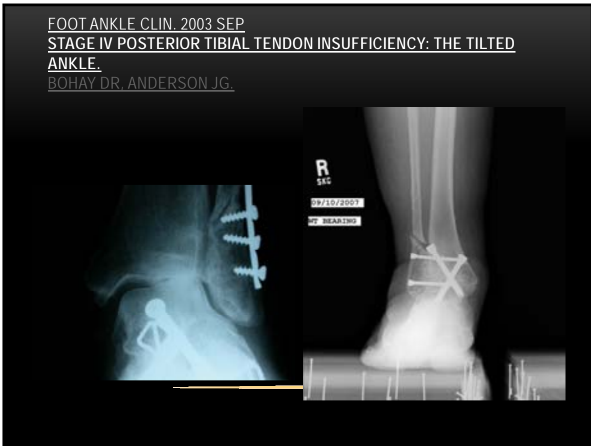
Steven M. Raikin, MD*, Brian S. Winters, MD, Joseph N. Daniel, DO

June 2012 Volume 17, Issue 2, Pages 169–181

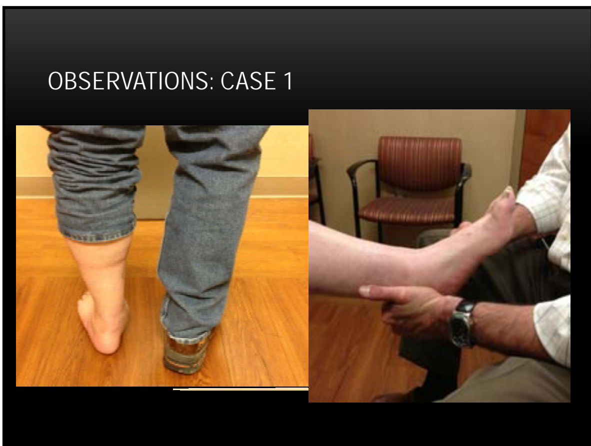
Foot and Ankle Clinics

RANKIN: RAM CLASSIFICATION
ANATOMIC

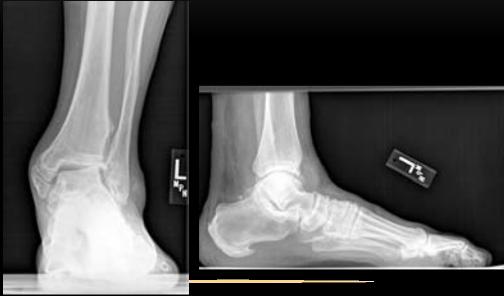
	Rearfoot	Ankle	Midfoot
Ia	Tenosynovitis of PTT	Neutral alignment	Neutral alignment
Ib	PTT tendonitis without deformity	Mild valgus (<5°)	Mild flexible midfoot supination
IIa	Flexible planovalgus (<40% talar uncoverage, <30° Meary angle, Incongruency angle 20° to 45°)	Valgus with deltoid insufficiency (no arthritis)	Midfoot supination without radiographic instability
IIb	Flexible planovalgus (>40% talar uncoverage, >30° Meary angle, incongruency angle >45°)	Valgus with deltoid insufficiency with tibiotalar arthritis	Midfoot supination with midfoot instability—no arthritis
IIIa	Fixed/arthritic planovalgus (<40% talar uncoverage, <30° Meary angle, incongruency angle 20° to 45°)	Valgus secondary to bone loss in the lateral tibial plafond (deltoid normal)	Arthritic changes isolated to medial column (navicular-medial cuneiform or first TMT joints)
IIIb	Fixed/arthritic planovalgus (>40% talar	Valgus secondary to bone loss in the lateral tibial	Medial and middle column midfoot arthritic changes


FOOT ANKLE CLIN. 2003 SEP
STAGE IV POSTERIOR TIBIAL TENDON INSUFFICIENCY: THE TILTED ANKLE.
BOHAY DR, ANDERSON JG.
R
09/10/2007

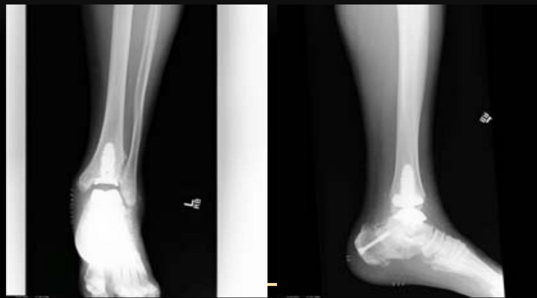
OBSERVATIONS: CASE 1
L
KS
STANDING


OBSERVATIONS: CASE 1

OBSERVATIONS: CASE 2

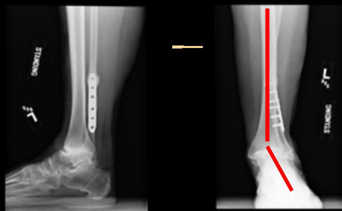


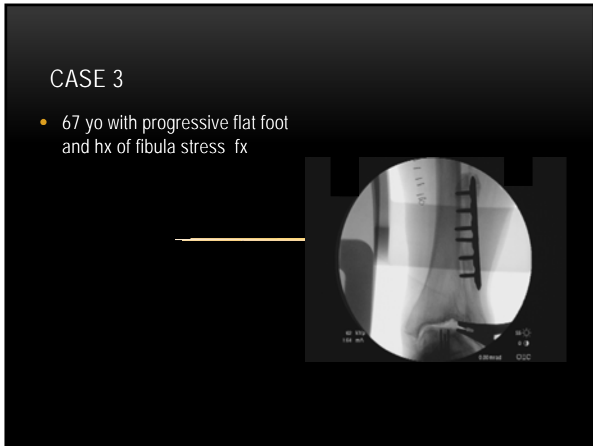
OBSERVATIONS: CASE 2



CASE 3: VALGUS WITH FLATFOOT DEFORMITY

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

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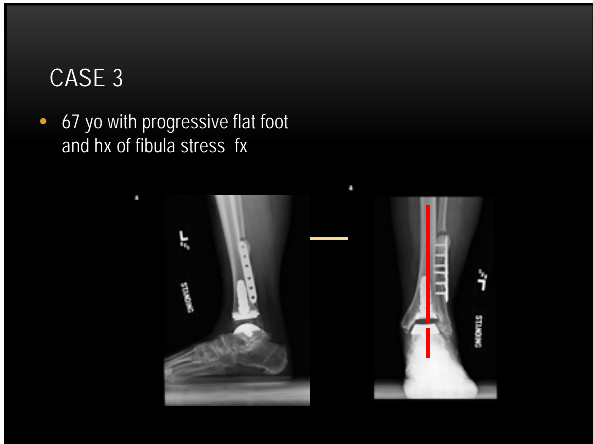
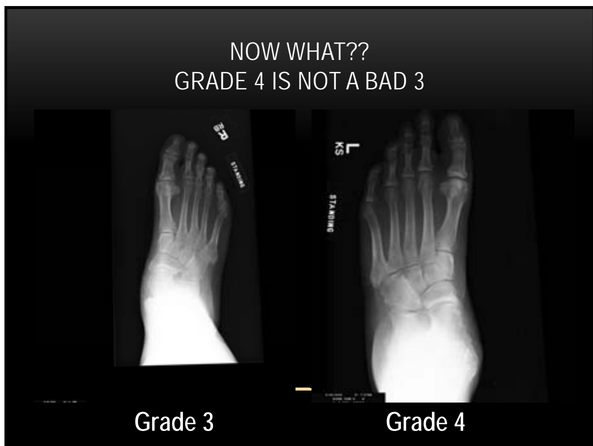
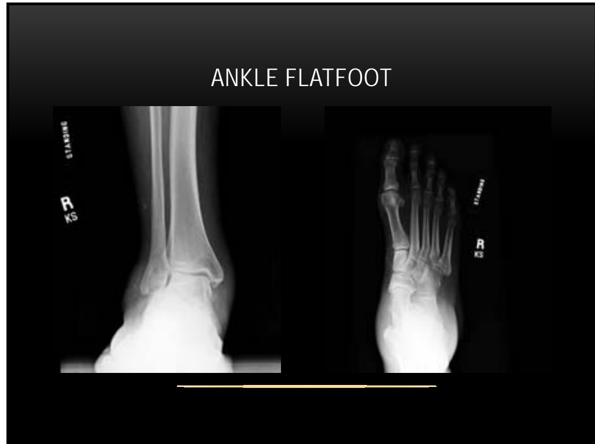

CASE 3
67 yo with progressive flat foot and hx of fibula stress fx
STANDING
STANDING


NOW WHAT??
GRADE 4 IS NOT A BAD 3
STANDING
Grade 3
Grade 4

ANATOMIC APPROACH TO FLAT FOOT
Ankle, Hindfoot, Midfoot
Slotted by the eitiology
Not all from PTTD
May be able to prevent collapse with early stage reconstruction
Do fewer triples if approach ankle first??
STANDING


ANKLE FLATFOOT
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KS
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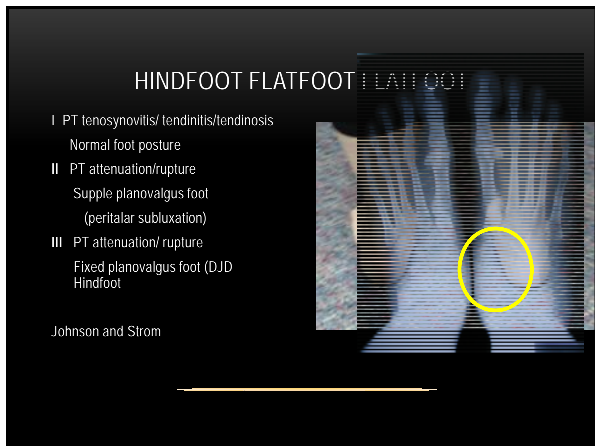
KS


HINDFOOT FLATFOOT
I PT tenosynovitis/ tendinitis/tendinosis
Normal foot posture
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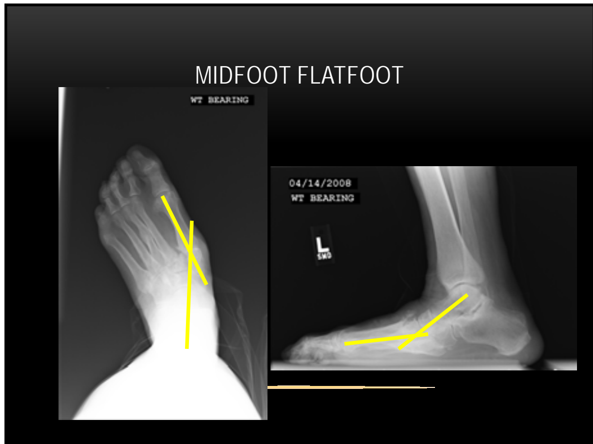
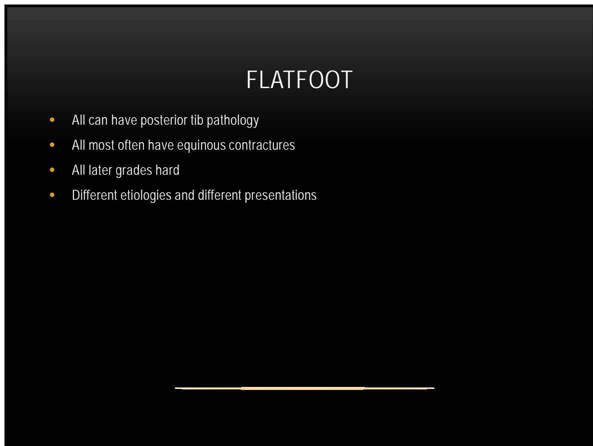
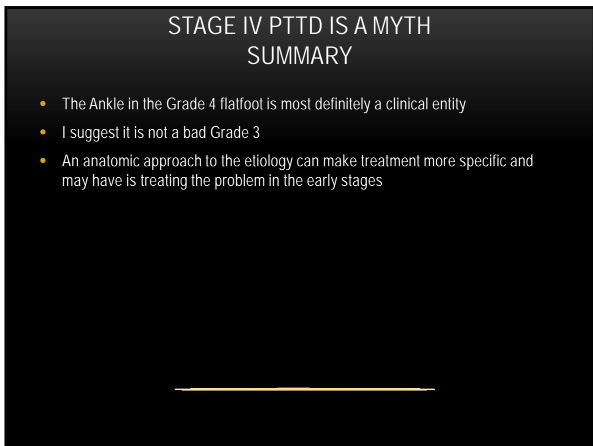
Supple planovalgus foot
(peritalar subluxation)
III PT attenuation/ rupture
Fixed planovalgus foot (DJD Hindfoot
Johnson and Strom


MIDFOOT FLATFOOT
WT BEARING
04/14/2008
WT BEARING
L


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

- Myerson MS. Adult acquired flatfoot deformity: treatment of dysfunction of the posterior tibial tendon. Instr Course Lect 1997:46:393– 405.
- Bluman EM, Myerson MS. Stage IV posterior tibial tendon rupture. Foot Ankle Clin 2007:12(2):341– 62.
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- Raiken SM, Winters BS, Daniel JN. The RAM Classification. Foot Ankle Clin.June 2012: Vol. 17 (2)

THANKS