

What constitutes good foot conformation?

And how do we determine it?

Stephen E. O'Grady, DVM, MRCVS
Virginia Therapeutic Farriery
In Assoc. with: Palm Beach Equine Clinic
Keswick, Virginia 22947, USA
Website: <http://www.equipodiatry.com>



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We have come a long way...



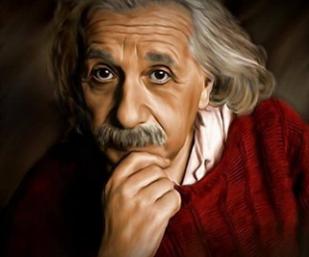
Visani 2022

Roman 100 AD

But have we left the basics of farriery behind?

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Education is Not The Learning of Facts



It's Rather The Training of The Mind To Think

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Sooo...if you think about one aspect of farriery or the foot differently...this presentation will be a success!



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“Knowledge isn’t free. You have to pay attention.”



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Our Goal: A healthy foot



macieatwood

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Why a healthy foot?!

- Promotes soundness and allows the horse to perform at the highest level possible
- Greater than 70% of forelimb lameness are either localized to the foot or related to the foot if it occurs in the limb above
- Is the best possible deterrent to prevent lameness in equine veterinary medicine

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There is no free lunch...

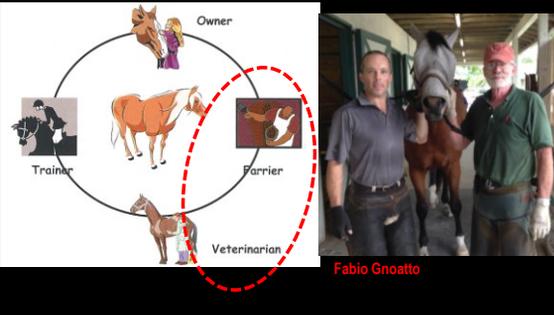
Every time farriery is performed on a horse's foot...

- The anatomical relationship of the structures within the foot will change
- The biomechanical forces exerted on the foot / digit will be affected



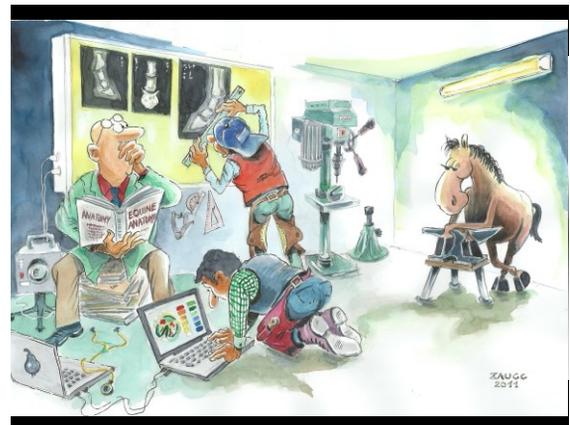
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It takes a village... The ideal

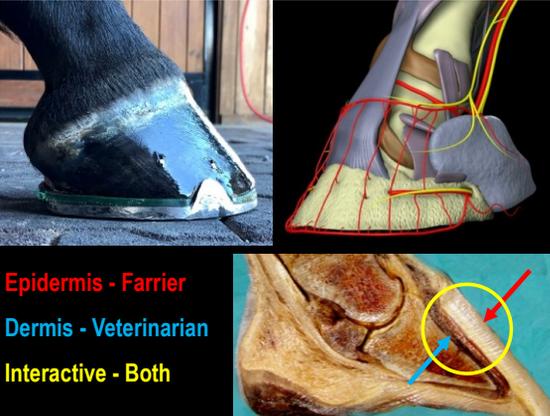


Fabio Gnoatto

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Epidermis - Farrier

Dermis - Veterinarian

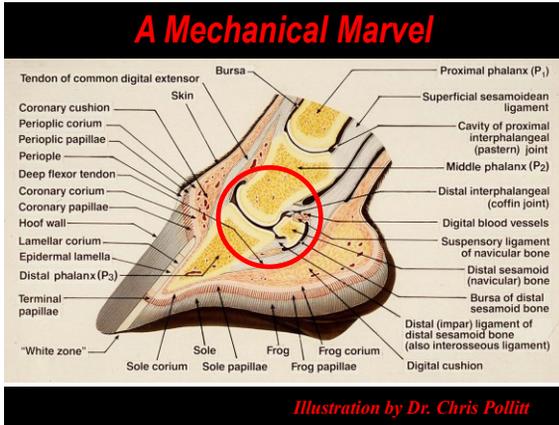
Interactive - Both

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The horse's foot is unique as it is a biological entity that follows the laws of physics.

(S. O'Grady, 2009)

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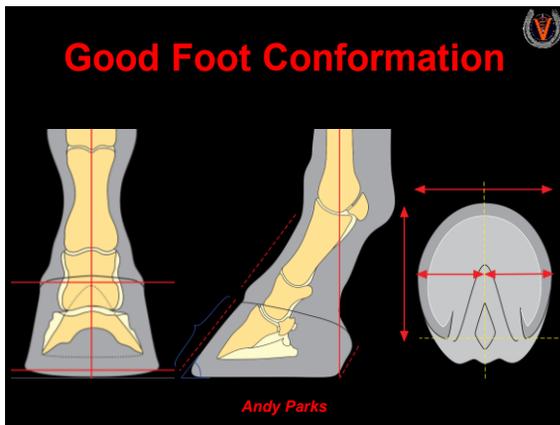
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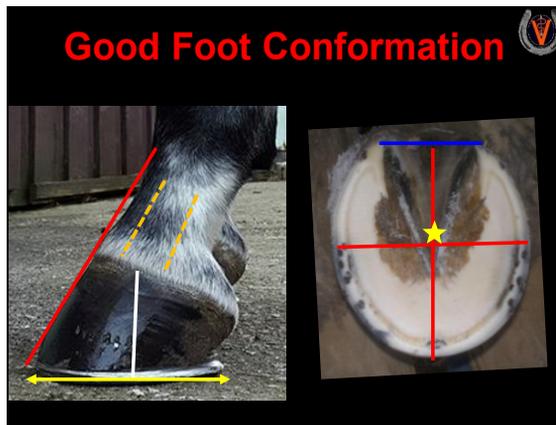
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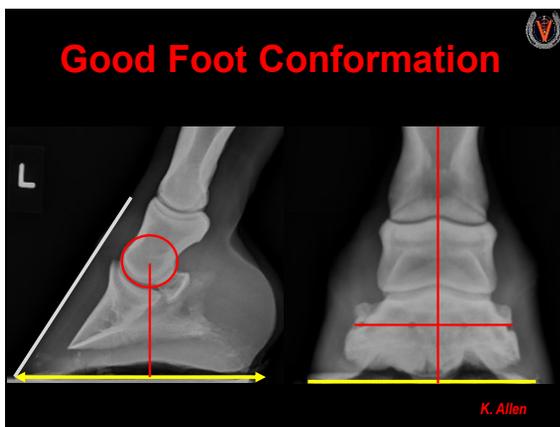
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Basic Farriery

- **Trimming** is the “mainstay” of farriery
- Application of the shoe
 - ◆ **Protect and compliment the trim**
 - *Size, type and placement of shoe*
 - *Breakover modification*
 - *Heel elevation*

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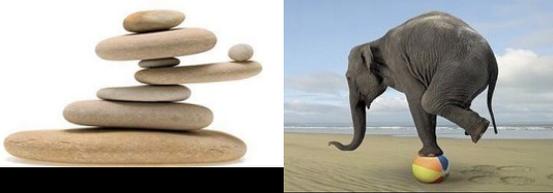
A few things your mother told you never to discuss in polite company

- Politics
- Religion
- Sex
- **“Hoof Balance”**

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Hoof Balance

What is it?



There is no definition...it is a concept!

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Hoof Balance

There is:

- Static balance
- Dynamic balance
- *Natural balance*
- 3-dimensional balance

How can we satisfy all of these?!

Hoof Mapping???

Lots of methods / cumbersome

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Hoof Balance



James Gilchrist

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Guidelines for Trimming

- Hoof-pastern axis
- Center of rotation
- Ground surface of hoof capsule extending to the base of frog or trimmed to include the frog (**the same plane**)

O' Grady S.E. (2009) Guidelines for trimming the equine foot: a review. Proc 55th Ann. Conv. Am Assoc. Eq. Pract. P. 218-225

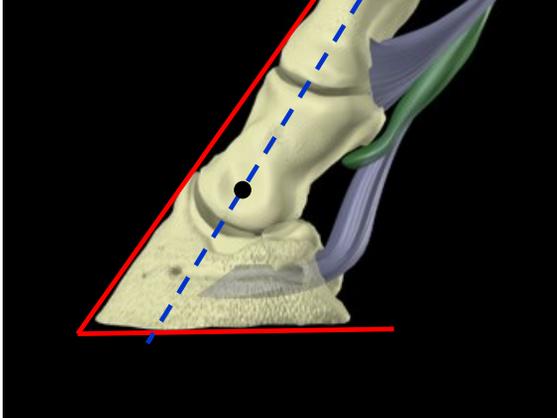
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The Hoof-Pastern Axis

Straight
Broken-back
Broken-forward



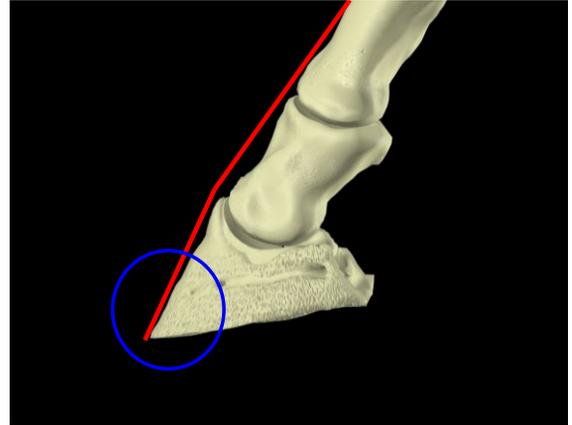
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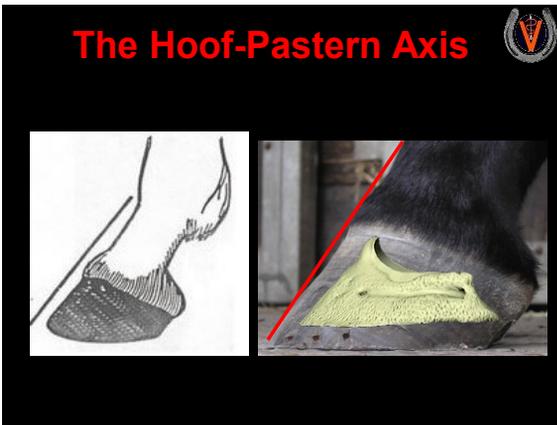
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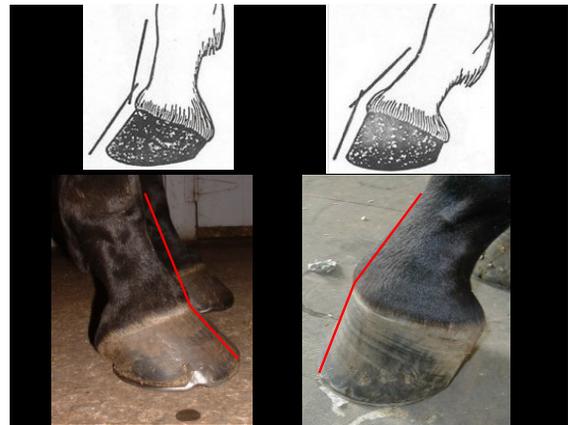
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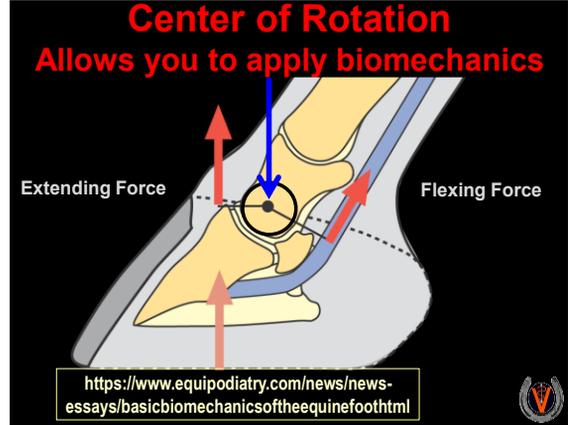
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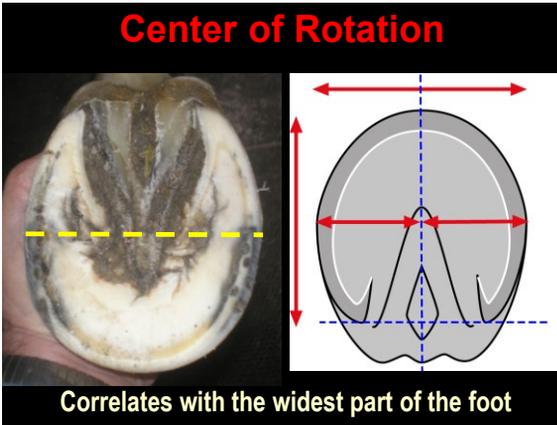
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Reasonable to say, the HPA is the best estimator of the angulation of the DIP J without a radiograph!

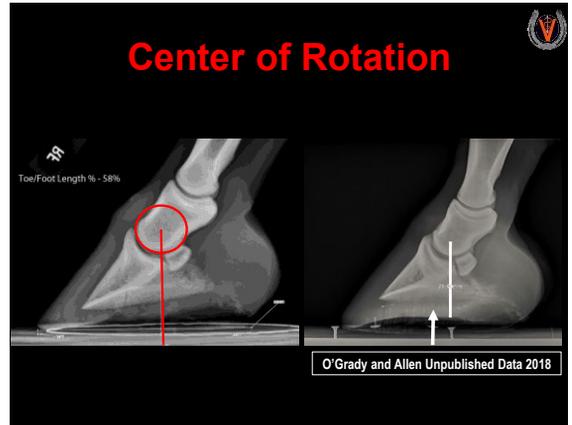
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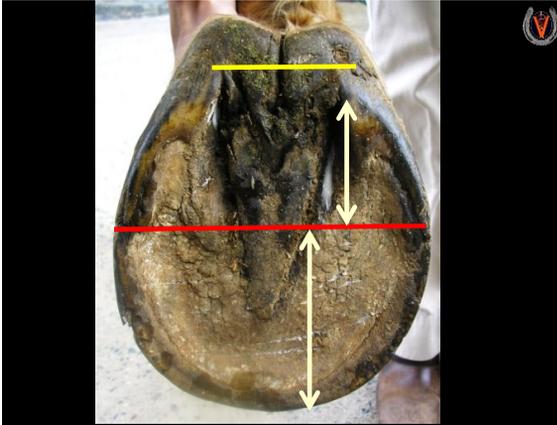
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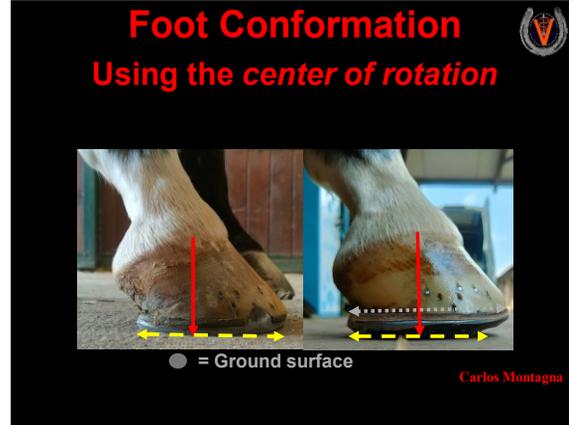
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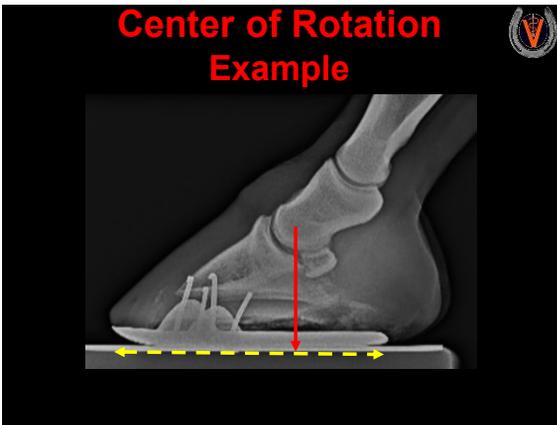
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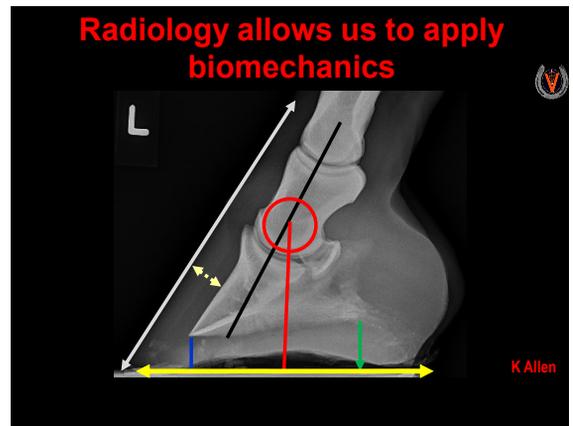
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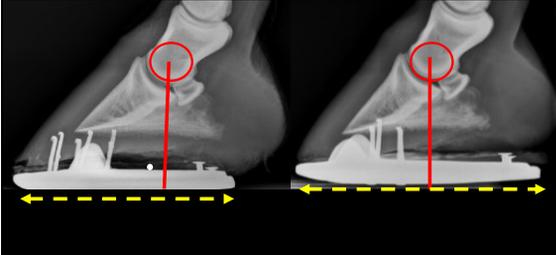


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Center of Rotation Radiology



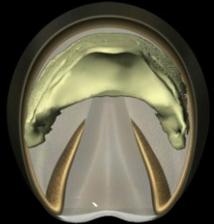
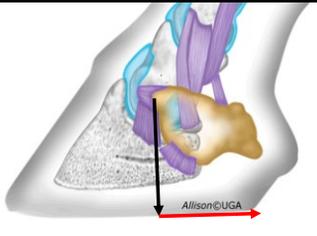
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Center of Rotation Example

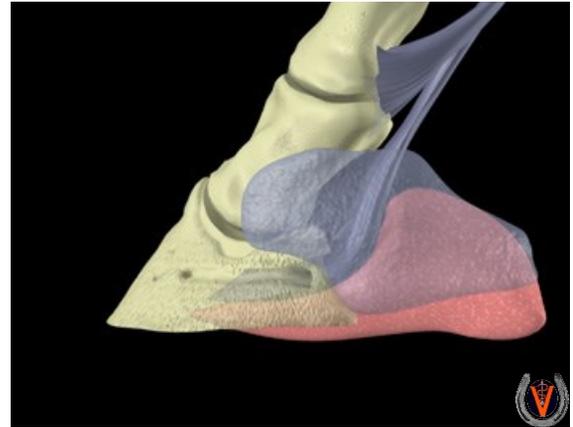


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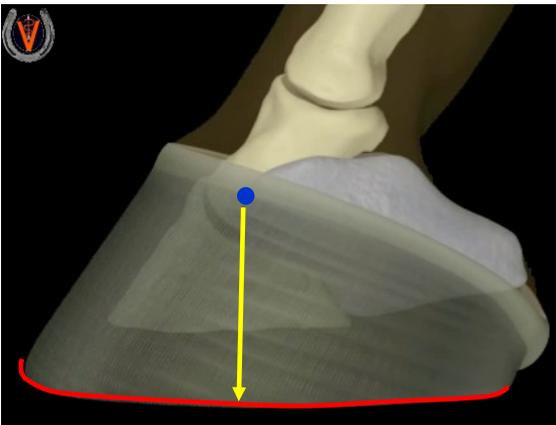
Ground Surface of the Foot Extends to the base of the frog



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Short shoes



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The Palmar foot

Trimming the heels...

Often controversial

Many theories / thoughts

BUT... the anatomy and biomechanical principles are factual...



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Trimming the heels

- **'Don't lower the heels'** should be removed from the farriery language
 - ◆ Heels grow forward not tall
- **Trimming the heels to the base of the frog** increases ground surface on the bottom of foot
 - ◆ Improves foot conformation

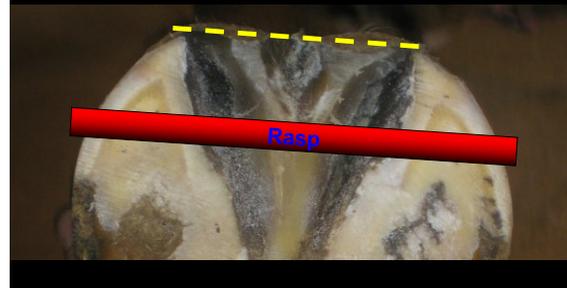


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Trimming the palmar foot 'Heels load sharing'



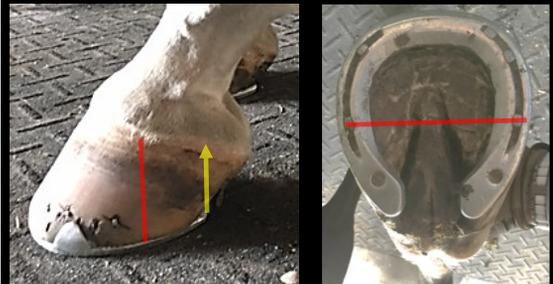
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There is a difference Assess the heel structures



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Heels migrating dorsally



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Heels migrating dorsally



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Heels migrating dorsally



62

Heels migrating dorsally



63

Heels migrating dorsally



64

Heels migrating dorsally



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Negative Plane of the Distal Phalanx



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Negative Plane of the Distal Phalanx

What is it?

- It is a Radiographic Symptom
- Indicative of dorsiflexion of the DIPJ
- Common Clinical Features
 - Broken-back HPA
 - Low heels
 - Dorsal sole depth ↑
 - Increased sole concavity



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Negative Plane of the Distal Phalanx

Symptom leads to the disease

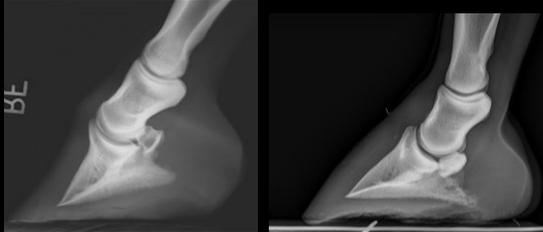


Negative plane of DP Joint

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Negative plane of the distal phalanx

Angle correlates with tension in DDF



Flexural deformity occurs when toe is overloaded and heel is underloaded

Dorsoflexural deformity occurs when heel is overloaded and toe is underloaded

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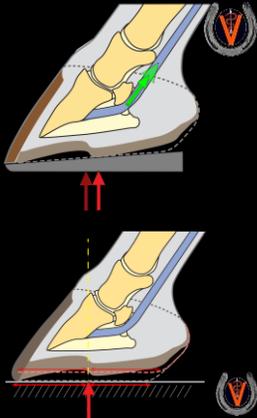


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Pathogenesis:

Possible Mechanisms

- Primary heel collapse
 - Normal structures / abnormal load
 - Weak structures / normal load
 - secondary damage of palmar foot structures
 - secondary lengthening of DDF?



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Negative Plane of the Distal Phalanx

Causes

- Many factors or combinations contribute...
 - Genetics
 - Breed predisposition
 - Development of foot as a youngster
 - Limb / foot conformation
 - Amount of work
 - Footing / surfaces
 - Inappropriate farrier practices

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Negative Plane of the Distal Phalanx

Reality check!

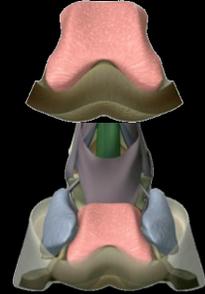
- Means you have lost the soft tissue mass in the palmar section of the foot
- This allows the palmar processes of the distal phalanx to descend



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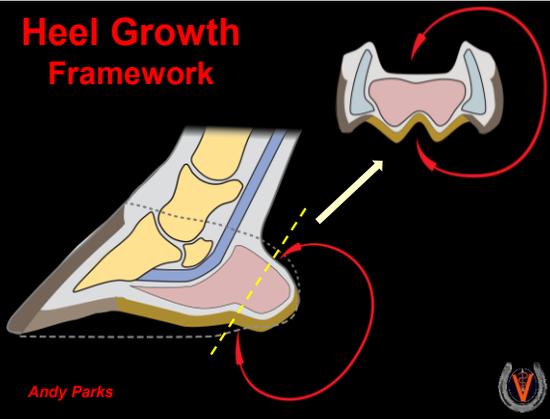
The Problem Heel growth

The Limiting Factor



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Heel Growth Framework



Andy Parks

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Farriery Principles

- Barefoot
- Reduce toe length / leverage
- Increase ground surface...trim/shoe
- Redistribute weight bearing
- Breakover

Hunt RJ. Farriery for the Hoof with Low or Underrun heels. Vet Clinic N America Equine Practice 2012

O'Grady, S.E. Principles of trimming and shoeing. In: Baxter GM, ed. *Adams and Stashak's Lameness in Horses 7th ed.* Ames, IA: Wiley-Blackwell, 2020;1112-1133.

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Prognosis

- If primary heel collapse caught early without secondary changes → fair for reversibility
- If primary heel collapse with secondary changes → long term management
- If primary increase in DDF length/decrease in tension → long term management

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Thoughts....

- Distal phalanx negative angle is a radiographic symptom (not a disease)
- Would be better named "dorsiflexural deformity"
- Several potential causes and therefore, different approaches
- Reversibility probably depends cause and duration and structural damage
- There is much more to learn about this conformation

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