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Technical issues with the Recording?

- Clear browser cache using these instructions
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Still having issues?

- Call 866-782-6258 (M-F, 8 AM-8 PM ET)
- Email customerservice@PhysicalTherapy.com

The Complicated Foot Made Simple

Paul Drumheller
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Learning Outcomes

After this course, participants will be able to:

- Identify subtalar joint neutral position in prone and standing.
- Assess gait and identify if rearfoot has normal motion and timing during the stance phase.
- Identify at least two aspects of normal foot motion during the stance phase of gait.
- Describe how the 1st Ray position and mobility can affect gait pattern.
- Identify at least three treatment strategies based on foot findings.

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Disclosure

I am the owner and presenter of continuing education courses: "When the Feet Hit the Ground…Everything Changes" and "When the Feet Hit the Ground….Running."

Background…

- Why I wanted to do this webinar…

Starting the Process…

- Complete subjective eval…Listen just not hear!
- How long have symptoms been present?
- Previous injury?
- Previous treatments?
- Watch them walk
  - What is "Normal?"

Initially Walk without lines on the skin

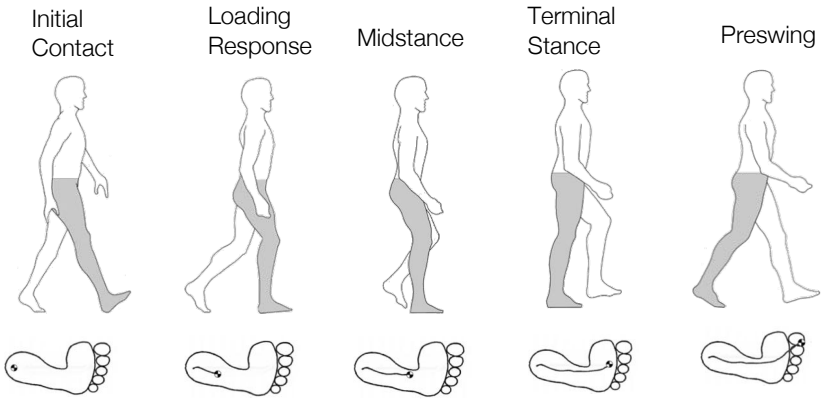
Look at one foot at a time

The Primary Function of the Foot

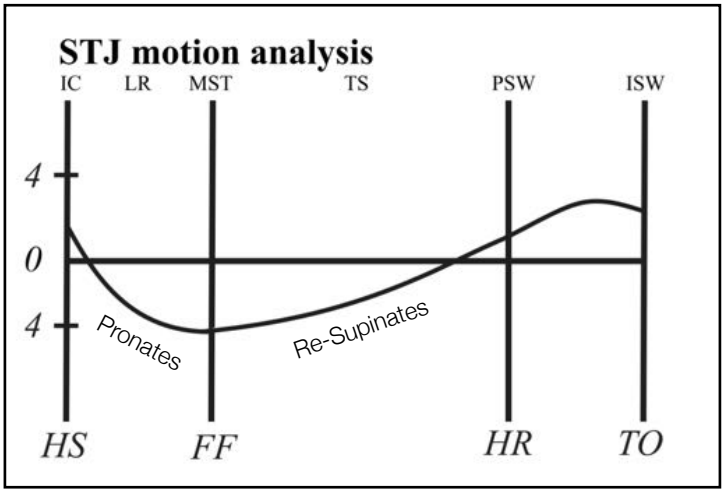
- Lateral calcaneus
- Medial calcaneus
- 5th ray
- 1st ray / hallux / big toe

- Once this happens… the foot has done it's job!!!

Gait Mechanics

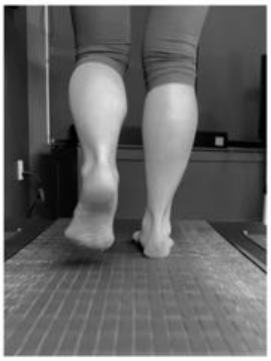


Ideal "Normal" Gait



Video Gait Analysis – Look at One Foot at a Time

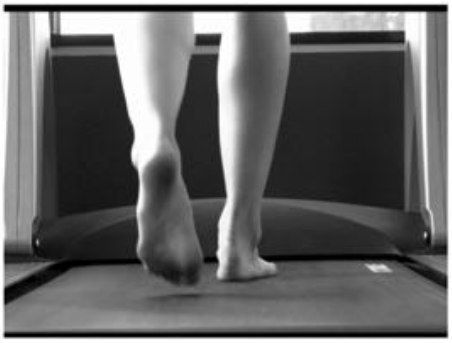
Rear view is essential



Side view

What to Look For?

- Lateral calcaneus hits the ground first
- How many toes (should see two lateral toes)
- Does rearfoot go through neutral
- When does re-supination occur



Lateral calcaneus hits the ground first
How many toes (should see two lateral toes)
Does rearfoot go through neutral
When does re-supination occur

Lack of Ankle Dorsiflexion – Compensations…

Early heel rise, Toe out gait, knee hyperextension

- Major contributor to several pathologies:
  - Plantar Fasciitis
  - MTSS
  - Metatarsalgia
  - Achilles tendon pain
  - Ankle sprains
  - Poor balance
  - Knee pain

Measure it… Should be 10°

- Visual inspection is not accurate for assessing / diagnosing ankle equinus
- Goniometer and inclinometer are both show good inter-rater reliability (Awatani)
- Measure in weightbearing lunge (Foot on box) had good validity (Hall)
- Midfoot control with testing (Smith)
- Rearfoot should be slightly inverted at terminal stance

Other ways to measure…

Asymmetry is more important




Assessing Rearfoot

- Rearfoot is made up of calcaneus, talus and talocrural and subtalar joints
- Need to assess in prone…
  - Rearfoot should have 10° of eversion and 20° of inversion from neutral



Hand holds for finding neutral STJ

Mark Calcaneal and Lower Leg Bisection

Subtalar Joint Position

Prone Neutral

Prone Inverted

Half-Kneeling

Forefoot Position

- Metatarsal heads should be perpendicular to calcaneal bisection
  Take the lower leg out of it

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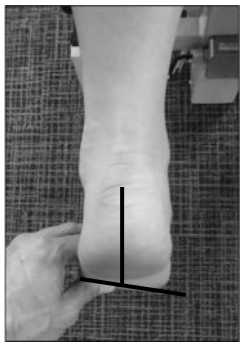
Forefoot Variations Both Left foot

Forefoot Varus- deviation towards midline

Forefoot Valgus – deviation away from midline



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Effects in Gait with Forefoot Variances

- Forefoot Varus
  - Will take longer…thus more rearfoot pronation…to get the big toe to the ground
- Forefoot Valgus
  - Since the big toe gets to the ground faster…the rearfoot doesn't have to pronate as much

1st Ray (1st cuneiform and 1st metatarsal) Assessment

- In long sitting, palpate metatarsal heads from 5th to 1st
- Assess position of 1st in relation to 2nd
  - Index fingers and thumbs should line up
- If fingers don't line up then it is either plantar flexed (more common) or dorsiflexed (sig less common)
- Then move 1st ray up and down and it should move about one index finger above and below

Neutral 1st Ray

1st Ray Position

Plantarflexed

Dorsiflexed

Hallux Dorsiflexion

Need about 60° to walk and 90° to run

1st ray mobility can affect functional use of available hallux dorsiflexion

Midtarsal Joint Assessment

- Midtarsal joints consist of Talonavicular and Calcaneocuboid
- Talonavicular joint
  - Longitudinal Axis
    - Inversion and Eversion

Midtarsal joint assessment

- Calcanealcuboid Joint
  - Oblique Axis
    - Plantarflexion and Adduction (down and in)
    - Dorsiflexion and abduction (up and out)

Loose or Stiff?

- Pronate the rearfoot and midtarsal joints will move easily
- Supinate the rearfoot and midtarsal joints will become less mobile
- If the MTJs get stiffer with supination, then this tells us that the we can affect the forefoot stiffness if we can get the rearfoot to supinate
- If the MTJs stay loose with rearfoot supination, then they will need exercises and possible external support – taping, wedges, shoes, orthotics, etc…

Video of MTJ Stability

Longitudinal Axis

Oblique Axis

Brief Re-Cap

- Talocrural dorsiflexion mobility is necessary to allow the body / tibia to advance over a fixed / weightbearing foot
- Rearfoot mobility is necessary to allow pronation and get the big toe to the ground
- Midtarsal joint stability is vital to allow the foot to resupinate in late midstance to terminal stance
- A forefoot varus will cause the rearfoot to pronate more than normal
- A forefoot valgus or plantarflexed 1st ray may cause the rearfoot to stop pronating faster thus causing the rearfoot to stay inverted

Standing Neutral Subtalar joint

- Neutral to relaxed position should measure around 5° of motion from inverted to everted

The process…

Normal Motion in Standing

- Should have about 5° of motion from neutral to relaxed
  - Ideally from inversion – through neutral – to eversion
- Excessive eversion can lead to several common pathologies such as plantar fasciitis and posterior tibialis tendonitis
- Excessive rearfoot eversion can be caused by several factors including proximal weakness / gluteals and / or midtarsal joint laxity
- Lack of rearfoot mobility in standing can be due to stiff subtalar joint or plantarflexed 1st ray

What Do You Do Now?

- You have a completed your subjective evaluation
- You have completed a visual gait assessment
- You have completed a rearfoot mobility and midtarsal joint stability assessment in NWB and WB

- Is it a mobility or stability problem? Where is it?
  - Address mobility first!

If Mobility Problem…

- Get it to move!!!
  - Joint mobilizations
  - Mobilization with movement
  - IASTM
  - Stretching
  - Exercises that emphasize mobility
  - Fibular relocation taping
  - Neutral / less stiff shoe
  - Lateral wedges

If Stability Problem…

- Usually medial foot and/or ankle pain due to excessive or uncontrolled pronation
- Get more stability!!!
  - Exercises
  - Wedges
  - Navicular sling taping
  - Proper shoes
  - OTC or custom orthotics

This is How Fast Foot Assessment Can Take

- Watch them walk and then…

Summary…

- Try it soon!
- Practice it!
- Don't be afraid to make mistakes…
- Keep these principles in mind no matter what type of injury or post-surgical procedure you have to assess
- Never forget about importance of ankle dorsiflexion since it can affect foot mechanics and gait and…

Shameless Plug

- If you want to learn more or want to clarify what you learned today and practice while receiving feedback, you can take the class "When the Feet Hit the Ground…Everything Changes"
- Get more course information and sign up at
  - Whenthefeethittheground.com

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Q & A

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