Mastering the Feet and Ankles
The “Wong Way”

Kevin M. Wong, BS, DC, FCCA

MASTERING THE FEET AND ANKLES THE "WONG WAY"

DR. KEVIN M. WONG, BS, DC, FCCA

Thank You All For Being Here !

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Foot Levelers Representative:

Tammy Davis

FOOT LEVELERS

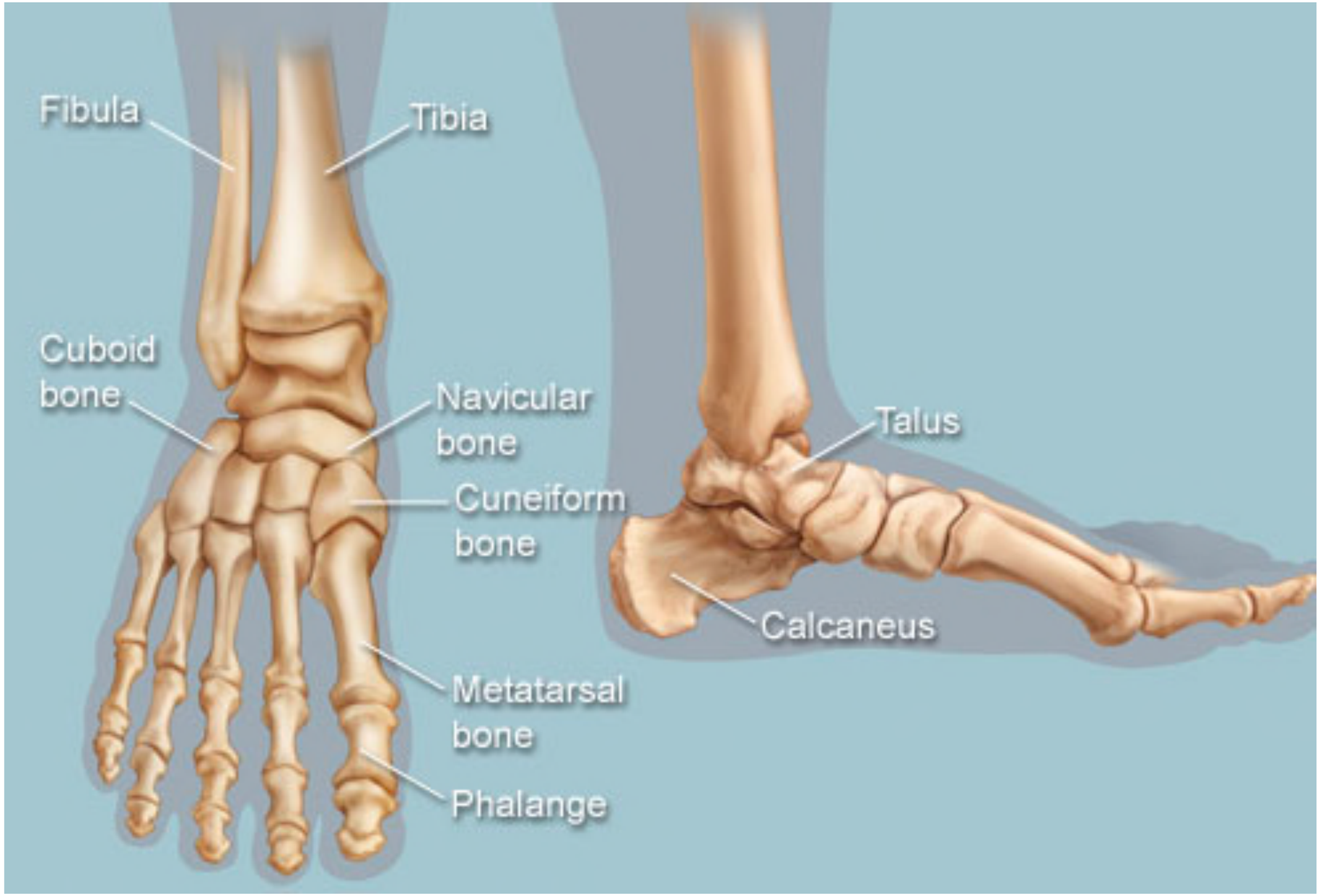
GOALS: Understand….

- WHY evaluating the feet/ankles of every patient is important.
- WHO can have foot issues.
- HOW the lower extremities affect the spine.
- WHAT useful adjustments and treatments will help the feet/ankles.

When the foundation of your home is not level, the walls will start cracking and crumbling which can create problems on your top floor.

It’s the same with your body!

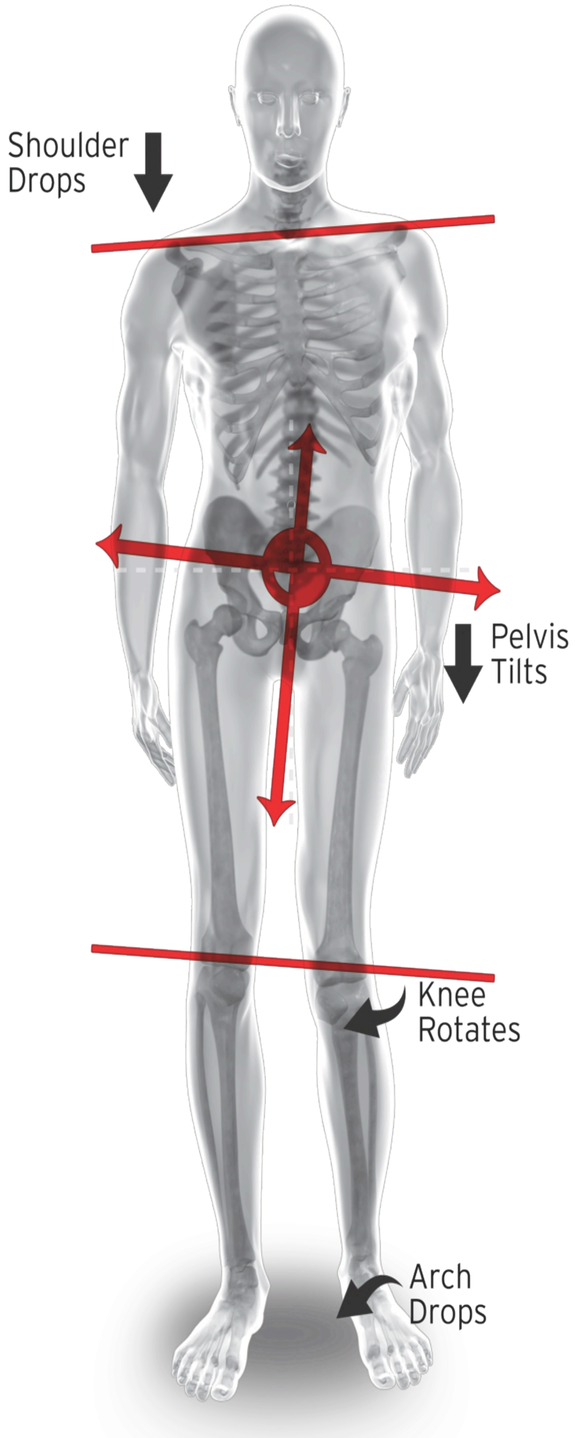
The Feet are the foundation of our house!

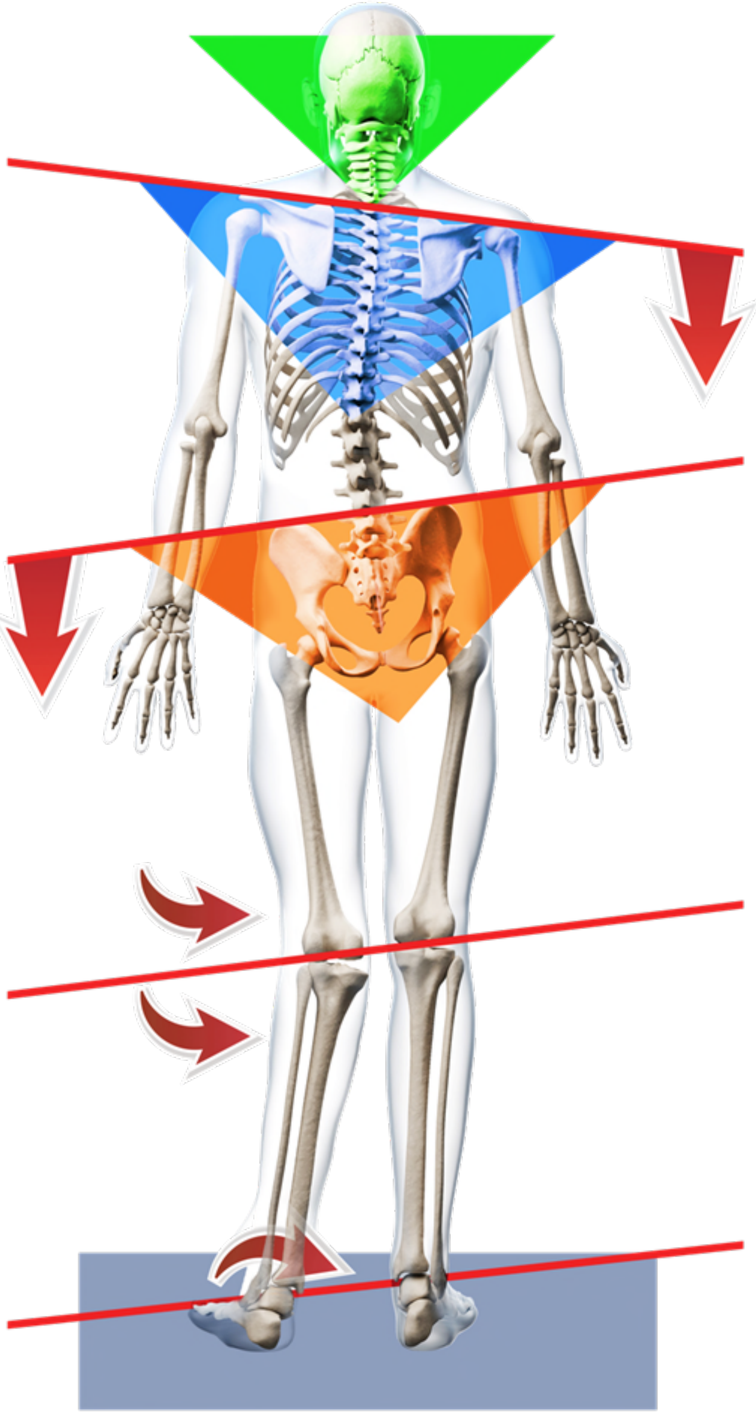


The entire body is supported **by the feet**

FOOT LEVELERS

Start with the foundation


Shoulder
Drops
Pelvis
Tilts
Knee
Rotates
Arch
Drops



Welcome to “Planet Foot”

Will you join me?

LE significantly affects the body and clinical conditions showing up in your practice.

Kinetic Chain

Cervical Spine

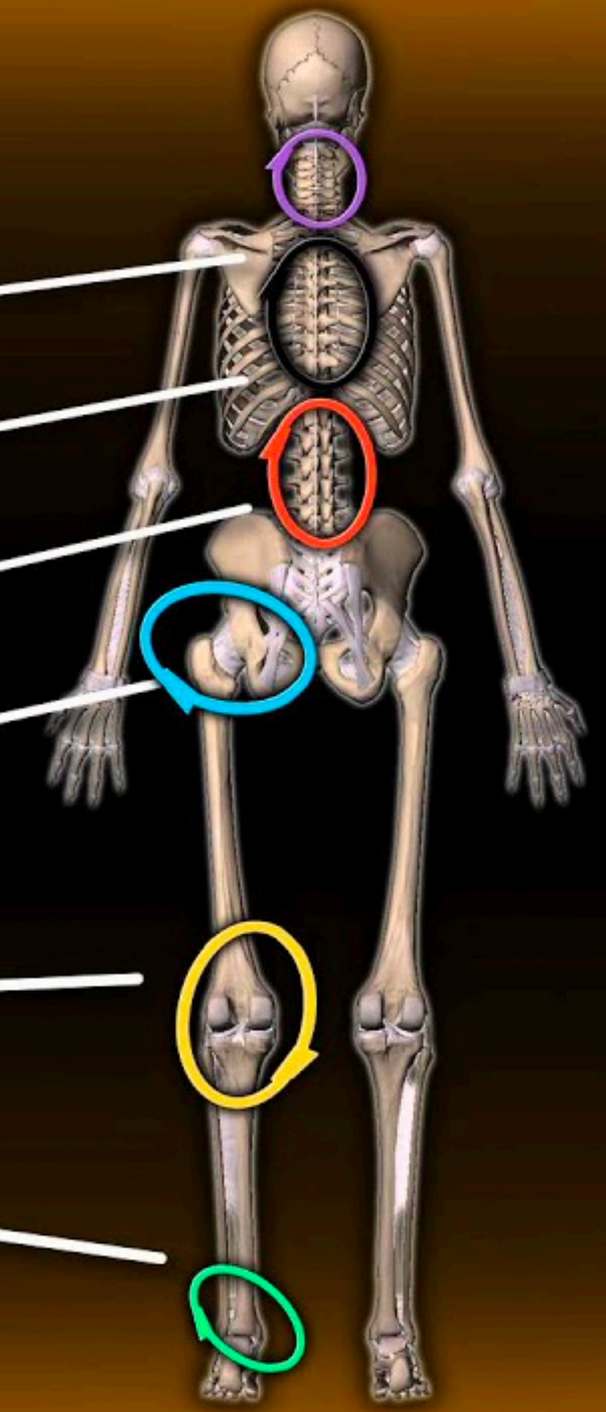
Thoracic Spine

Lumbar Spine

Hip Joints

Knee Joints

Ankle Joints




LOSE
THE
SHOES

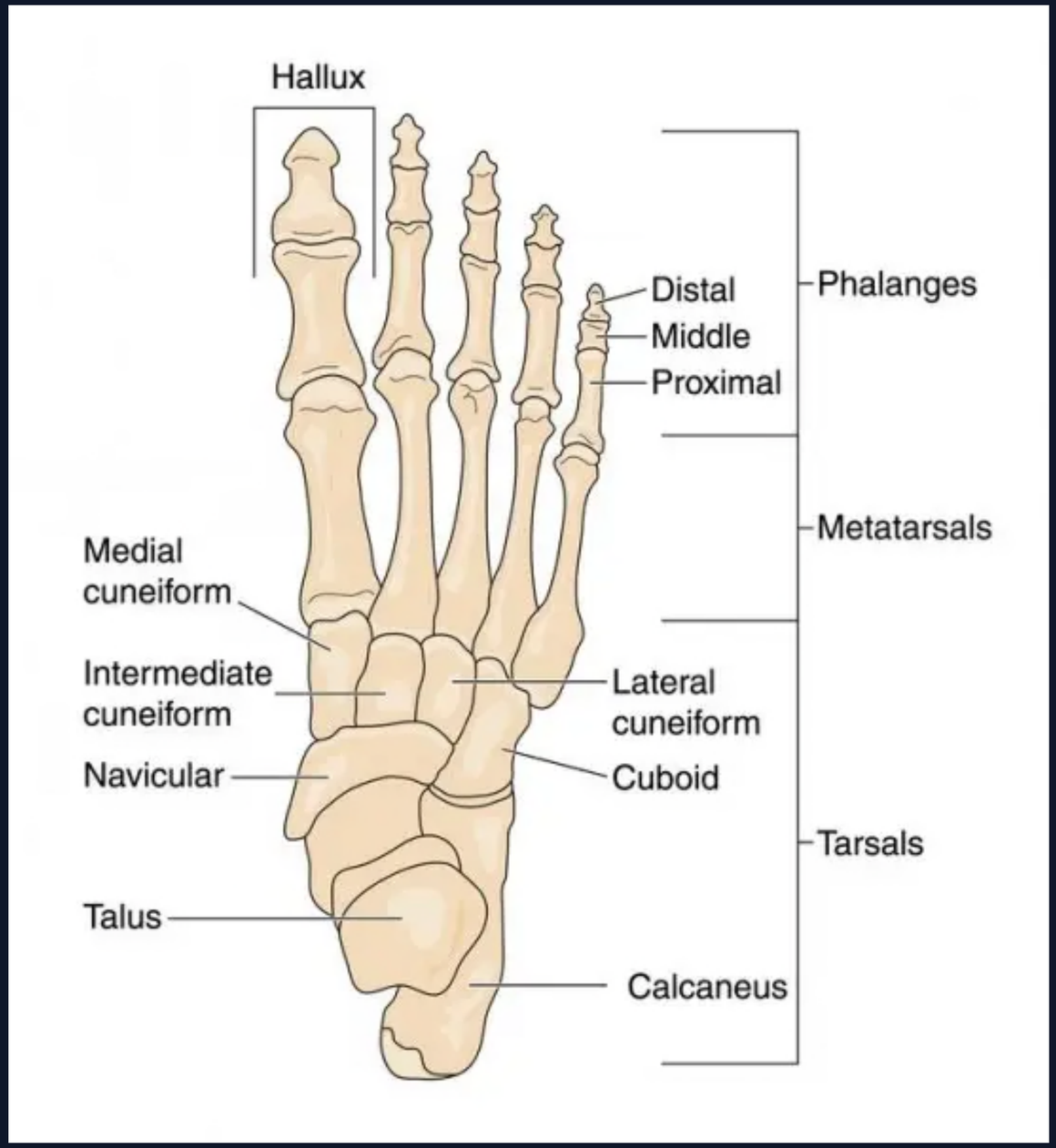
Foot Anatomy

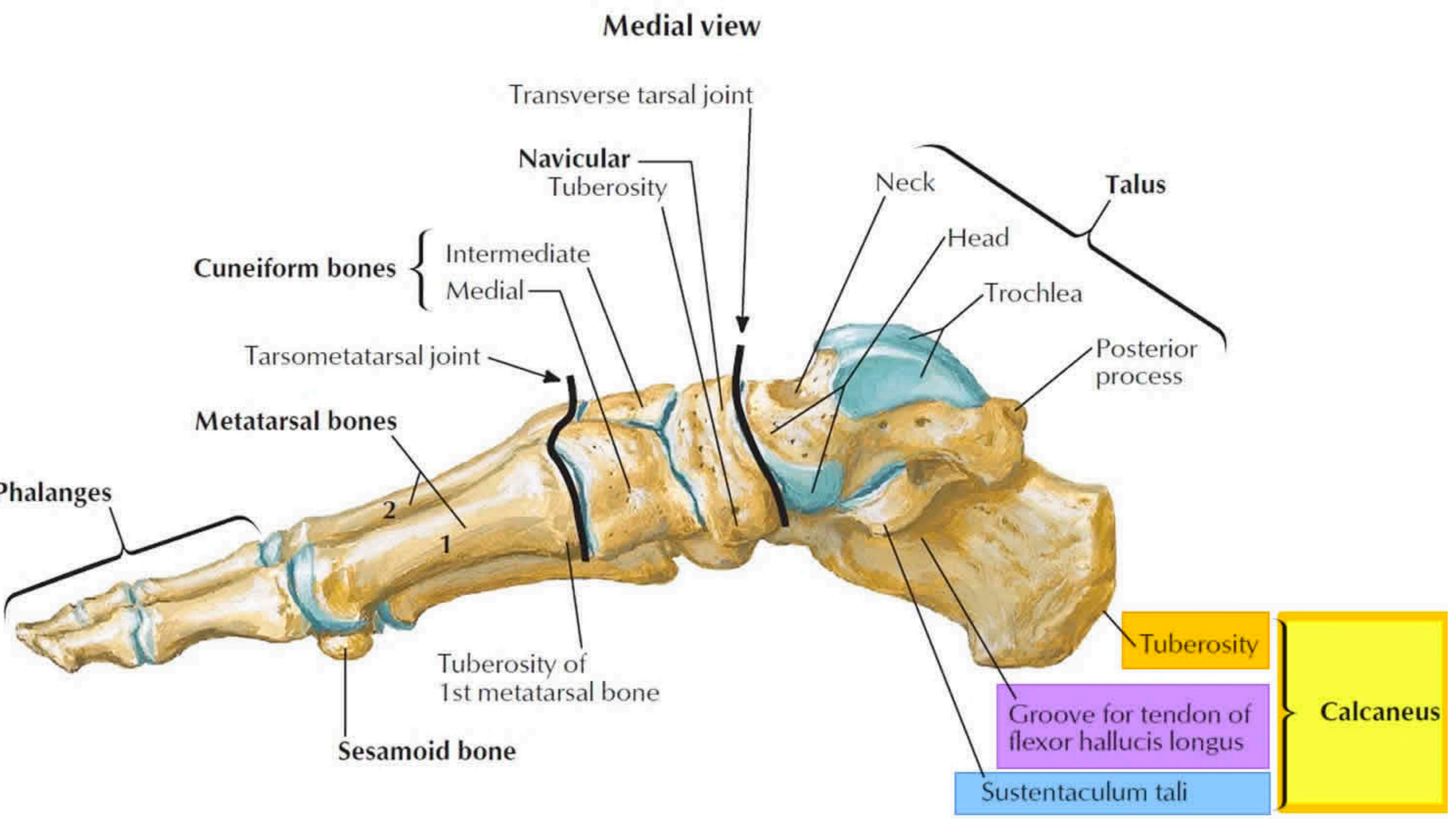
- 26 Bones of the Foot:

- **Tarsals (7 bones):** Talus, calcaneus, navicular, cuboid, 3 cuneiforms
- **Metatarsals (5 bones):** MT1-MT5, connecting midfoot to toes
- **Phalanges (14 bones):** 2 in hallux, 3 in each lateral toe

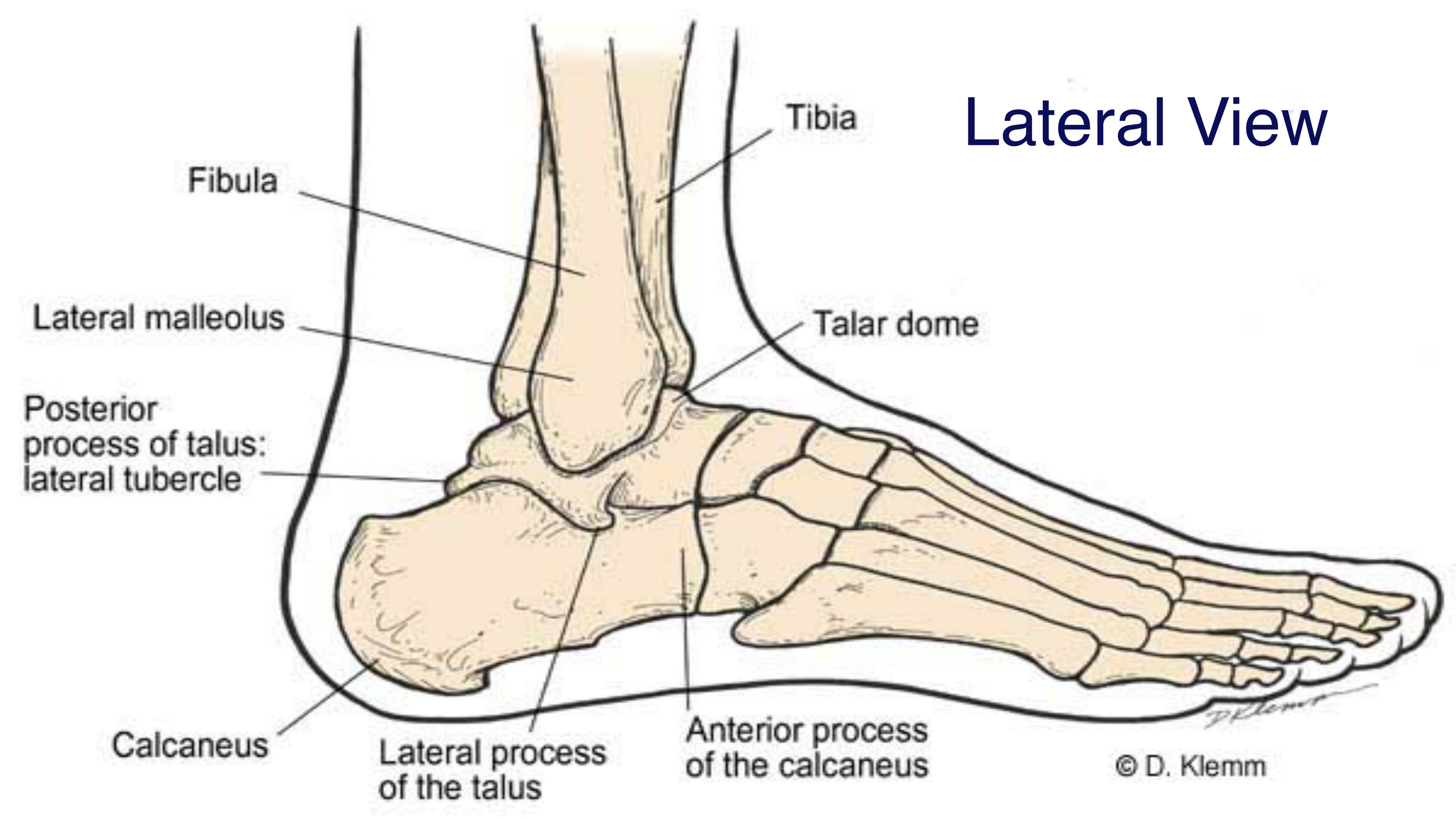
- 33 joints

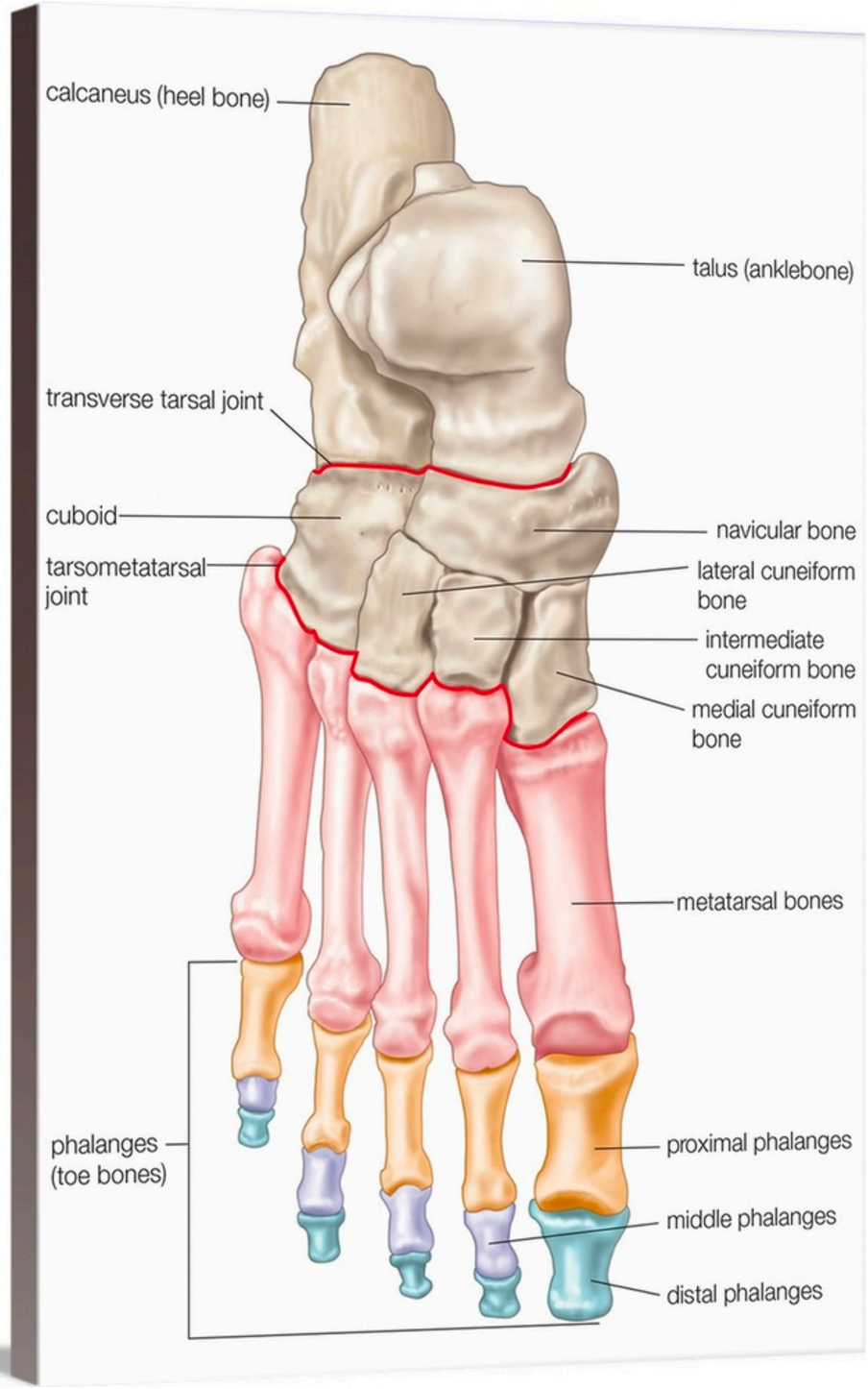
- 100+ muscles, tendons, ligaments




Medial view
Transverse tarsal joint
Navicular
Tuberosity
Neck
Talus
Head
Cuneiform bones
Intermediate
Medial
Trochlea
Tarsometatarsal joint
Posterior process
Metatarsal bones
Phalanges
2
1
Tuberosity of 1st metatarsal bone
Sesamoid bone
Tuberosity
Groove for tendon of flexor hallucis longus
Sustentaculum tali
Calcaneus

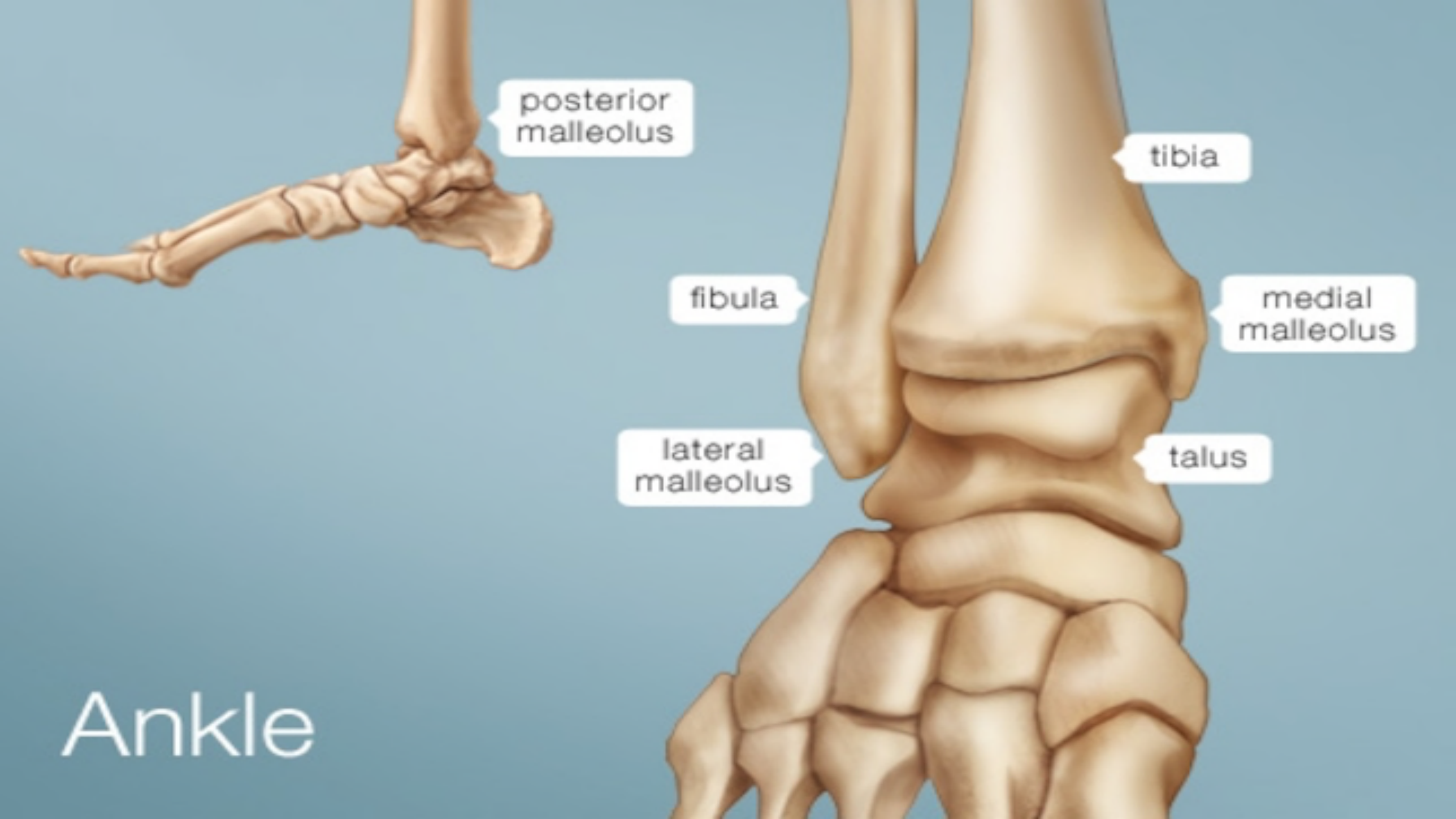
Lateral View





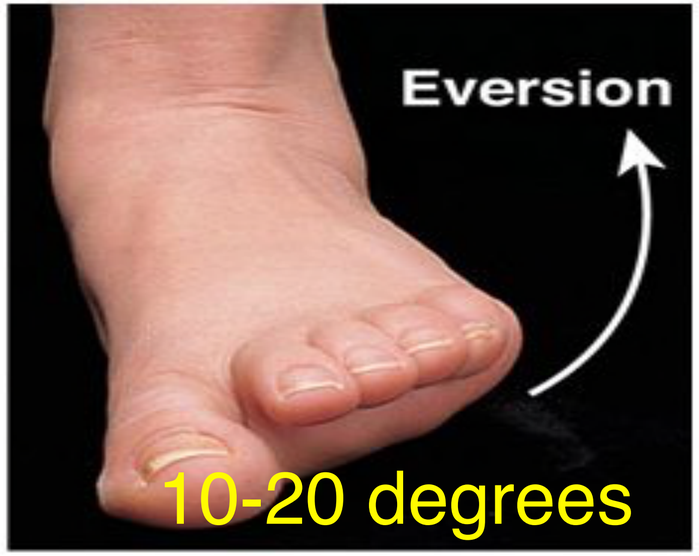
The **Talus** is the only bone with no muscular insertion.

It moves around during ankle motion.


posterior malleolus
tibia
fibula
medial malleolus
lateral malleolus
talus

Ankle

Joint Movements



Inversion and Eversion of the foot at the ankle

Dorsiflexion and Plantar flexion of the foot at the ankle

ANKLE & FOOT JOINT- MUSCLES INVOLVED

- Dorsi flexion :- Tibialis , Extensor Digitorum longus.
- Planter Flexion:- Gastrocnemius or soleus.
- Inversion:- Tibialis Anterior.
- Eversion:- extensor Digitorum

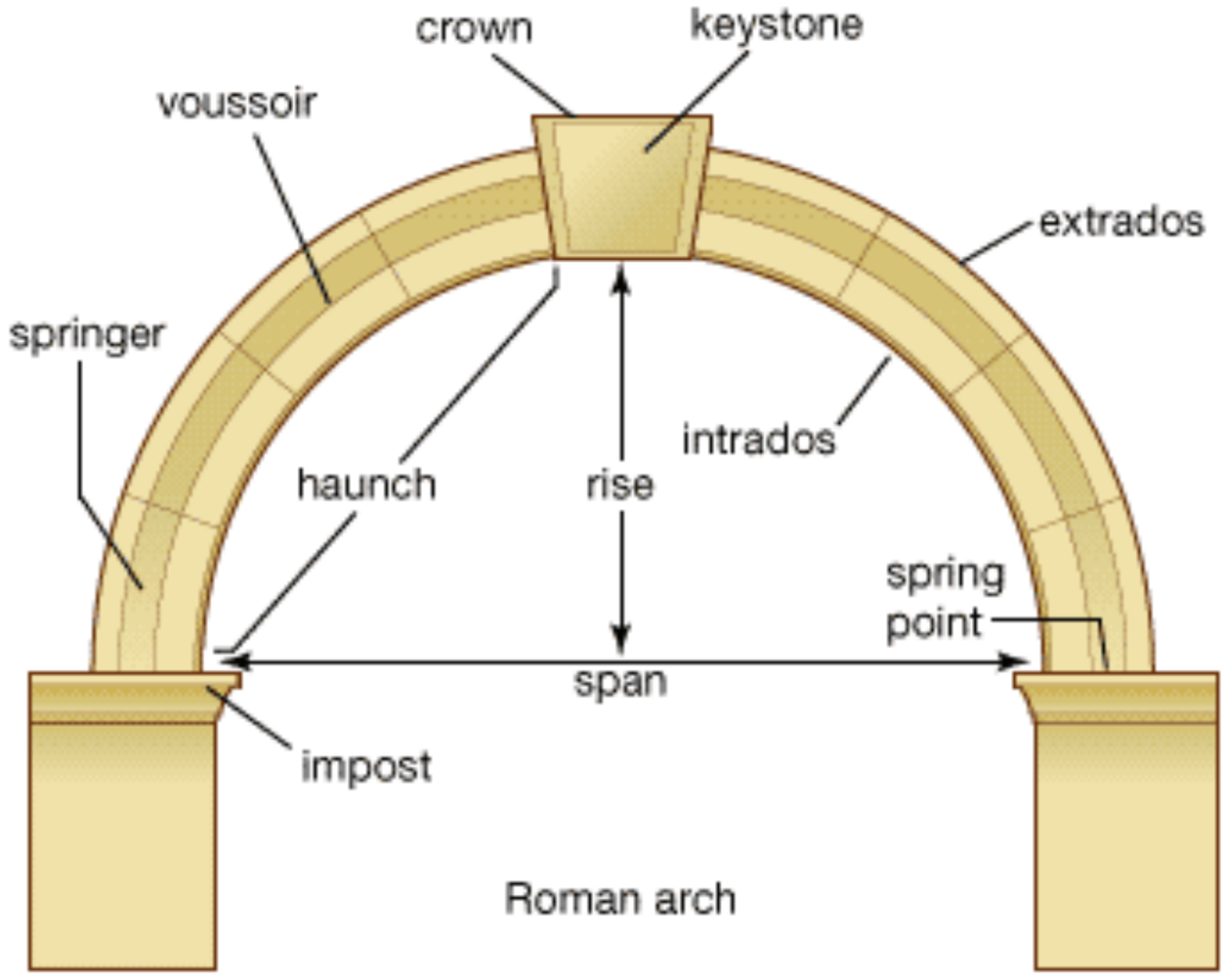
How many arches under each foot?

How many arches do patients think we have?

THE ARCHES

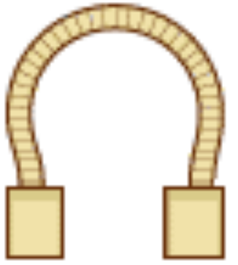
- Plantar vault
- Not present at birth

Arch Architecture




stilted arch


Gothic arch

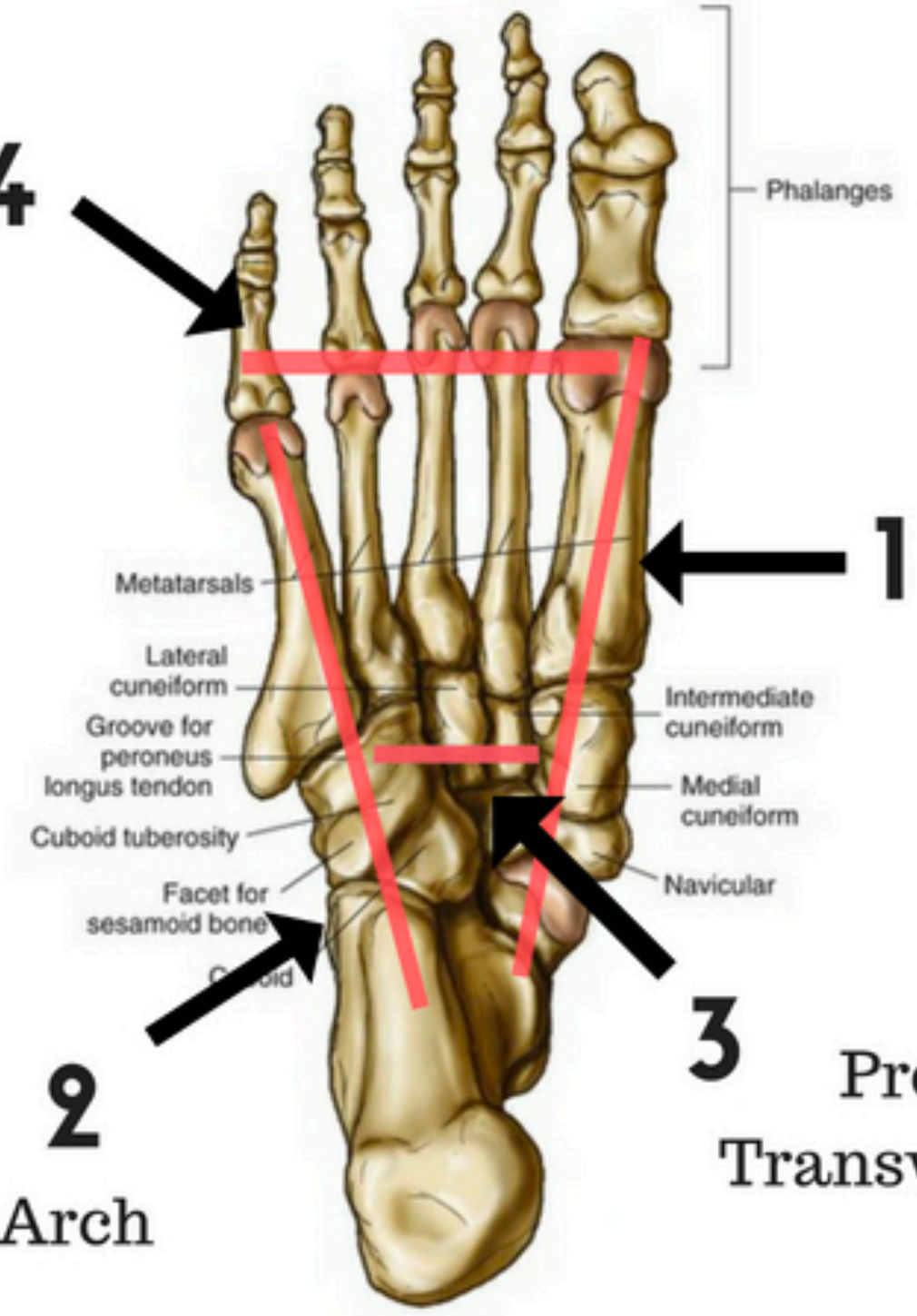

Moorish arch


Tudor arch


trefoil arch


ogee arch

Distal Transverse Arch 4

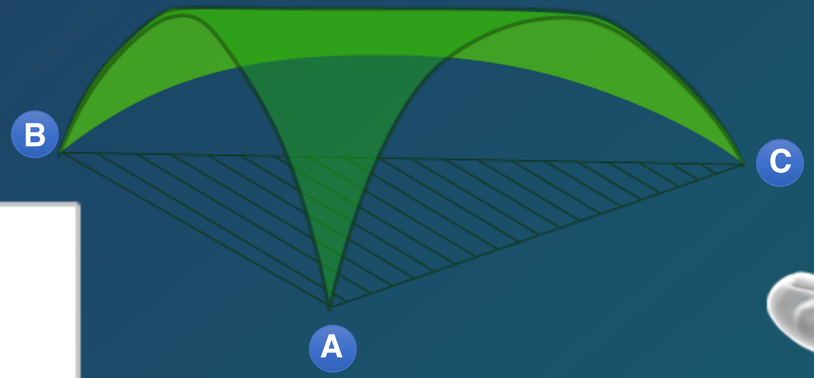


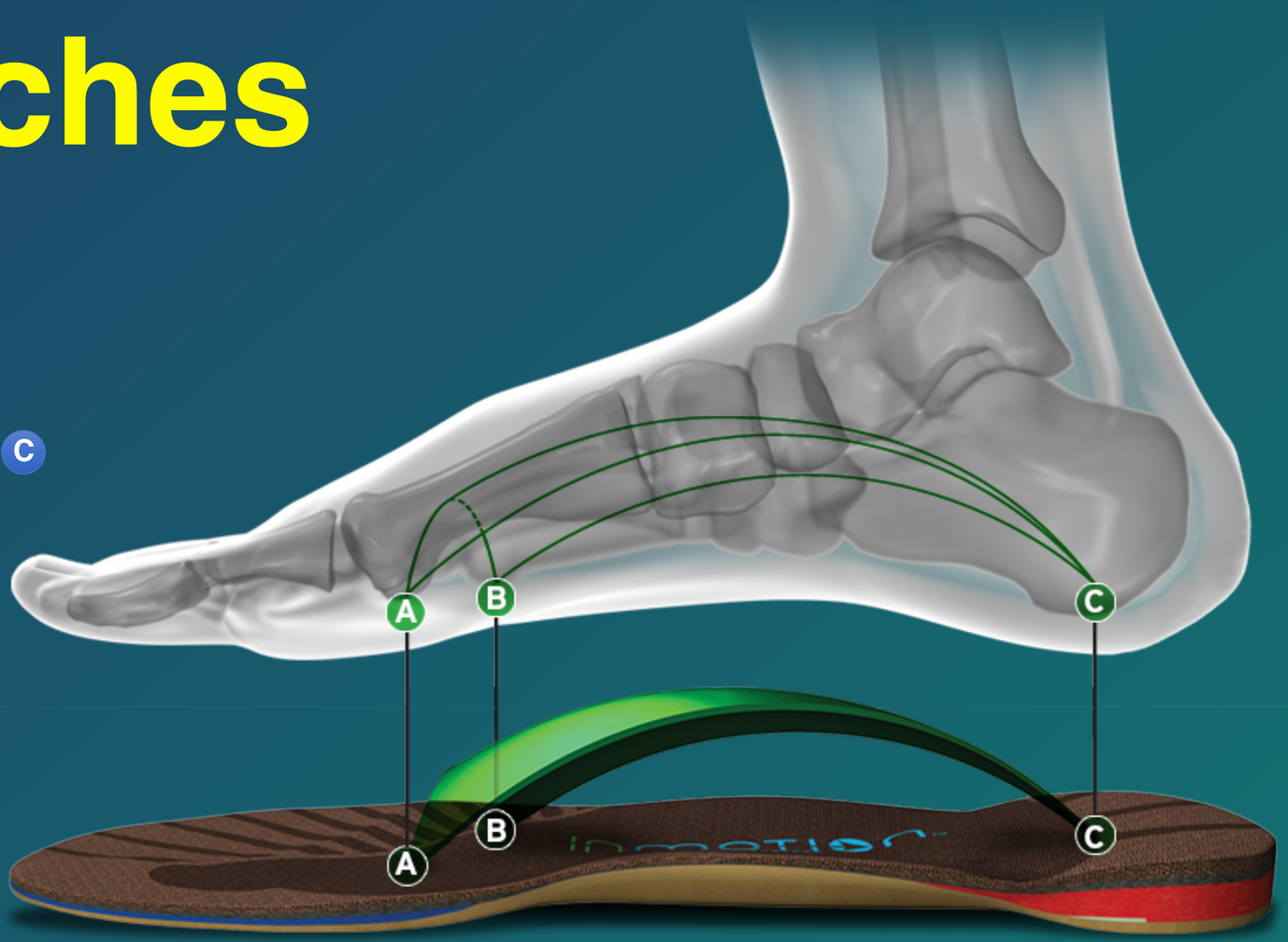
1 Medial Longitudinal Arch

2 Lateral Longitudinal Arch

3 Proximal Transverse Arch

3 Arches





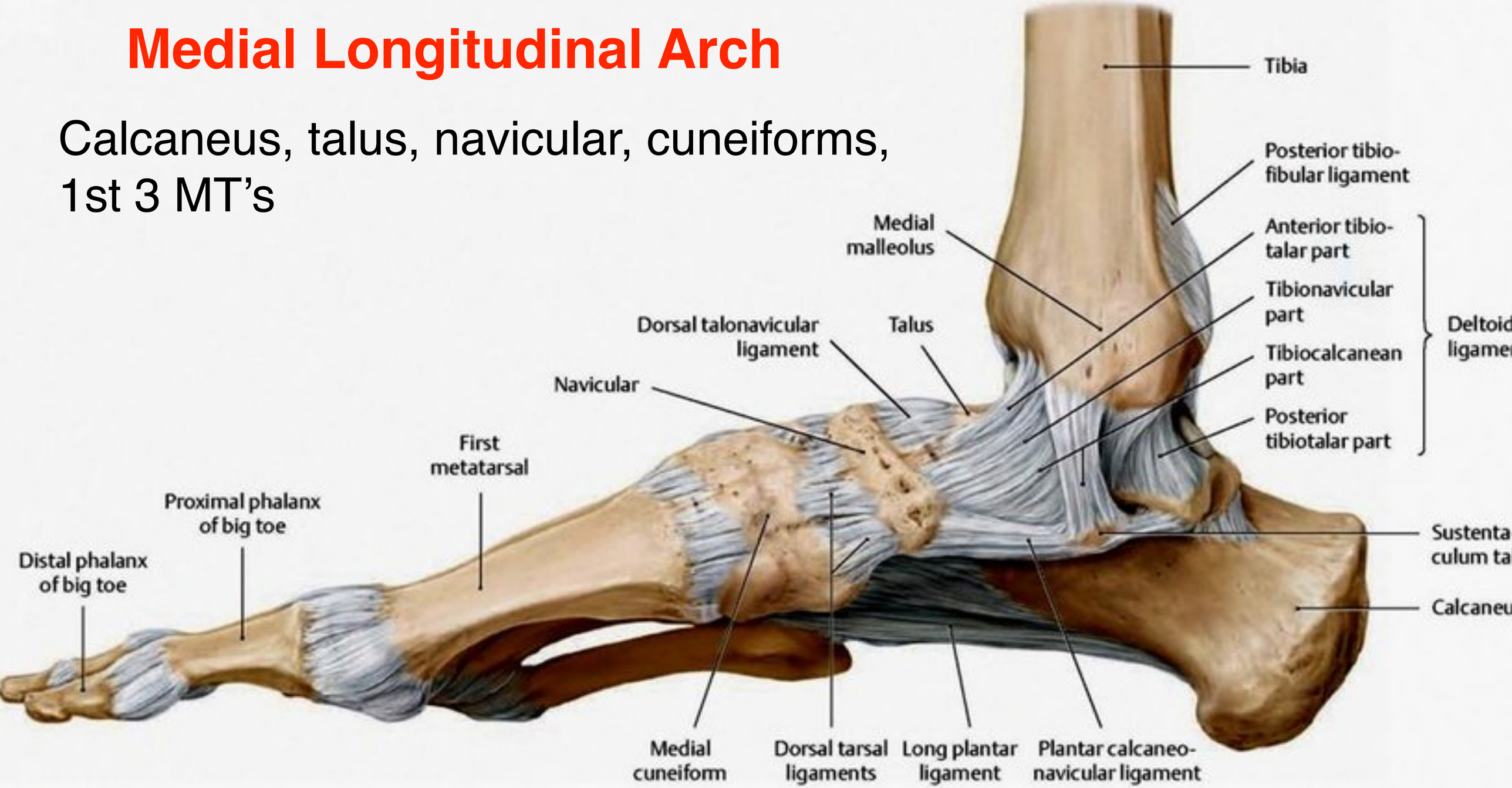
PLANTAR VIEW

Plantar Vault

A - C = Inner Arch (Medial Longitudinal Arch)
B - C = Outer Arch (Lateral Longitudinal Arch)
A - B = Across the Balls of Feet (Anterior Transverse [Metatarsal] Arch)

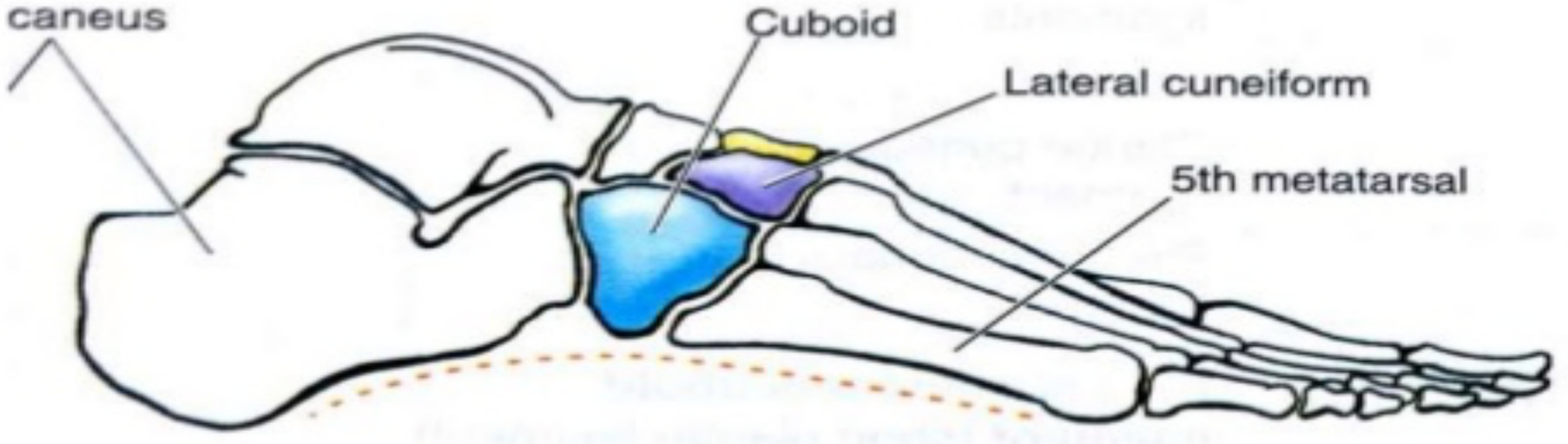
Medial Longitudinal Arch

Calcaneus, talus, navicular, cuneiforms, 1st 3 MT's



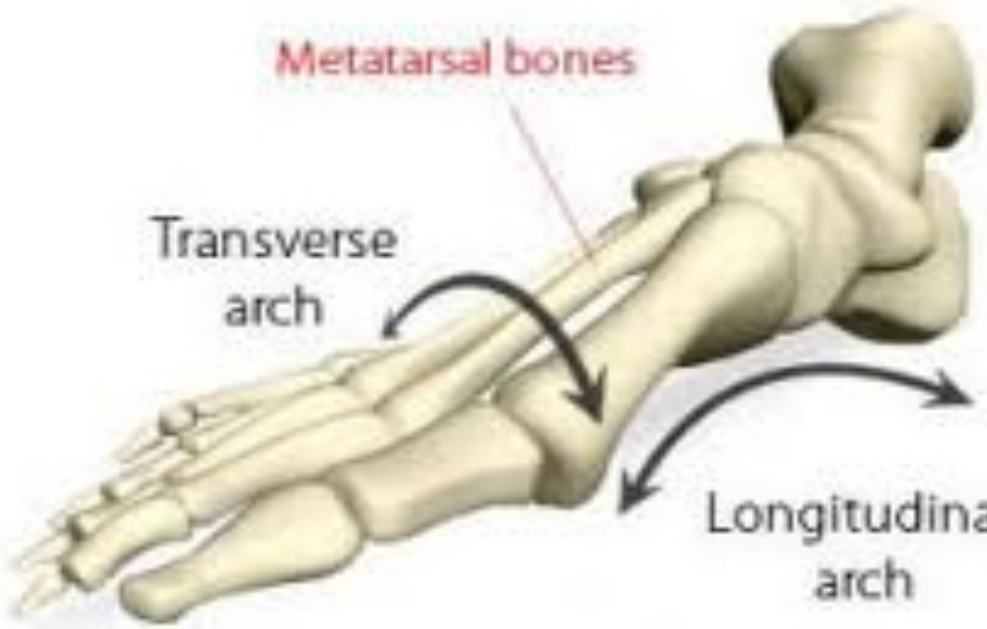
Lateral longitudinal Arch

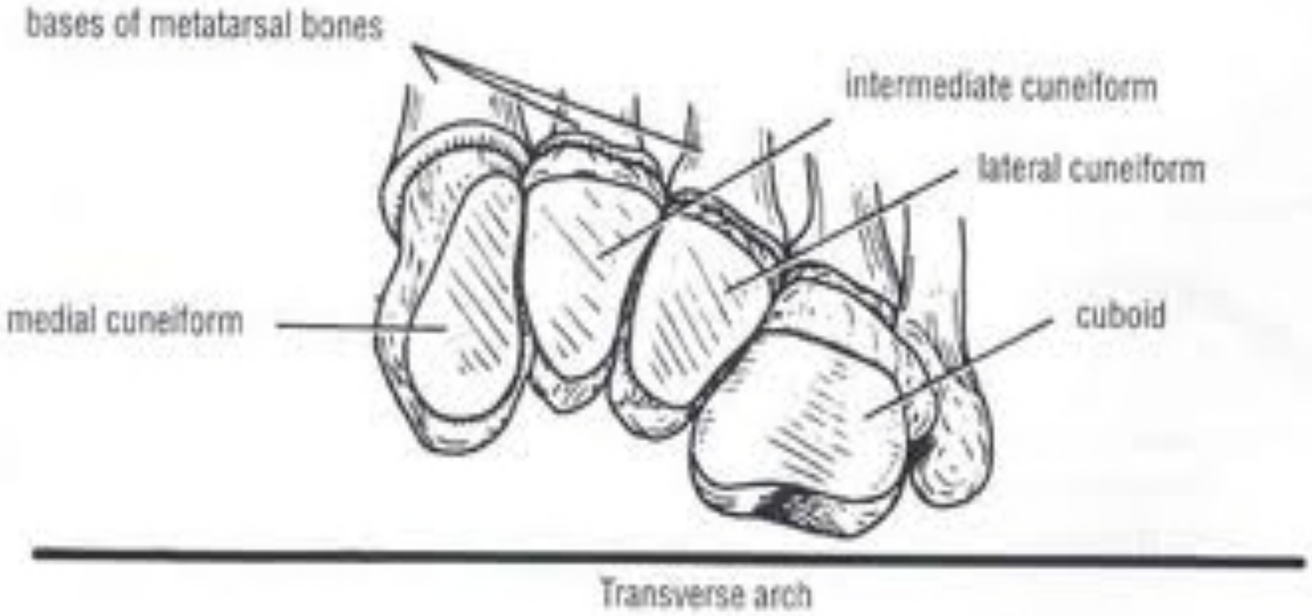
- Flatter than medial longitudinal arch.
- Rests on the ground during standing.
- It is made up of – calcaneous, cuboid, 2 lateral metatarsals.

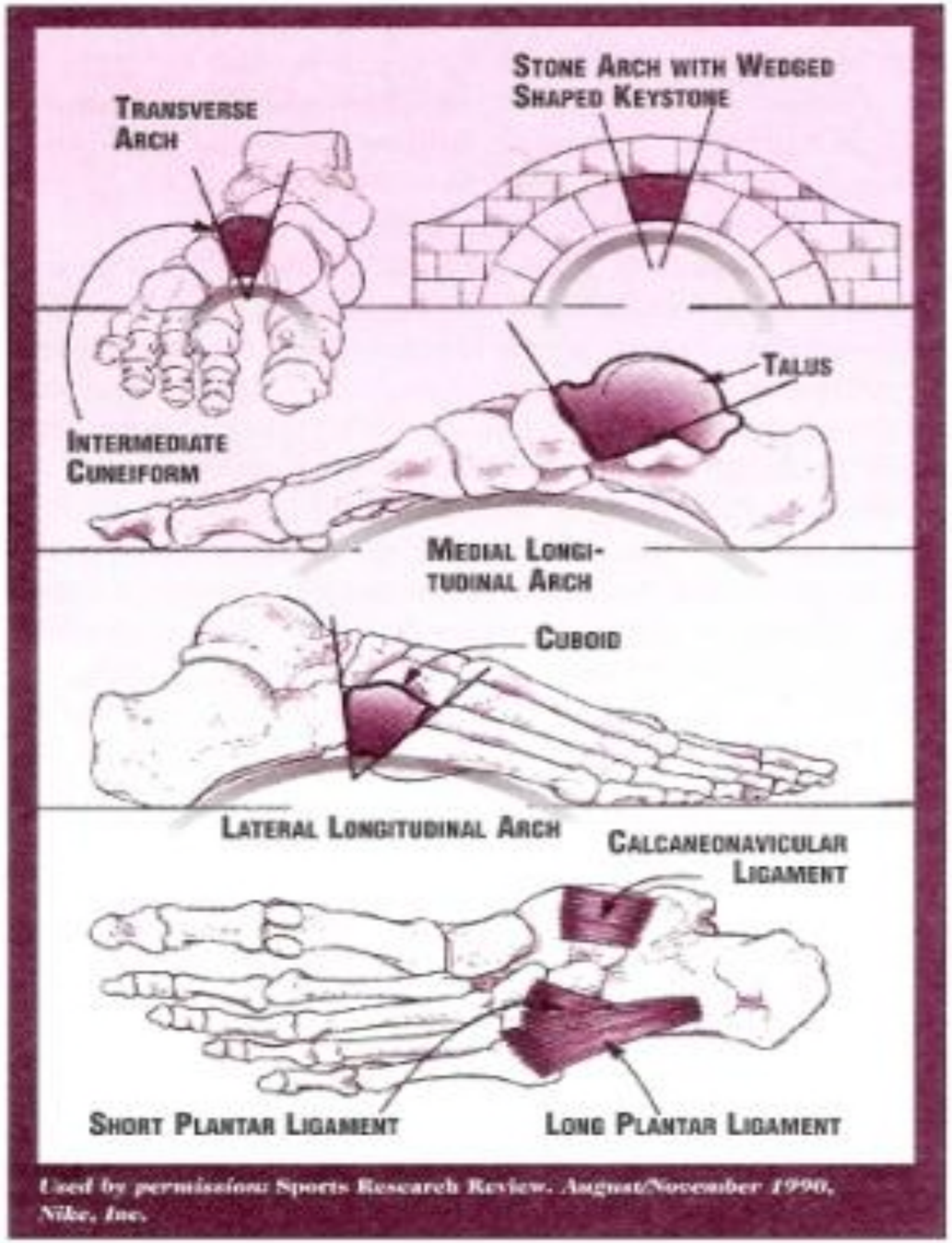


(B) Lateral longitudinal arch (lateral view)

Transverse Arch







Palpate the Feet:

- Calcaneus (heel)
- Talus (dome, just under the tibia)
- Navicular (tubercle) inside foot
- Cuboid (proximal to styloid process of MT5)
- Cuneiforms (medial, intermediate, lateral)
- Metatarsals 1- 5
- Phalanges 1- 5 (3 parts, except big toe)

Foot Development

Not all foot bones formed at birth

Avg. Foot length is 7.6 cm

Navicular last to ossify (age 2-5)

Walking starts 10-16 months

Skeletal Maturity

Skeletal maturity for girls typically occurs between the ages of **14 and 16**, (based on genetics, nutrition, and overall health)

Most girls reach peak bone growth around **12-14 years old**, and by **16-18 years old**, their growth plates close, signaling full skeletal maturity.

* **Greulich & Pyle Atlas (1959)** – *Radiographic Atlas of Skeletal Development of the Hand and Wrist*
* **Tanner-Whitehouse Method (TW2 & TW3) (1975, 2001)** – *Assessment of Skeletal Maturity and Prediction of Adult Height*
* **Bailey et al. (1984)** – *Aging, Bone Density, and Skeletal Maturity in Adolescents*
* **National Institute of Health (NIH) & CDC Growth Charts**
* **Malina, R. M., Bouchard, C., & Bar-Or, O. (2004)** – *Growth, Maturation, and Physical Activity*
* **Pyle & Hoerr (1955)** – *Skeletal Maturity of Children in the U.S.*

FOOT LEVELERS

Skeletal Maturity ♂

Skeletal maturity for boys typically occurs between the ages of **16 and 18**, though some bones, like the clavicle, may continue developing until around **21-25 years old**.

Growth plates usually begin closing around **14-16 years** but are fully fused by the late teens to early 20’s.

Arch integrity depends heavily on ligamentous support and muscular control, so dysfunction in the tibialis posterior, peroneals, or plantar fascia can significantly alter load distribution and predispose to conditions such as adult-acquired flatfoot or plantar fasciopathy.

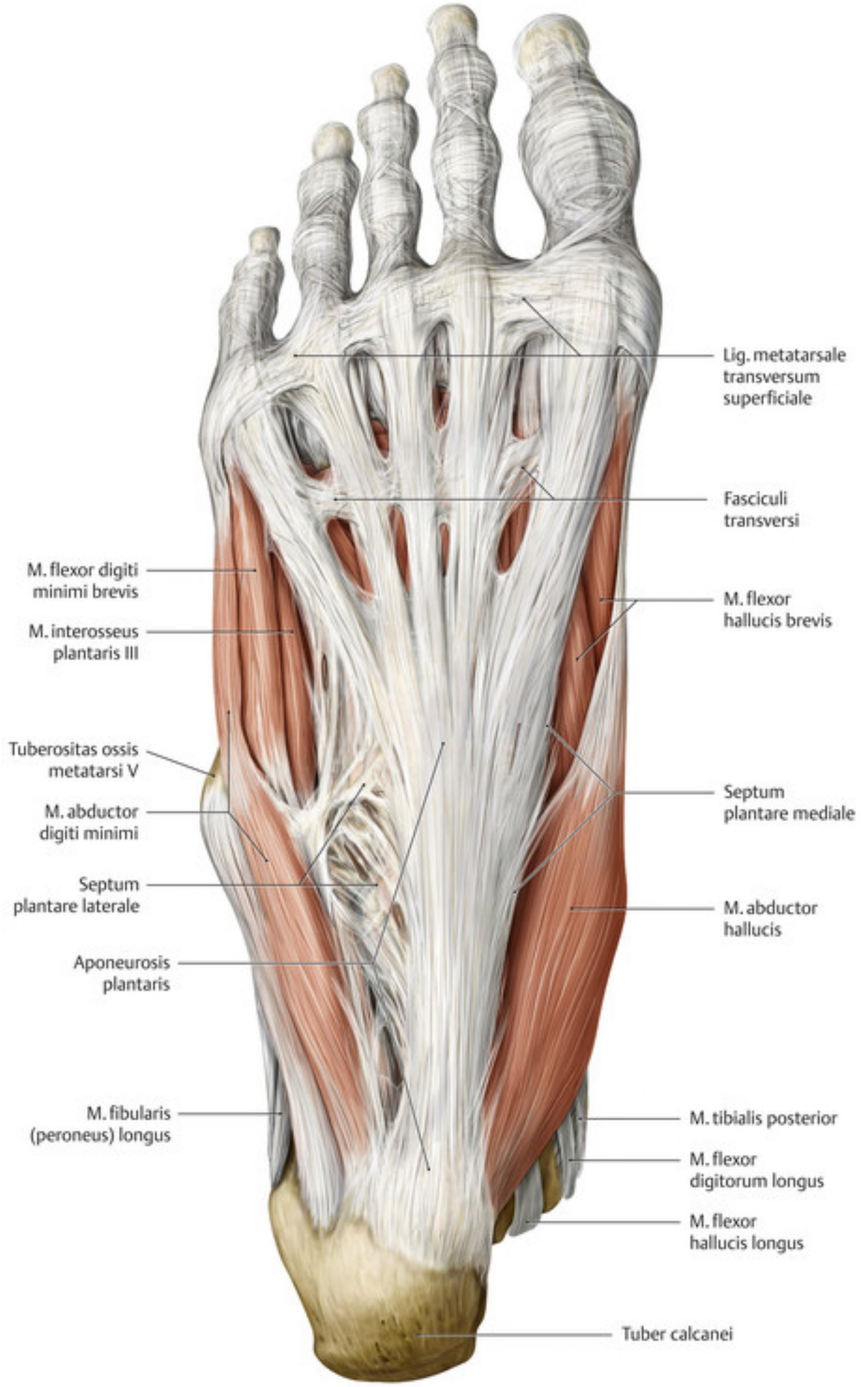
https://my.clevelandclinic.org/health/body/21597-foot-ligaments

FOOT LEVELERS

- ***The highest relative contribution to arch stability was provided by the plantar fascia, followed by the plantar ligaments and spring ligament.***

- **Plantar fascia was a major factor in maintenance of the medial longitudinal arch.**

  - *Huang et al: Biomechanical Evaluation of Longitudinal Arch Stabilty. Foot & Ankle, Vol. 14, No. 6, July/August 1993*



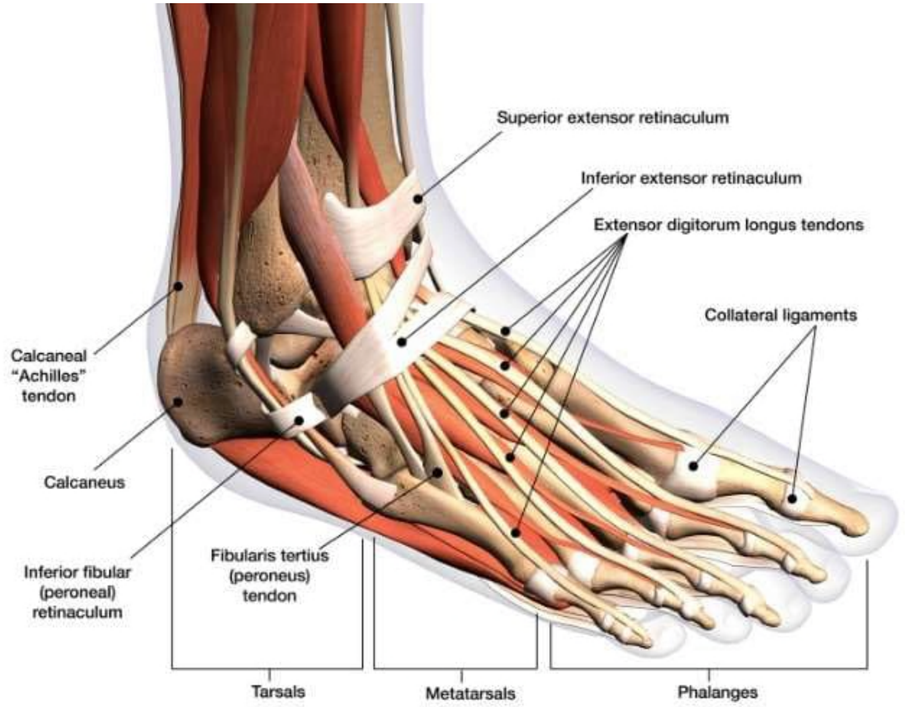
Arch Support

- "The first line of defense of the arches is ligamentous."

- …muscles did not come into play until a force greater than 400 pounds was exerted."

  - ***Basmajian JV et al. The Role of Muscles in Arch Support of the Foot: An Electromyographic Study. J of Bone and Joint Surgery, Vol 45, No 6 September 1963.***

What the Foot Research shows:



No research definitively proves that exercises or conservative methods can fully restore or reconstruct the three arches of the foot once they have permanently flattened in adults, particularly in rigid pes planus where ligaments have undergone significant lengthening or degeneration.

- **Muscle strengthening improves function but does not rebuild arches**
  - Exercises targeting foot intrinsics (short foot, toe walking, heel rises), posterior tibialis, and hip stabilizers can improve symptoms alignment, balance, and dynamic arch height in flexible flatfoot (adult-acquired flatfoot deformity, stage I–II).
  - Studies show gains in arch index, pain reduction, and proprioception, but these reflect better muscle support and control, not ligament shortening or true structural reconstruction.

Vulcano E, Deland JT, Ellis SJ. Approach and treatment of the adult acquired flatfoot deformity. Curr Rev Musculoskelet Med. 2013 Dec;6(4):294-303. doi: 10.1007/s12178-013-9173-z. PMID: 23765382; PMCID: PMC4094099.

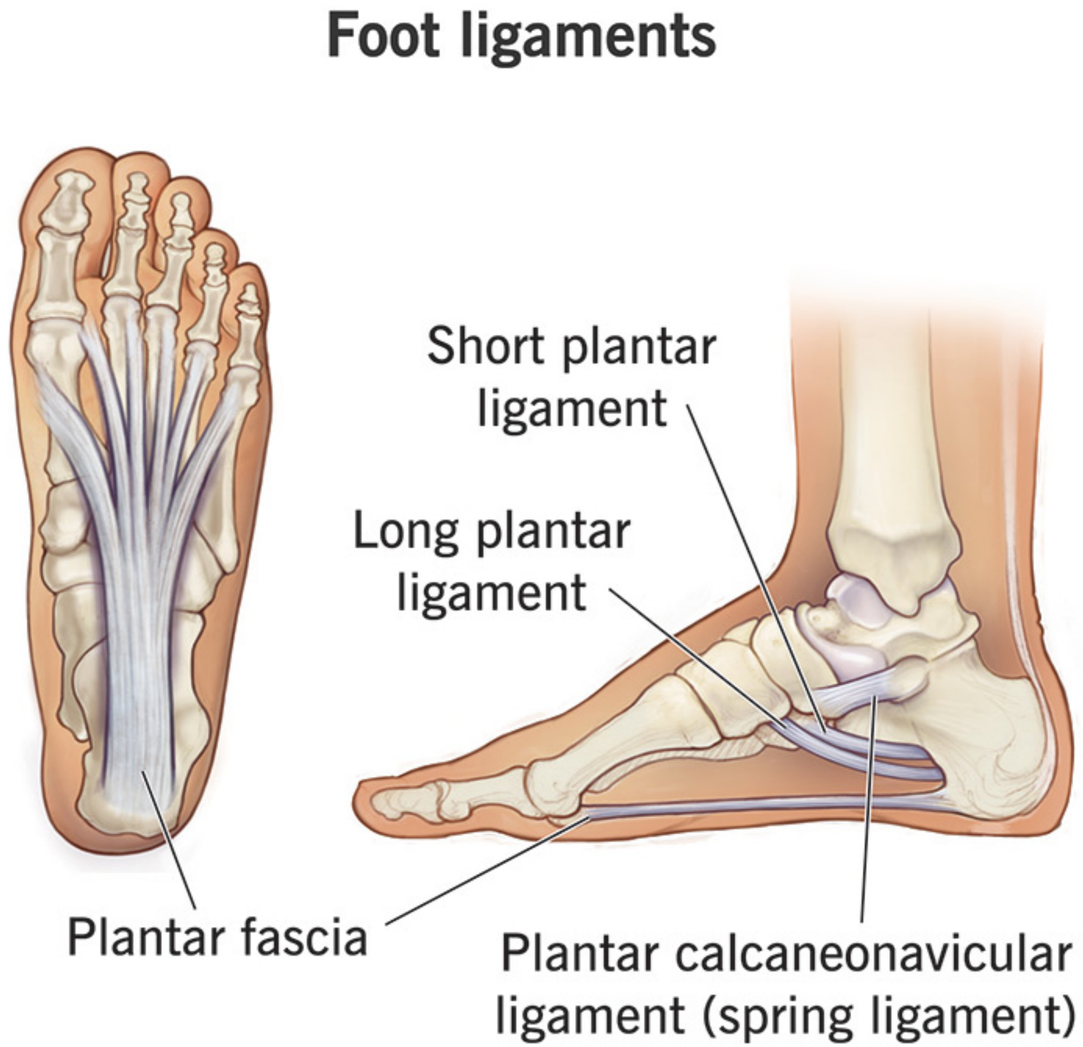
- demircioglu G, Genc H. The impact of different exercise approaches on balance in people with pes planus. Physiother Quart. 2025;33(1):73–77; doi: https://doi.org/10.5114/pq/186758.

FOOT LEVELERS

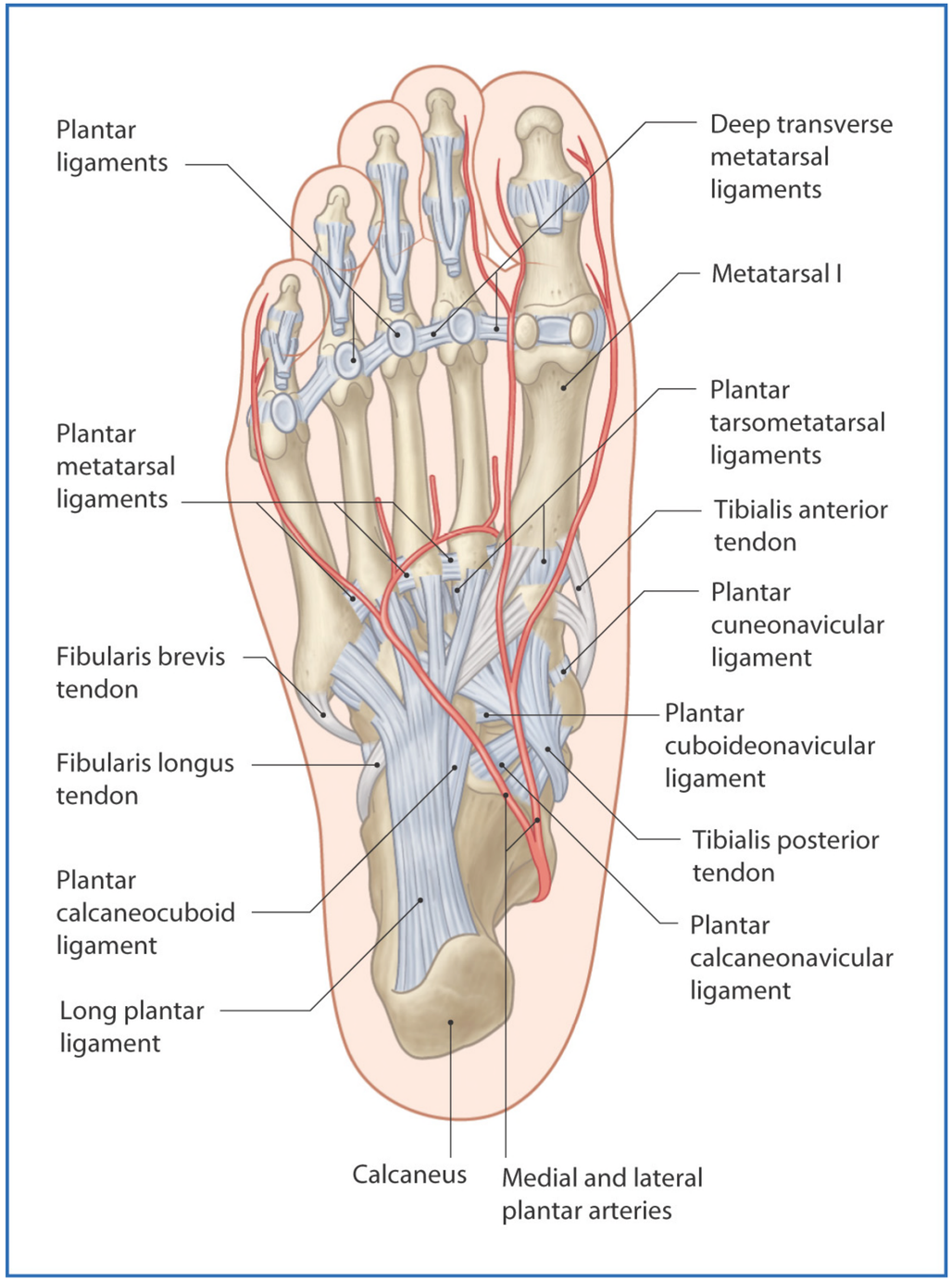
Ligament Research Reality:

- The arches depend primarily on static support from ligaments (plantar fascia, spring ligament, long/short plantar ligaments) and tendons. Once stretched or damaged (as in rigid flatfoot), ligaments do not significantly shorten through exercise alone.

- Orthotics provide external arch support and can prevent progression, but they do not reverse ligament laxity.



- Malakoutikhah H, Madenci E, Latt LD. The contribution of the ligaments in progressive collapsing foot deformity: A comprehensive computational study. J Orthop Res. 2022 Sep;40(9):2209-2221. doi: 10.1002/jor.25244. Epub 2022 Jan 3. PMID: 34981558.



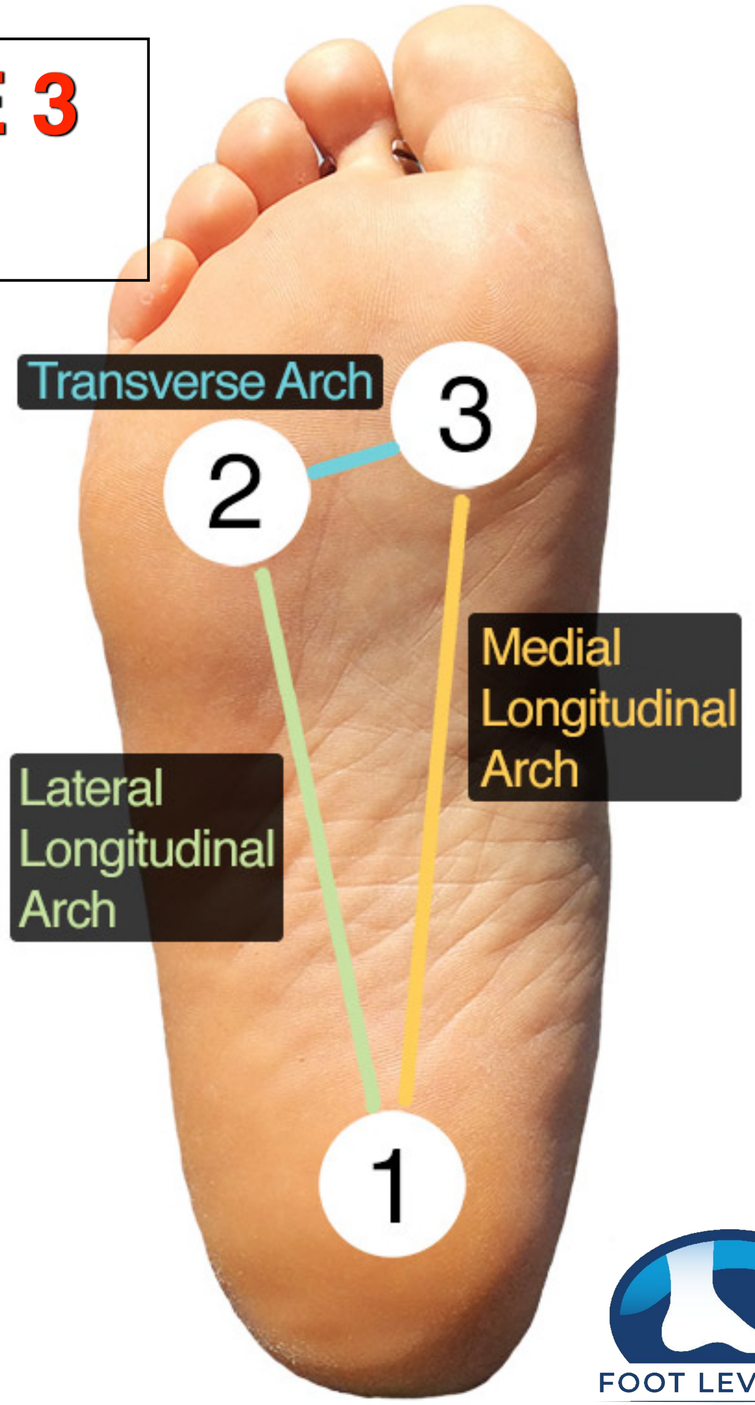
The Ligament Premise:

Stretched ligaments do not spontaneously contract, and no exercise protocol reliably reverses chronic flattening. Focus remains on symptom management, prevention of progression, and functional optimization.

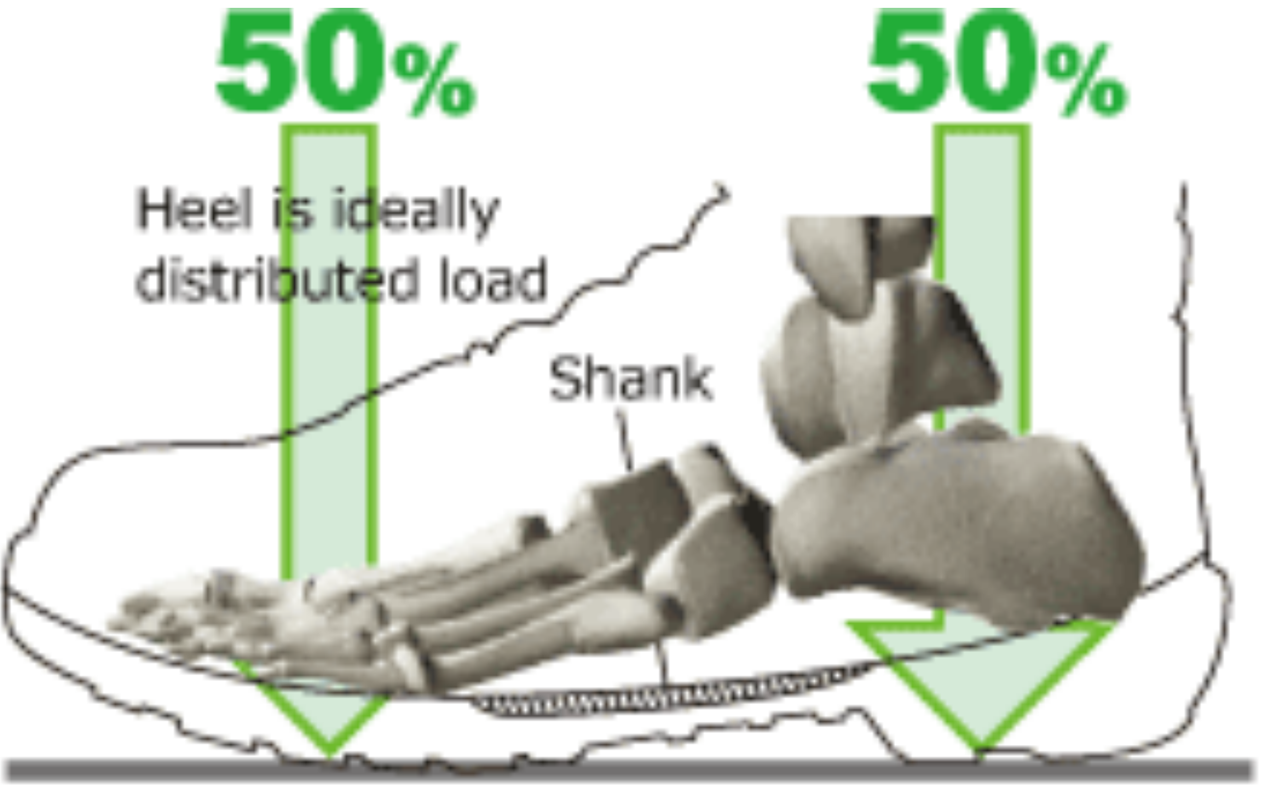
Raj MA, Tafti D, Kiel J. Pes Planus. [Updated 2023 May 23]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK430802/

FOOT LEVELERS

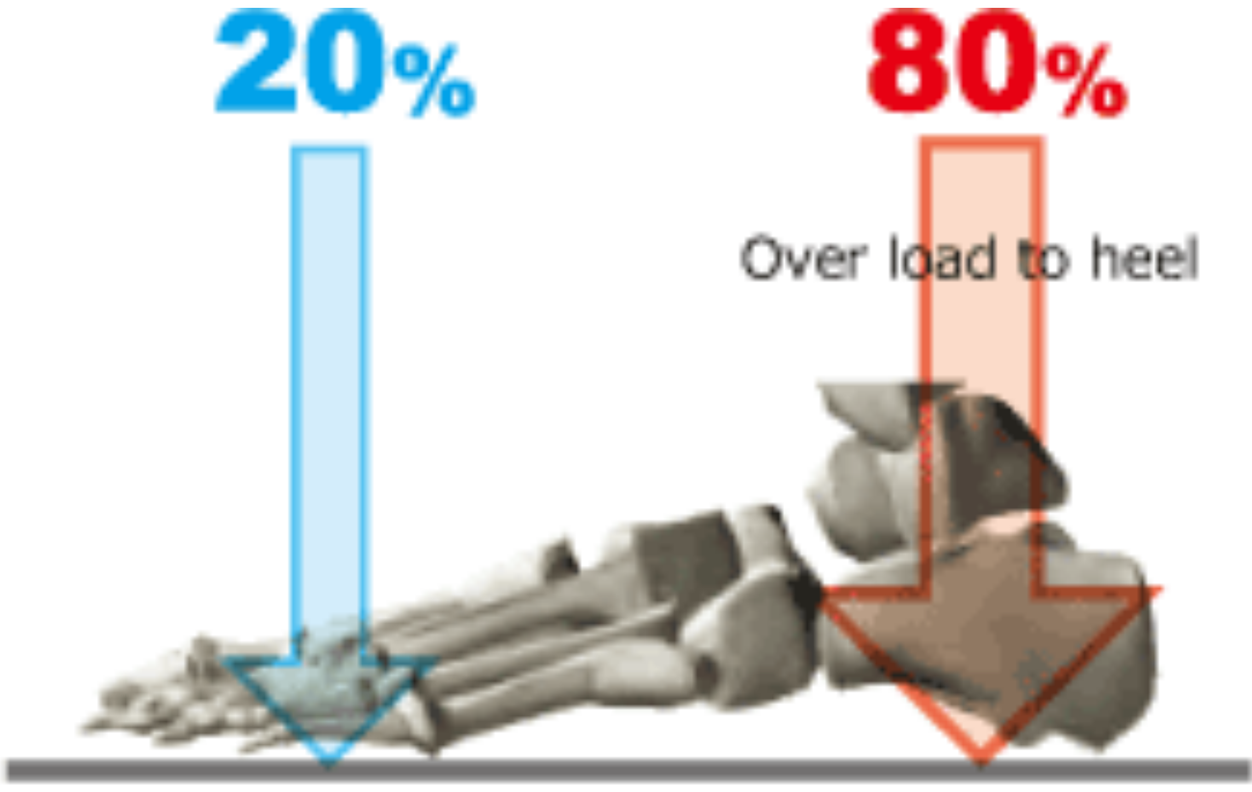
WHAT NORMALLY HAPPENS TO THE 3 ARCHES WHEN YOU STAND UP?



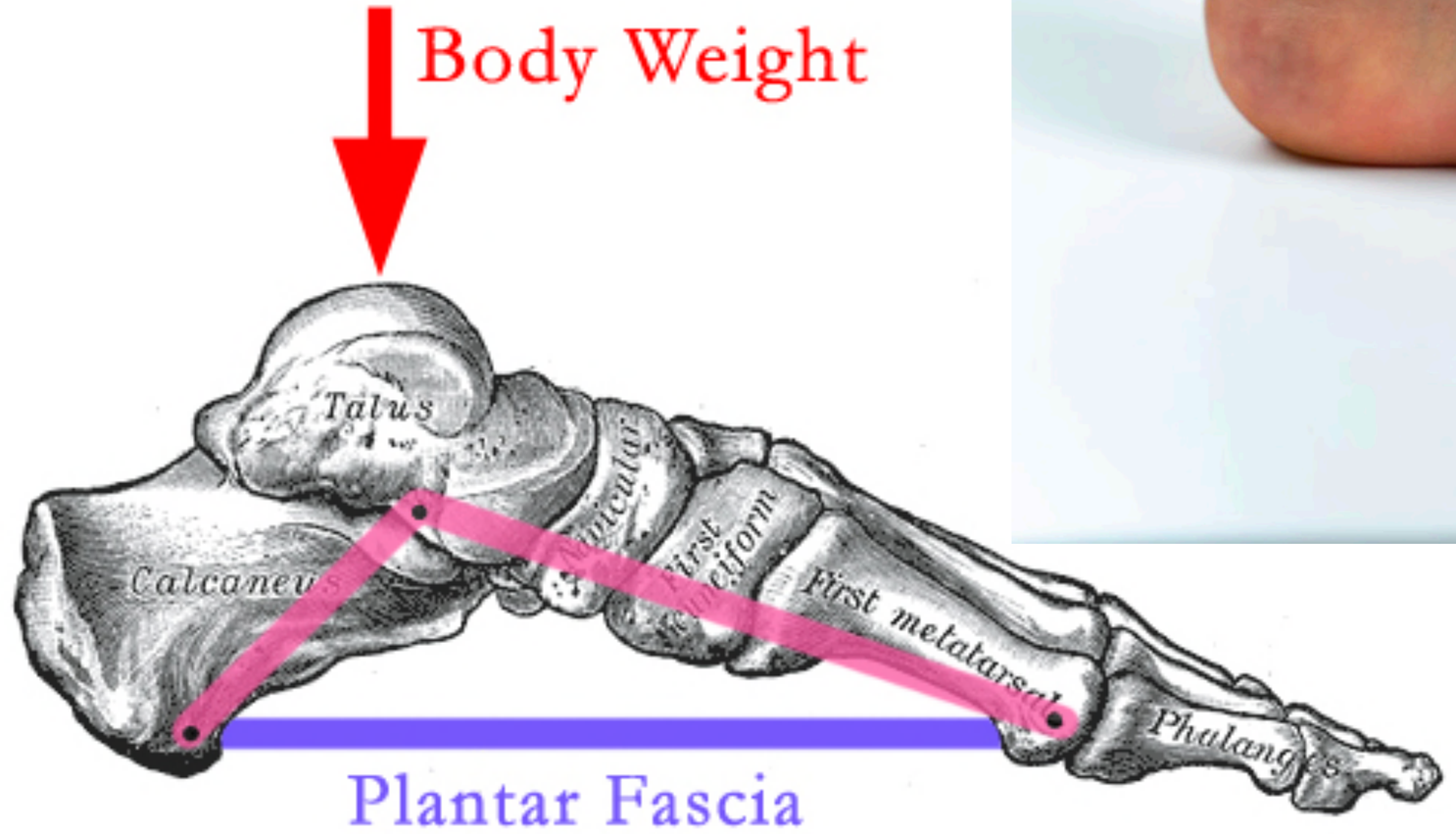
FOOT LEVELERS



In case of having a moderate height of heel



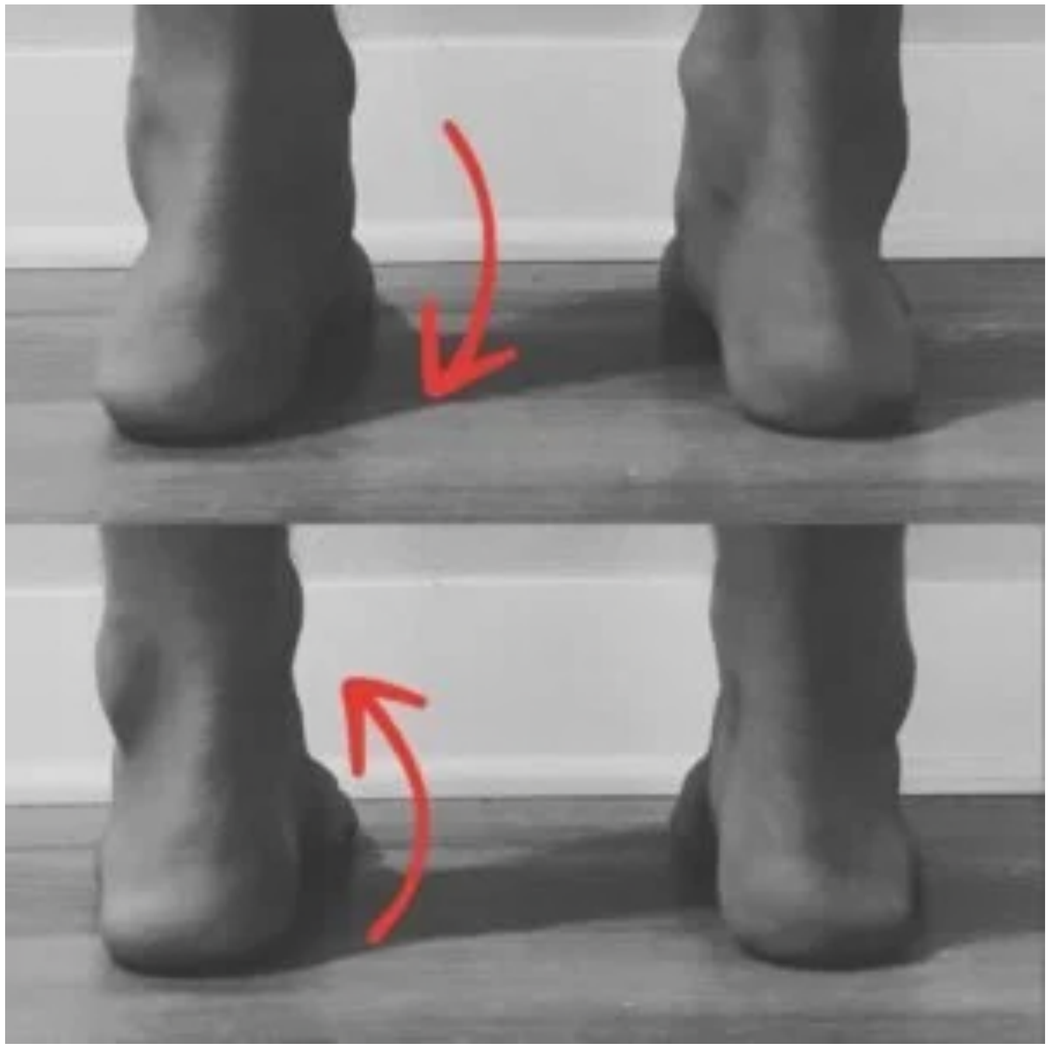
In case of not having the height of the heel


Body Weight
Talus
Calcaneus
First metatarsal
Phalanges
Plantar Fascia

…ON YOUR BARE FEET

Greenawalt pronation/supination visual:

- Roll your feet inward as flat as you can.
- Roll the feet outwards as much as you can.
- Notice how your knees and hips move (without your control)



FOOT LEVELERS

Patient Demo: hands on greater trochanters

Excessive Supination

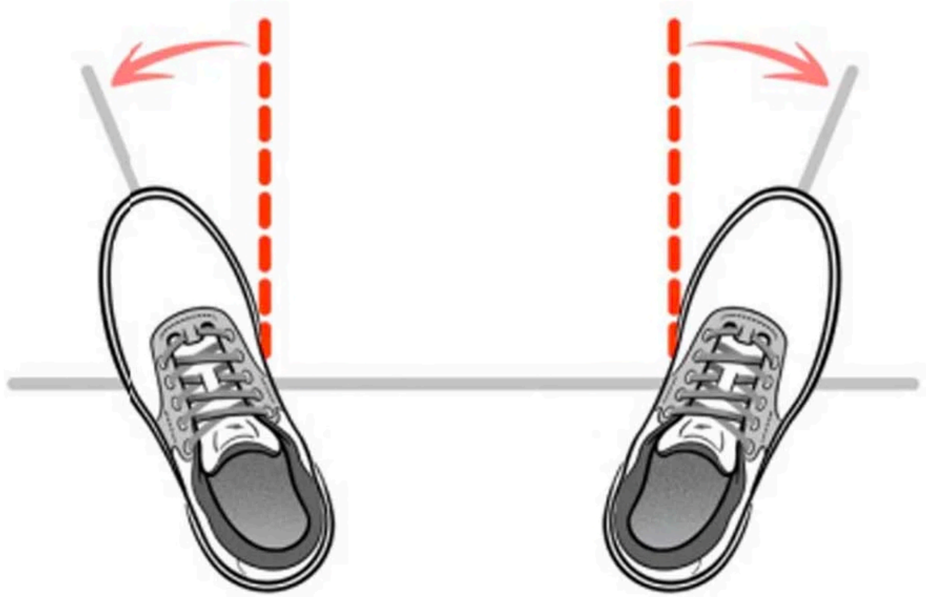
Feel your arches, ankles, knees, hips, pelvis..

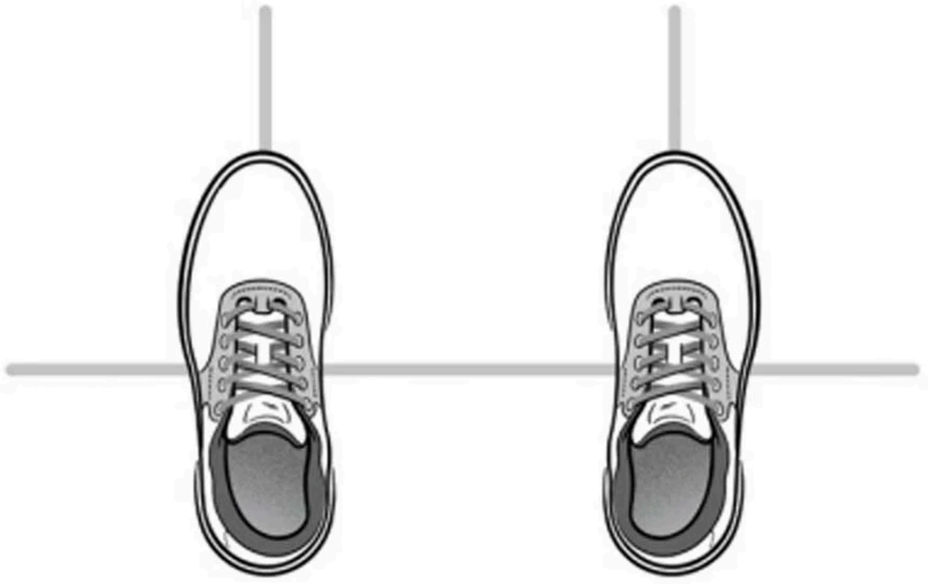
Patient Demo: hands on greater trochanters

Excessive Pronation

- Patients ***SEE*** and ***FEEL*** connection between feet, knees, hips, pelvis and spine.

(Makes Foot-Spine-NS Connection)

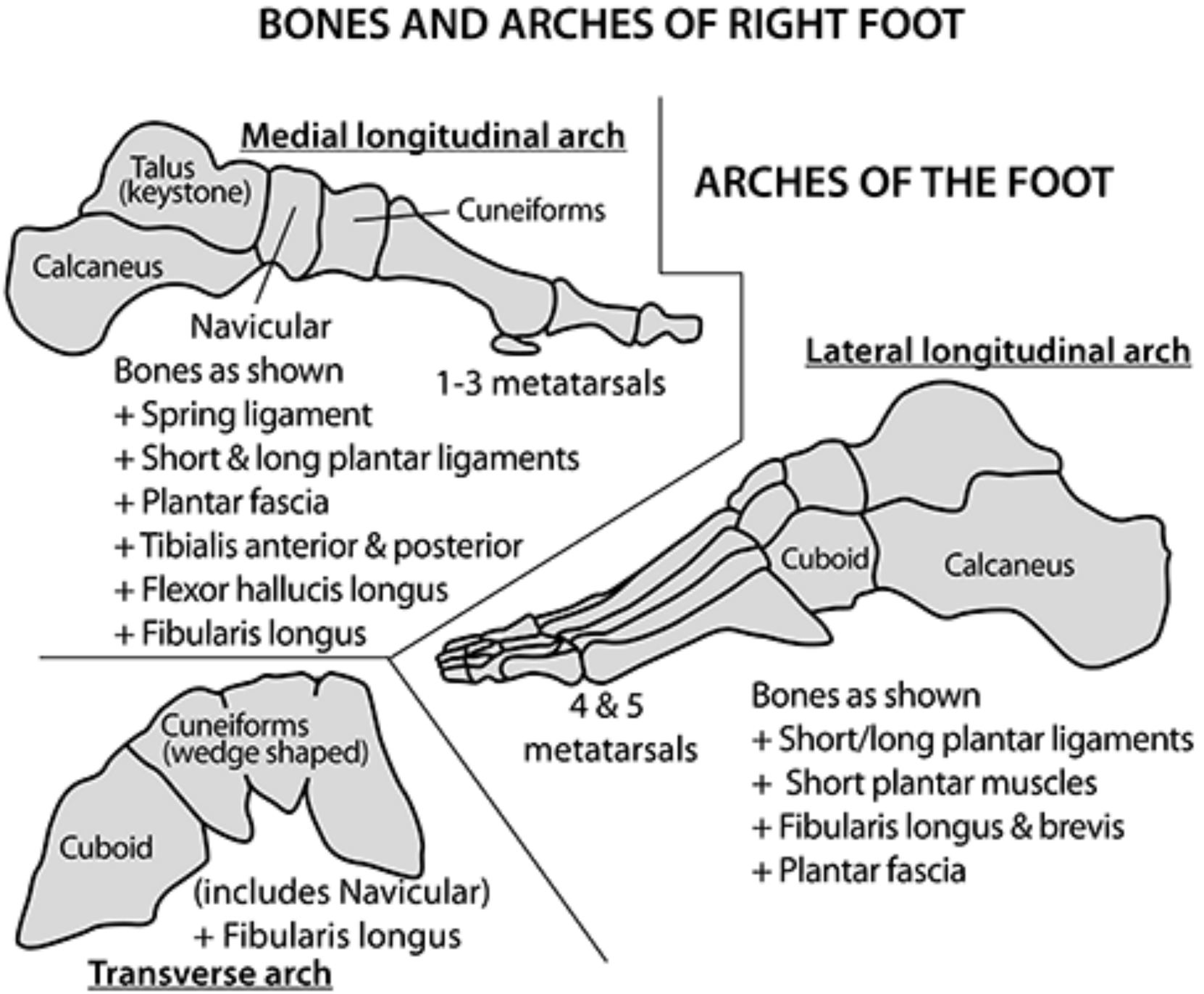


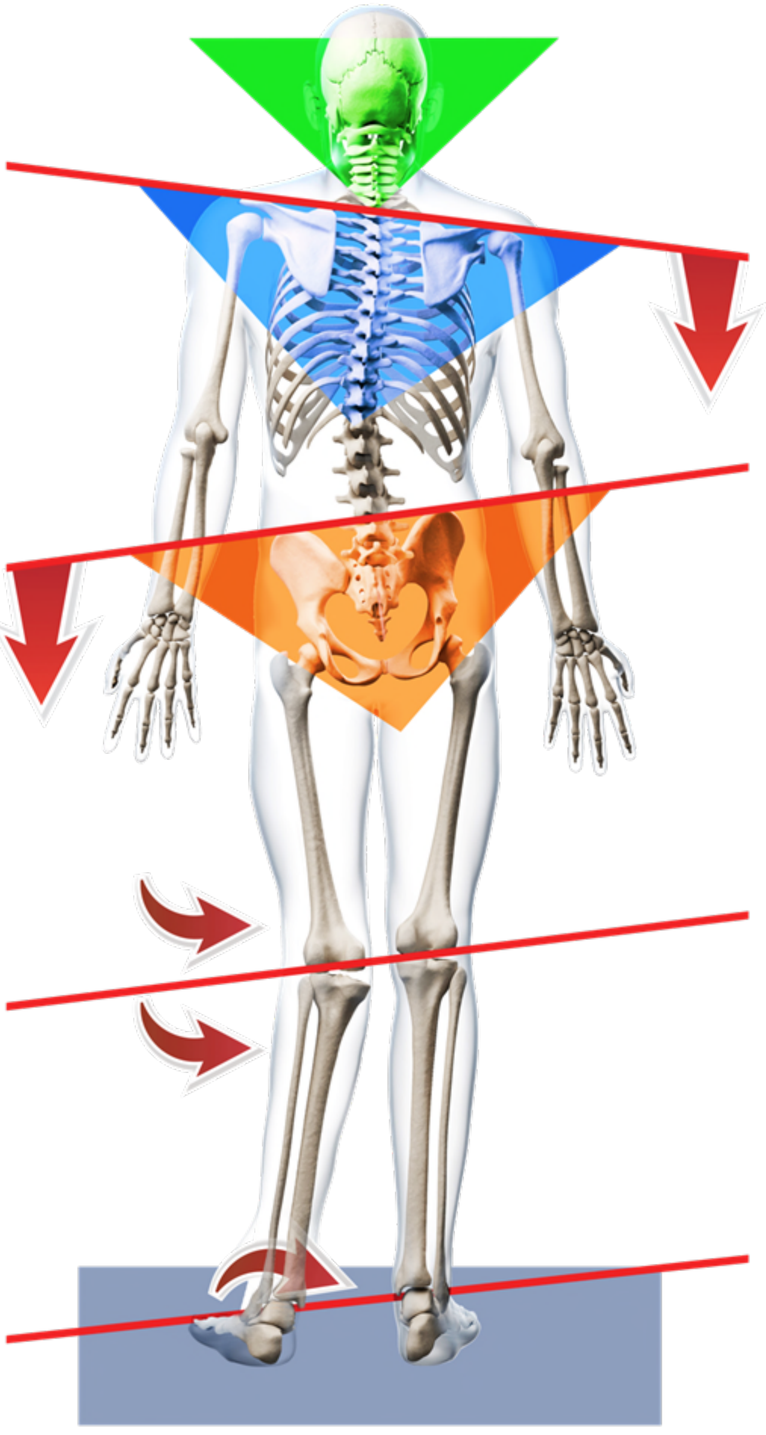


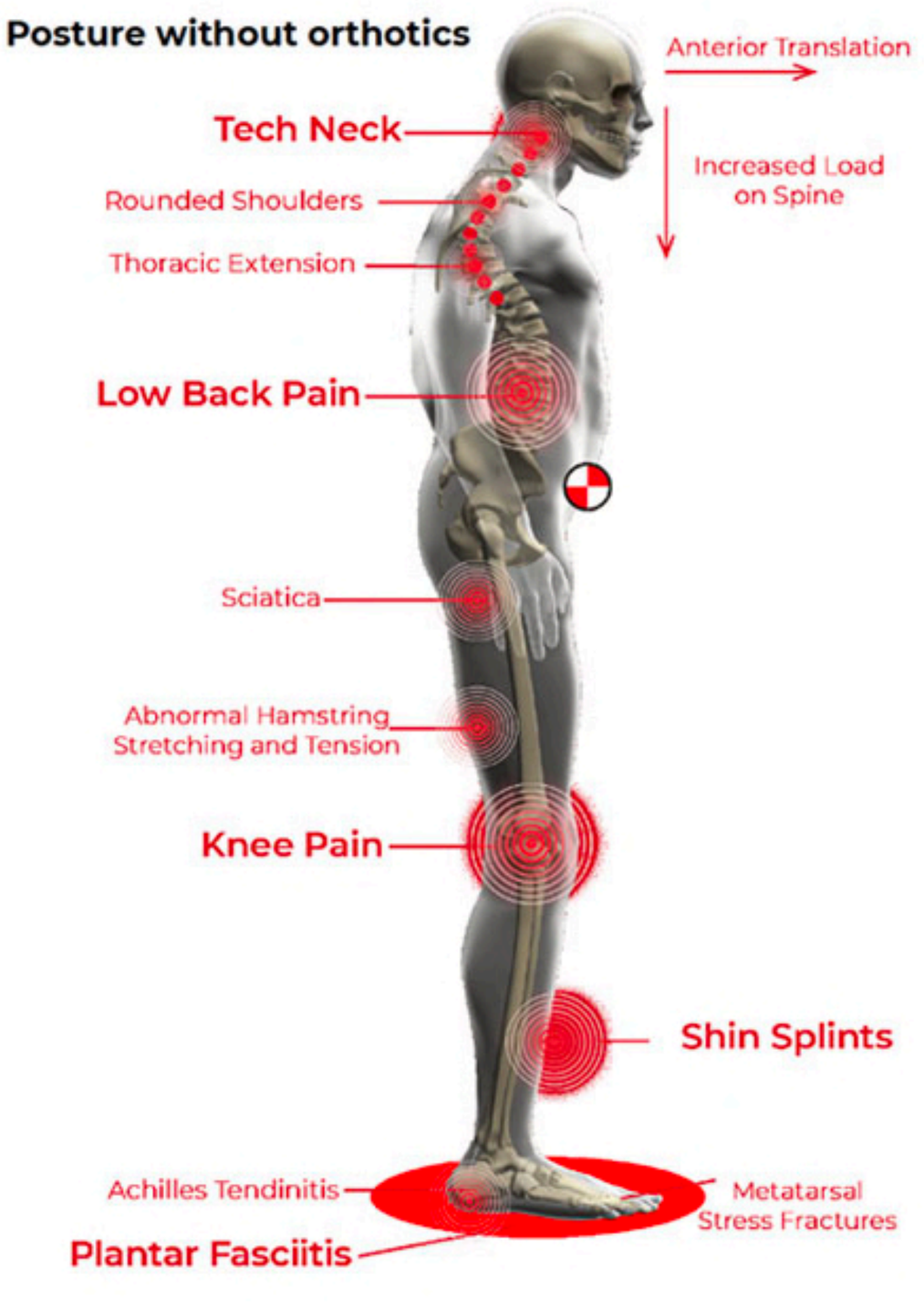
Foot Flare: normal is 12-18 degrees

ARCH FUNCTIONS

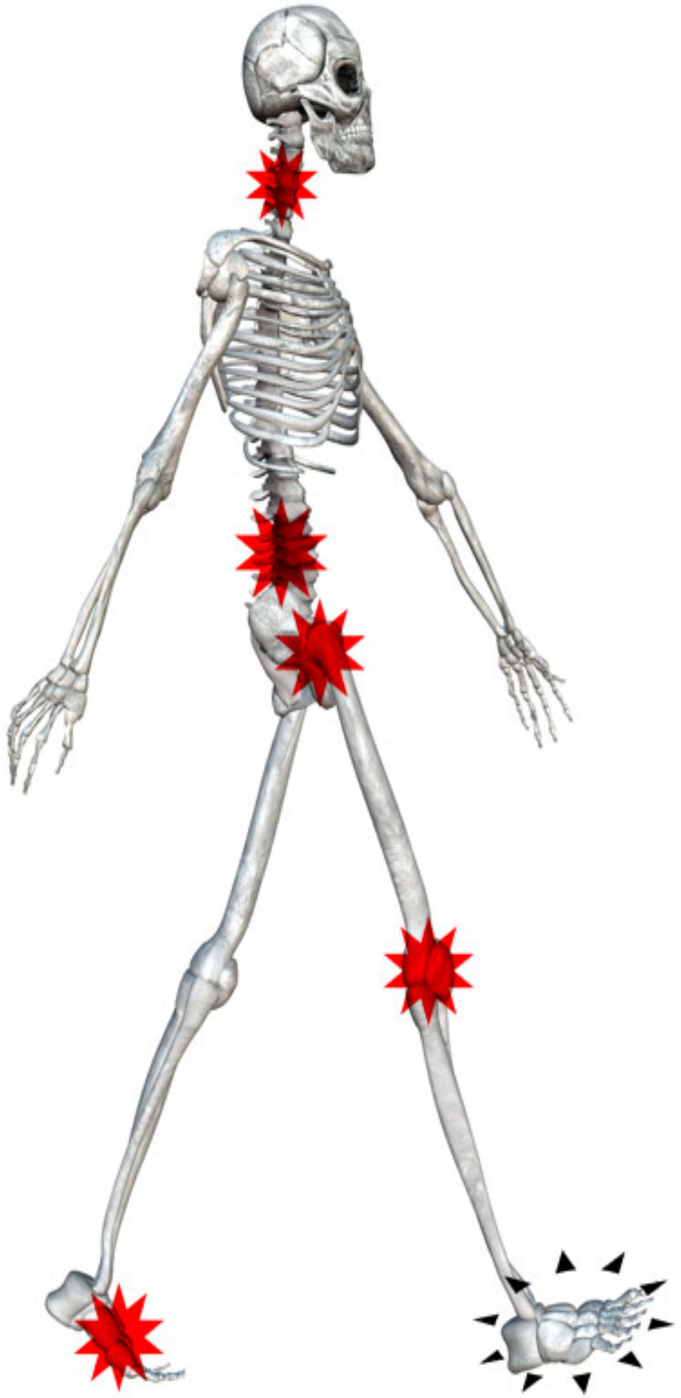
- Absorb & Disperse Shock
- Support body weight
- Propel body



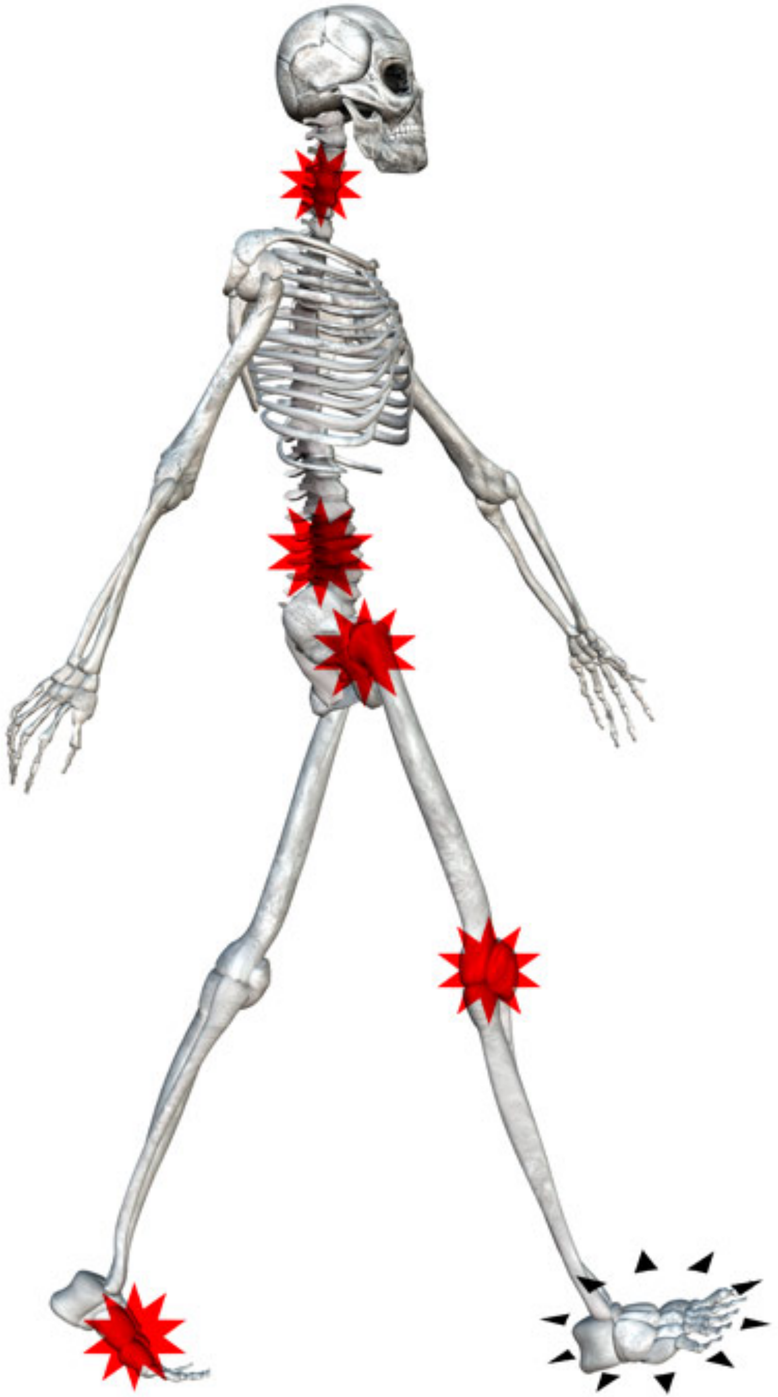



Posture without orthotics
Anterior Translation
Tech Neck
Increased Load on Spine
Rounded Shoulders
Thoracic Extension
Low Back Pain
Sciatica
Abnormal Hamstring Stretching and Tension
Knee Pain
Shin Splints
Achilles Tendinitis
Metatarsal Stress Fractures
Plantar Fasciitis

Every biomechanical imbalance is transmitted to the spine



Heel strike force sends a shock wave up the leg to the pelvis, spine and skull



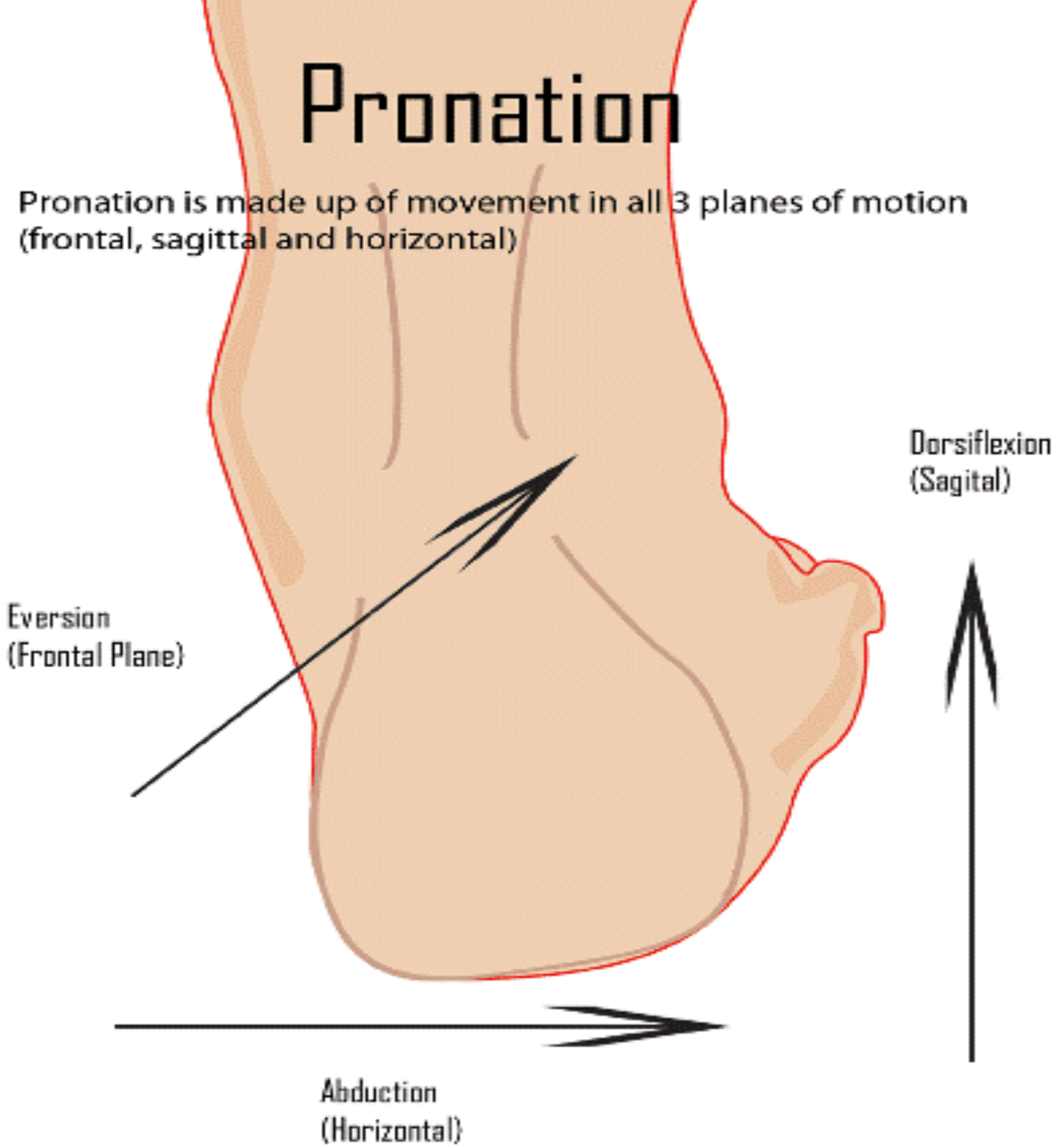
5 G’s of force on the foot/ankle becomes

.5 G’s at the skull (TMJ) within 10 ms*

*Hyland, John K., Musculoskeletal Shock: Causes and Prevention, 1980

A force of **5 G's** means you are experiencing acceleration that makes your body feel **five times heavier than normal**.

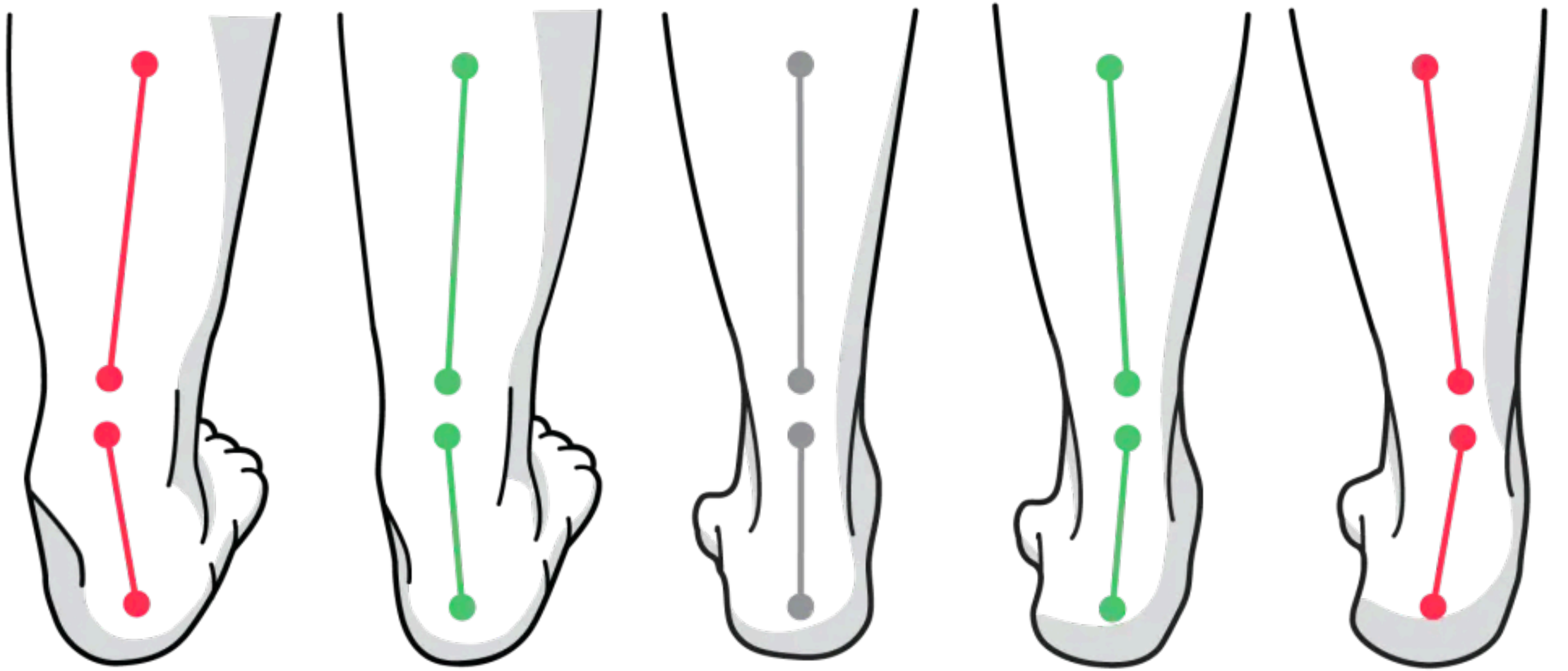
- Unlocks foot
- Absorbs ground shock (**30%**),



Normal Pronation Is Important!

- Conforms foot to grip the ground
- Then re-stiffens (supinates) for leverage as leg propels forward to the next step.

Pronation is necessary for correct biomechanics.

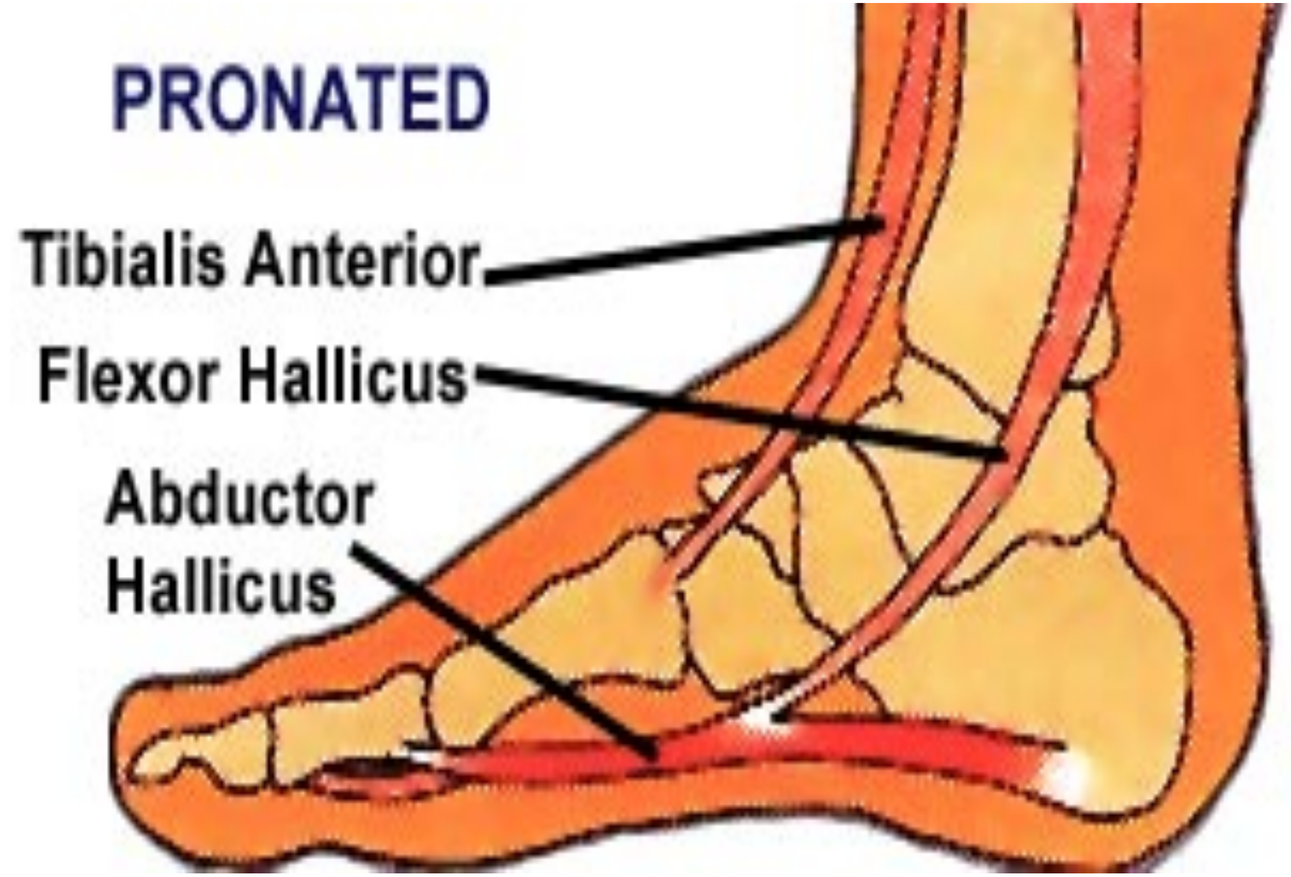


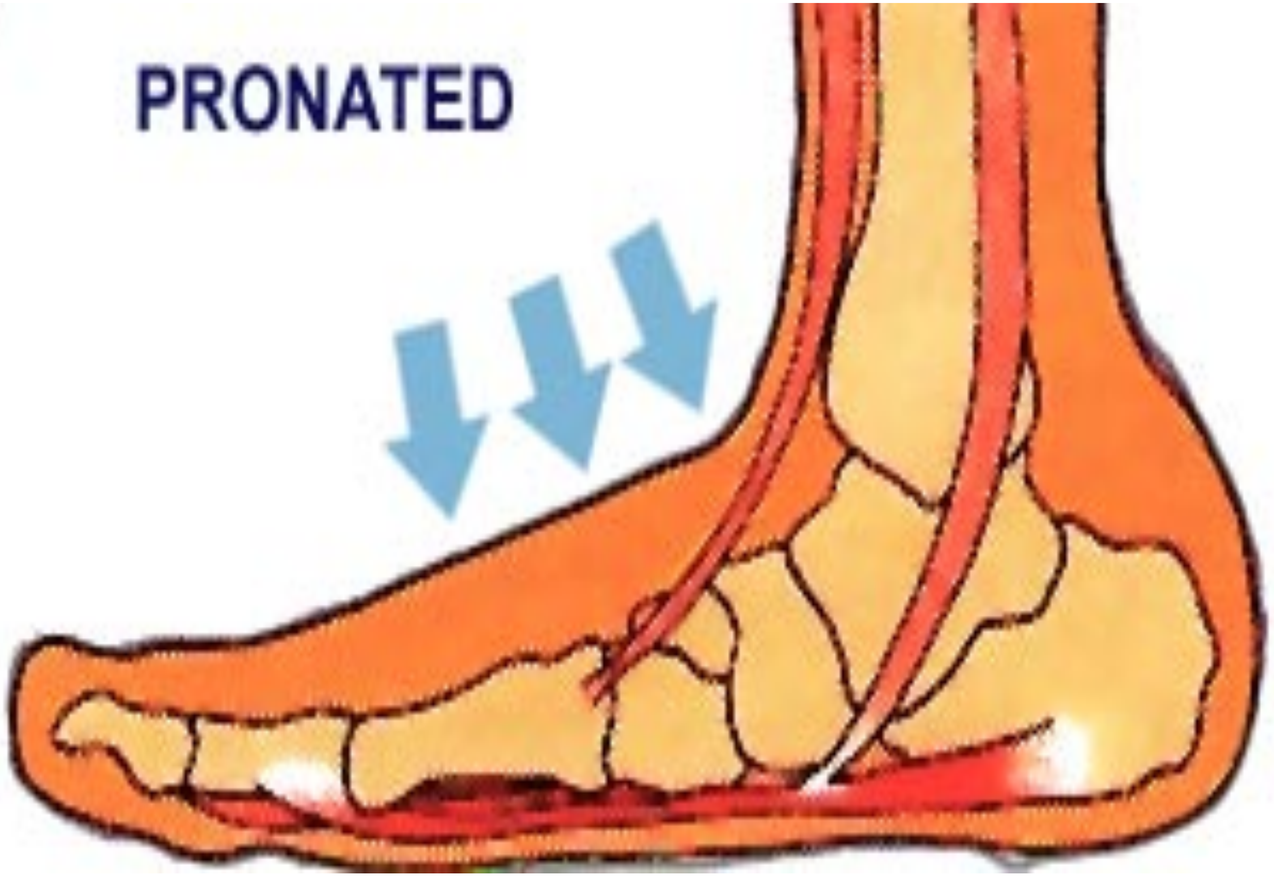
Overpronation | Pronation | Neutral (Right foot) | Supination | Oversupination

ELASTIC VS. PLASTIC DEFORMATION

Plastic Deformation

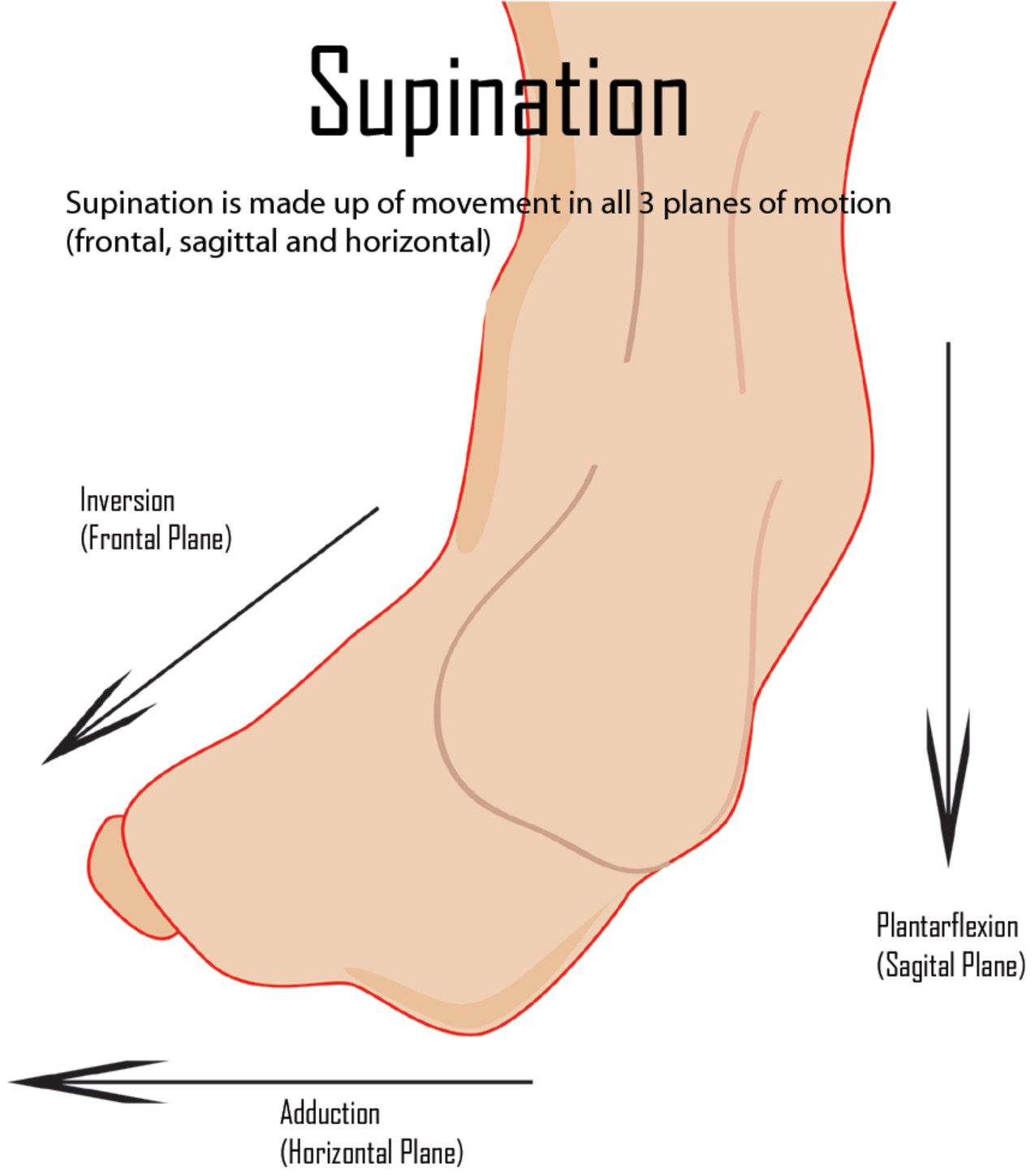
Plastic deformation takes over….





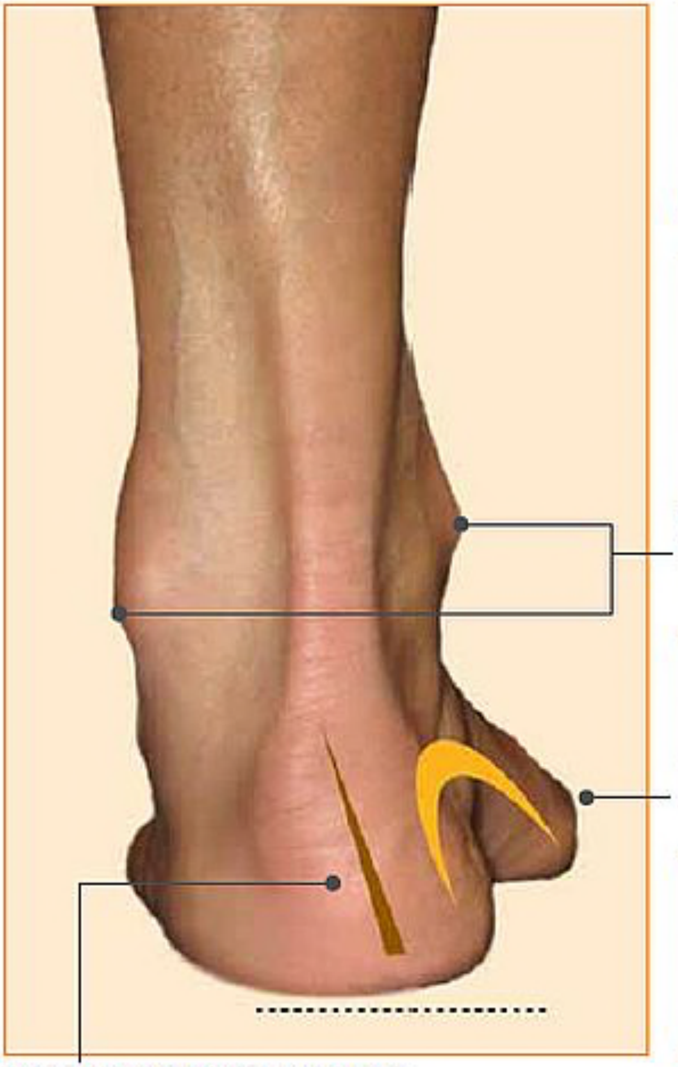
Supinators (<10%)

- Flattened lateral & transverse arches
- Stress on lateral ankle, knee, hip, LB



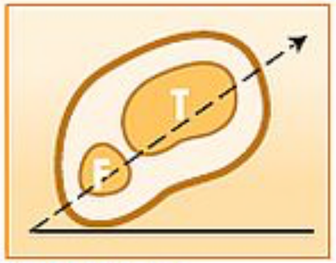
SEVERE PES CAVUS

The Quad A foot-type is commonly thought of as an over-supinated or Severe Pes Cavus foot. This condition, also known as a Torque Foot, occurs when an Uncompensated Rearfoot Varus is coupled with a Large Rigid Forefoot Valgus.



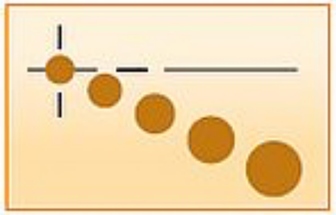
LARGELY INVERTED HEEL ALIGNMENT

PROPELS FORCEFULLY FROM 1st METATARSAL

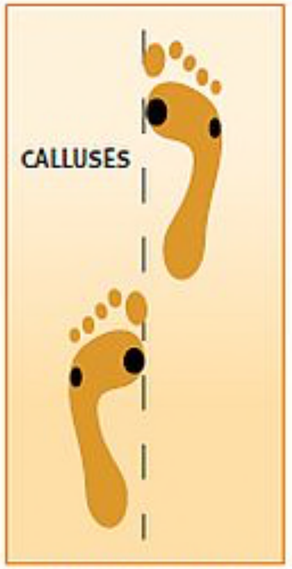


LARGE EXTERNAL TIBIAL/FIBULAR ROTATION

CAVUS/HIGH ARCH



VALGUS FOREFOOT ALIGNMENT



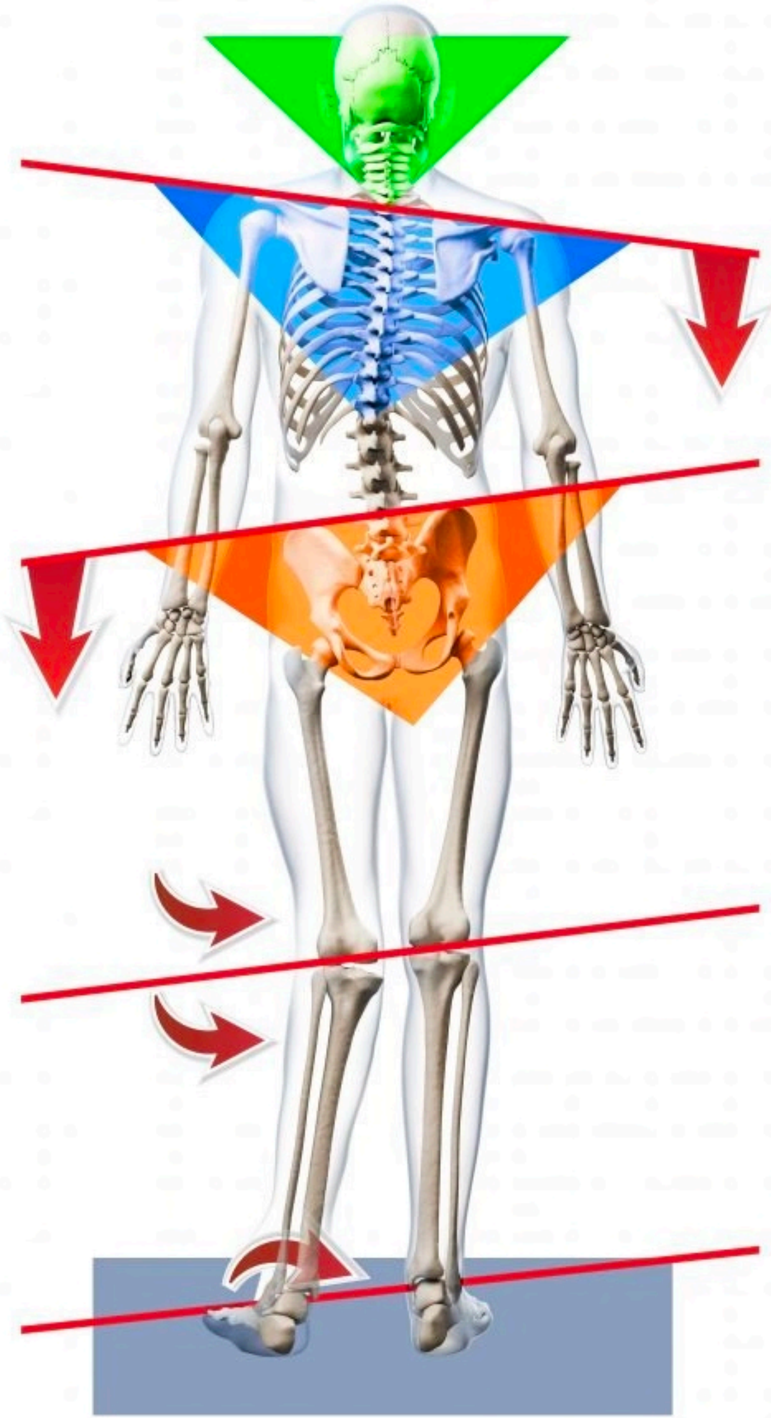
FOOT PROGRESSION ANGLE

- Poor Shock Attenuation
- Excessive Supination
- Narrow or Cross Over Gait

LOWER EXTREMITY ASSESSMENT TOOLS:

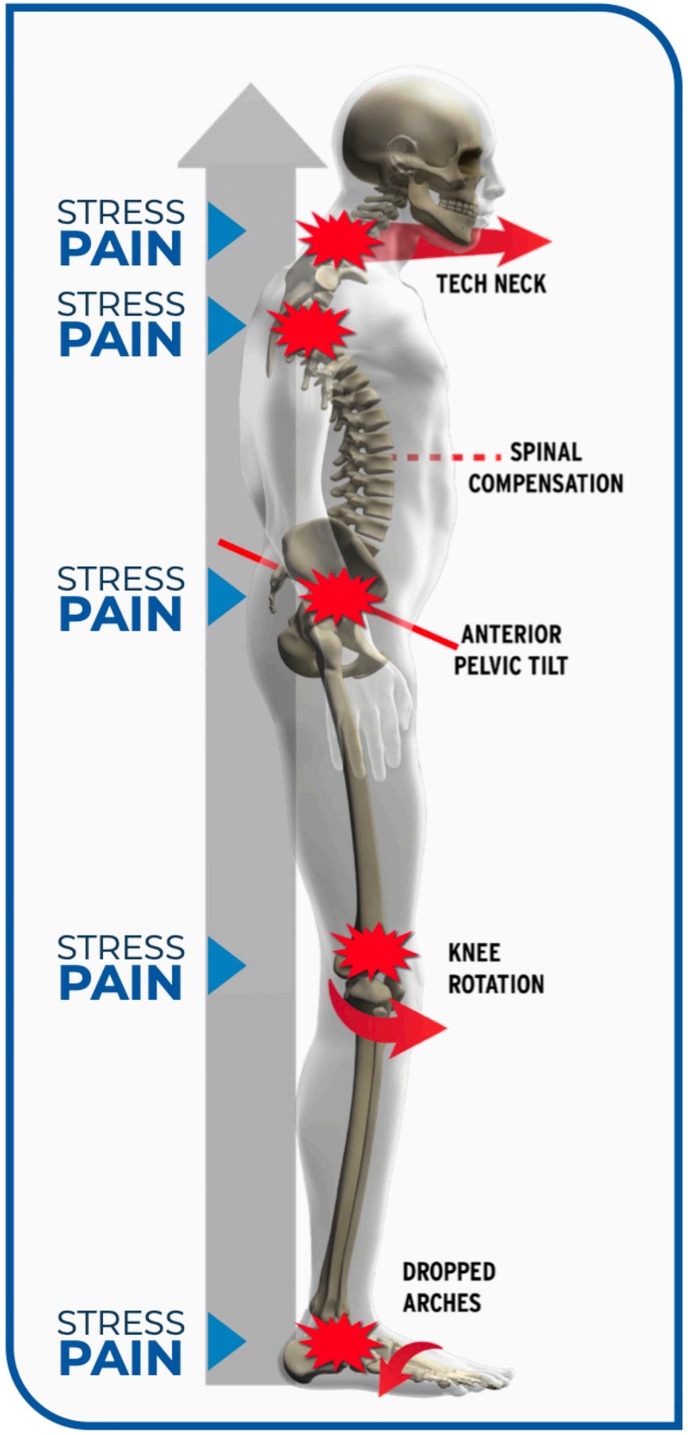
- Standing posture
- Gait analysis
- Manual Muscle Testing
- 3-D, Digital, Laser Scan

Do your patients look like this during your posture exam?



4 Global Posture Distortions

3. Kyphotic posture with thoracic extension



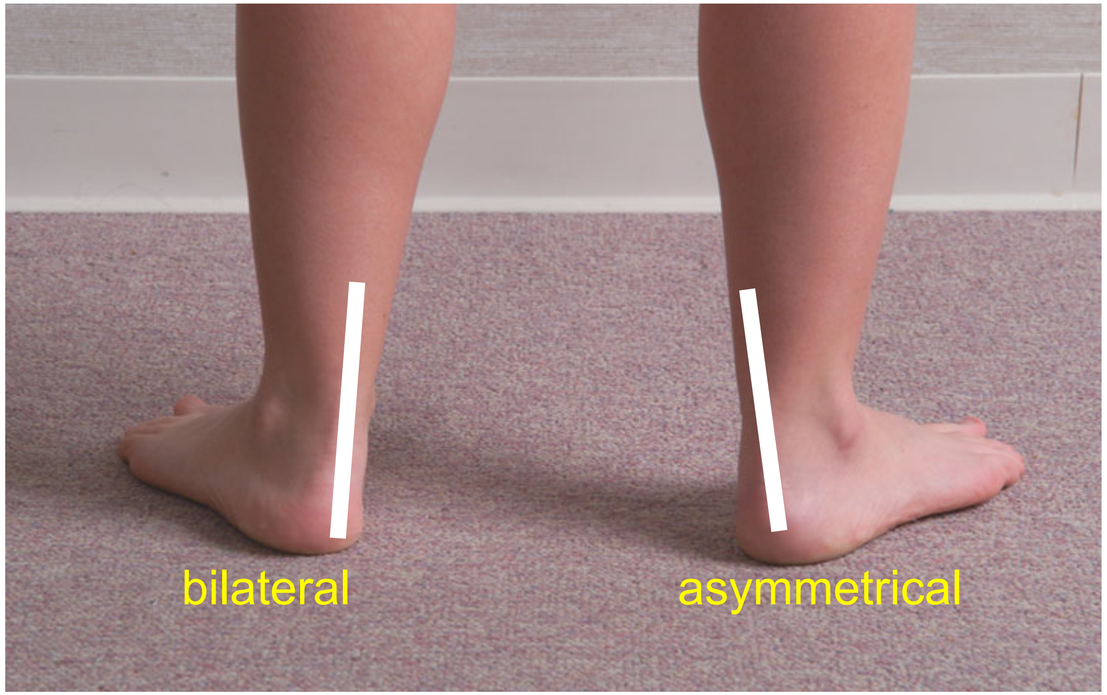
4. Forward head Translation or carriage

2. Anterior Pelvic Rotation and Translation

1. Bilateral, asymmetrical Foot pronation

“THE 2 SECOND EXAM”

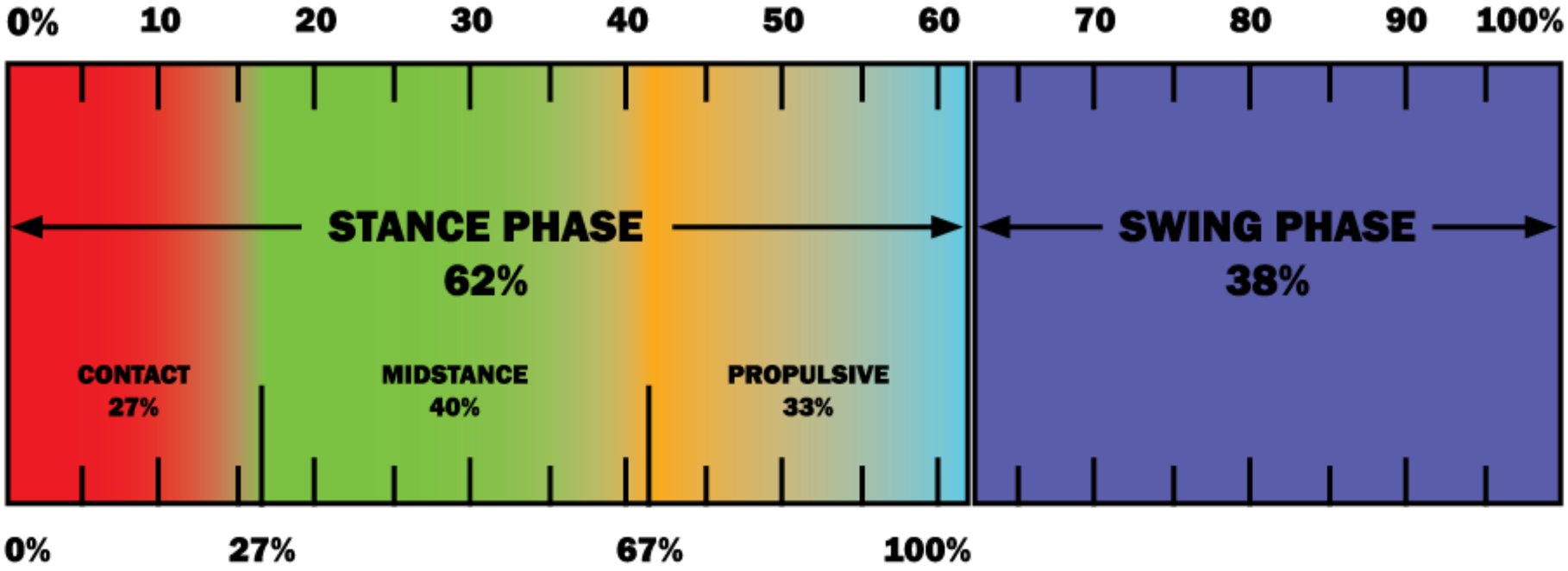
- Achilles tendons bowing inward or outward?
- Medial arches dropped or high?



Why Am I over pronating?

- Joint Fixation
- Hypermobility/Instability
- Muscle Imbalance
- Acute/Chronic Injuries

Gait Cycle


0%
10
20
30
40
50
60
70
80
90
100%
STANCE PHASE
62%
SWING PHASE
38%
CONTACT
27%
MIDSTANCE
40%
PROPULSIVE
33%
0%
27%
67%
100%


HEEL STRIKE
FOREFOOT LOADING
HEEL LIFT
TOE-OFF

- Calcaneus inverts
- Foot supinates
- Force goes from heel to ankle

- Foot pronates at subtalar joint
- Medial rotation of tibia/femur

- Foot supinates
- MTP’s dorsiflex
- Plantar fascia tightens
- Leg externally rotates

Foot/Ankle Limits of Normal Movement

	WALKING	RUNNING
PRONATION	8°	12°
SUPINATION	2°	4°

FOOT LEVELERS

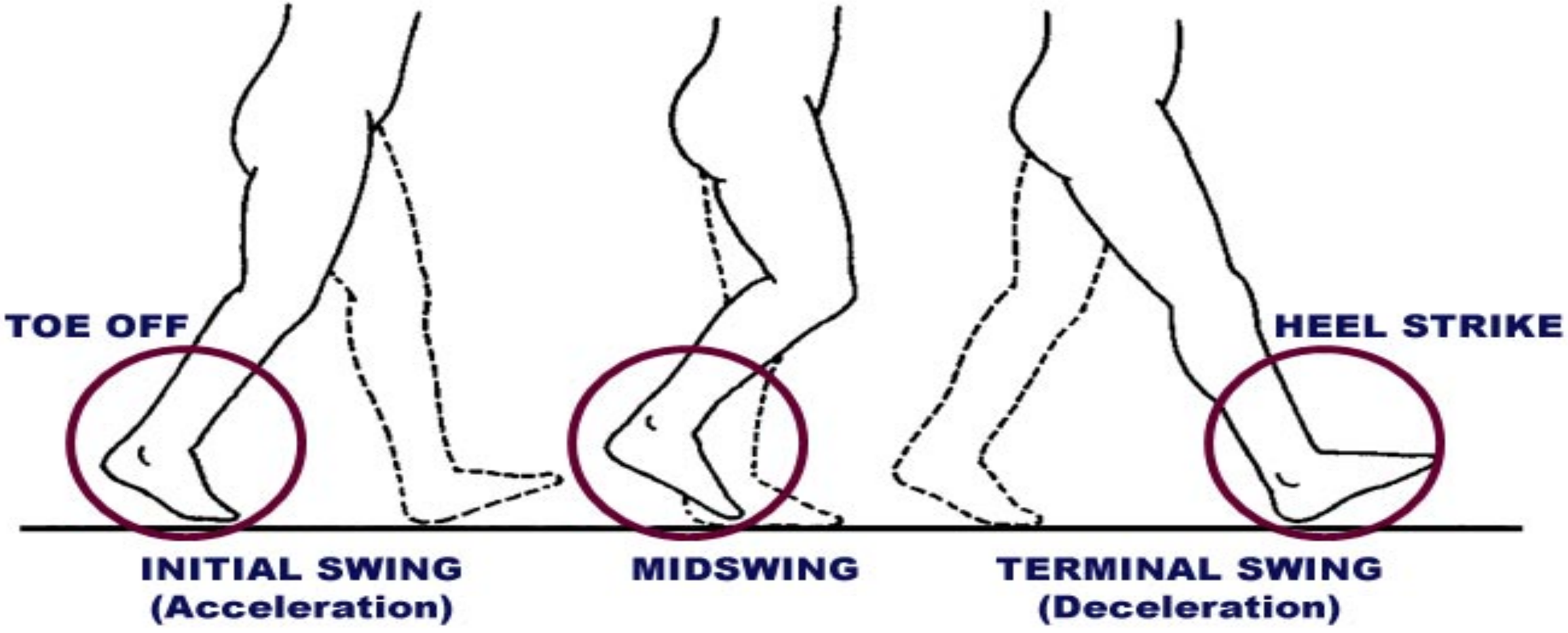
Walking 1 Mile puts approximately

50 tons

of pressure on

your arches.

Running = 3x-5x more

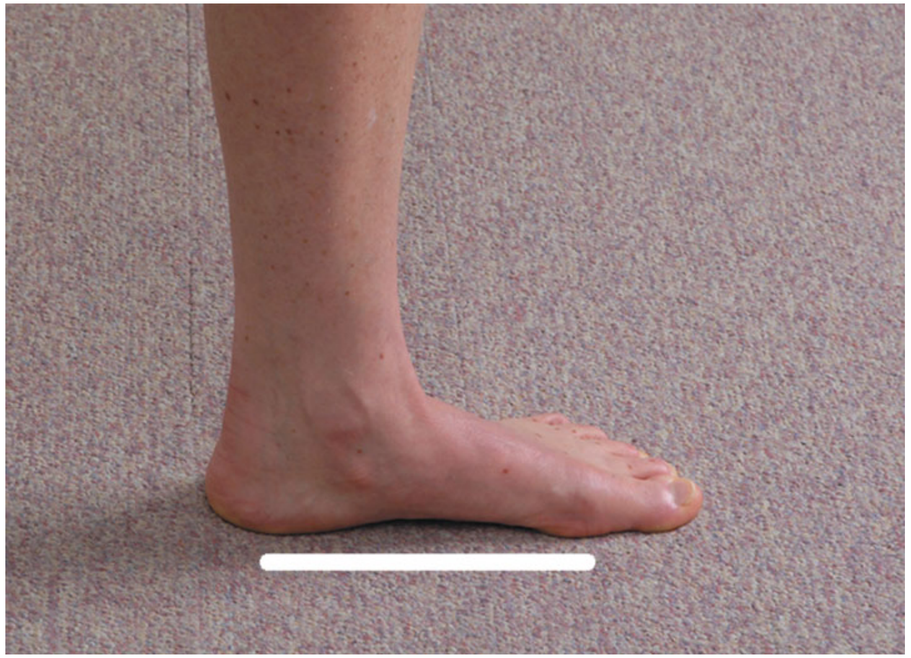

TOE OFF
HEEL STRIKE
INITIAL SWING
(Acceleration)
MIDSWING
TERMINAL SWING
(Deceleration)


stance phase = 62%
swing phase = 38%
HEEL STRIKE
TOE OFF
HEEL STRIKE

Foot Conditions By Age

- 99% of feet are normal at birth
- 8% of feet develop trouble by age 1
- 41% of feet develop trouble by age 5
- 80% of feet develop trouble by age 20
- Nearly everyone has foot trouble by age 40

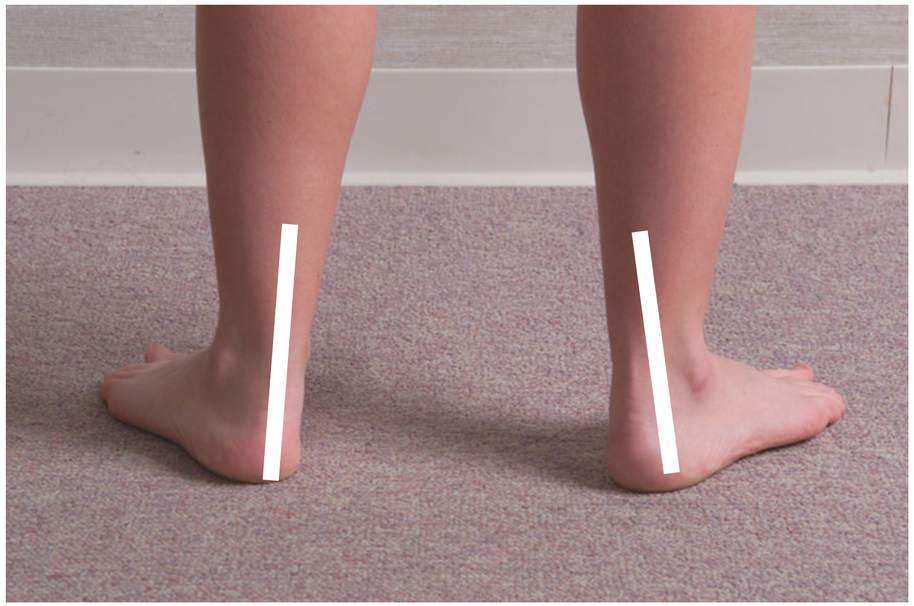
What Else Do You See With Over Pronation?



Knee pain

Current/previous injury

DJD

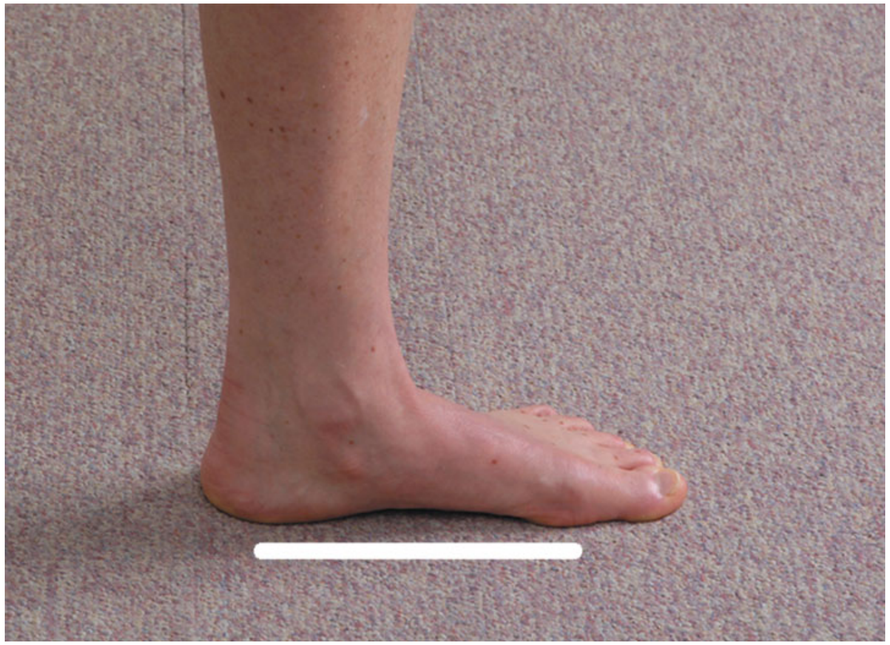


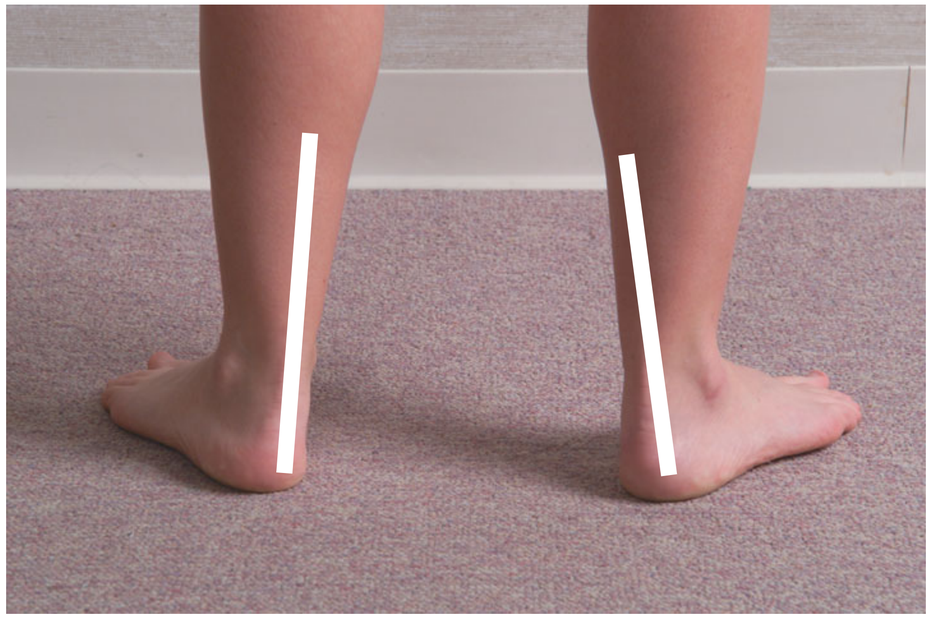
Ankle Sprains

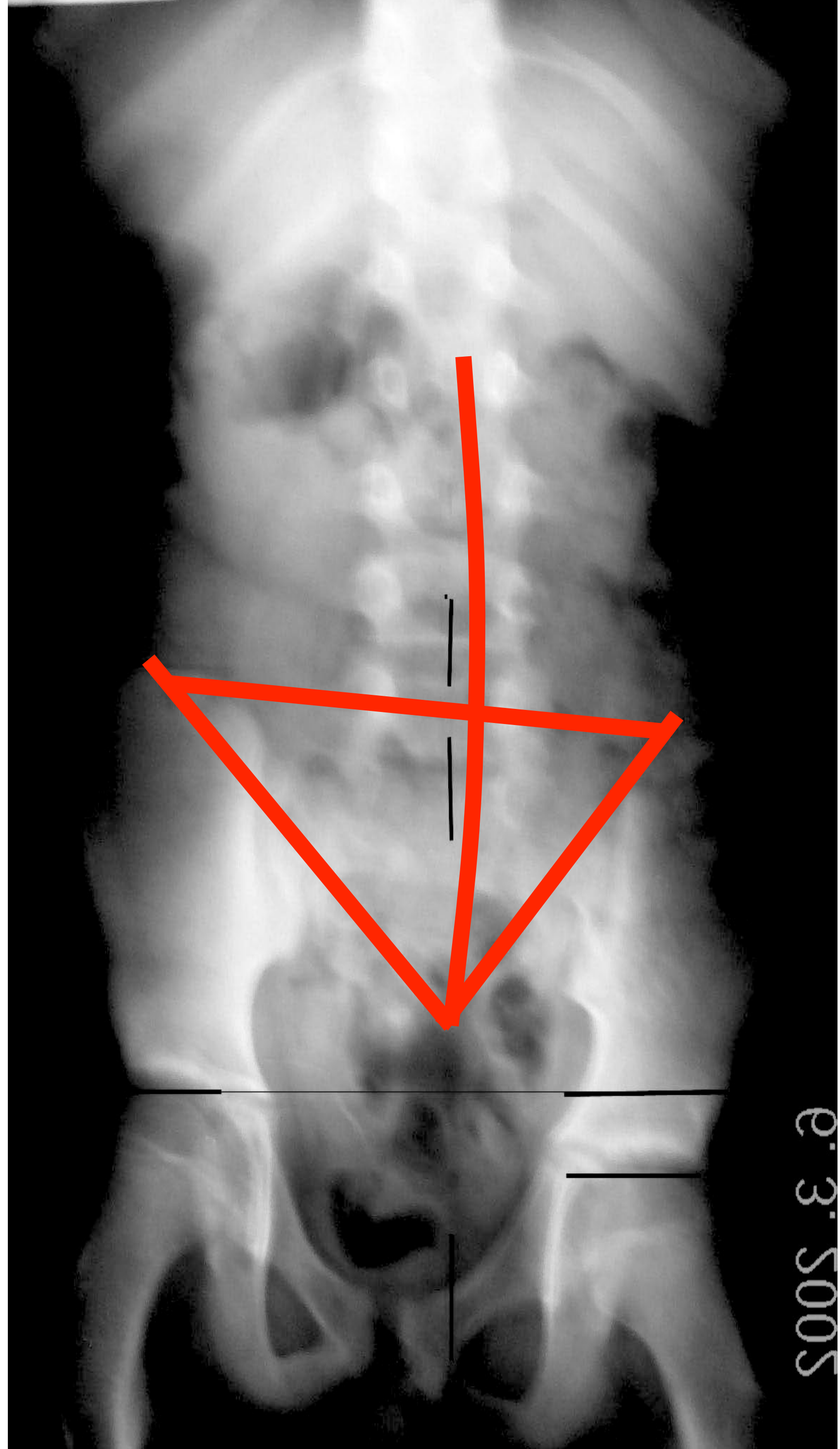
Plantar Fasciitis

Heel Spurs

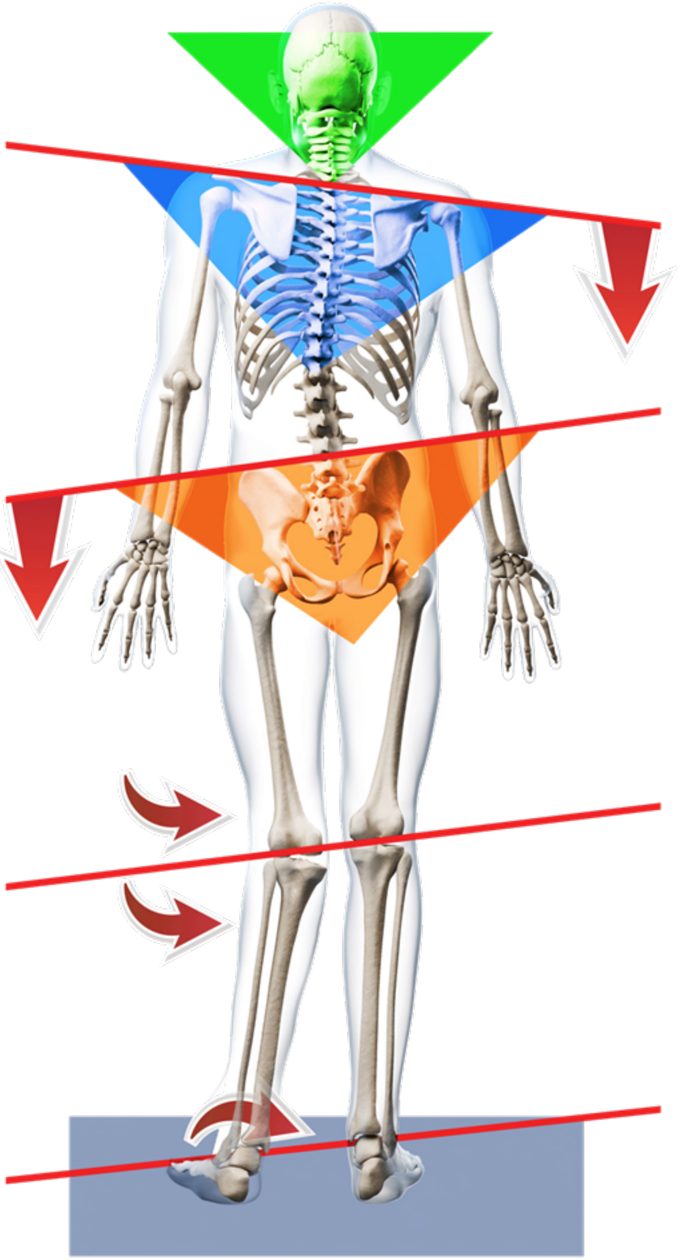
With Over Prontation, What Else Do You See?







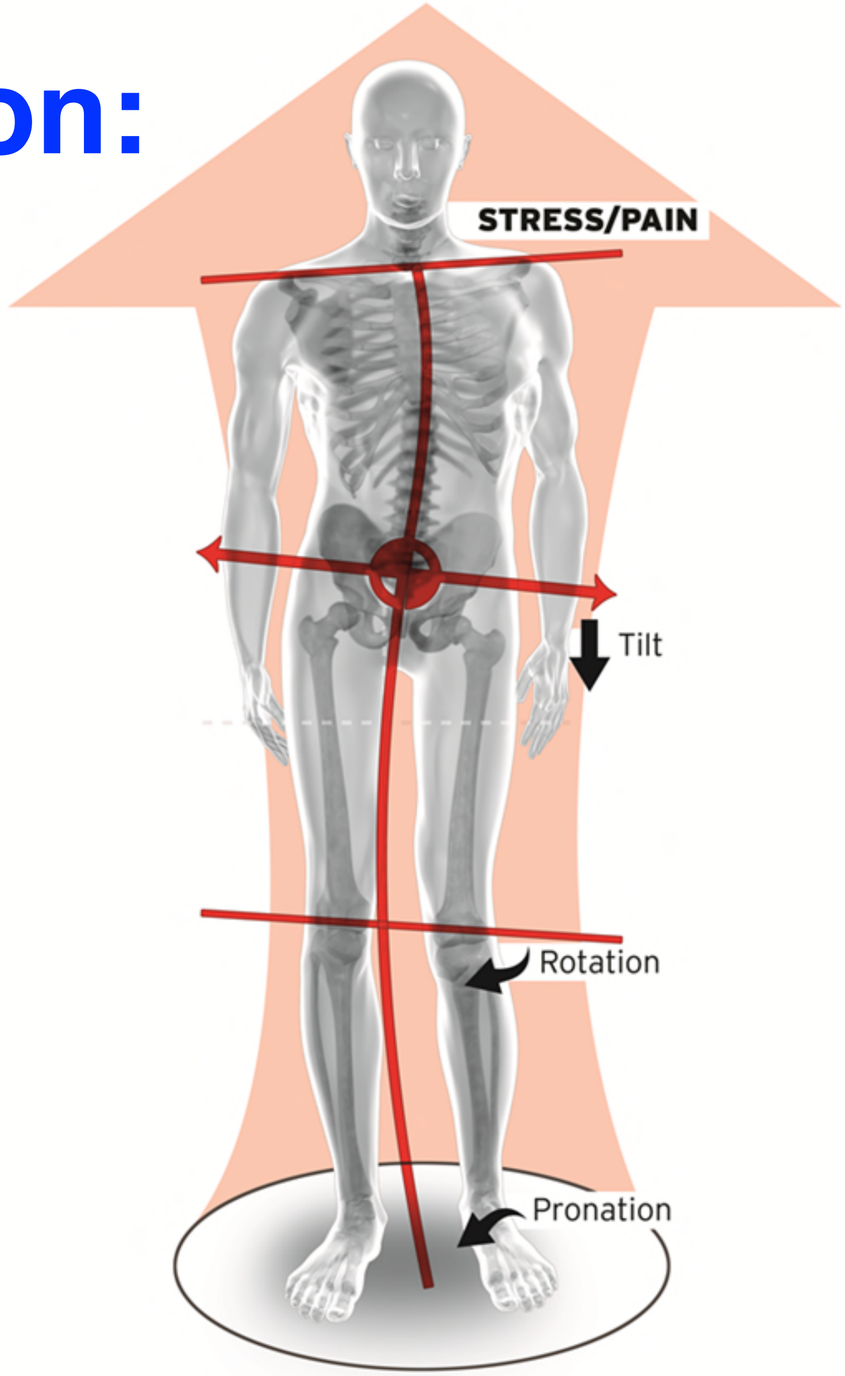
Don’t Overlook the Lower Extremities!



The Effects of Over Pronation:

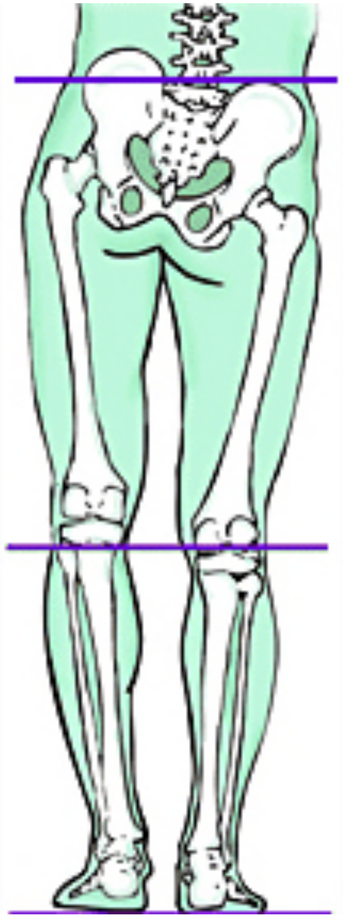
- Excessive spinal rotational stress

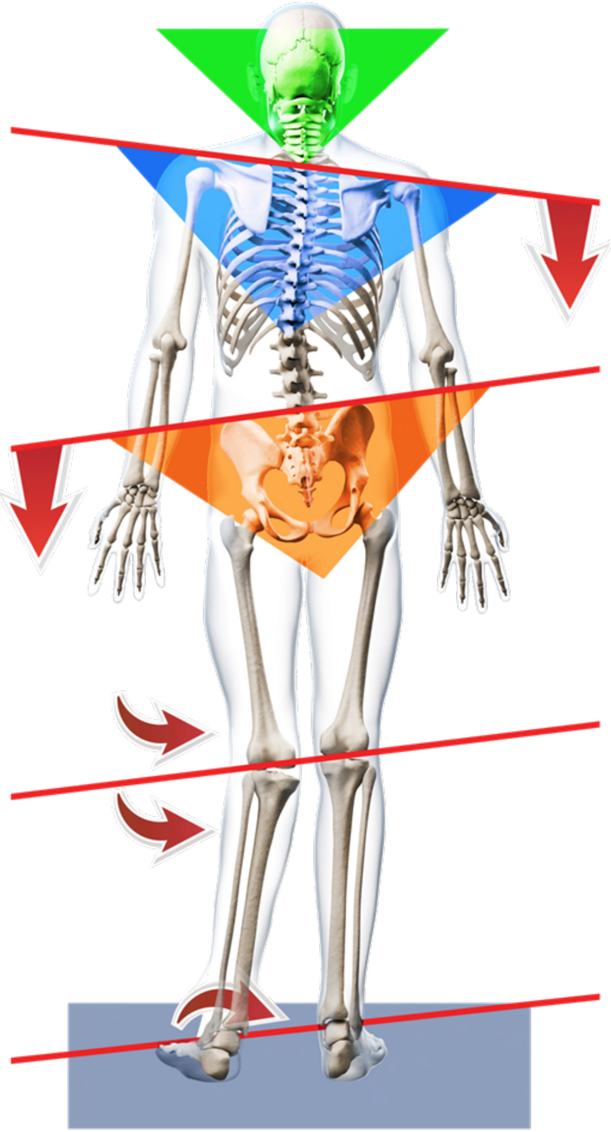
- Chronic SI joint stress



The Effects of Over Pronation:

- Excessive shock transmission
- Pelvic unleveling due to LLI





Factors of Pronation

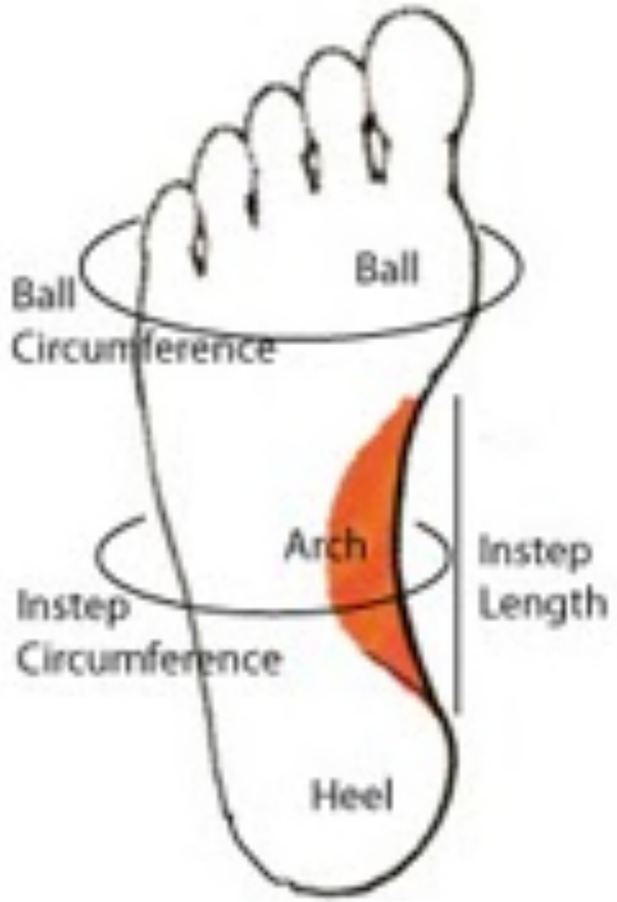
Symptoms of Over Pronation

- History or chronicity of symptoms
- Spinal/extremity symptoms worse with WB.
- Short-term response to Chiro. Adjustments

How do the Sexes Differ?

Woman have a narrower heel/midfoot with a wider forefoot

Their biomechanical forces are distributed differently!



Male Feet have a
"Square" shape

Female Feet have a
"Triangle" shape

Are Female Feet Different?

Biomechanical, forefoot conditions in women > men

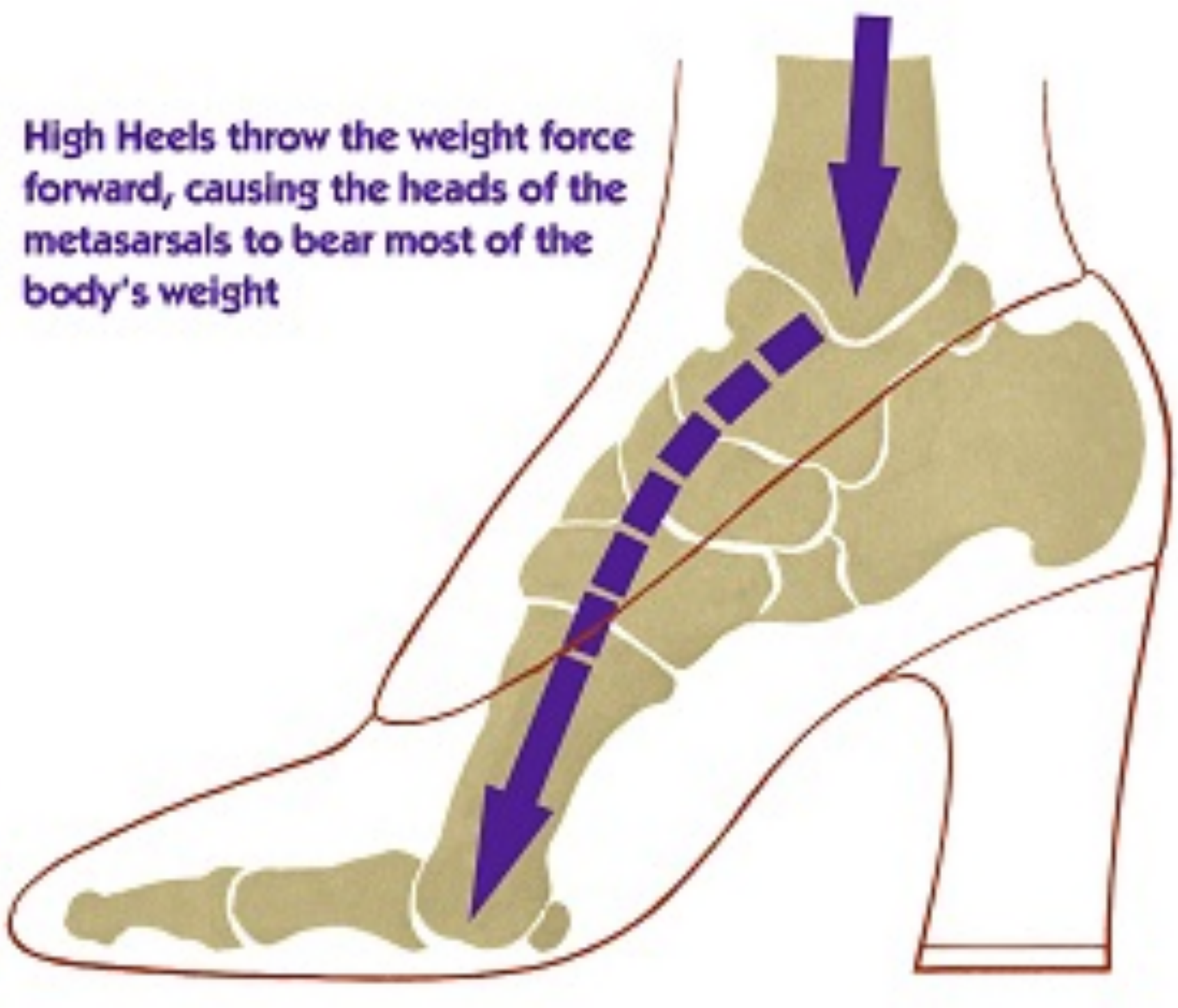
(Bunions, hammer toes, calluses, neuromas, metatarsalgia)

- **MT arch support is key!**

Footwear

- People cram feet into shoes that don’t fit.
- Many don’t update their shoe size as they age

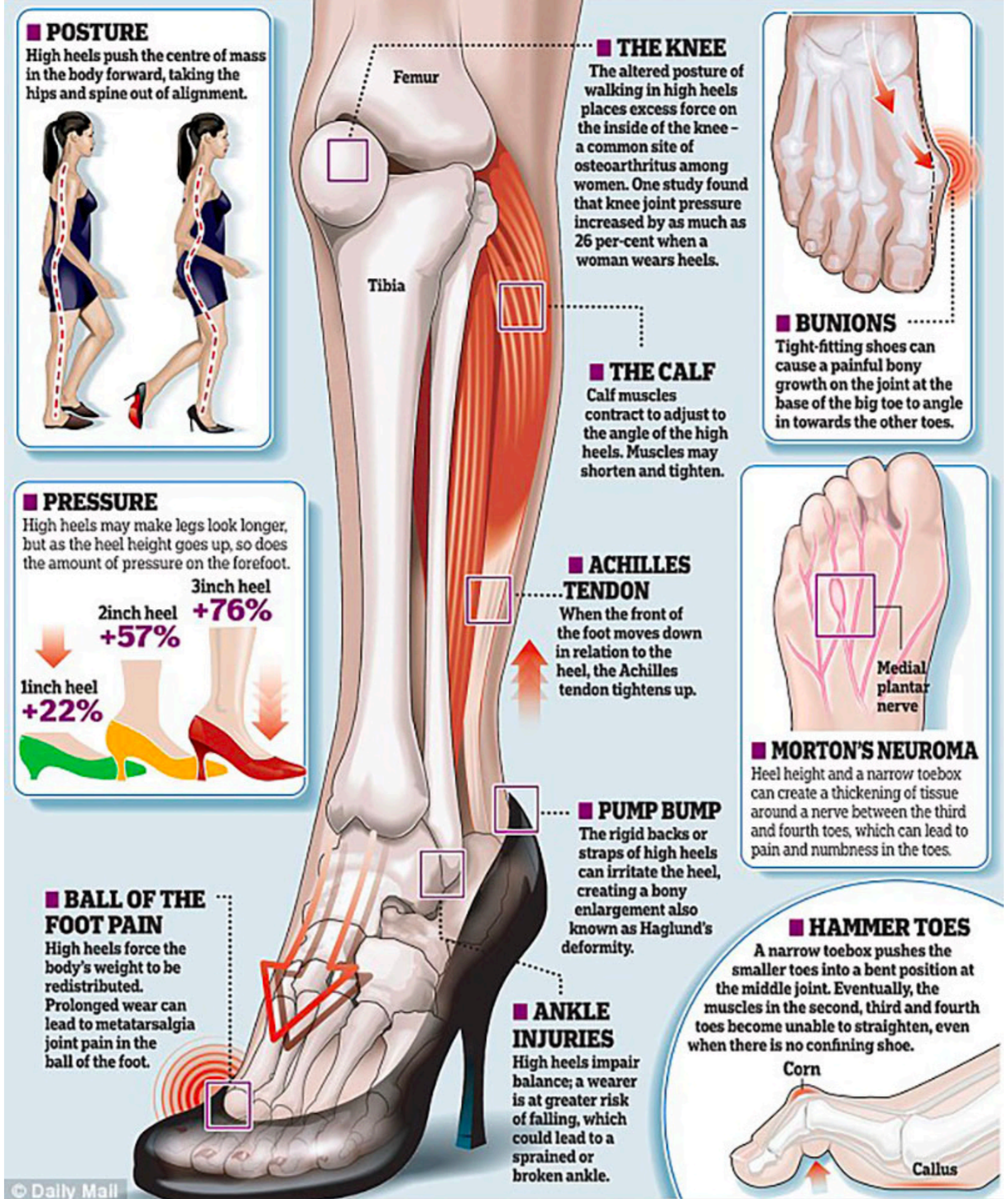
High Heels throw the weight force forward, causing the heads of the metasarsals to bear most of the body's weight



Dangers of Heels

Forefoot pressure increases by:

1 inch heel - 22%
2 inch heel - 57%
3 inch heel - 76%



Foot Facts

75% of people will suffer from foot problems in their lifetime*

Because of the types of shoes women wear, they have **4 times** the number of foot problems as men*

*American Academy of Orthopedic Surgeons

The most common foot problems seen in a podiatrist's office:

- *Plantar fasciitis*
- *Bunions*
- Ingrown toenails
- *Hammertoes*
- *Corns and calluses*
- Nail fungus
- Athlete’s foot (fungal infection of the skin)
- *Flat feet*
- *Neuromas* (such as Morton’s neuroma)
- Diabetic foot problems (including neuropathy, ulcers, and infections)
- *Achilles tendonitis/tendinopathy*
- *Foot and ankle arthritis*
- Blisters and foot injuries

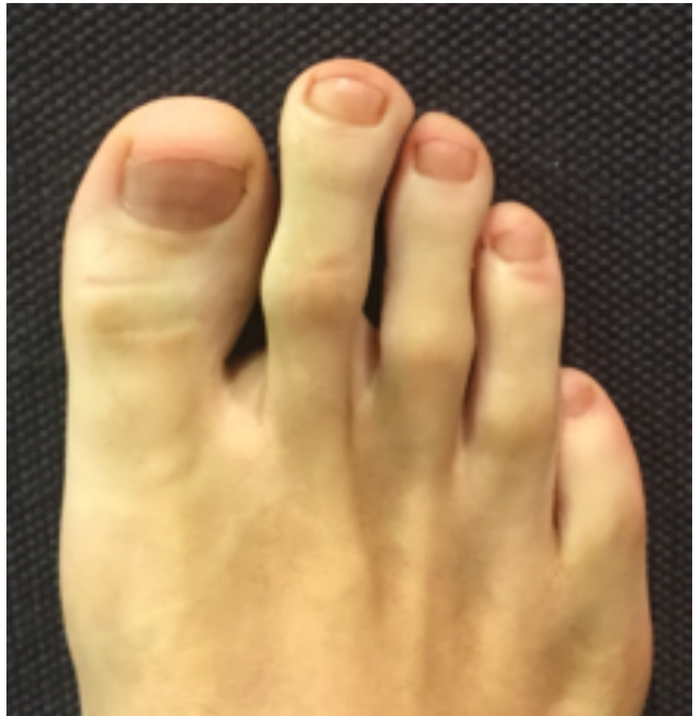
FOOT LEVELERS

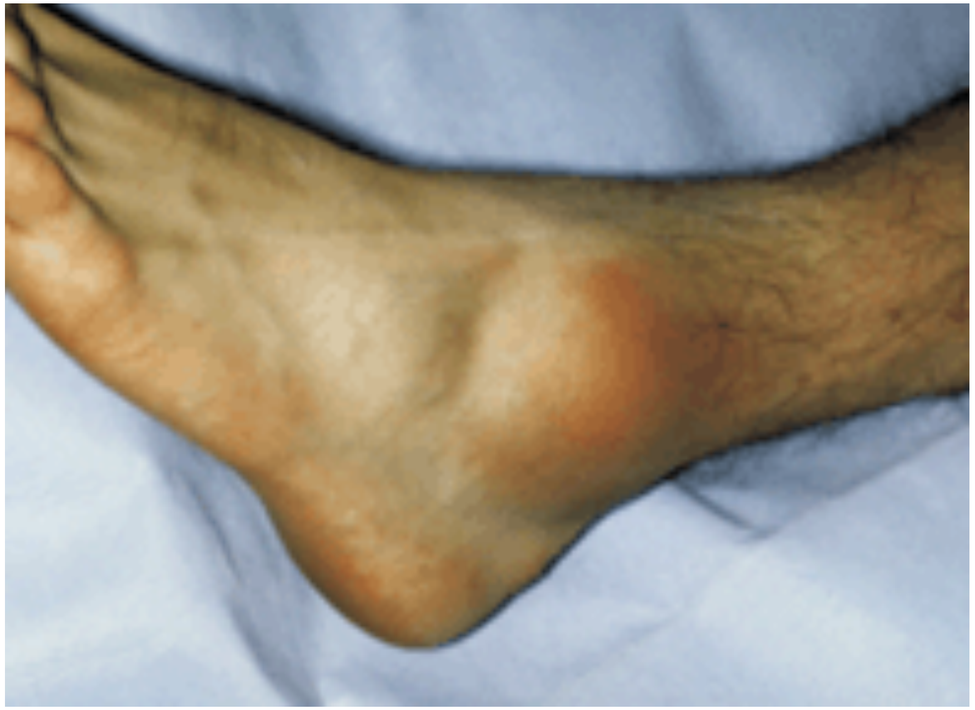
Visual/Palpatory Findings:

- Corns
- Bunions
- Callouses
- Hammer toes
- Hallux Valgus

Visual Findings:

- Collapsed arches
- Morton’s Foot
- Past foot/ankle injuries
- Fat/callous pads under arches





WHAT IS A BUNION?

A **bunion** is a bony bump on the inside of the big toe.

A **bunionette** or **"tailor's bunion"** forms on the outside base of the little toe.

1/3

of U.S. adults will develop bunions.

10x

Women are 10 times more likely as men to have bunions.

Risk factors:

- Arthritis
- Genetics
- Trauma
- Pregnancy
- Overpronation (flat feet)
- Unhealthy foot alignment

Shoes styles that contribute to bunions:

Pointed toes

Shoes that are too small or narrow

High heels (3 inches or more)

Once formed, bunions don't go away on their own. They can modify the way you walk, causing biomechanical issues in other parts of the body. This can lead to pain and increase your risk for injury.

THE 4 STAGES OF BUNION DEVELOPMENT

STAGE 1

FORMATION OF BUNION

FORMATION OF 'BUMP' CAN BE SEEN ON BASE OF BIG TOE

STAGE 2

INWARD MOVEMENT OF BIG TOE

THE BIG TOE STARTS TO MOVE TOWARDS THE SECOND TOE

STAGE 3

ABSENCE OF GAP BETWEEN TOES

THE BIG TOE PRESSES AGAINST THE SECOND TOE

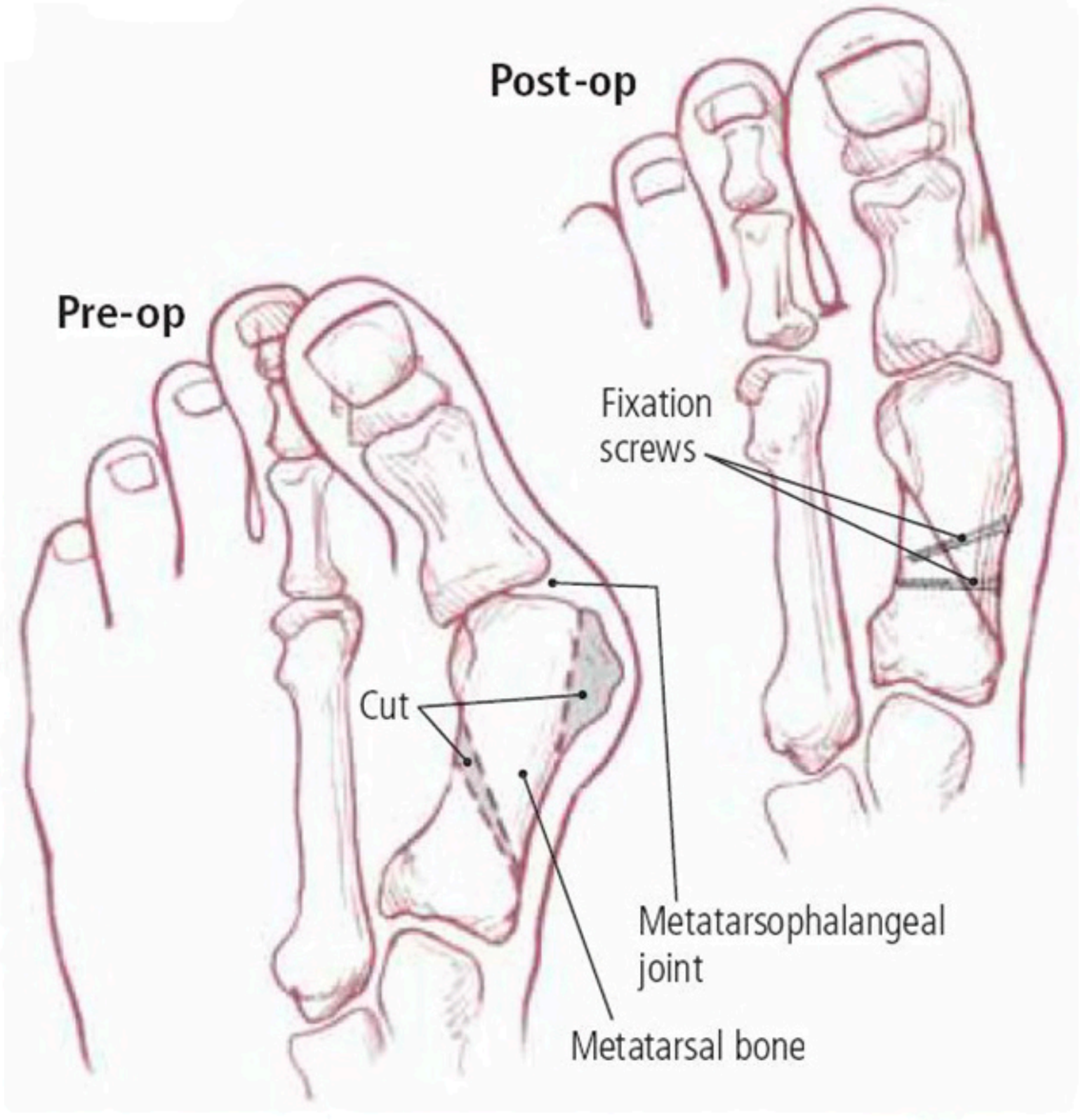
STAGE 4

COMPLETE DESTRUCTION OF TOE ALIGNMENT

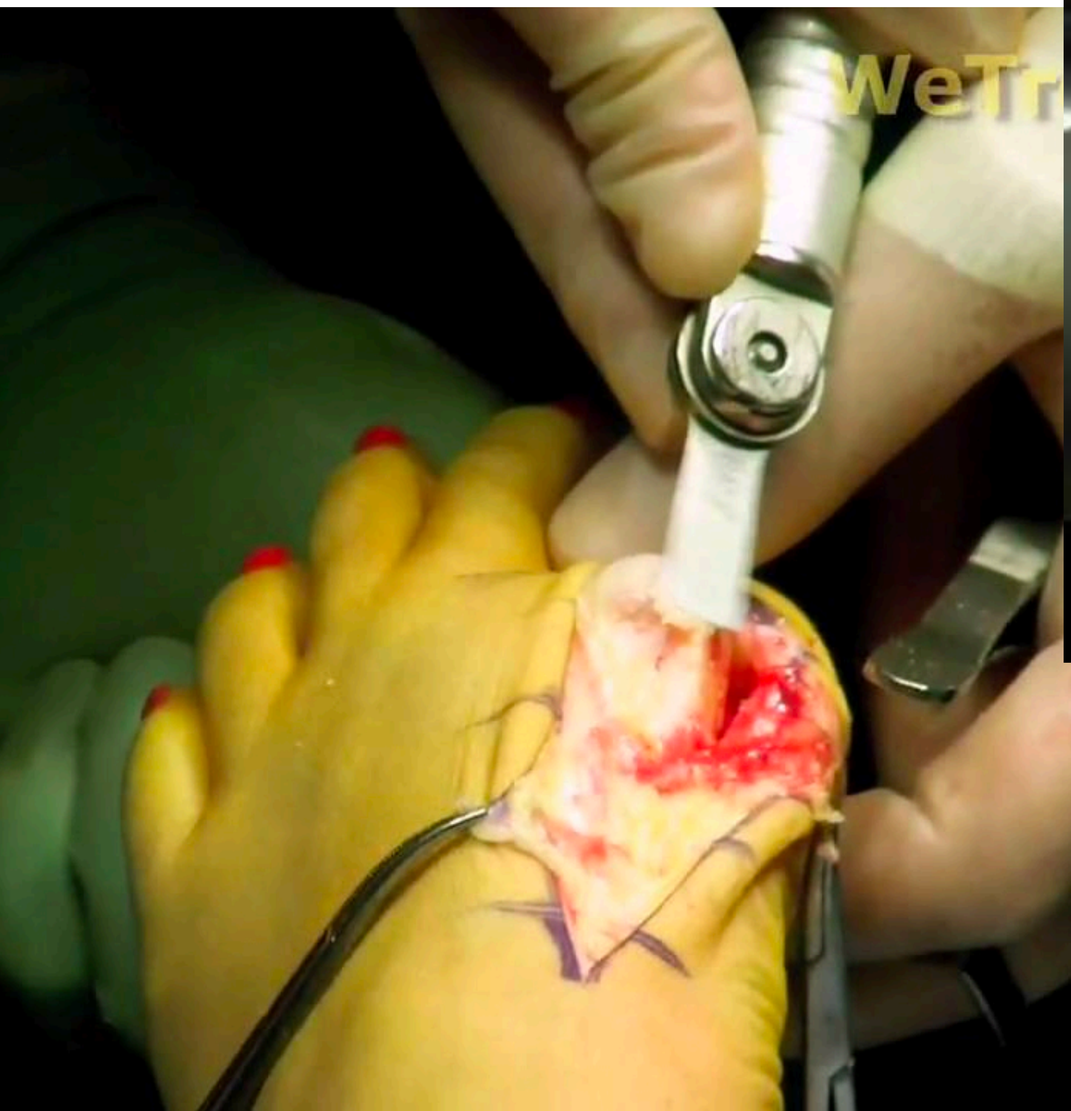
THE BIG TOE MOVES UNDER THE SECOND TOE

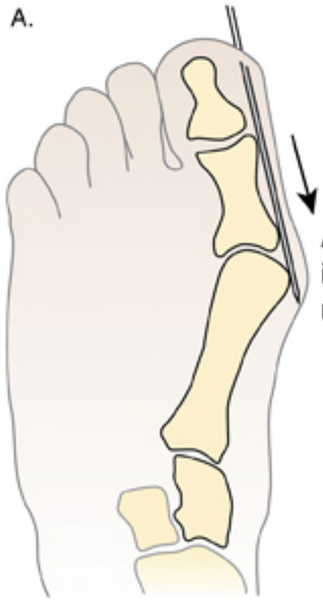

A
B

Surgical correction of a bunion



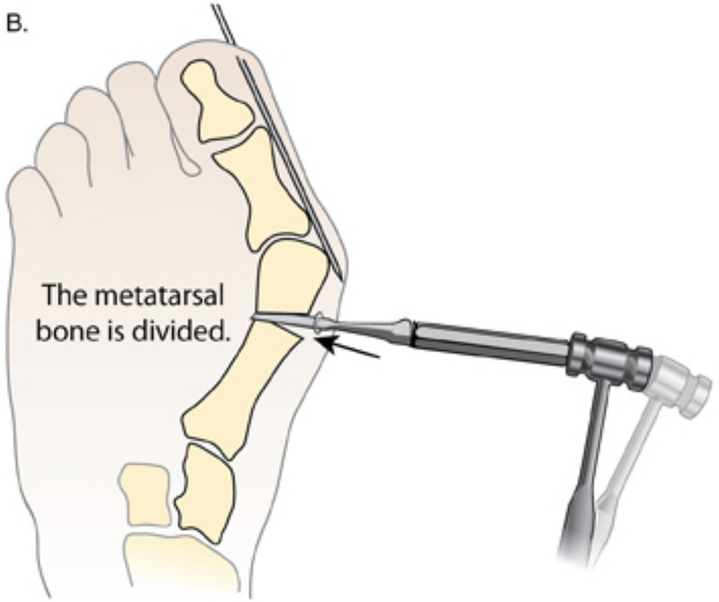
Bunionectomy





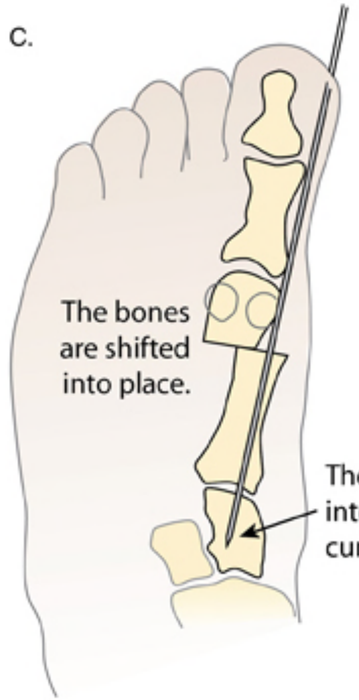
A.

A pin is inserted to the metatarsal head.



B.

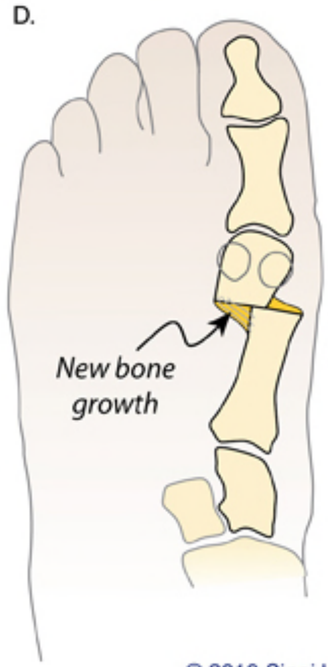
The metatarsal bone is divided.



C.

The bones are shifted into place.

The pin is advanced into the medial cuneiform bone.



D.

New bone growth

The metatarsal bone heals in proper alignment.

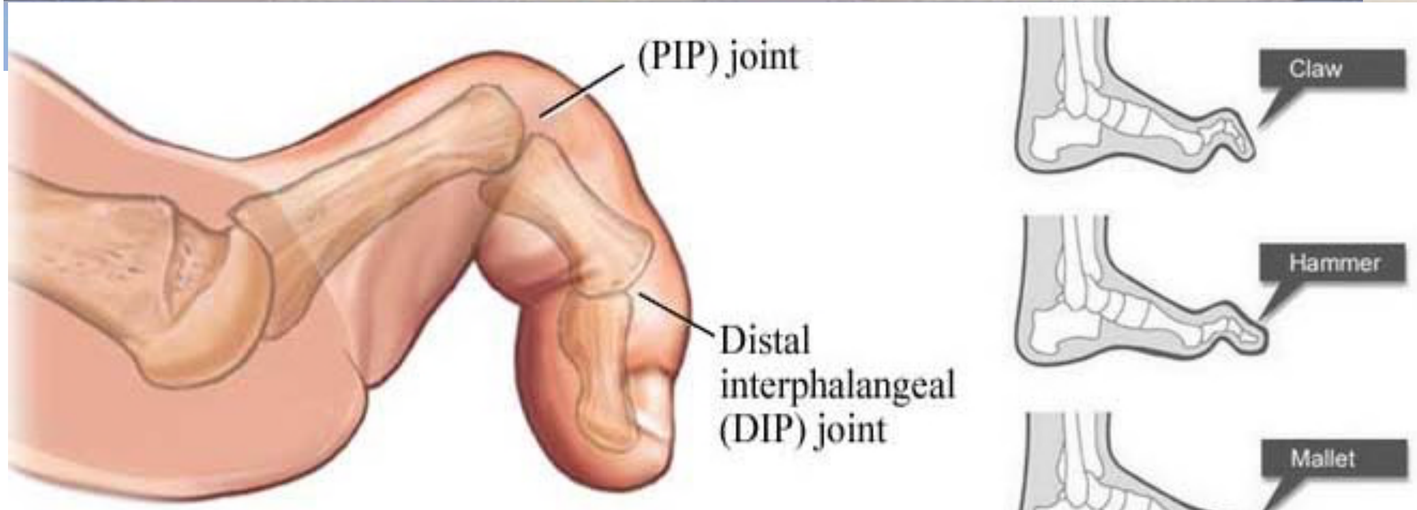
Before Surgery

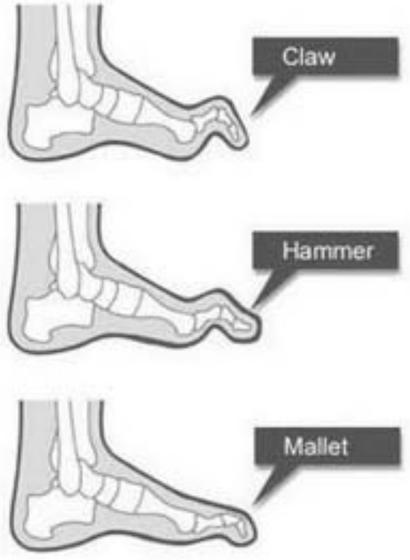
After Treatment

FOOT LEVELERS

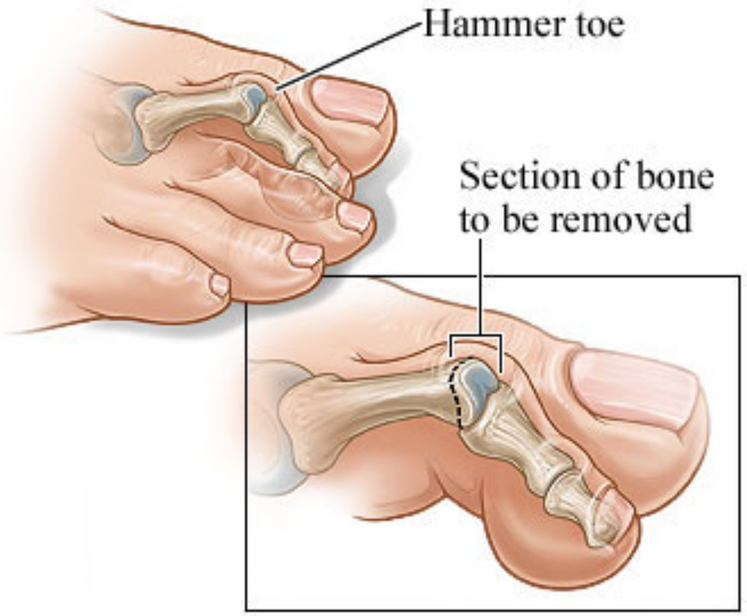
Bunion Aid® Splint

HAMMER TOES


(PIP) joint
Distal
interphalangeal
(DIP) joint


Claw
Hammer
Mallet

Hammer Toes

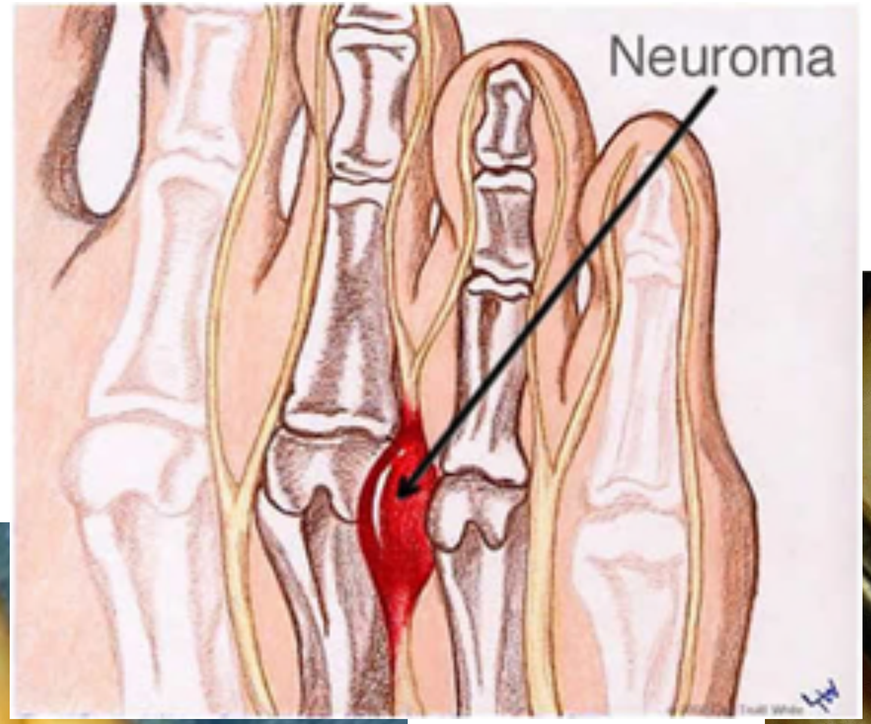


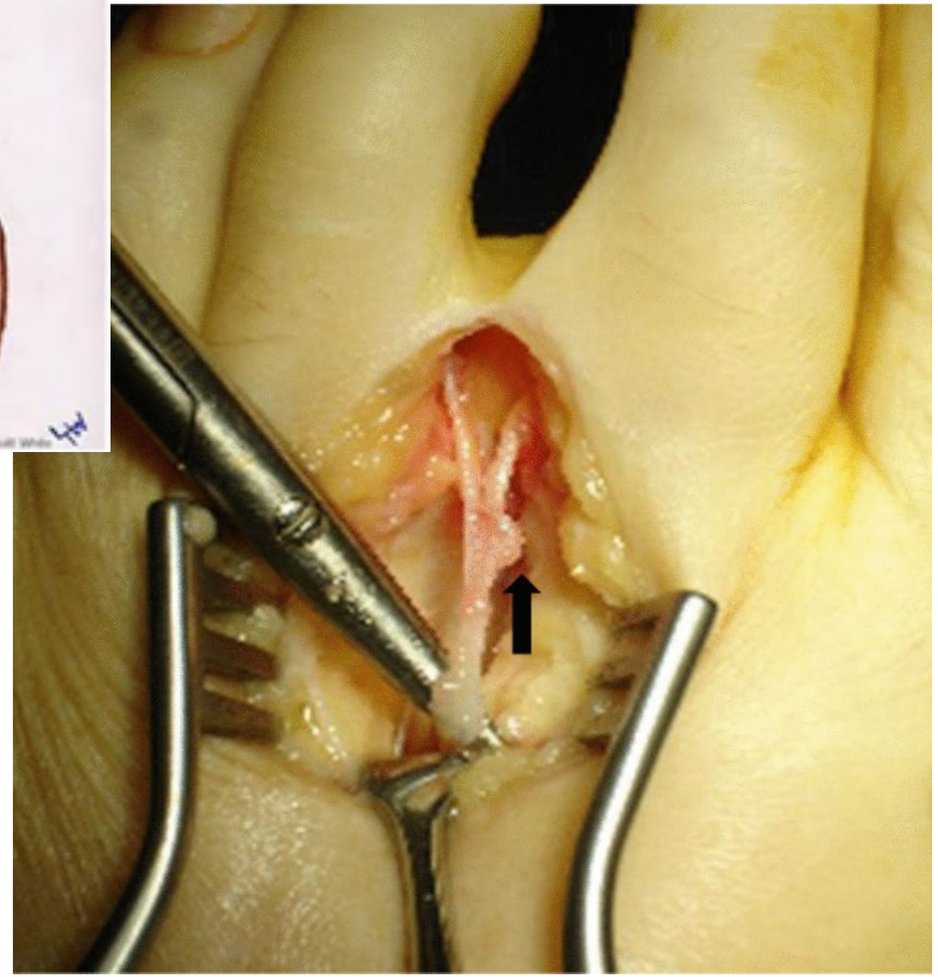
Hammer Toes

This postoperative X-ray depicts a bunionectomy and crossover second hammertoe repair using a traditional percutaneous Kirschner wire.


2) Three days after Surgery. Note the metal pins with white colored pin caps.

Neuroma



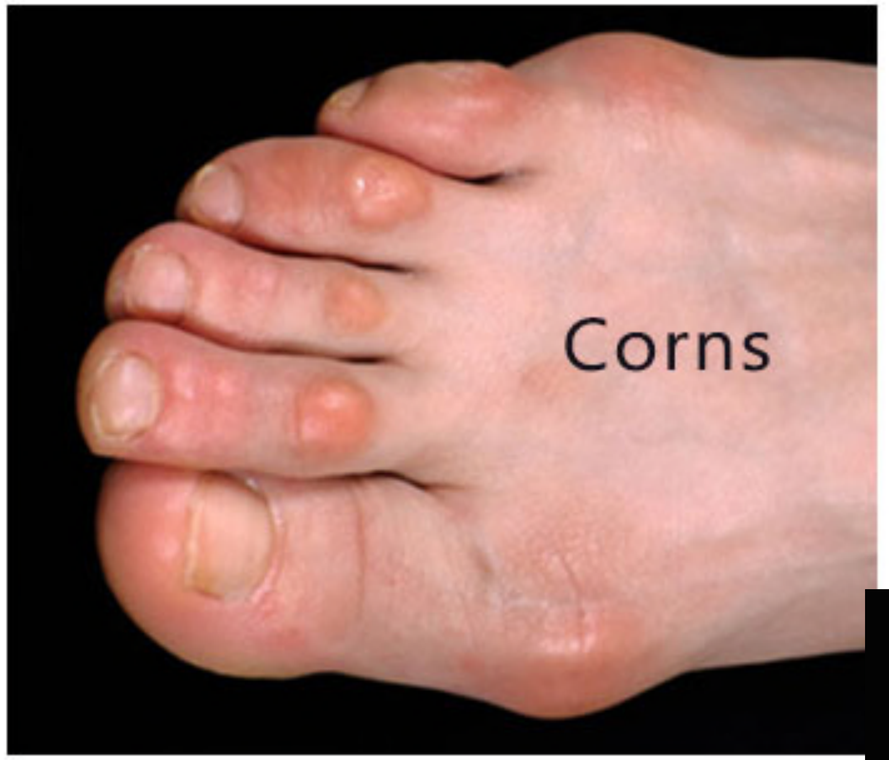


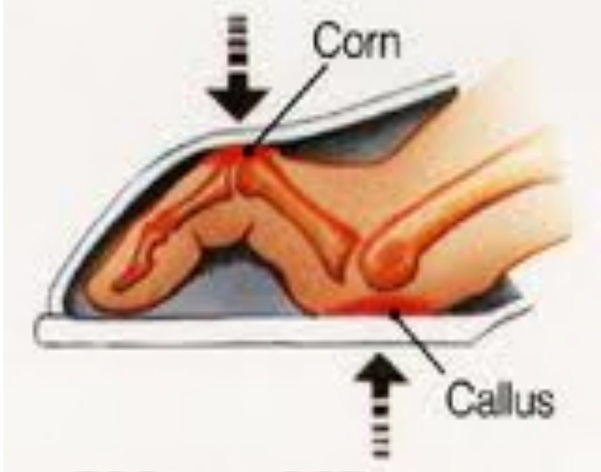
FOOT LEVELERS

FOOT LEVELERS

FOOT LEVELERS

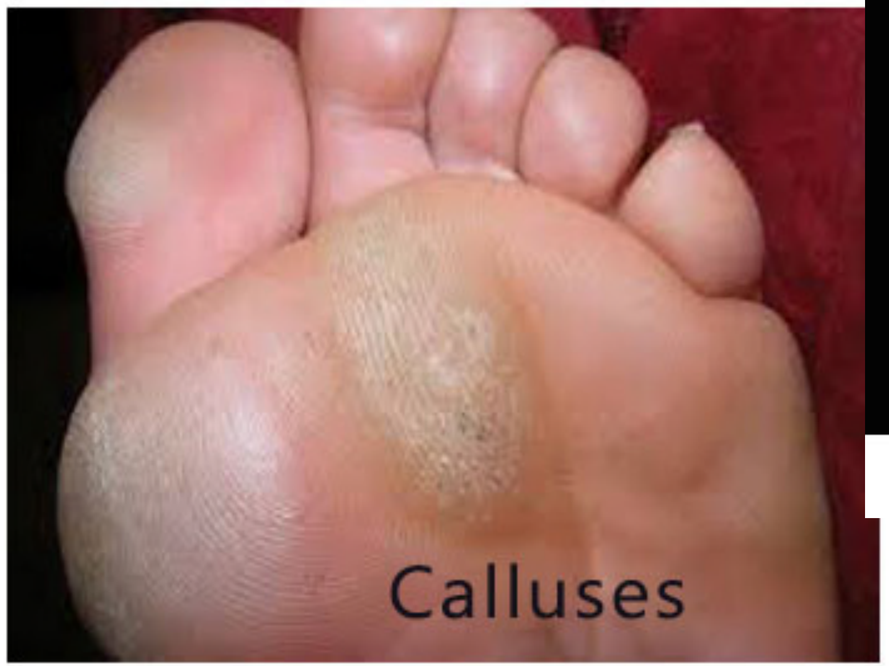
Corns & Calluses





CORNS

CALLUSES



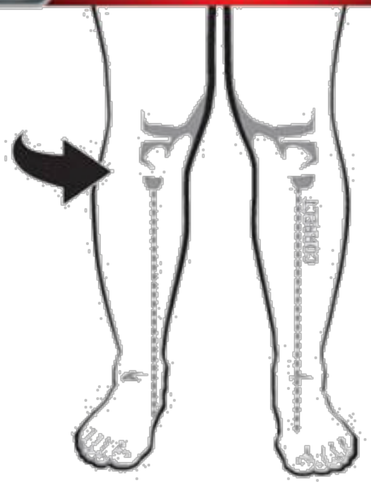
Morton’s Toe/Foot

Morton’s Foot

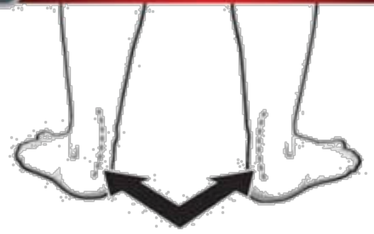
5 RED FLAGS OF PRONATION

1 Foot Flare During Gait

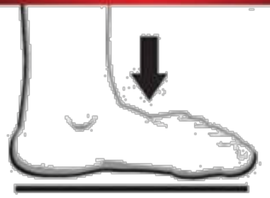
2 Internal Knee Rotation



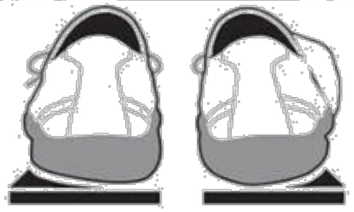
3 Bowed Achilles Tendon

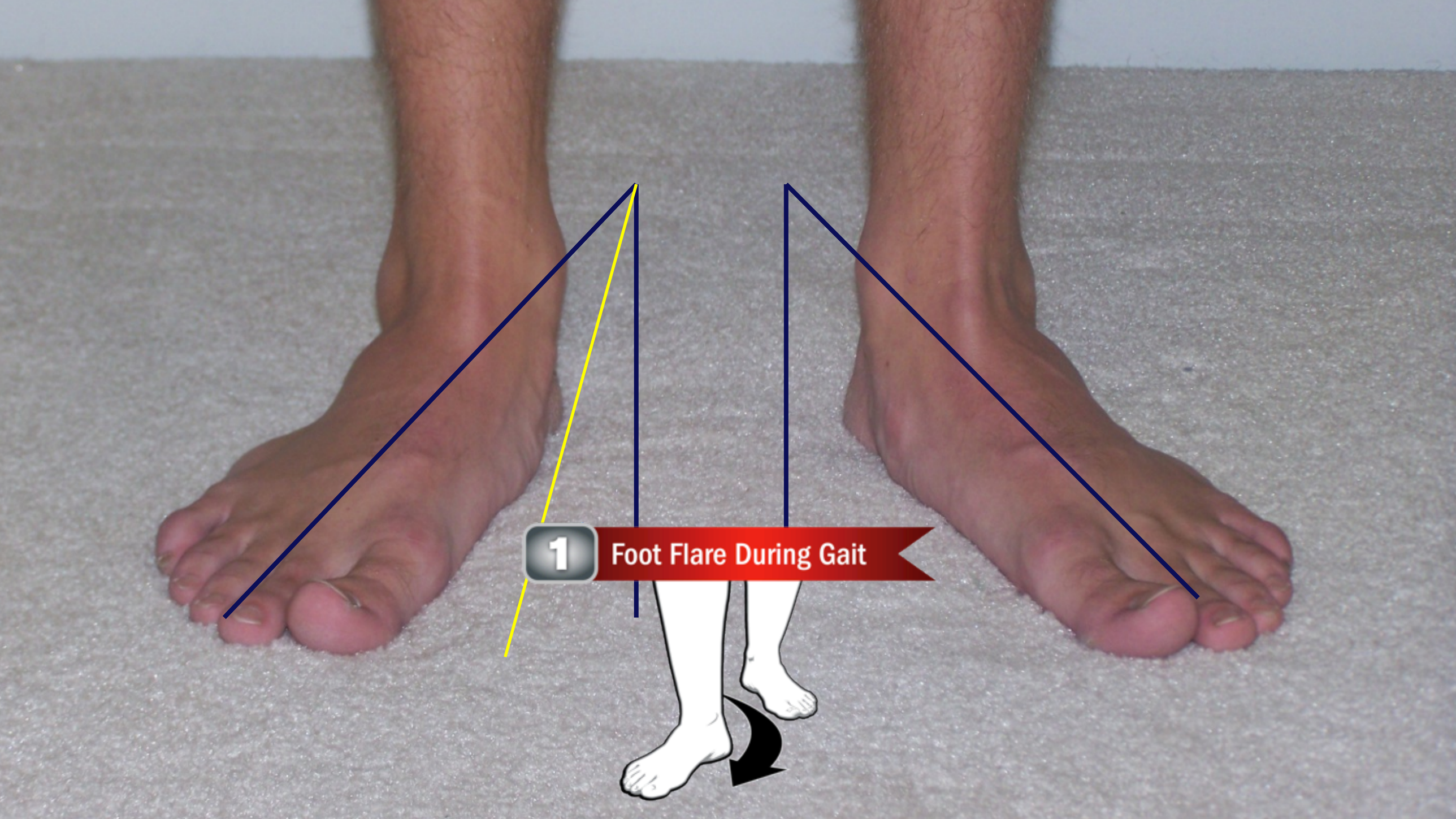


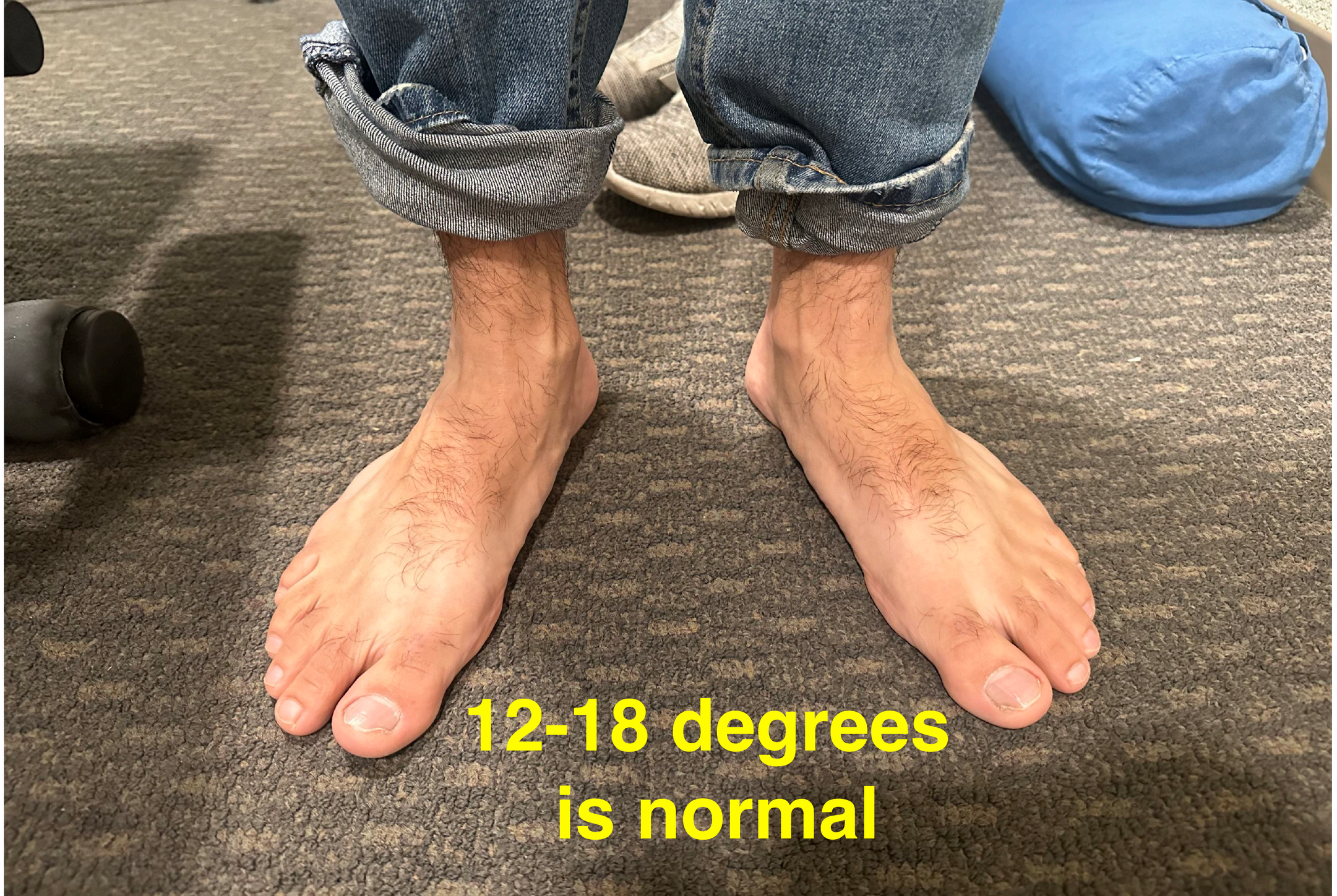
4 Flat Foot

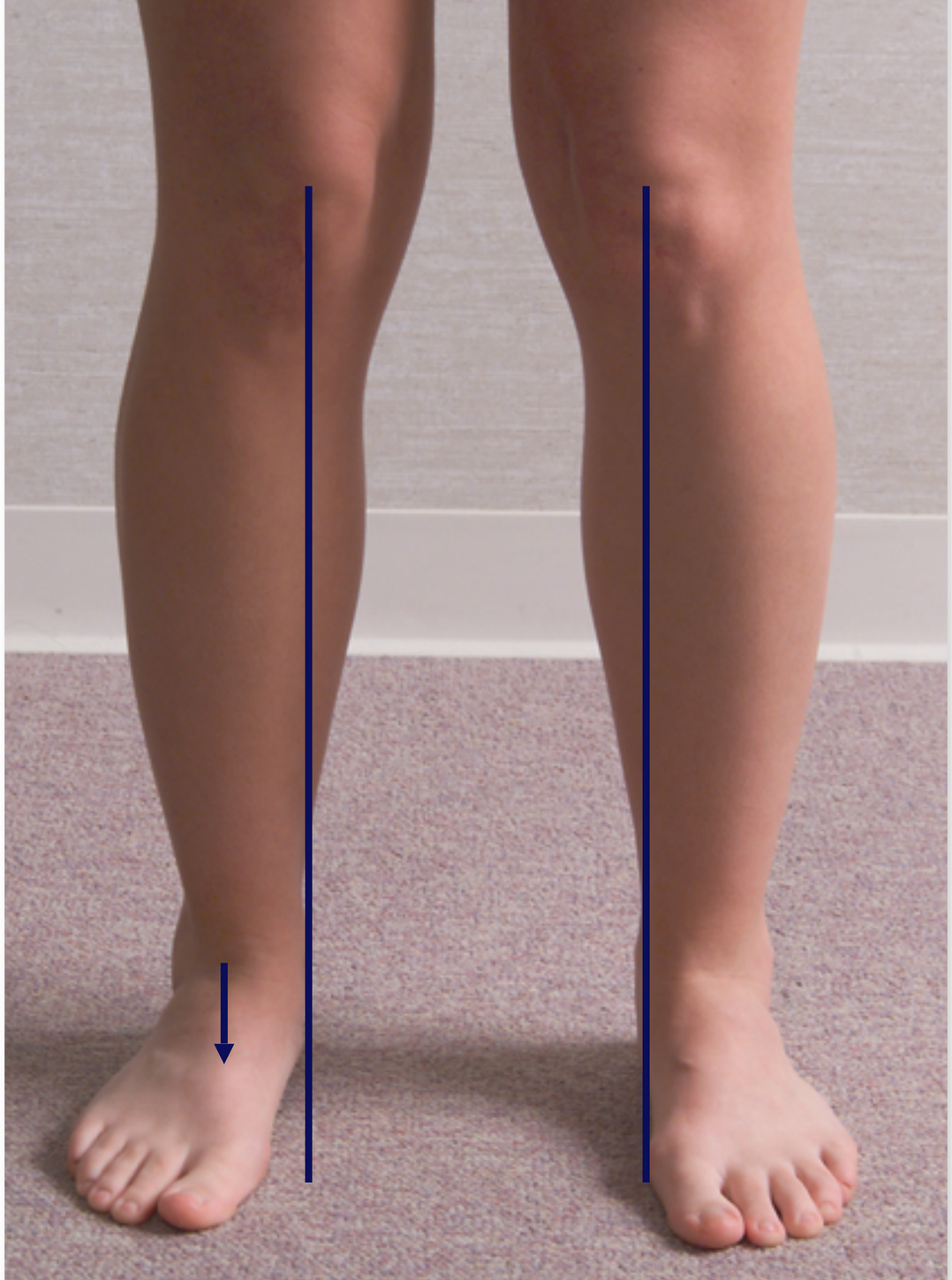


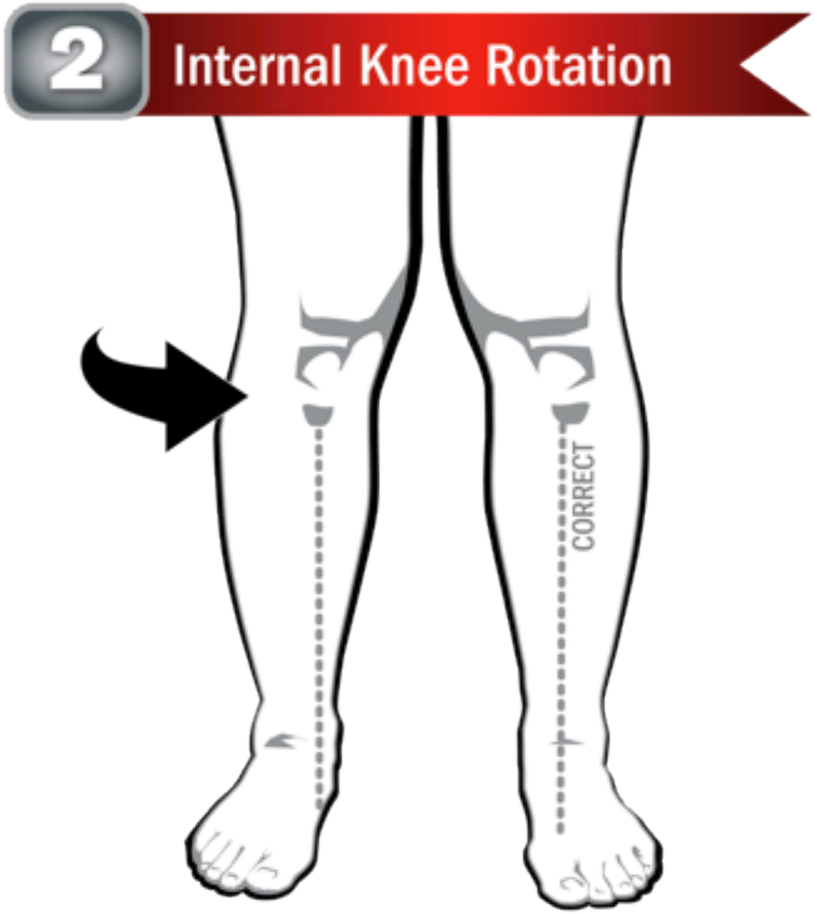
5 Uneven Shoe Wear

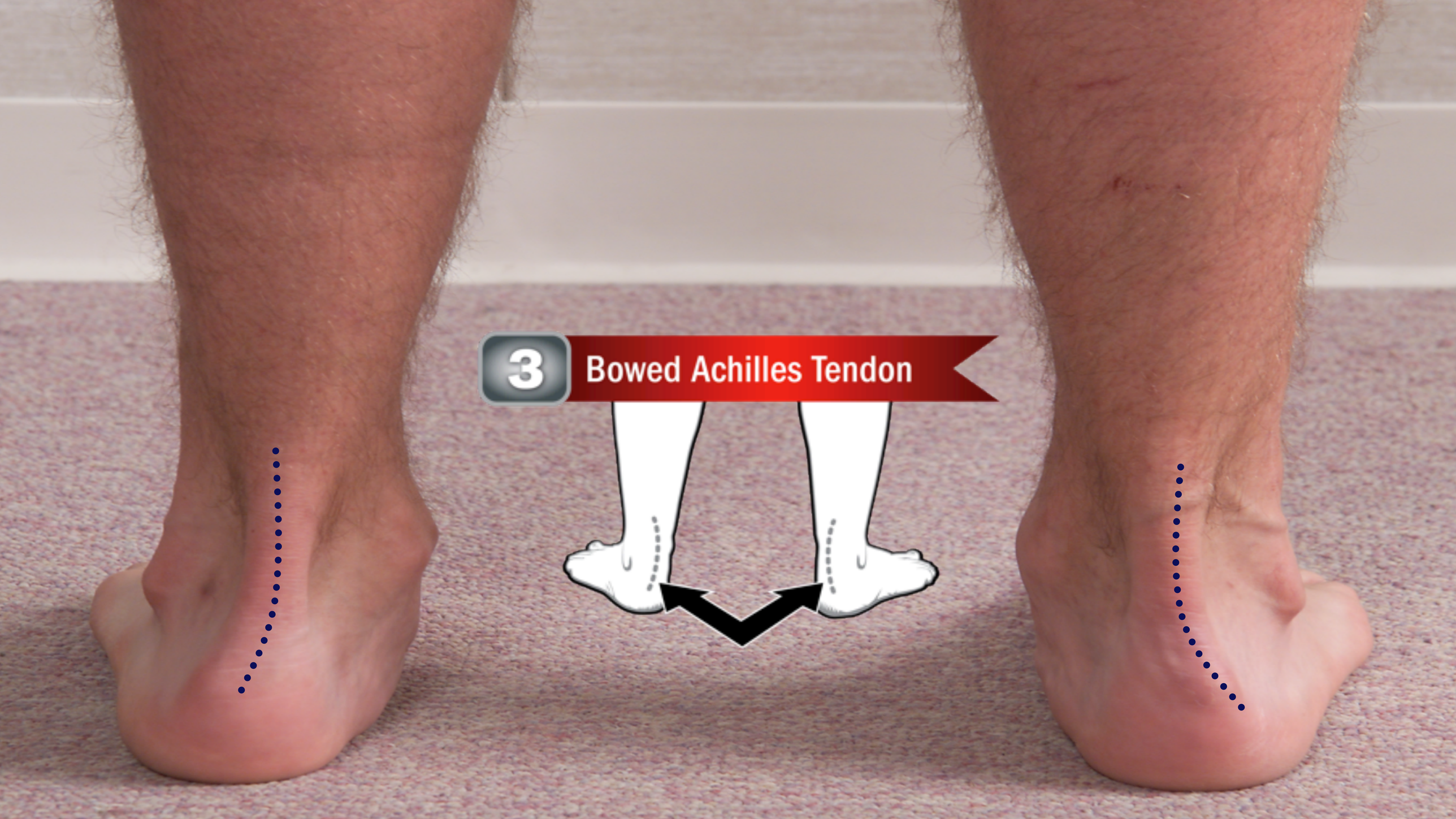



1
Foot Flare During Gait


12-18 degrees
is normal



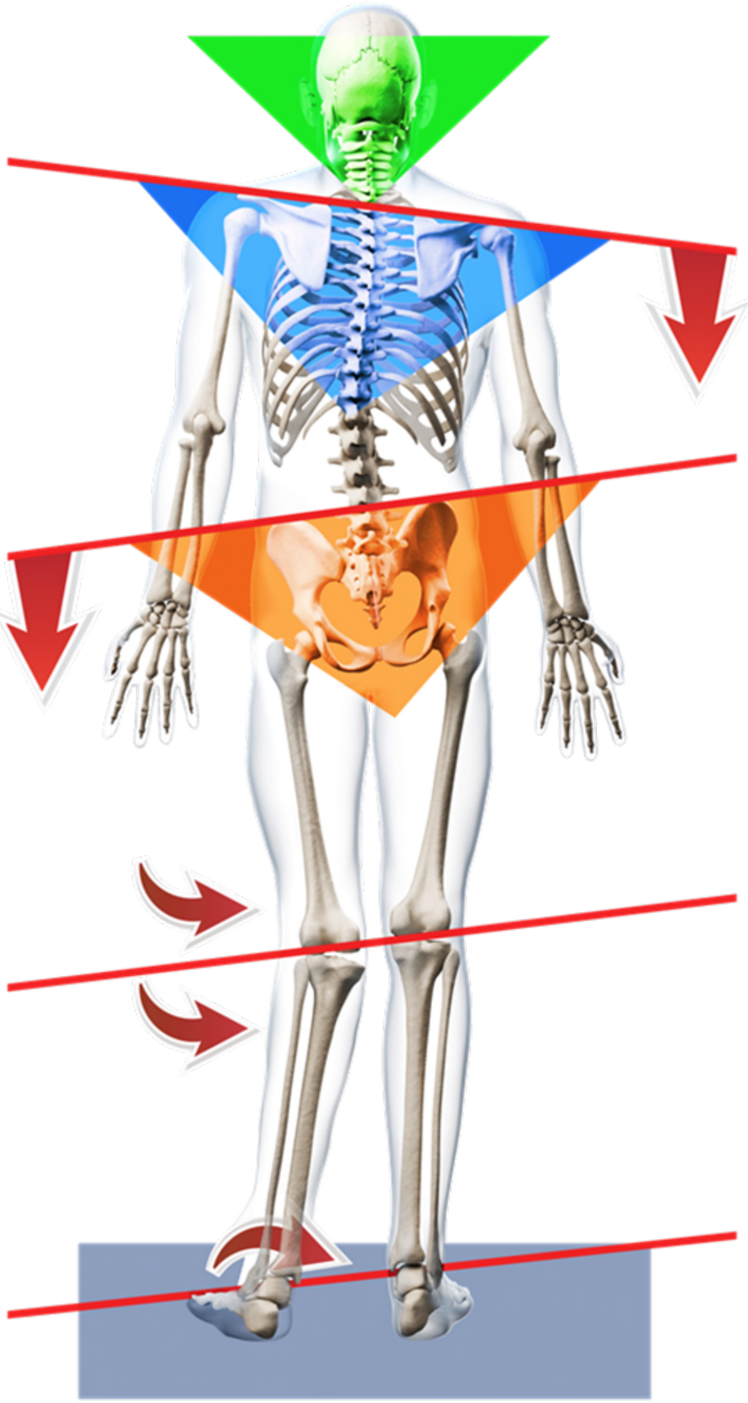

2
Internal Knee Rotation
CORRECT


3
Bowed Achilles Tendon

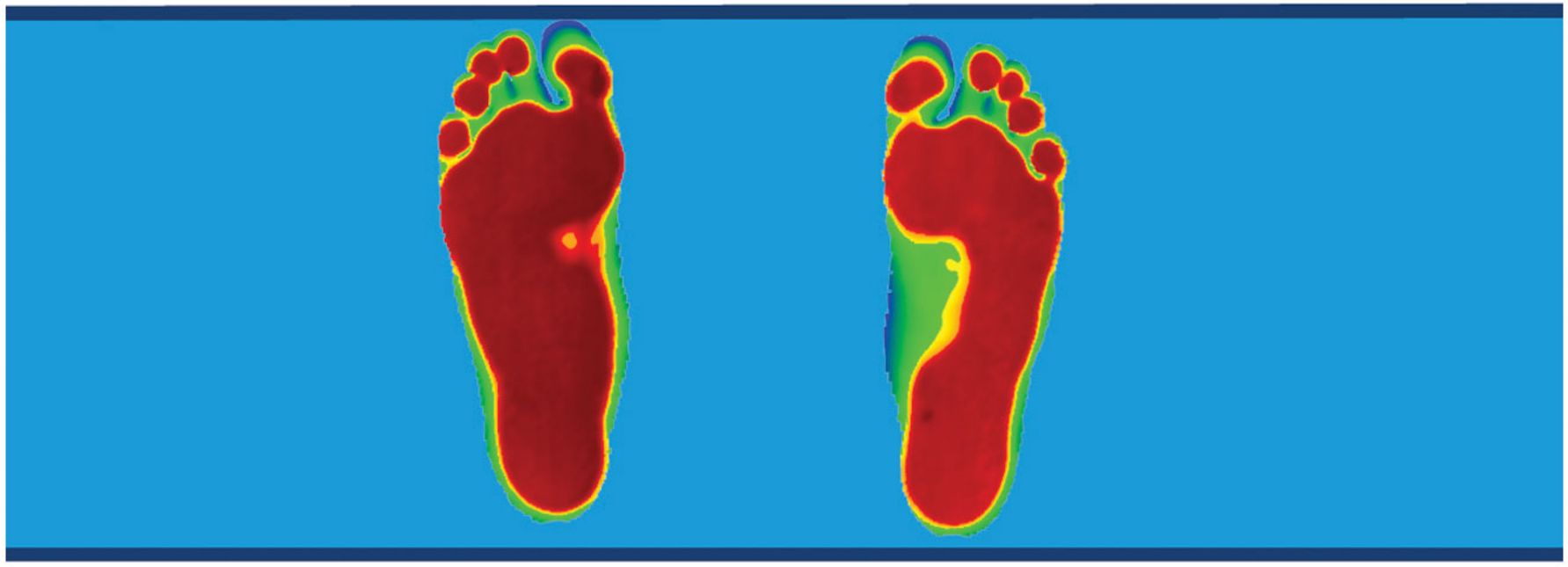

4
Flat Foot

5 Uneven Shoe Wear

Structural stress produces muscle imbalances



SAME PERSON
DIFFERENT FEET



Scanning the feet shows immediately
asymmetrical overpronation

The World's First

Posture Check 3D™
BY FOOT LEVELERS

A New Dimension To Body Posture Scanning

FootLevelers.com

FOOT LEVELERS

FOOT LEVELERS

I SCAN EVERY PATIENT!

It’s part of my protocol

WHY? →

Various studies show **overpronation creates biomechanical dysfunction**

↓

It’s an educational opportunity to show patients **the feet play an instrumental part in the care you provide**

FOOT LEVELERS

Posture Check 3-D

Our Best
Scanning Technology

- **TIME SAVER** - Patients scan themselves.
- **Referral tool**: Patients receive social media-ready scan results.
- **Patient education:** helps patients understand how problems in their feet could be the cause of their pain
- **Cloud-based**: Near-instant Report of Findings provides patient results. Streamlines the ordering process.

FOOT LEVELERS

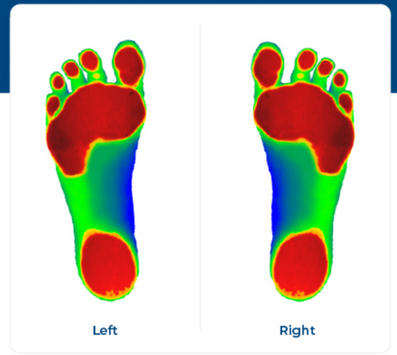
1/2/25

Foot Levelers 3D Scan Analysis

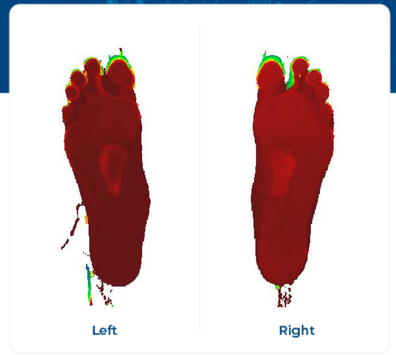
Your Results.

FOOT LEVELERS

Optimal Scan



Your Scan



Pronation Stability Index™

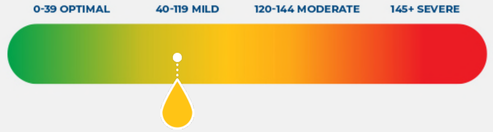
199 PSI

Your feet are essentially flat. Flat feet cause:
1. Severe pain and discomfort
2. Greatly reduced physical performance

Optimal Posture

Your Posture

Tech Neck Index™



70 TNI

With forward head posture, you may experience:
1. Increased upper back and neck pain
2. Limited range of motion
3. Increased foot pronation
4. Decreased stability

Joe

45 years old

6’2”

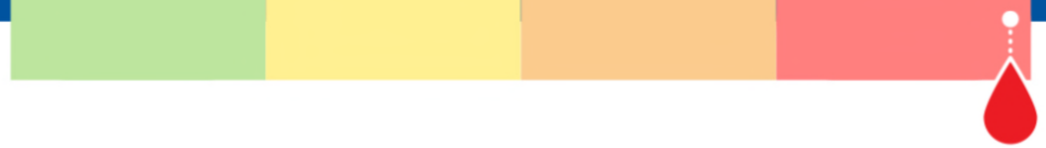
Your Results

From your Foot Levelers 3D Scan Analysis

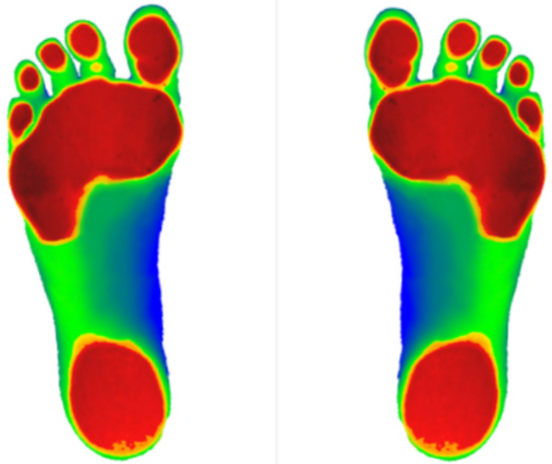
194 PSI

Pronation Stability Index™

0-34 OPTIMAL | 35-84 MILD | 85-124 MODERATE | 125+ SEVERE

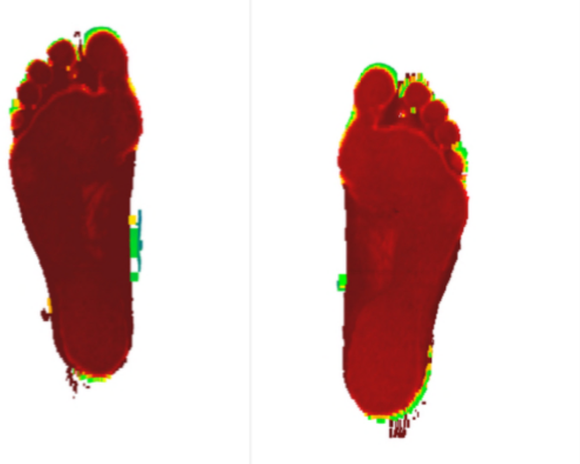


Optimal Scan



Left Right

Your Scan



Left Right

Know?

Research suggests that 77% of the population pronates, and 66% has forward head posture.

4/29/2025

Lindsay

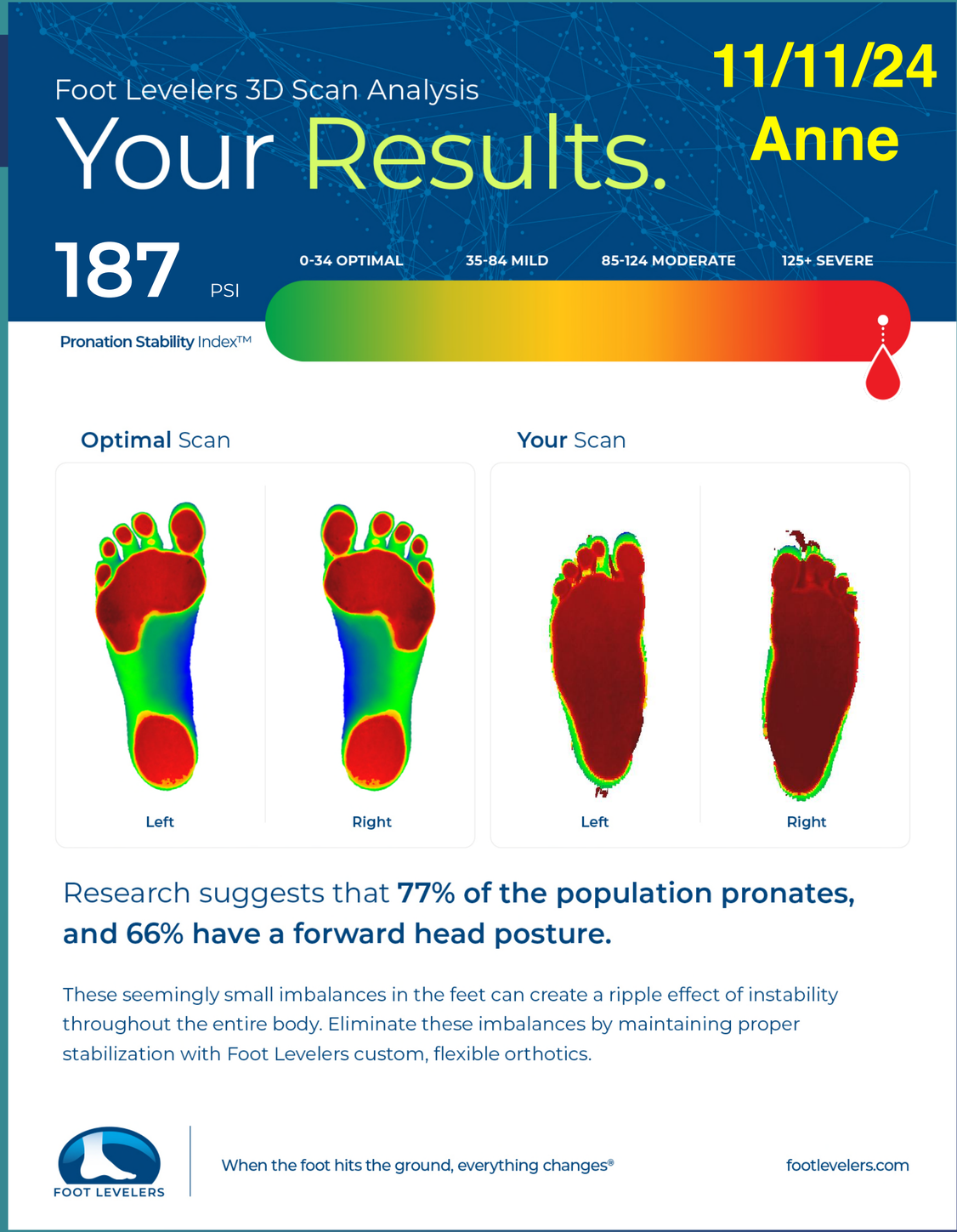
50 years old

5’6”

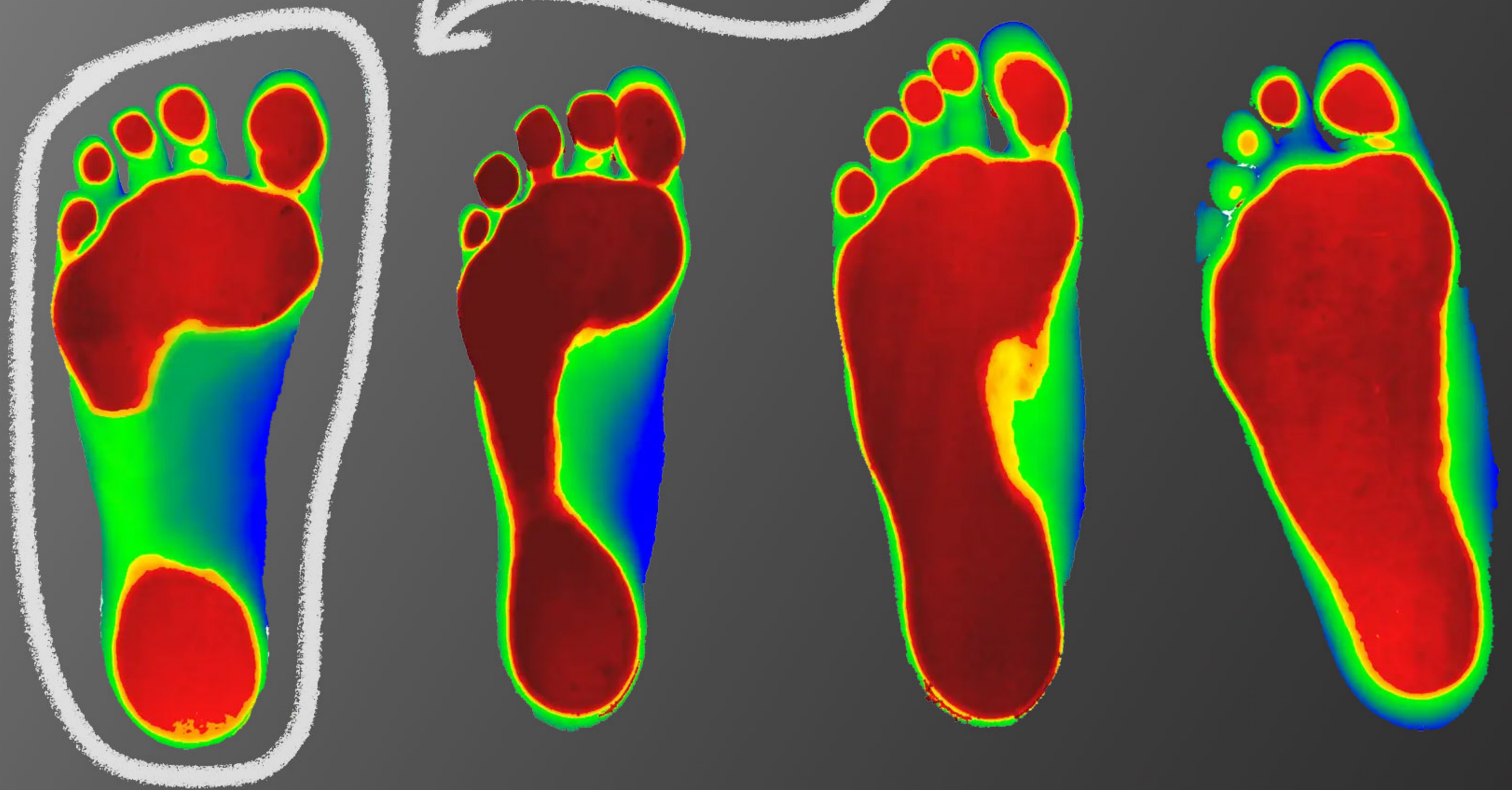
FOOT LEVELERS

Report of Findings

- Patient ROF is emailed before patient steps off scanner
- Shareable on social media – **REFERRALS!**
- Helps educate on the need and value of orthotics



Do you have an **Optimal Foot** like this?



Optimal Foot

Mild Pronation

Moderate Pronation

Severe Pronation

- 77% of people suffer from moderate to severe pronation [1]
- 90% have some degree of leg length inequality [2]
- Back pain is the #2 cause of work-related disability in the U.S. [3]
- 80% of people will experience some sort of back pain in their lifetime [4]

1 – “77% of Participants Improve Body Balance with Stabilizer.” John Hyland, DC, MPH DABCR, DABCO, CSCS
2- NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1232860/
3 – CDC: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm5816a2.htm

Consequences of Pronation

77%

of Patients Improve Body Balance with Stabilizing Orthotics

John K. Hyland,DC, MPH, DABCR, DABCO, CSCS

Foot Facts

Approx. **80%** will suffer from back pain in their lifetime*

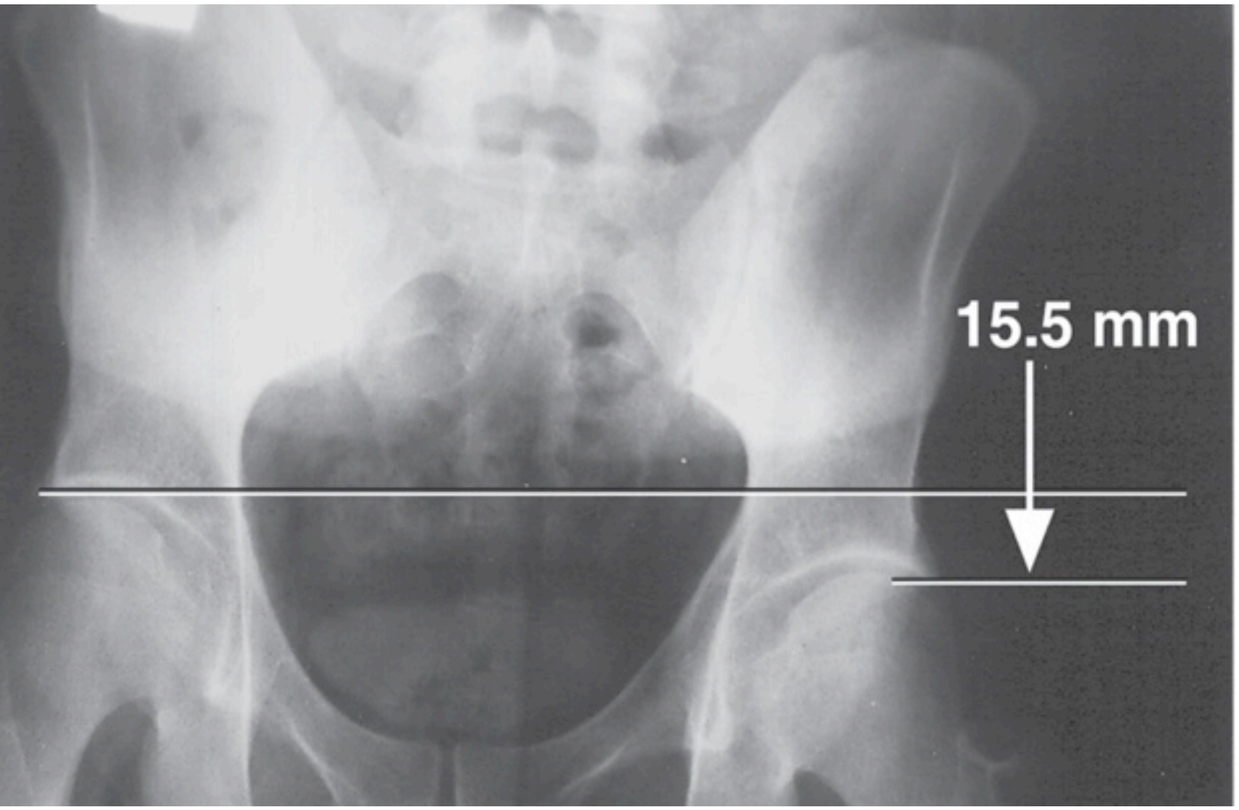
Similar numbers for foot and low back pain

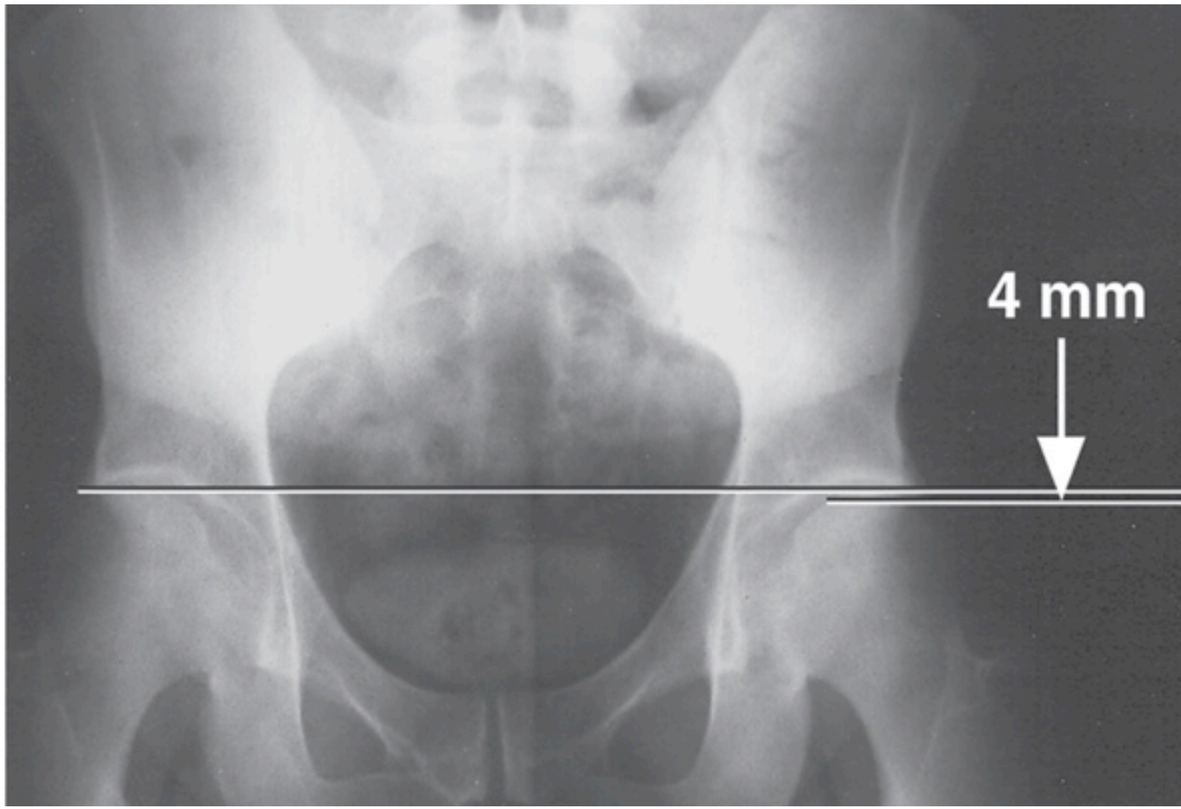
Coincidence?

*American Chiropractic Association

NCBI: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4339077/

FOOT LEVELERS





a. Pelvic torque or obliquity
b. Unlevel femoral heads

c. Postural scoliosis
d. Disc degeneration/spondylosis

Leg Length Inequality

ANATOMICAL

(Bone Discrepancy)

Trauma

Degeneration

Congenital

Systemic

Neoplasms

FUNCTIONAL

(Rotational Patterns)

Pelvis

Hips

Knees

Ankles

Feet

Apparent leg Length Test:

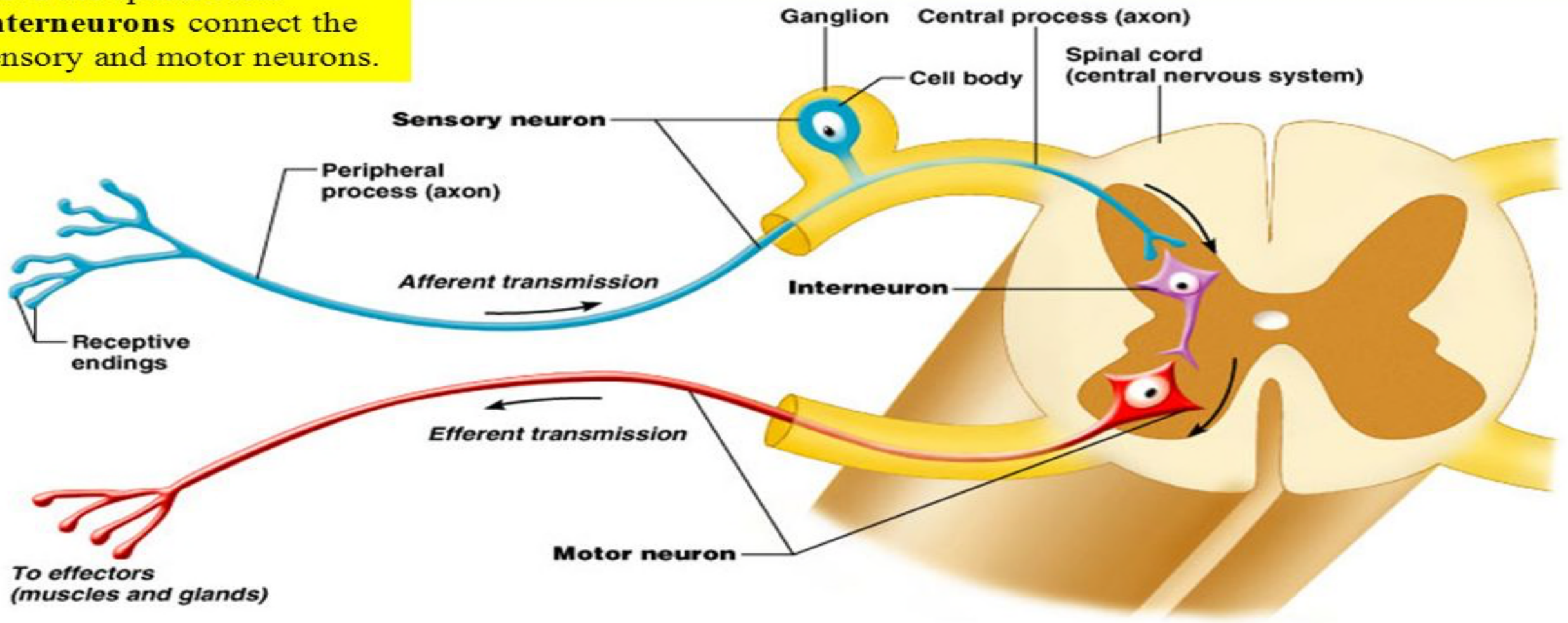
Umbilicus to medial/lateral malleolus

True (Actual) Leg Length Test:

ASIS to medial/Lateral malleolus

Neurons Classified by Function: Sensory vs. Motor Neurons

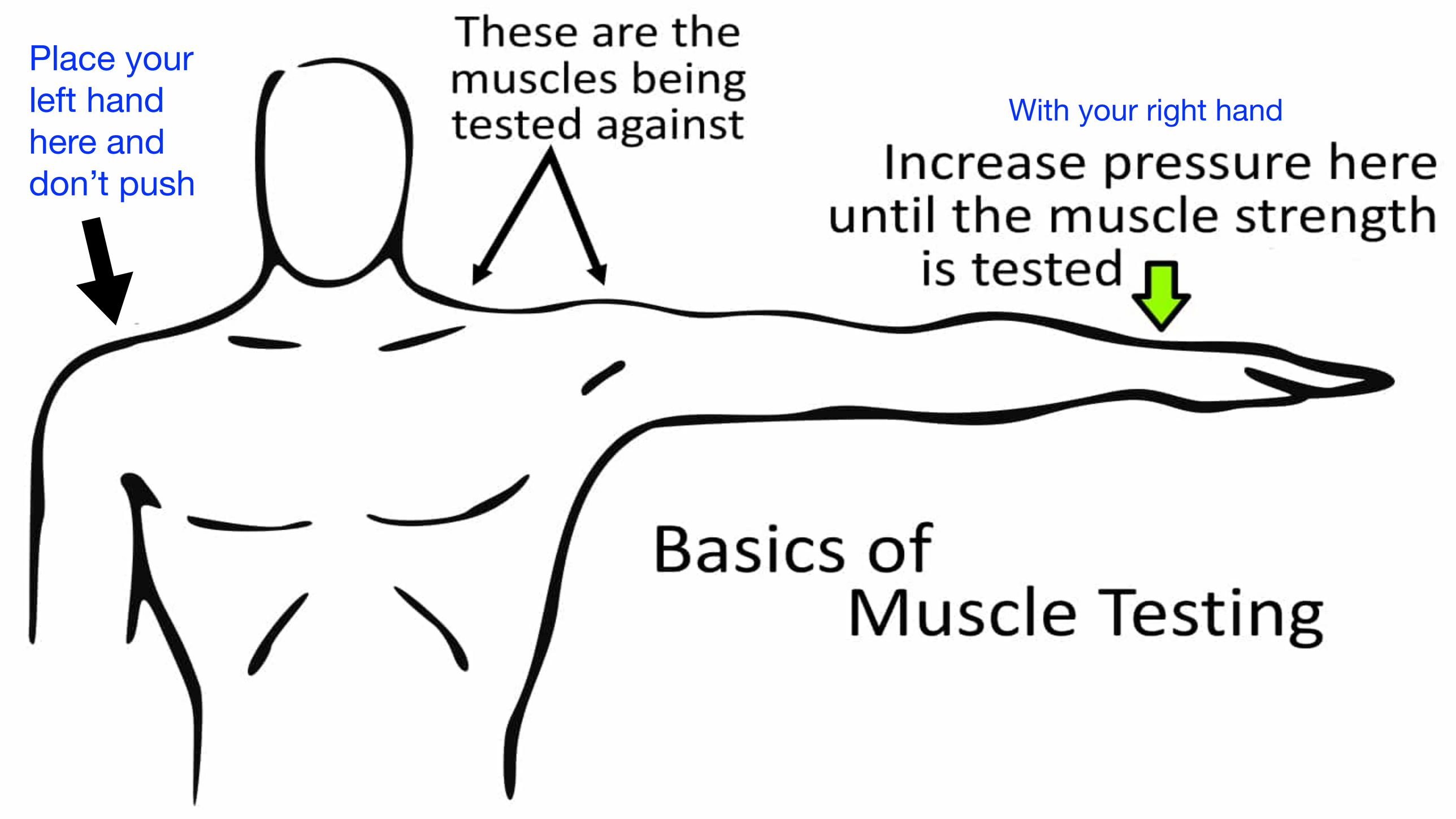
Sensory neurons enter the spinal cord. **Motor** neurons leave the spinal cord. **Interneurons** connect the sensory and motor neurons.



Manual Muscle Testing or Applied Kinesiology

Involves putting pressure on a muscle and interpreting the response of that muscle. The **testee** holds out his or her arm and the **tester** applies steady downward pressure on the arm.

Arm must be at 90^0


Place your left hand here and don't push
These are the muscles being tested against
With your right hand
Increase pressure here until the muscle strength is tested
Basics of Muscle Testing

Why Muscle Test?

1. Show the patient how the feet affect the upper extremity.

2. Show them how 3 arch, custom, flexible orthotics support the whole body.

3. Show them if their current orthotics are working for them (rigid, off the shelf)

4. Show them if their orthotic/shoe combination is working for them

If the muscle gives way and the arm moves, this an unlocking muscle, which indicates stress or the answer *no*. If the muscle holds and the arm stays still, this a locking muscle, which indicates no stress or the answer *yes*.

Posture Stabilizing Test Kit

FOOT LEVELERS

PHASE 1

Proprioceptive Testing

After finishing the side view video of the patient standing on the functional orthotics...

"Stay standing on the functional orthotics for a moment, I am going to do a muscle test to see if your nervous system communicates to your muscles in an efficient manner."

1) Hold your arm up real strong and don't let me push it down, resist.(tests strong).

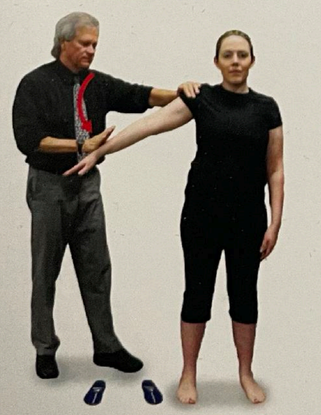
2) Good, now step off the funtional orthotics and let's re-test. Hold the arm up real strong, resist. (weak test)

3) Stand back on the functional orthotics and lets check that again.(tests strong).

That tells me that your brain is communicating more efficiently to your muscles when you stand on the functional orthotics than when you aren't standing on them.

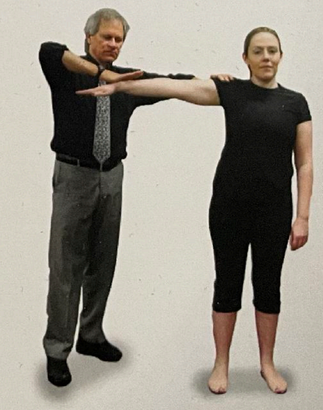
The fact that the arches in your feet flatten out a little like we saw on the foot scan contribute to stress in your nervous system and that weakens some of your postural muscles, we just used your arm muscle to test it."

Without Orthotics
Less Resistance



Unsupported

With Orthotics
More Resistance



Supported

PHASE 2

Functional Squat Test Protocol

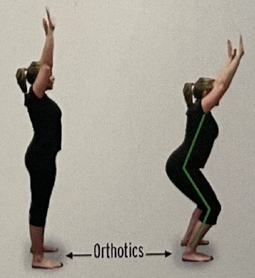
For the maximum impact, Foot Levelers recommends the use of a postural screening software.

1. Ask the patient to "stand with your feet shoulder-width apart and raise your hands straight up in the air. Now I want you to squat down like you are sitting in a chair." Have them repeat that motion twice while recording it on video.

2. Facing the doctor, have the patient stand on the Proprioceptive Test Orthotics, "with your feet shoulder-width apart and hands straight up in the air, squat down like you are sitting in a chair." Video tape two repetitions of the maneuver.

3. Have them turn to the left and repeat the test, video taping them from the side view. Note how patient's arms do not cover ear.

4. While the patient is still turned to the left, have them stand on the Proprioceptive Test Orthotics and repeat the maneuver. Note how patient's arm does cover ear.



FOOT LEVELERS

FOOT LEVELERS

Neurological Manual Muscle Test Explanation:

Dr. Lisa K. Bloom, DC, Ph.D

* Professor Emeritus, Northeast College of Health Sciences
* Fellow of the International Academy of Chiropractic Neurology
* Adjunct Professor, Graduate Studies at Concordia University Chicago

Neurological Muscle Test Explanation:

- Nociceptors send impulses to the spinal cord causing Pre-Synaptic Inhibition of the anterior horn cells.

- This produces 7-10 seconds of muscle weakness.

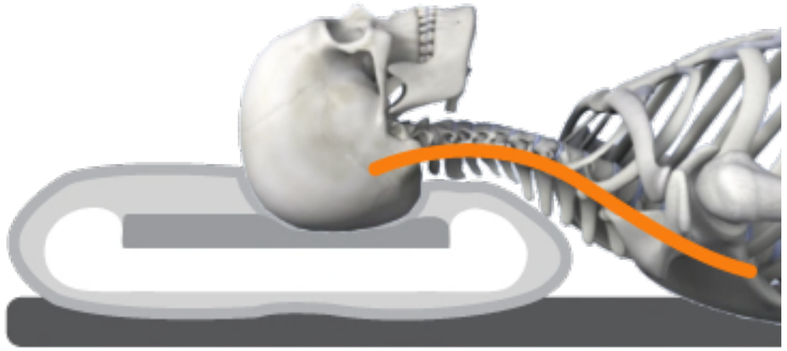
Neurological Muscle Test Explanation:

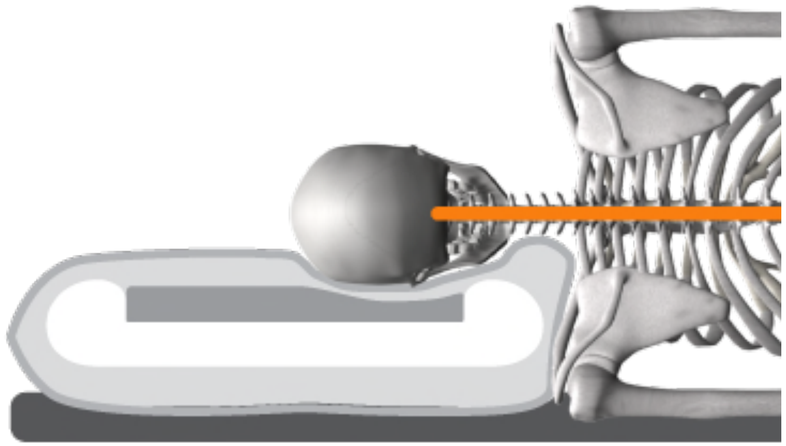
- An adjustment reduces nociceptor activity.
- Pre-Synaptic Inhibition is decreased (eliminating the 7-10 seconds of muscle weakness).
- Muscle strength is increased.

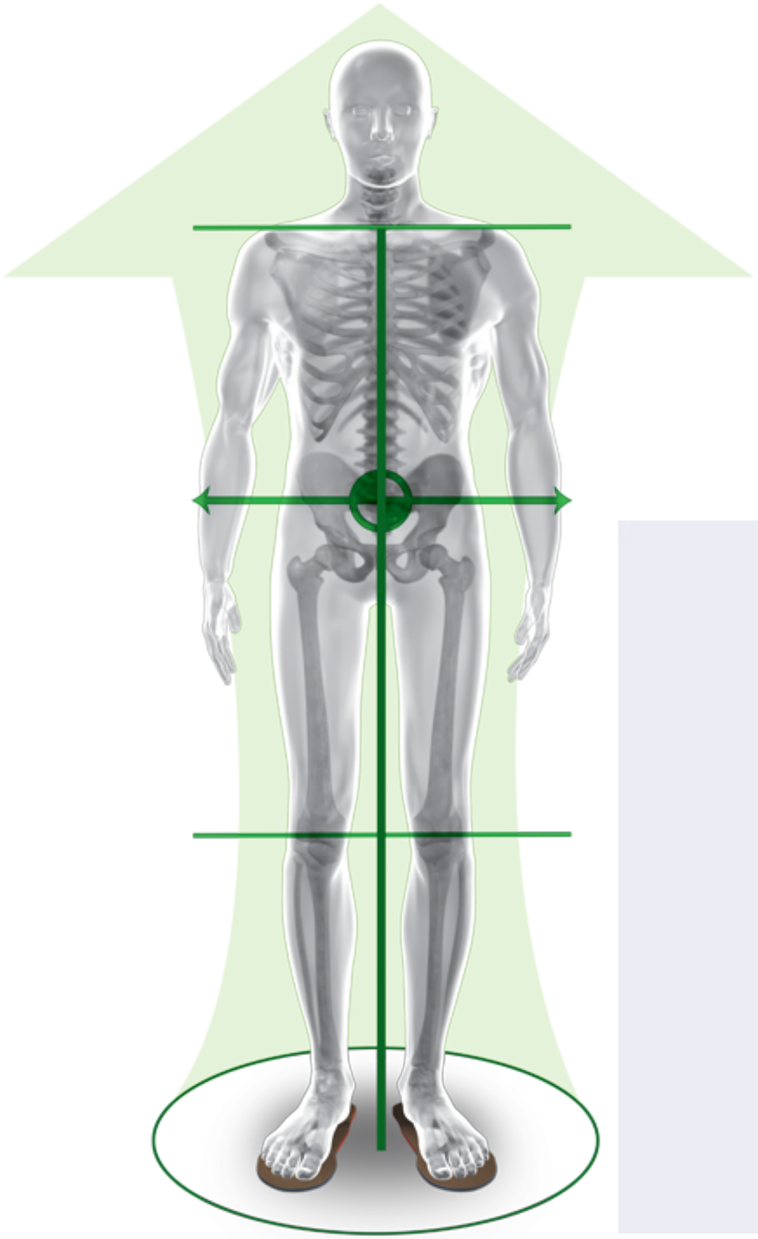
Healthcare trends are moving towards **active care**.

Adjust

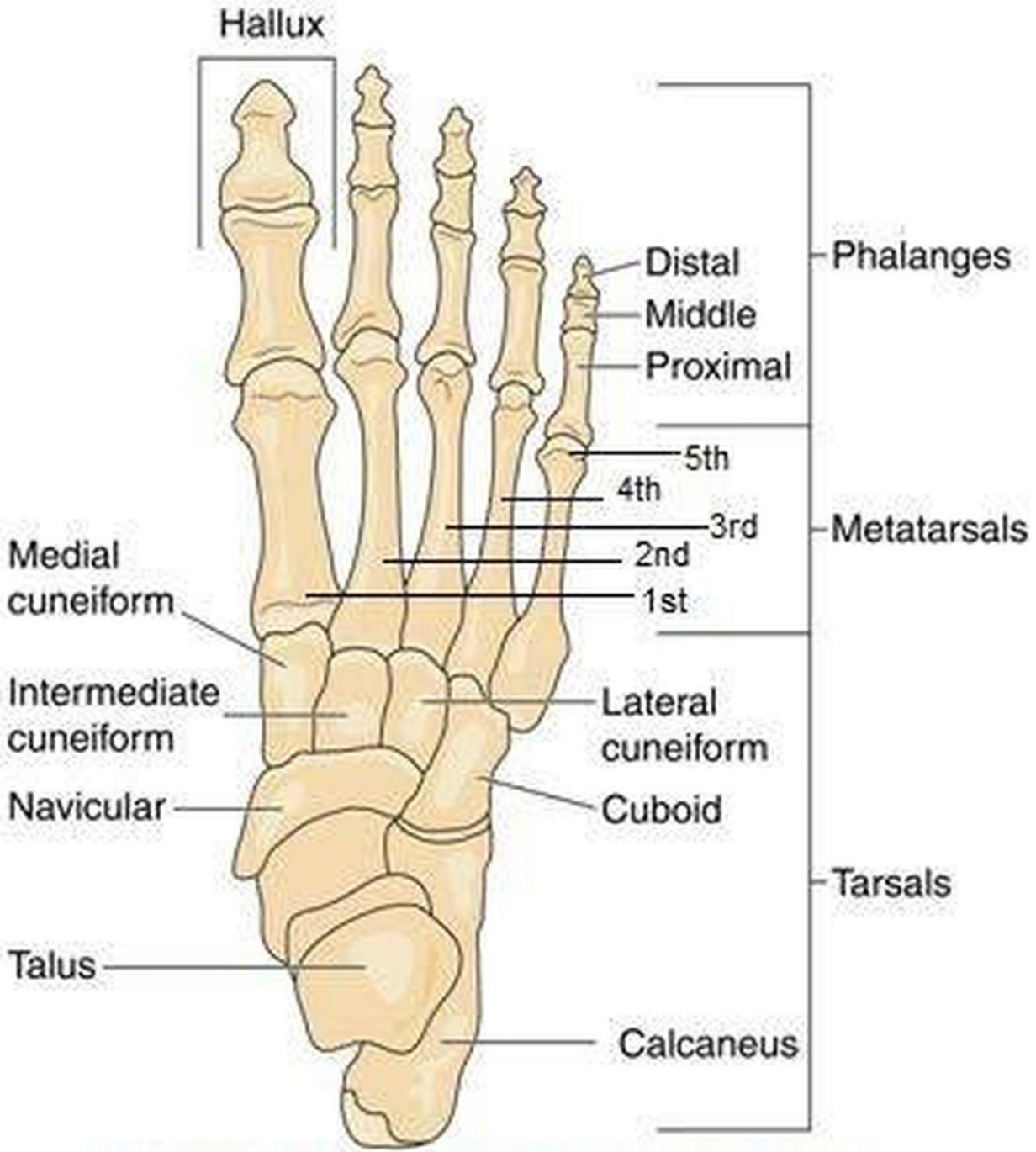
Support





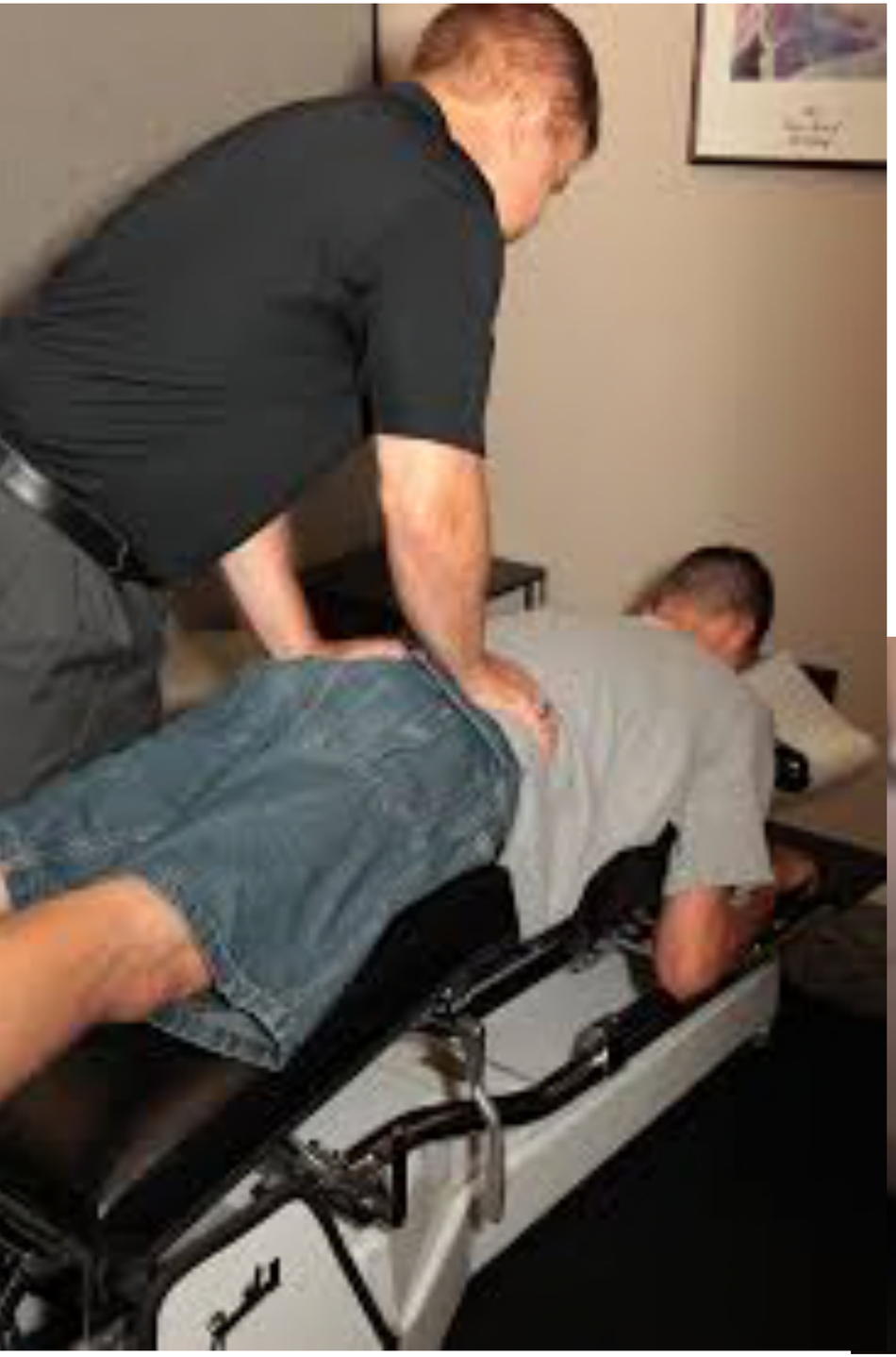


Rehabilitate



BONES OF THE FOOT (FROM ABOVE)

How do you want to adjust the 26 bones?

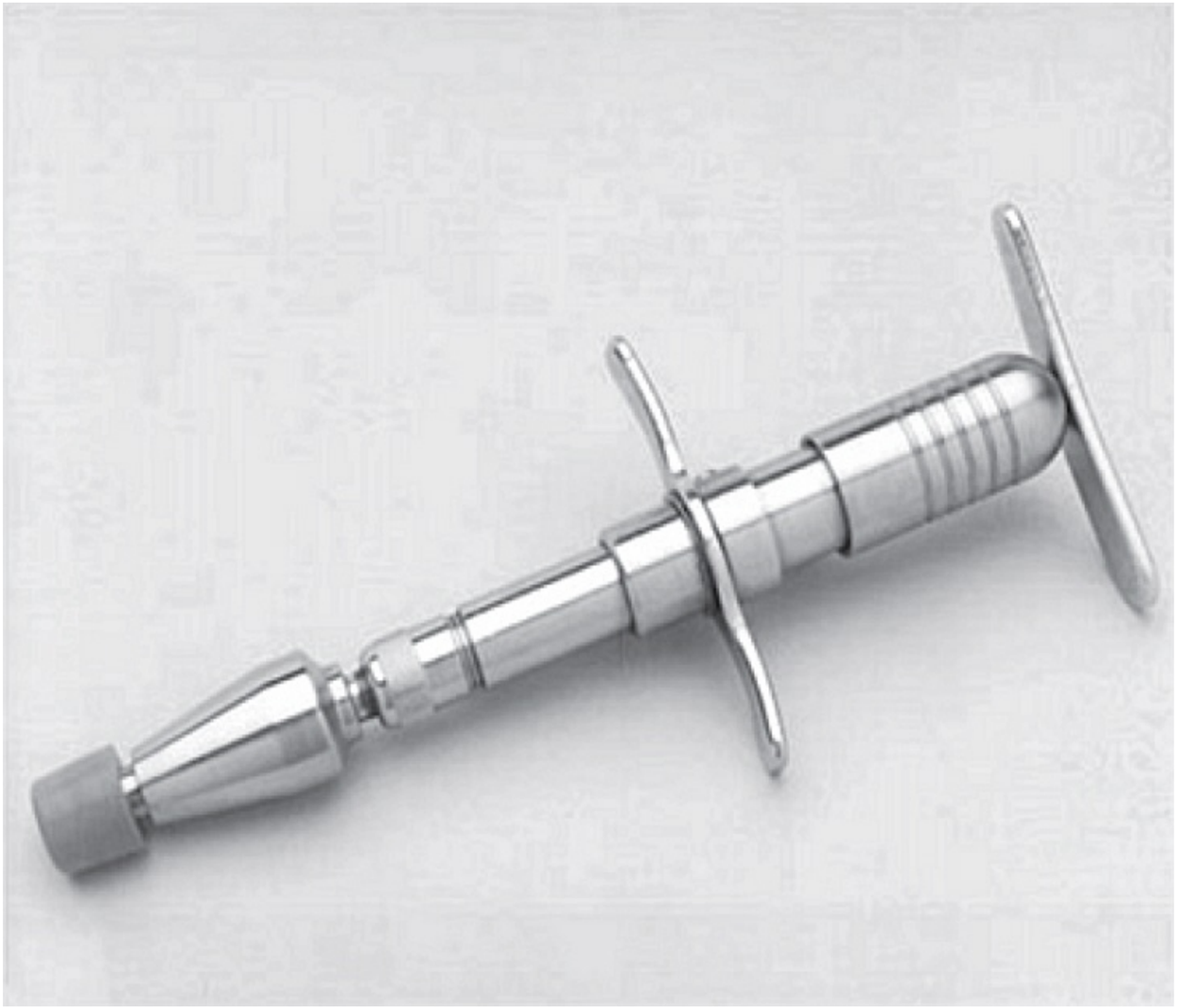


- Manual/Diversified
- Drop table
- Spring Loaded Instrument (SLI)

Portable Drop/Speeder Board:

- Tension
- Inhale/exhale
- Mind Spinal contours

Activator



Computerized Adjusting in Your Hands

impulse iQ ADJUSTING INSTRUMENT

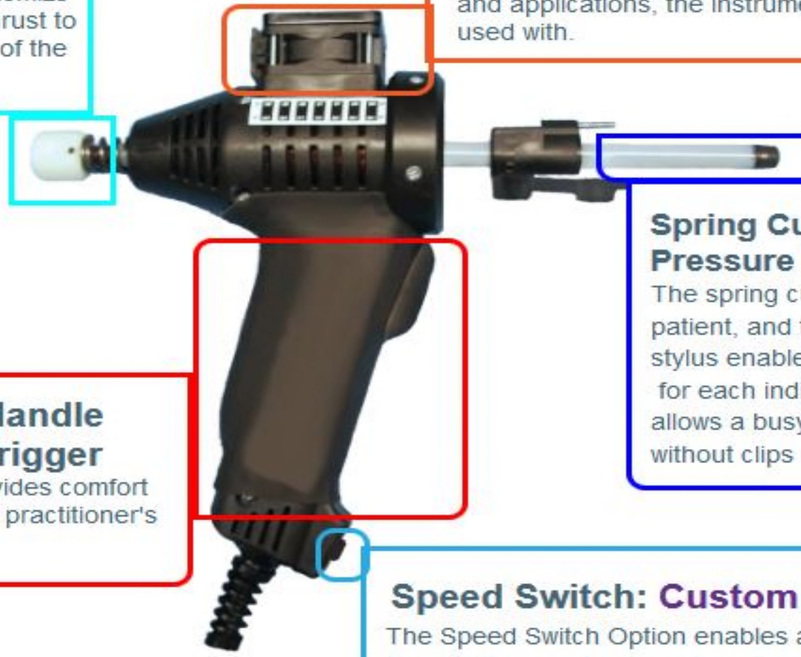
Features

- Stainless Steel Bezel For Precise Action
- LED Indicator for Preload Control
- Choose from Three Force Settings
- Audible/Visual Feedback For Doctor and Patient
- Micro-chip Computer With Auto-Sense® Technology
- Validated Accelerometer to Detect Spinal Motion
- Ten Foot Cord for Optimum Mobility
- Lightweight and Durable Lexan® Housing

The Pro-ArthroStim® Instrument

Variable Amplitude Knob
A practitioner can customize the amplitude of the thrust to best match the needs of the application.

Auto-Fan: Custom OPTION
The exclusive cooling system Auto-Fan Option increases the number of techniques, and applications, the instrument can be used with.



Spring Cushioned Pressure Responsive Stylus
The spring cushioned action ensures comfort for the patient, and the practitioner. The pressure sensitive stylus enables a practitioner to instantly tailor the input for each individual. The 'Fast On-Off Friction-Fit' design allows a busy practitioner to quickly exchange adaptors - without clips or locks.

Full Cushion Handle and Comfort Trigger
This combination provides comfort and protection for the practitioner's hand.

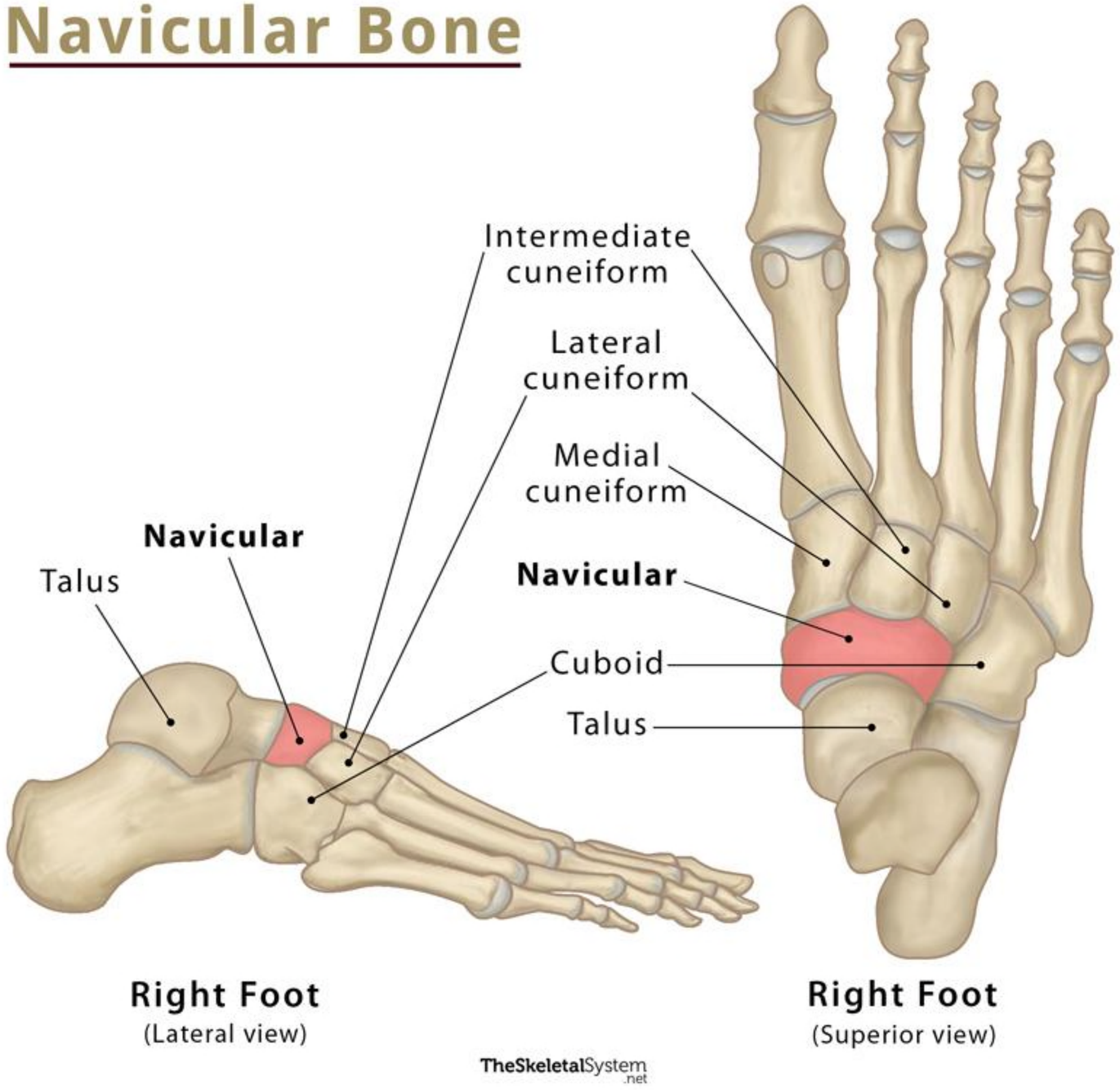
Speed Switch: Custom OPTION
The Speed Switch Option enables a practitioner to instantly select various thrusting rates at the flip of a switch.


READY FOR SOME HANDS ON?

The “Wong Way” to Adjust the Foot

- **Comfortable body position = correct LOD**
- **Forget how the bones misaligned? Stand up and pronate/supinate**

Navicular Bone



Misaligns:

inferior and medial (down and in)

"Push" superior and lateral (up and out)

Navicular - Index Finger

FOOT LEVELERS

Navicular - Index Finger

FOOT LEVELERS

Navicular - thenar

FOOT LEVELERS

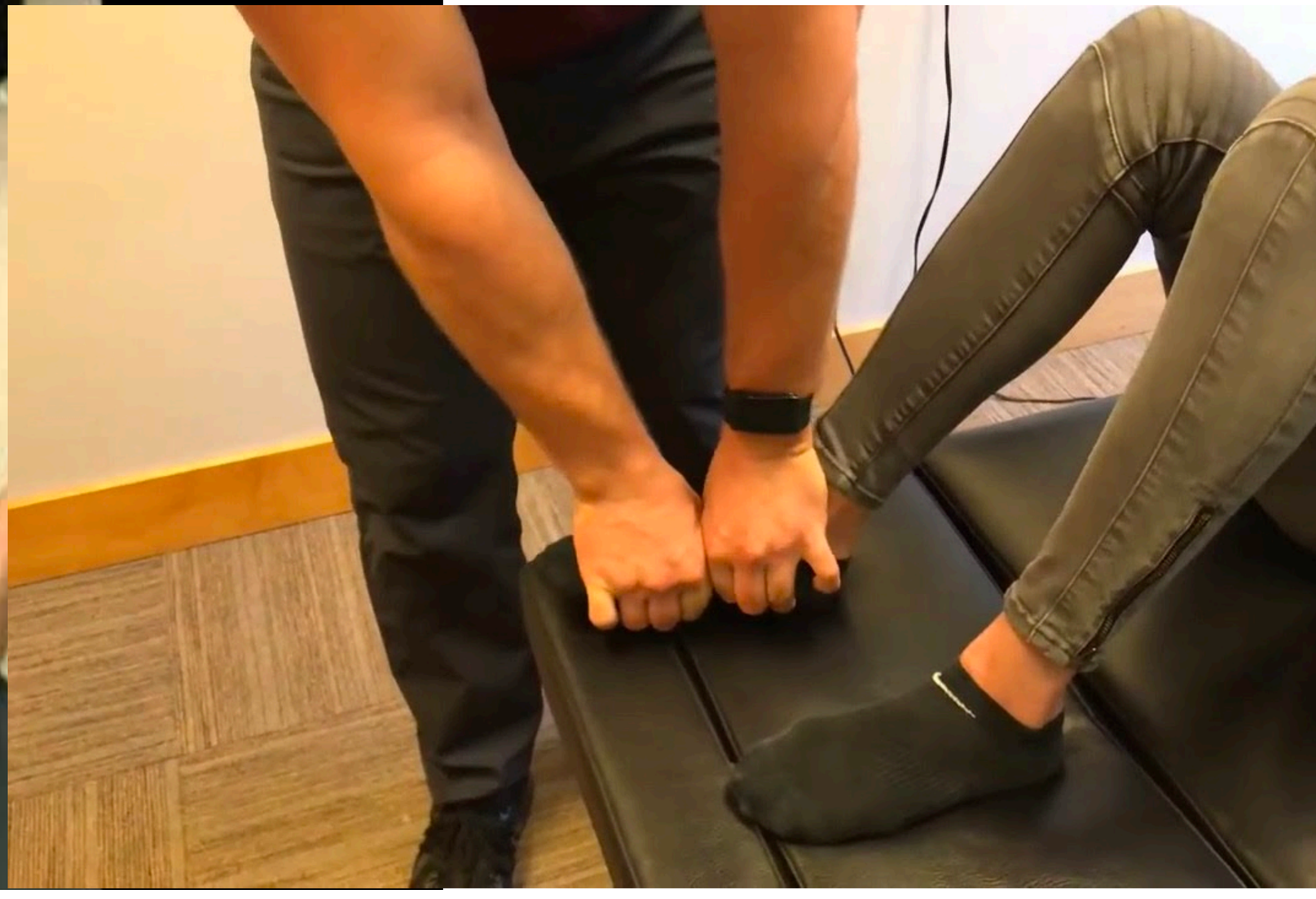
Navicular - Hypothenar/ Pisiform

FOOT LEVELERS

Navicular

- Prone: CP - double thumb, pisiform
- Drop table: CP - pisiform, double thumb (prone)
- Adjusting instrument:

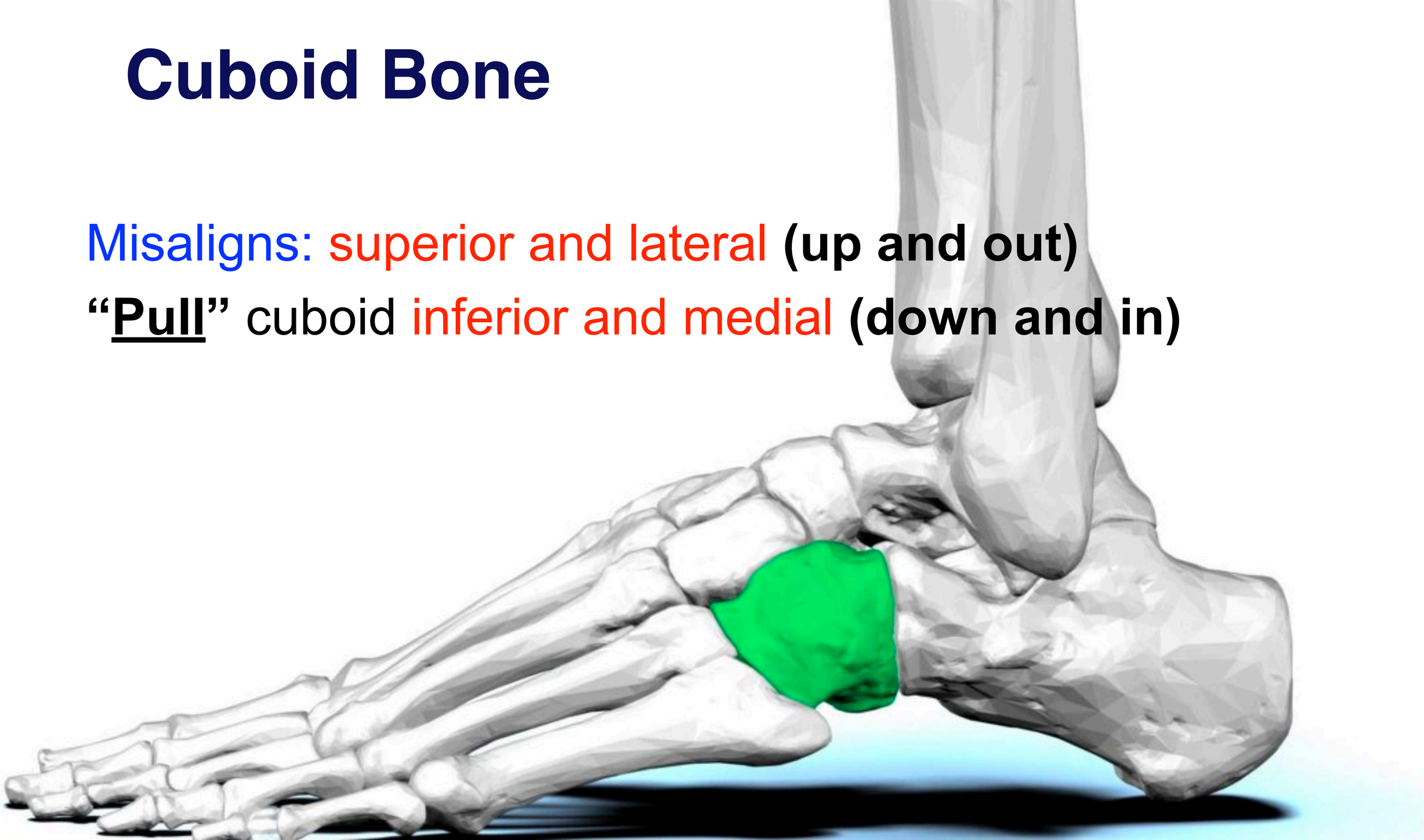
Navicular



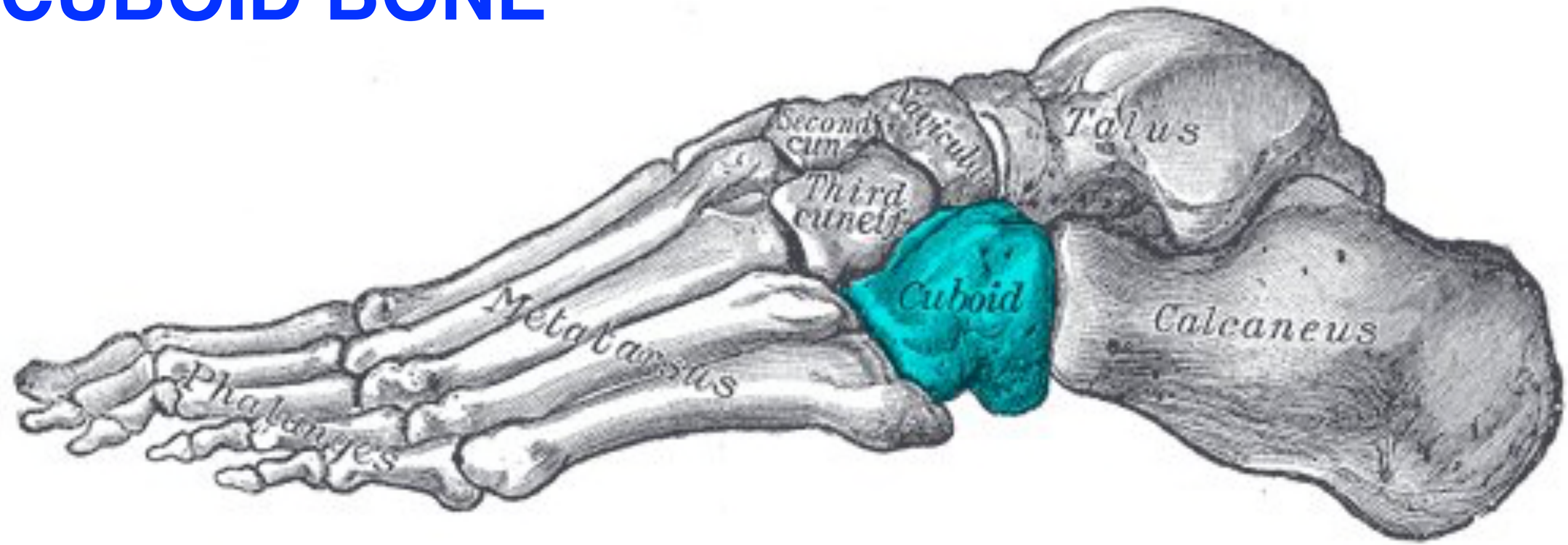
Cuboid Bone

Misaligns: superior and lateral **(up and out)**

"**Pull**" cuboid inferior and medial **(down and in)**



CUBOID BONE



- Supine: CP-double thumb web, double index or middle finger
- Drop table: foot dorsal, lateral side up. CP-Pisiform, double thumb w/foot slightly dorsiflexed for tension.
- Spring loaded instrument: watch LOD

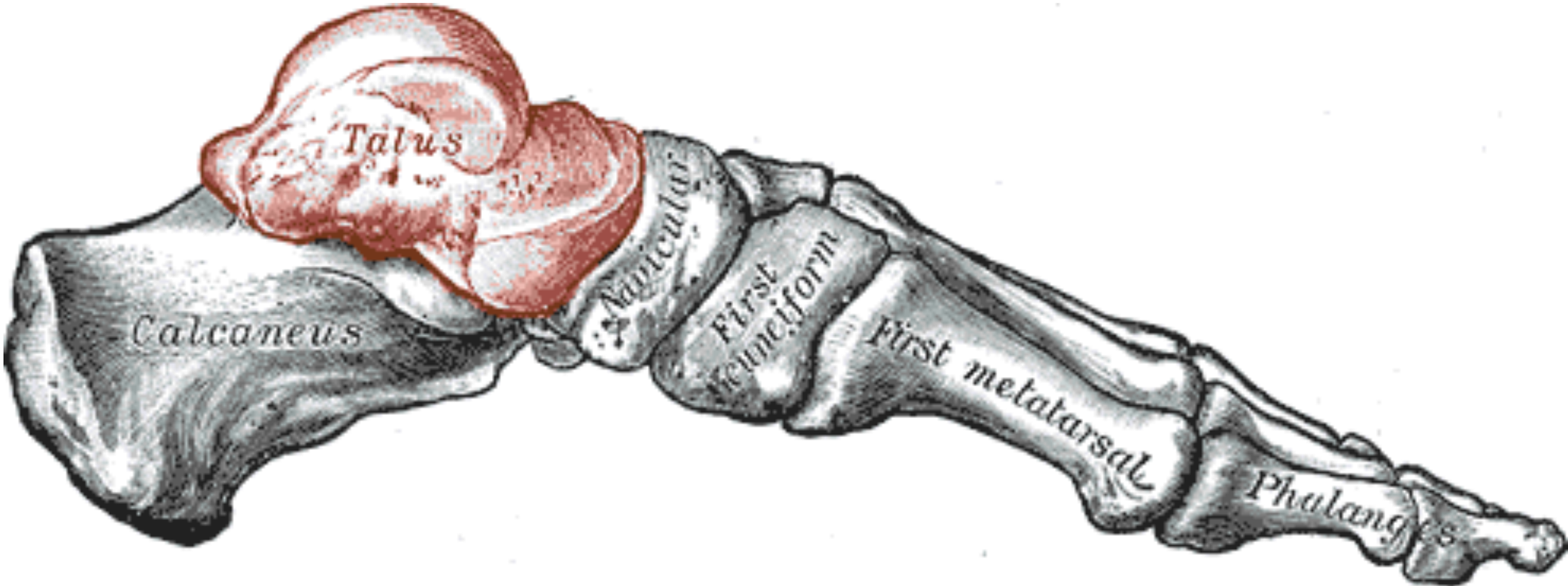
Cuboid - double middle finger

Cuboid - double thumb web

Talus Bone

Misaligns: **anterior and lateral**

"**Scoop**" talus **posterior and medial**



Talus - double middle finger

Talus Bone:

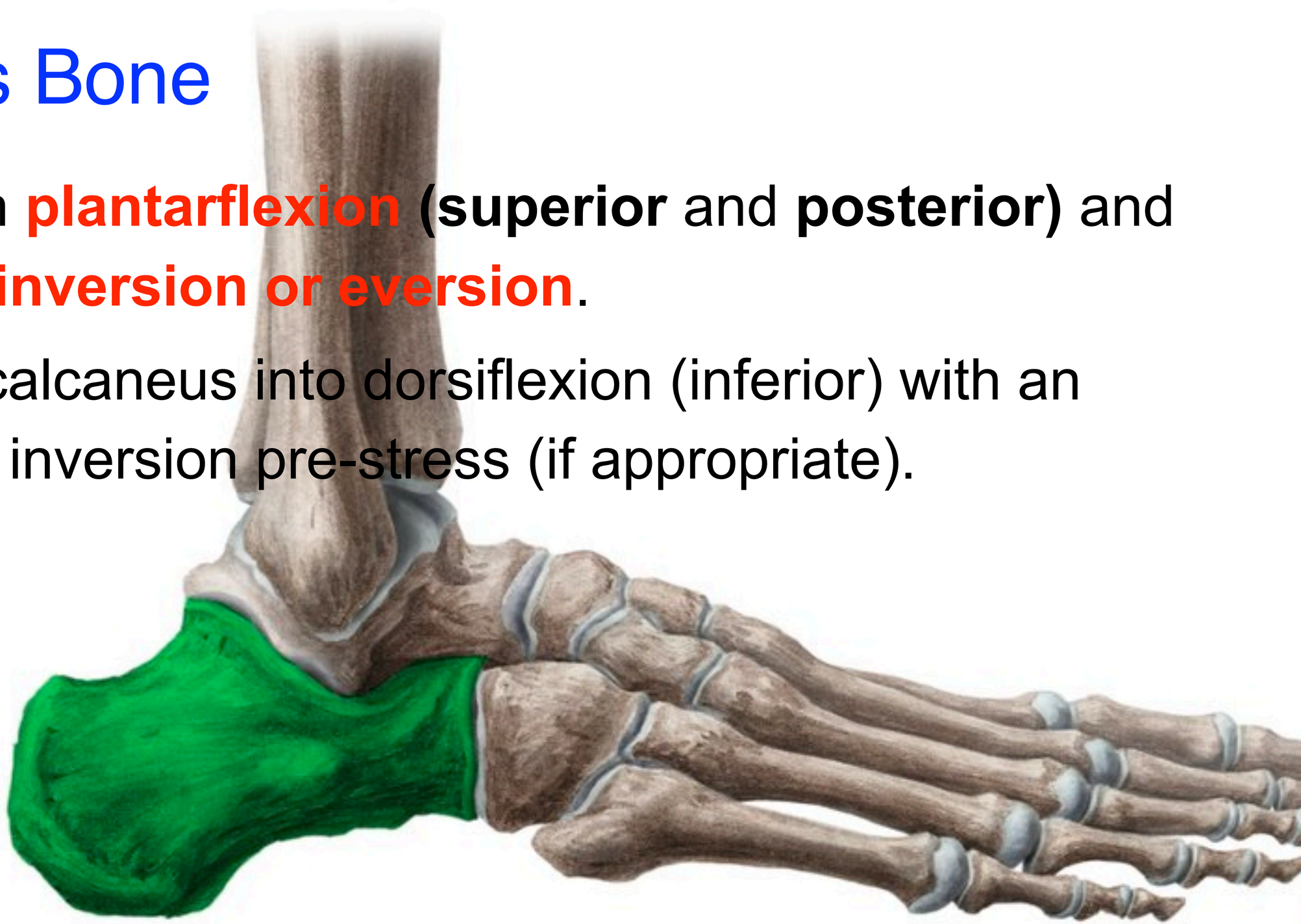
- Supine: CP - double middle or index finger
- Drop table: foot dorsal side up. CP is Pisiform or double thumb with foot slightly dorsiflexed
- Spring loaded instrument: watch LOD

Prone:

Calcaneus Bone

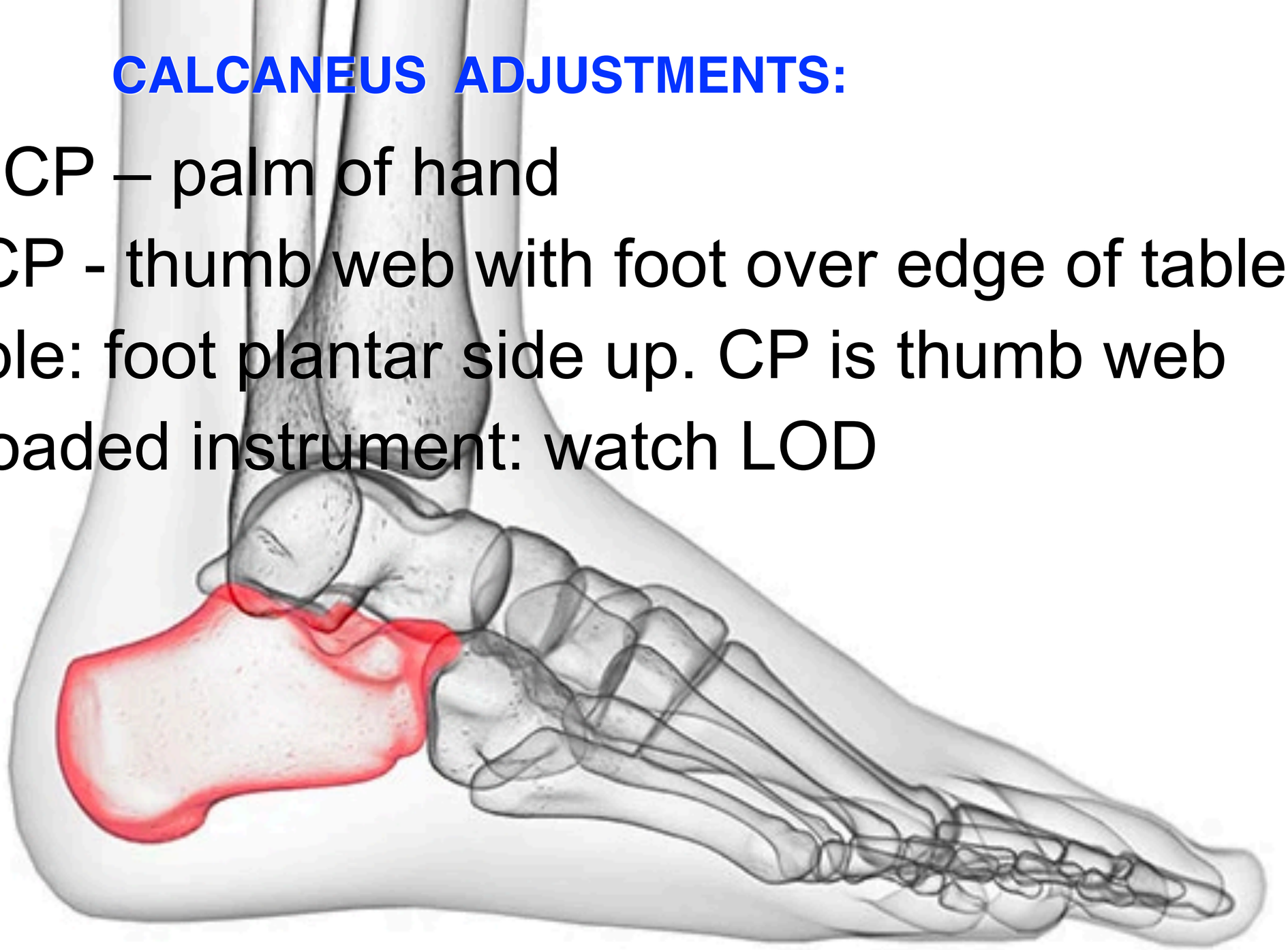
Misaligns in **plantarflexion (superior** and **posterior)** and possibly in **inversion or eversion**.

“Tug” the calcaneus into dorsiflexion (inferior) with an eversion or inversion pre-stress (if appropriate).



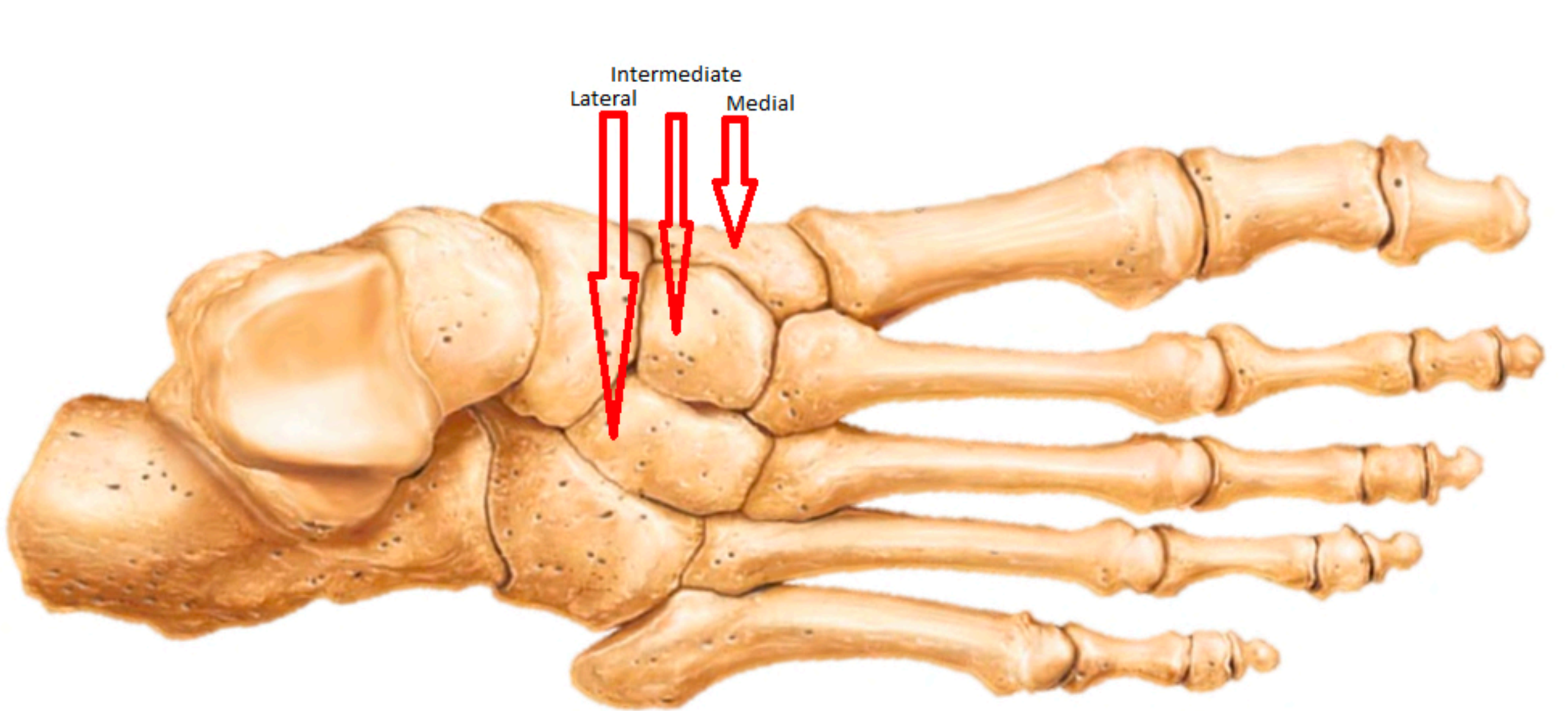
CALCANEUS ADJUSTMENTS:

- Supine: CP – palm of hand
- Prone: CP - thumb web with foot over edge of table
- Drop table: foot plantar side up. CP is thumb web
- Spring loaded instrument: watch LOD




Calcaneus

FOOT LEVELERS



Cuneiforms, MT heads 2,3,4 go **inferior** **(drop to the floor)**.

“Bicycle” the foot

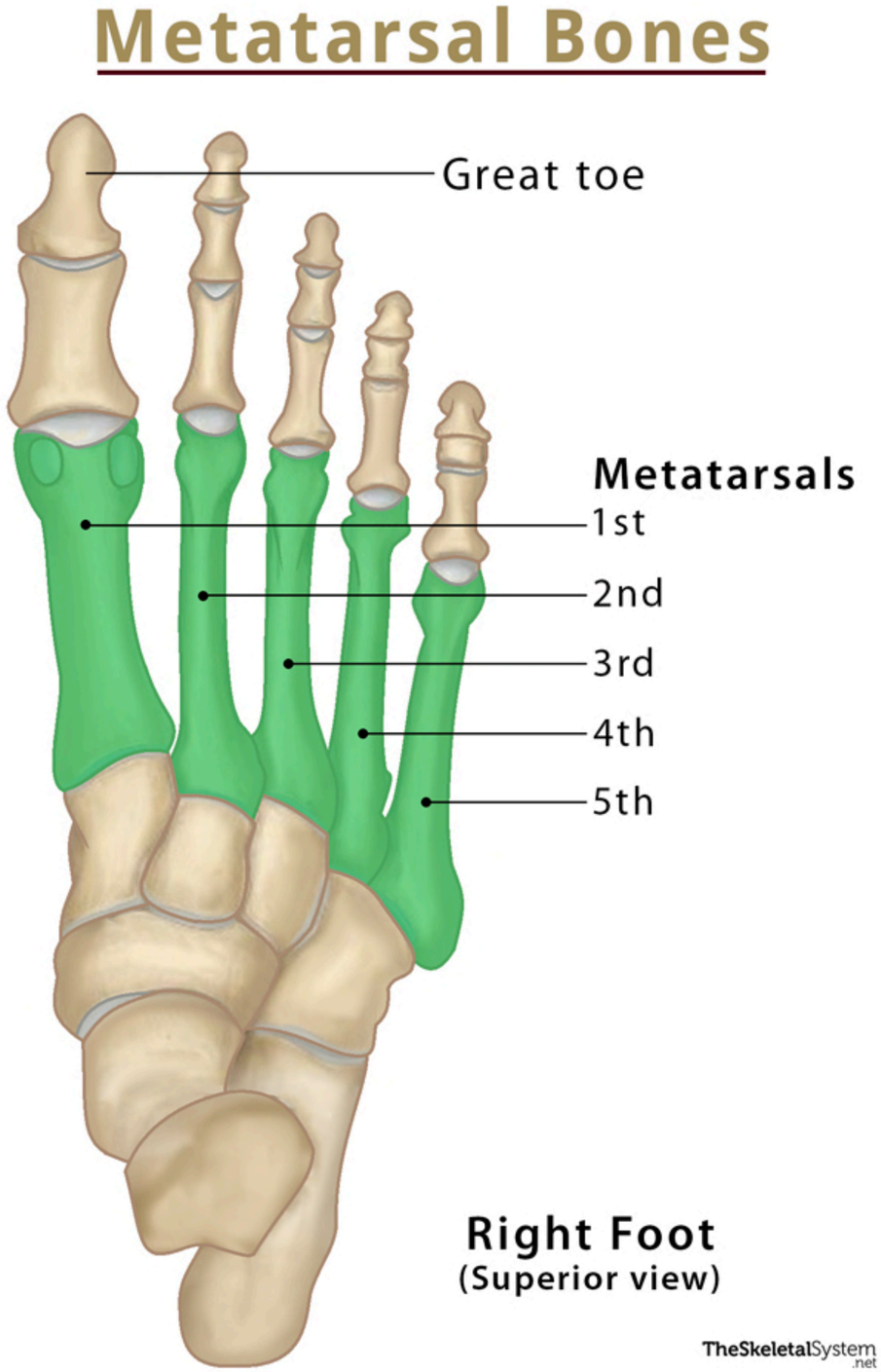
MT head #1
misaligns
superior and medial

MT head #5
misaligns
superior and lateral

FOOT LEVELERS

Cuneiforms/MT's

- Supine: CP- palms and fingertips
- Prone: CP- double thumb and palms
- Drop table: foot plantar side up. CP is double thumbs
- Spring loaded instrument: watch LOD



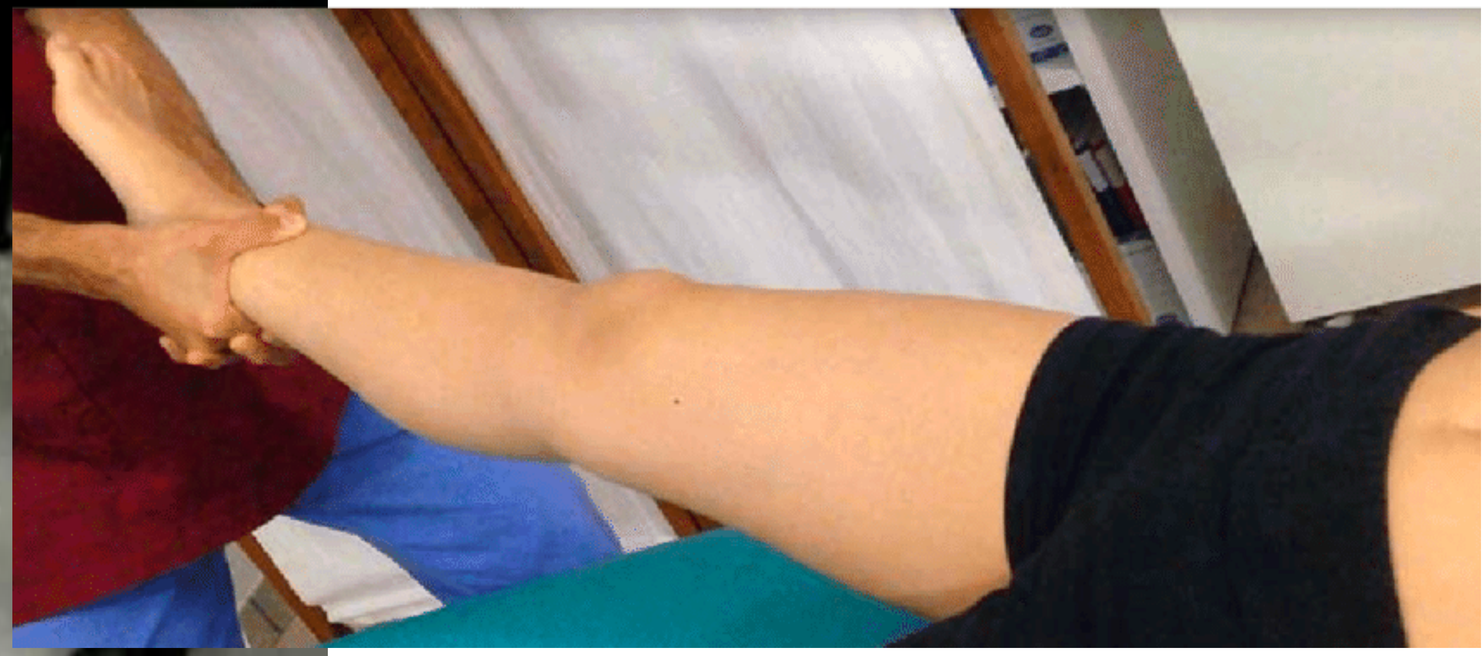

Cuneiforms/MT’s


Cuneiforms/MT’s


Phalanges

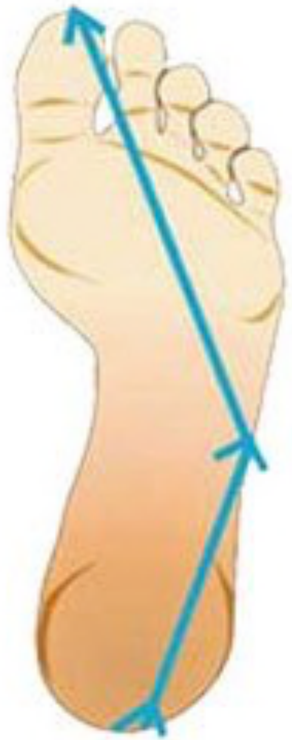
“All In One”

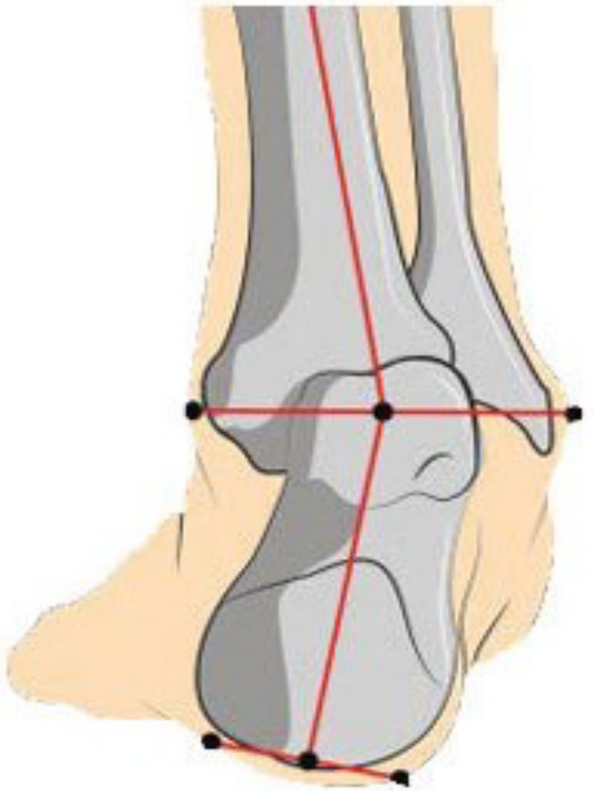
Navicular → talus → cuboid → calcaneus → hip



Supinated Foot

- The lateral longitudinal and transverse arches are flatter
- NAVICULAR has gone superior/lateral
- Adjust inferior/medial with double index/middle finger contact.






Left Foot
Right Foot
Heel turns towards center
Big Toe
Ankle rolls away from center
Little Toe
Little Toe

Supination

Support

- Elastic Therapeutic Tape
- Arch support
- Shoe types

FOOT LEVELERS

Elastic Therapeutic Tape

DC Tape

* Water-wave adhesive design
* Anti-slip
* Breathable
* Elastic, cotton fabric
* 95% cotton
* 5% spandex
* 50% waterproof
* Easy to cut (grid backing paper)
* 180% stretchability

PRIMEKINETIX™
Way ahead of the curve

DC TAPE

Tape every BODY

KINESIOTAPE MADE FOR DCs

Standard Roll

7.99 12+ Rolls

8.99 3-11 Rolls

MSRP RETAIL 12.99

BULK ROLL 114 .8FT ROLL

39.95 For 5+ Rolls

44.95 For 1-4 Rolls

MSRP RETAIL 59.95

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You Adjust We Supply

The ONLY Suppliers

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Way ahead of the curve

Primekinetix.com

877-215-1124

FOOT LEVELERS

“Free Gift Pack”

Answer a few questions and Josh will send you some free stuff!


ROCKTAPE


ROCK


ROCK

Tape Care:

- Water is fine
- Roll socks on/off carefully
- Avoid bare feet (carpet, pet hair)
- Lasts ~ 2-4 days

Elastic Sports Tape

- Stretch structure, not tape
- Cut/shape but do not stretch ends
- stretch tape < 25-50%
- Warn about adhesive (no latex)

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Orinda, CA 94563

W: 925-254-4040

Cell: 925-285-9301

drkevinwong@orindachiropractic.com

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FOOT LEVELERS

Plantar Fasciitis

Strain, inflammation or tear of the thickened fibrous aponeurosis.

PLANTAR FASCIITIS

It is estimated that

1 IN 10

people will develop PF during their lifetime.[2]

Some reports suggest that

81-86%

patients with PF have excessive pronation.[3]

Obesity is present in up to

70%

of patients with PF.[6]

Plantar fasciitis is the

most common

cause of heel pain presenting to the outpatient clinic.[1]

The use of orthotics can result in reduced pain for those who suffer from **plantar fasciitis.**[7]

Most experts agree that early recognition and management of PF leads to a shorter course of treatment and **greater chance of success** with conservative therapies.

Help prevent Plantar Fasciitis in your patients.

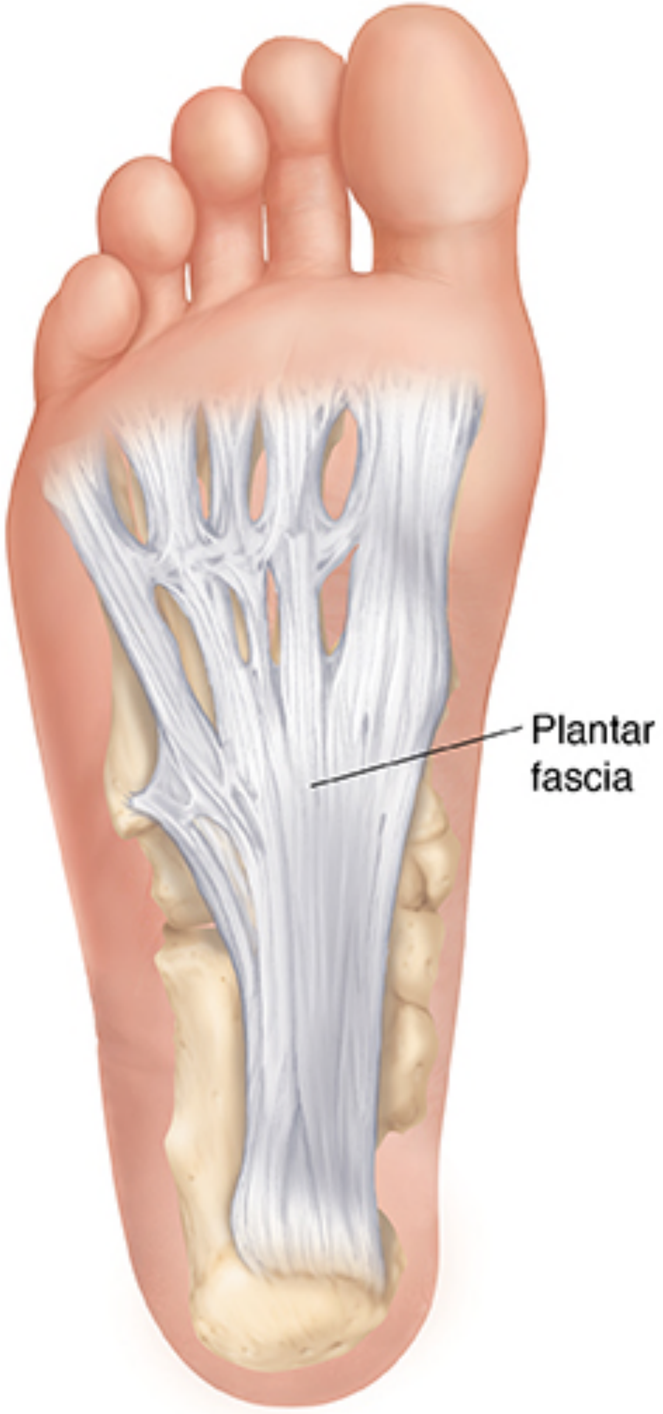
[redacted]

Plantar Fasciitis: Etiology

1. Excessive, long periods of foot pronation or supination
2. Landing hard on the sole of the foot
3. Instant foot acceleration and deceleration
4. WB activities for work or recreation

Plantar Fasciitis: S & S's

1. Sharp heel pain that radiates
2. Heel tenderness/swelling
3. Gradual onset
4. Worse getting out of bed in AM
5. Worse with WB
6. Better with rest



Treatment:

Physiotherapy modalities

Adjustments: Calcaneus, MT's, rest of the foot

Elastic Taping

Cutting Edge M7 MLS Class IV Therapy Lase

Robotized ULTRA Head:

- Optical group with 3 MLS laser sources and a 5cm spot size highlighted by high efficiency LED aiming beam.
- Automatically scan a treatment area (cm2) defined by programmable X and Y axis.
- Specify treatment areas from 1 to 30 to automatically calculate treatment time per area.
- 35 predefined programs categorized by anatomical area.
- Emission intensity can be set at 50% or 100% of the maximum power.

Ergonomic Handpiece:

- 1 MLS laser source with a 2cm spot size highlighted by high efficiency LED aiming beam.
- Specify treatment points from 1 to 20 to automatically calculate treatment time per point.
- Trigger point locator categorized by anatomical area.
- Emission intensity can be set at 25%, 50%, 75%, or 100% of maximum power.

- Continuous and pulsed MLS modulation.
- Simultaneous management of two independent channels.
- Automatic calculation of the emitted energy, energy density, and treatment time according to set parameters.
- Automated interactions.
- Fixed duty cycle at 50% or variable.
- Create and save up to 30 fully customized programs for both the Robotic ULTRA Head and Handpiece.

Pulse Wave - Shock Wave

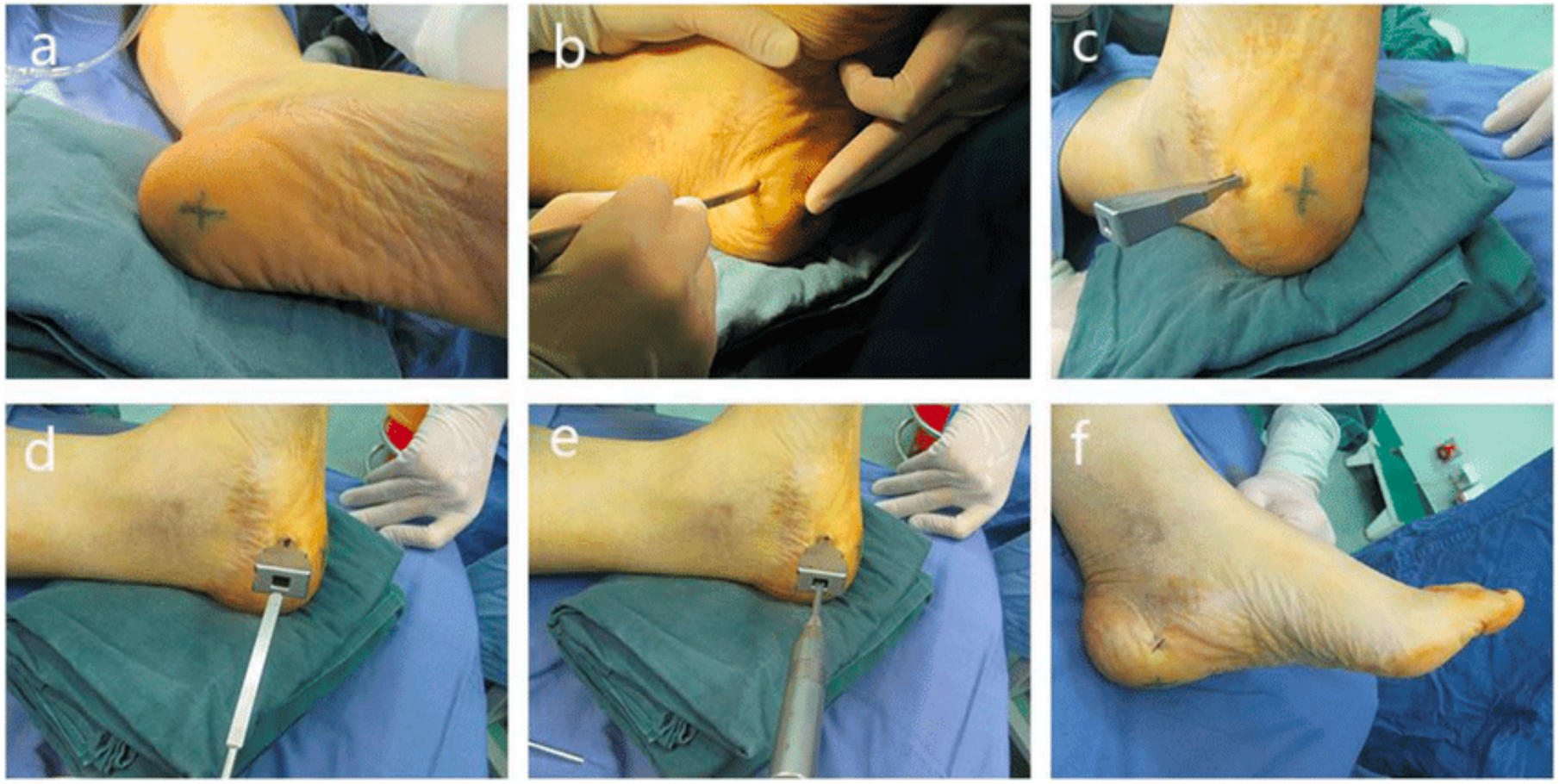
- FDA Registered - Class 1 Medical Device
- Electromagnetic Pulse Wave Technology
- 4th Generation Design & Mechanism
- Therapeutic Peak Pressure
- Adjustable Penetration
- Energy Mechanism for Precise Targeting
- Made in the USA

FOOT LEVELERS

Multi Radiance
Super Pulsed Lasers

FOOT LEVELERS

Endoscopic Plantar Fascial Release



Plantar Fasciitis: Support

Stabilizing Orthotics

Shoe types

Elastic Tape

Plantar Fasciitis: Rehab

- Roll foot on lacrosse/trigger/rock balls
- Frozen water bottle
- Gentle stretching exercises
- Towel scrunch exercises
- Teach patient how to tape
- Basic 4 Group of Theraciser Exercises

BEST PLANTAR FASCIITIS EXERCISES

1

Achilles/Gastrocnemius Stretch

2

Plantar Fascia Massage

3

Soleus Muscle Stretch

4

Plantar Fascia Stretch

5

Towel Toe Curls

6

Toe Extensions

Standing calf stretch

Seated plantar fascia stretch

Plantar fascia massage

Achilles stretch

Frozen can roll

Towel stretch


TOTAL BODY REHAB
Tri-FLEX
Low-Tech Rehab
FITMASTER
BACK2FIT

Tri-FLEX


Tri-FLEX
TOTAL BODY REHAB

Theraciser Concepts

- Isokinetic system of exercise
- Tubing permits movements through a joint's total ROM or a select portion

Theraciser Concepts

- Wide variability of speeds from very fast motion to very slow, sustained contractions.
- Resistance provided by the tubing can easily be very light to very heavy (depending on color).

Eversion

Inversion

Dorsiflexion

Plantarflexion

Start

Finish

Theraciser Protocol: Normal Patient

Phase Motion	*Range of Contraction*	*Speed of Exercise Motion*	*How Long Each*
I	short	slow	1 min. daily
II	short	fast	1 min. daily
III	full	slow	1 min. every other day
IV	full	fast	1 min. every other day

Use ice after each exercise session. 2 weeks per stage.

Theraciser Protocol: Athletic Patient

Phase	*Range of Motion*	*Speed of Contraction*	*How Long Each Exercise Motion*
I	short	slow	2 min. daily
II	short	fast	to fatigue daily
III	full	slow	to fatigue every other day
IV	full	fast	to fatigue every other day

After each exercise session use ice. 2 wks per phase

Morton's Toe/Foot

- 2nd toe longer than first toe
- Present 22% of time
- present in ~ 80% of pts. seeking care for musculoskeletal problems

Morton’s Toe/Foot

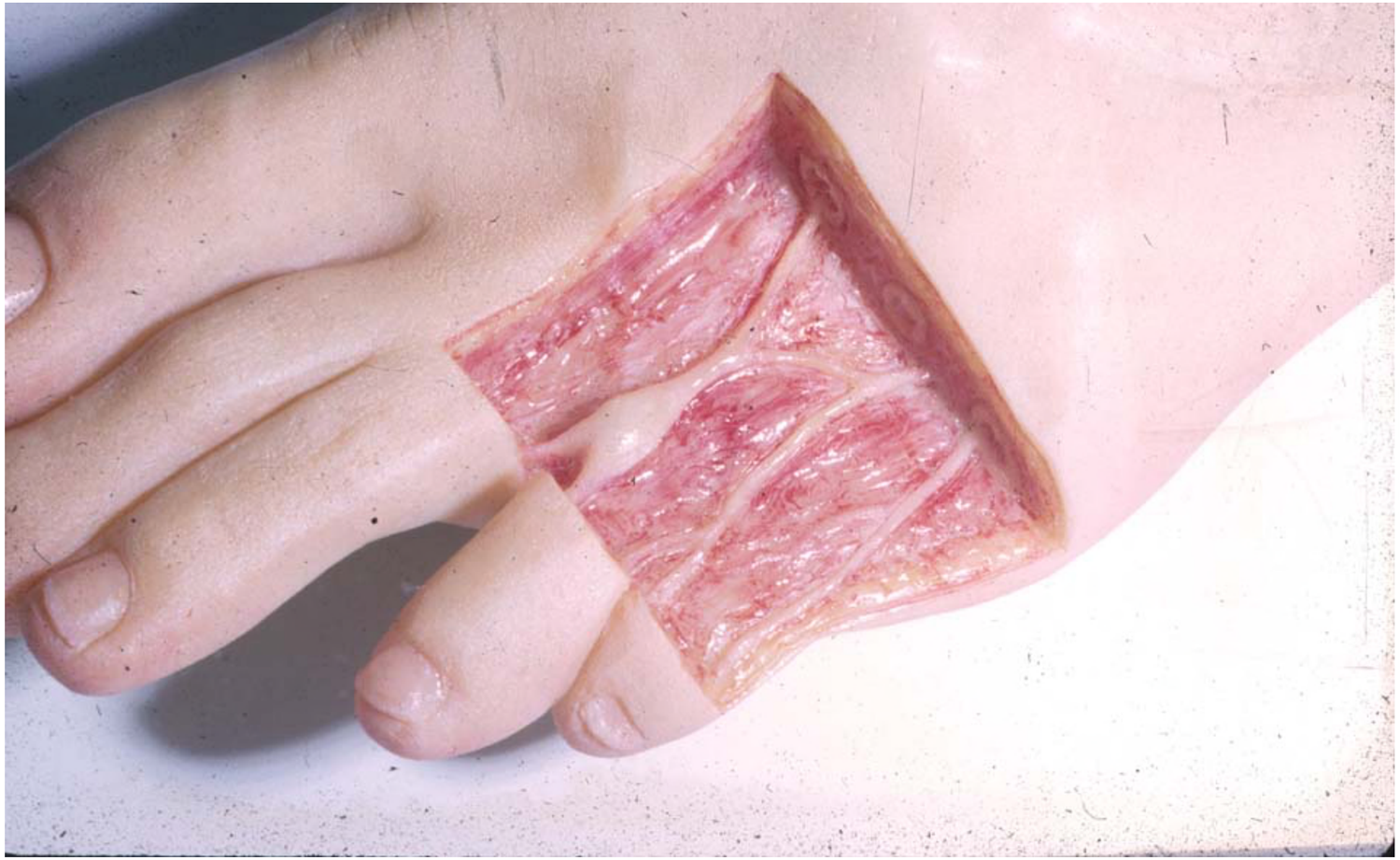
- 2nd toe alters toe off phase.
- Patient must externally rotate foot in order to place the 1st toe in position to toe off.

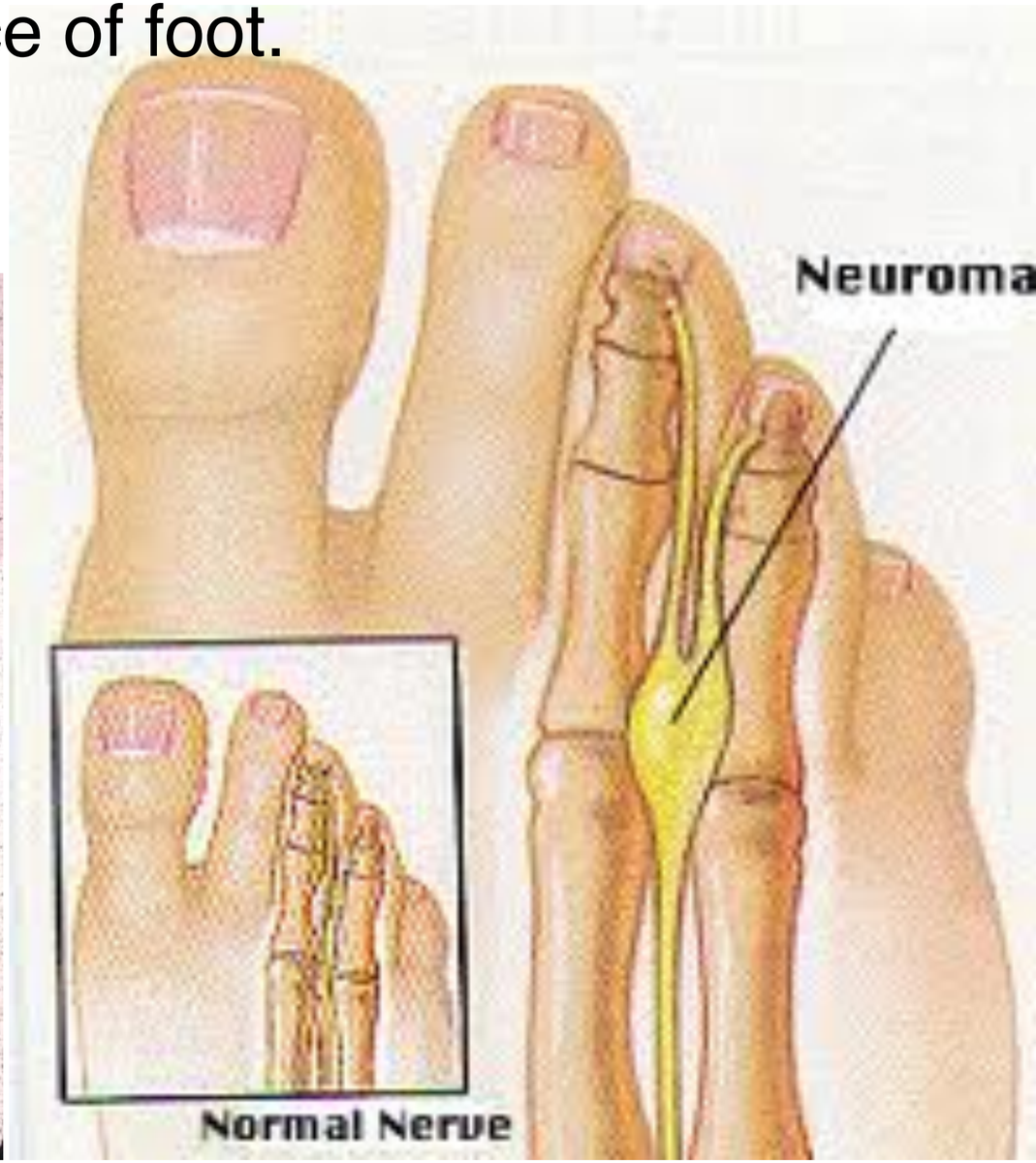
Morton's Toe/Foot

- Hypermobility of first and second toes
- Callousing of the 2nd MT head along with hammering of toes 2-3
- Leads to excessive pronation due to foot flare.

Morton’s Neuroma

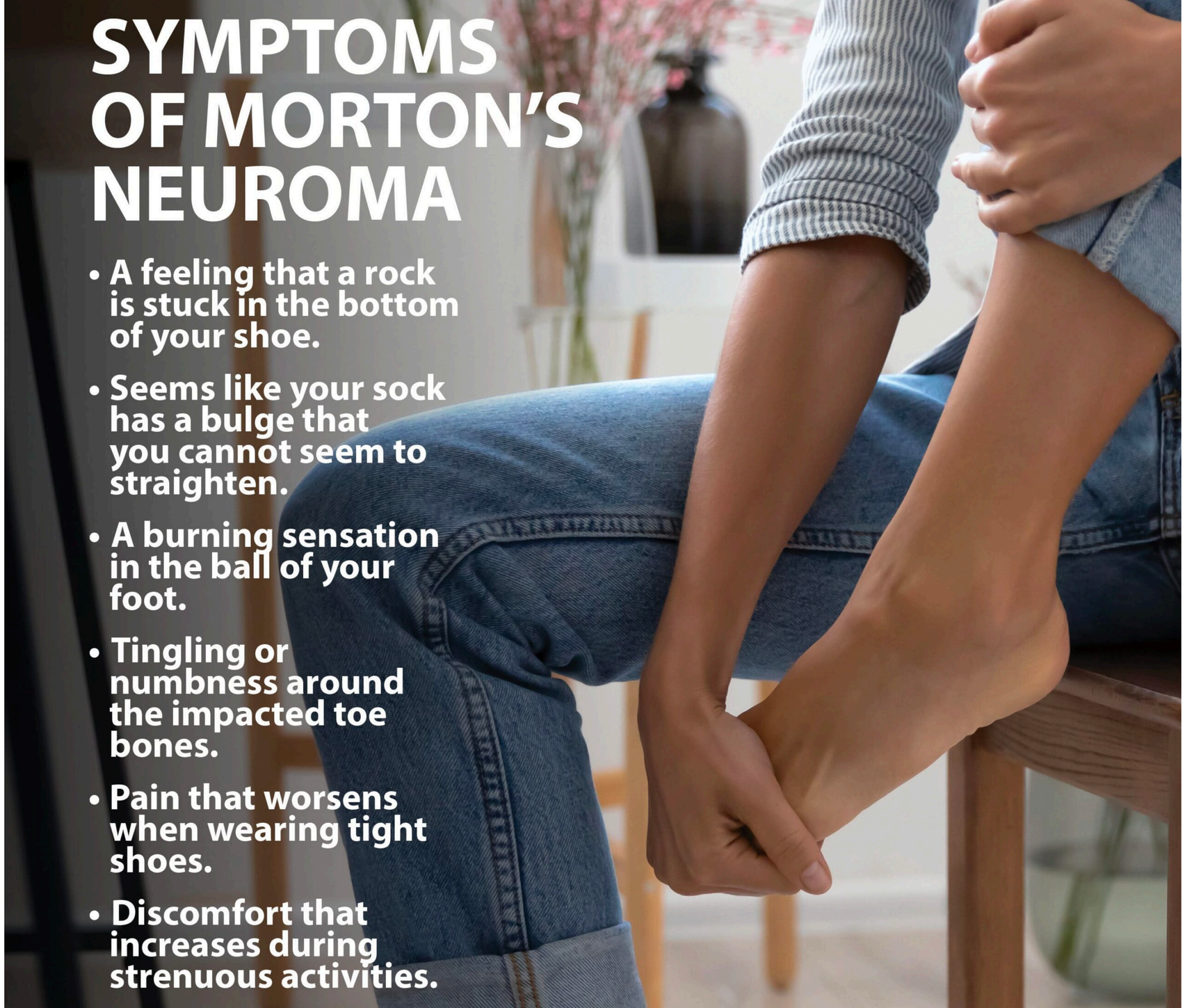
- Neuralgic radiating pain on plantar surface of foot.
- Located between the 3rd and 4th MT’s.





Morton’s Neuroma: Etiology

- Increased pressure on forefoot and interdigital nerves
- Results in swelling, overgrowth or benign tumor of nerve



SYMPTOMS OF MORTON'S NEUROMA

- A feeling that a rock is stuck in the bottom of your shoe.
- Seems like your sock has a bulge that you cannot seem to straighten.
- A burning sensation in the ball of your foot.
- Tingling or numbness around the impacted toe bones.
- Pain that worsens when wearing tight shoes.
- Discomfort that increases during strenuous activities.

Morton's Neuroma: Treatment

Physiotherapy modalities

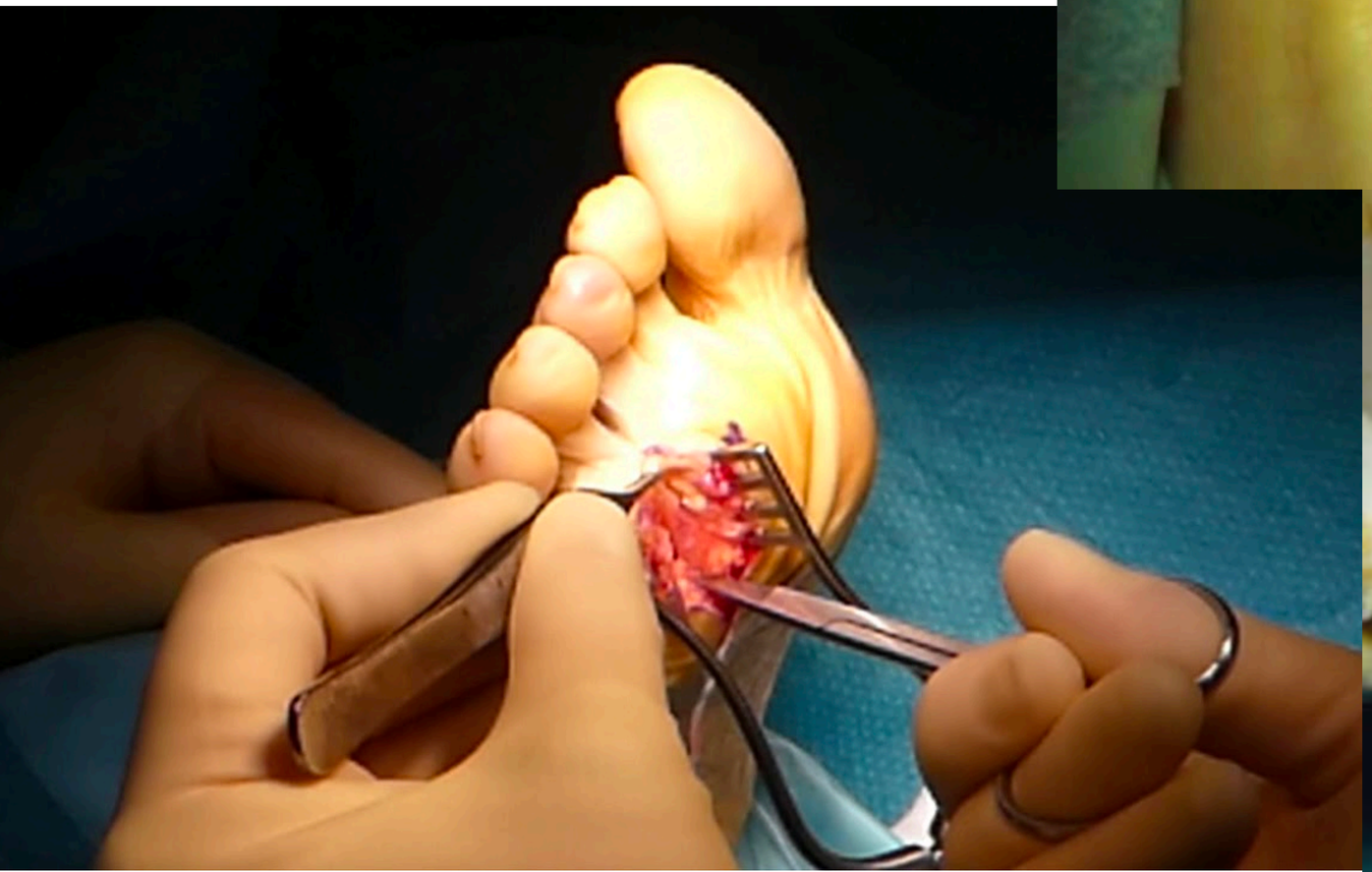
Adjustments: Basic Foot (MT's, toes)

Morton’s Neuroma: Treatment

Support: Stabilizing Orthotics

Elastic Taping, Shoe Types

Neuroma Surgery



Neuroma Surgery

Morton’s Neuroma: Treatment

“Basic 4” Thera-Ciser Exercises

Towel scrunch exercises

Golf/lacrosse ball exercises

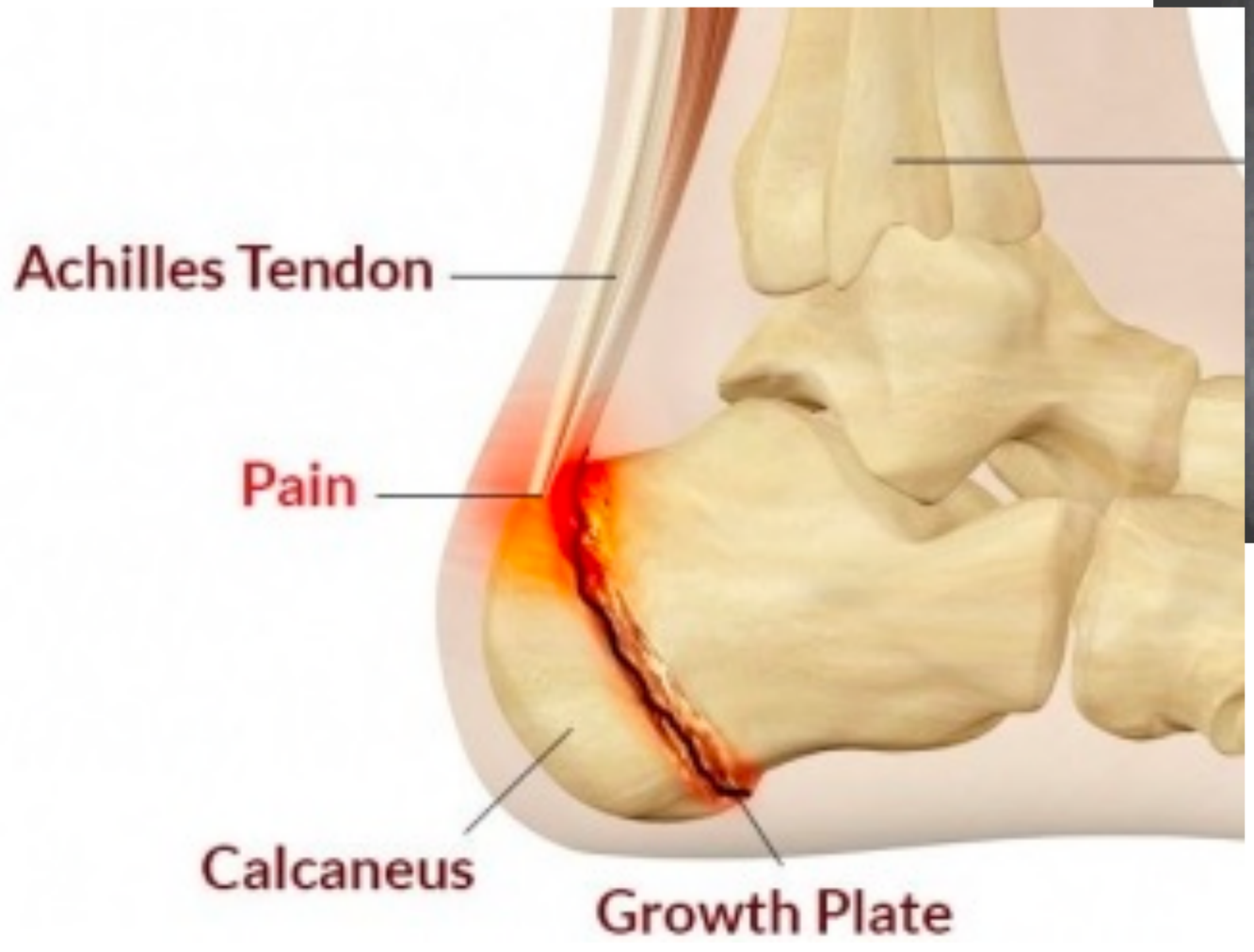
Calf Stretches

SEVER'S DISEASE

"Calcaneal Apophysitis"

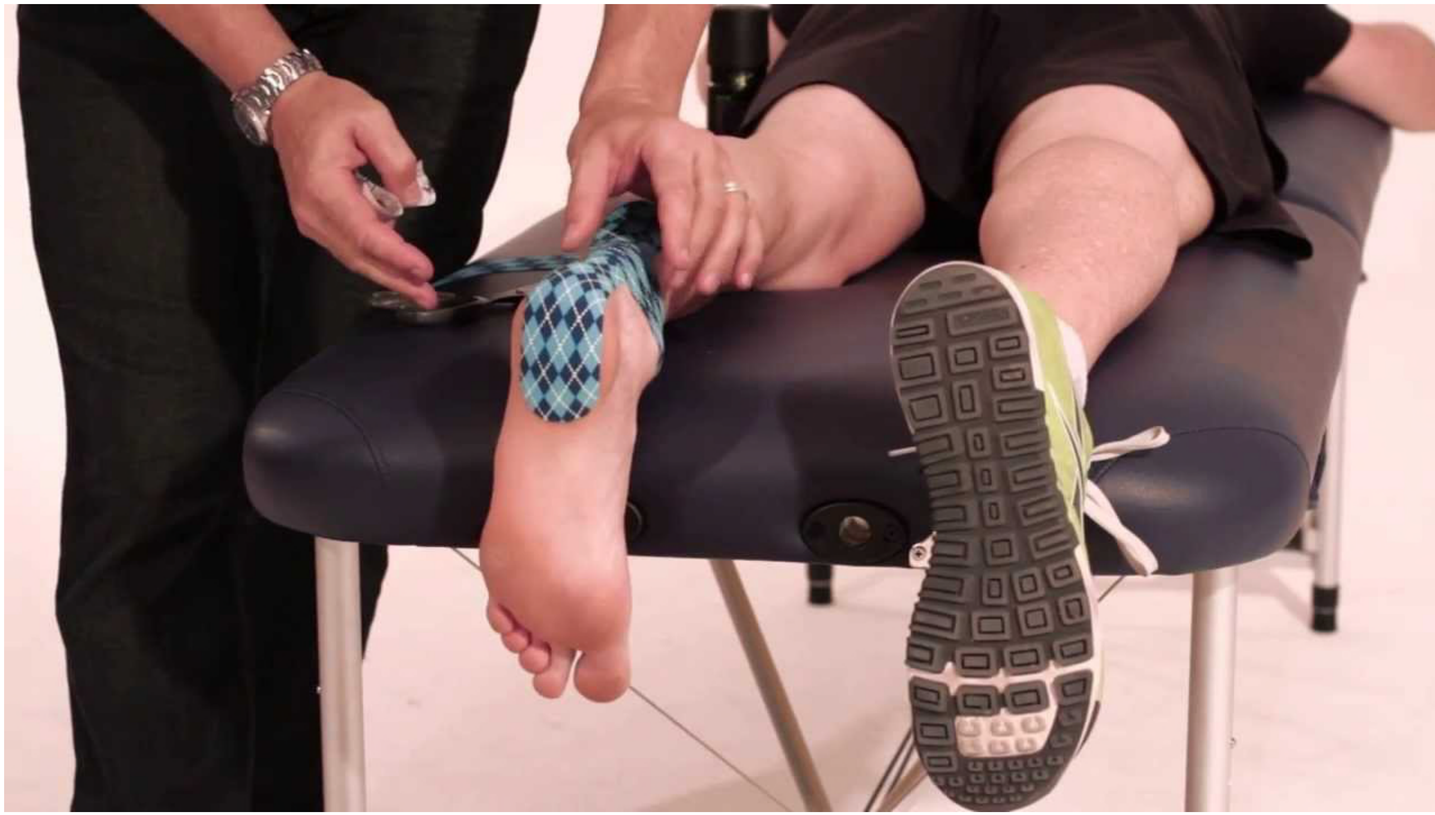
- Inflammation of growth plate in heel of growing children, typically adolescents.
- Pain in heel due to repetitive stress to and is common in active children.

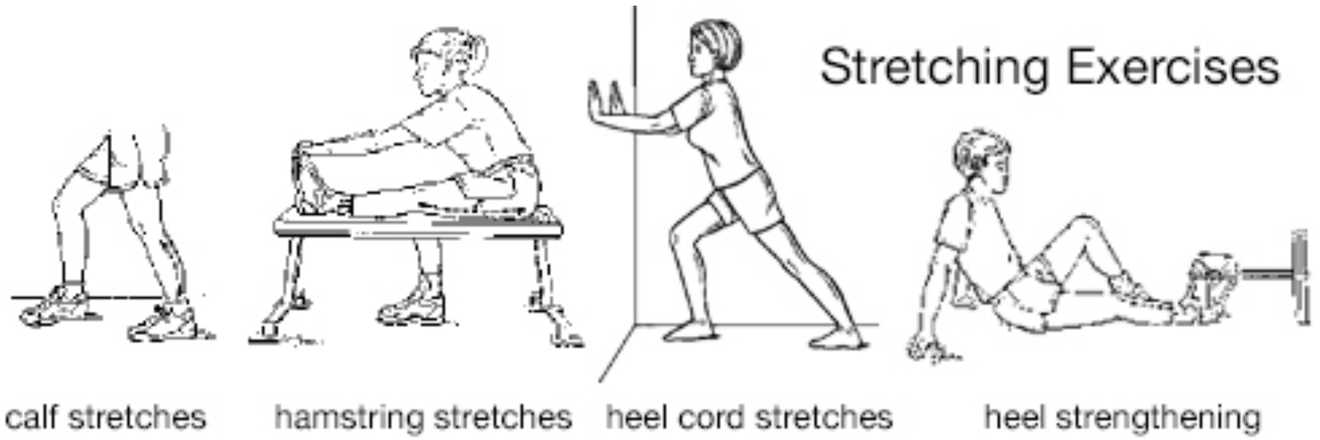
Sever's Disease



Sever's Disease: TX

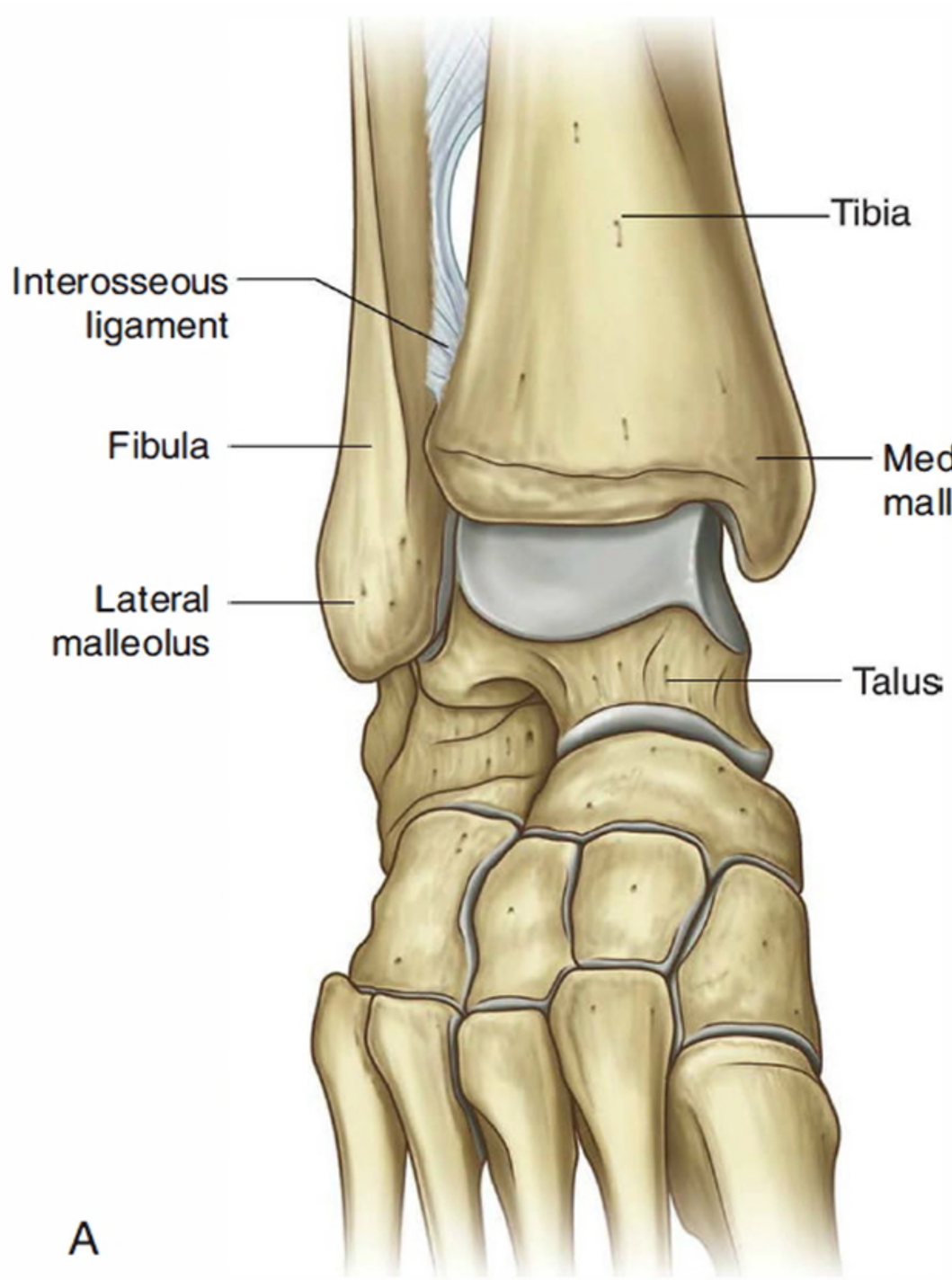
- Physiotherapy modalities (NO laser, US)
- Orthotics
- Elastic Taping
- Stretching/strengthening exercises

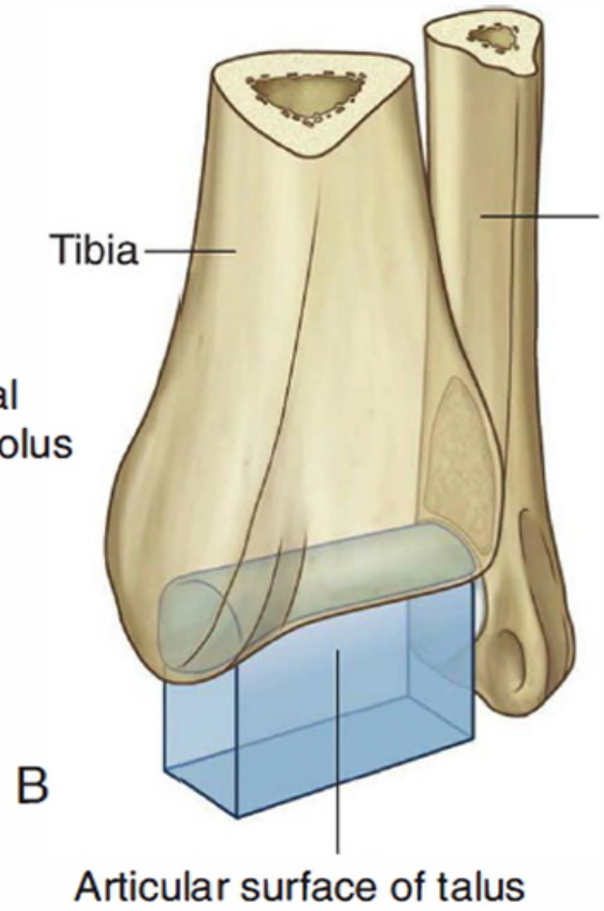


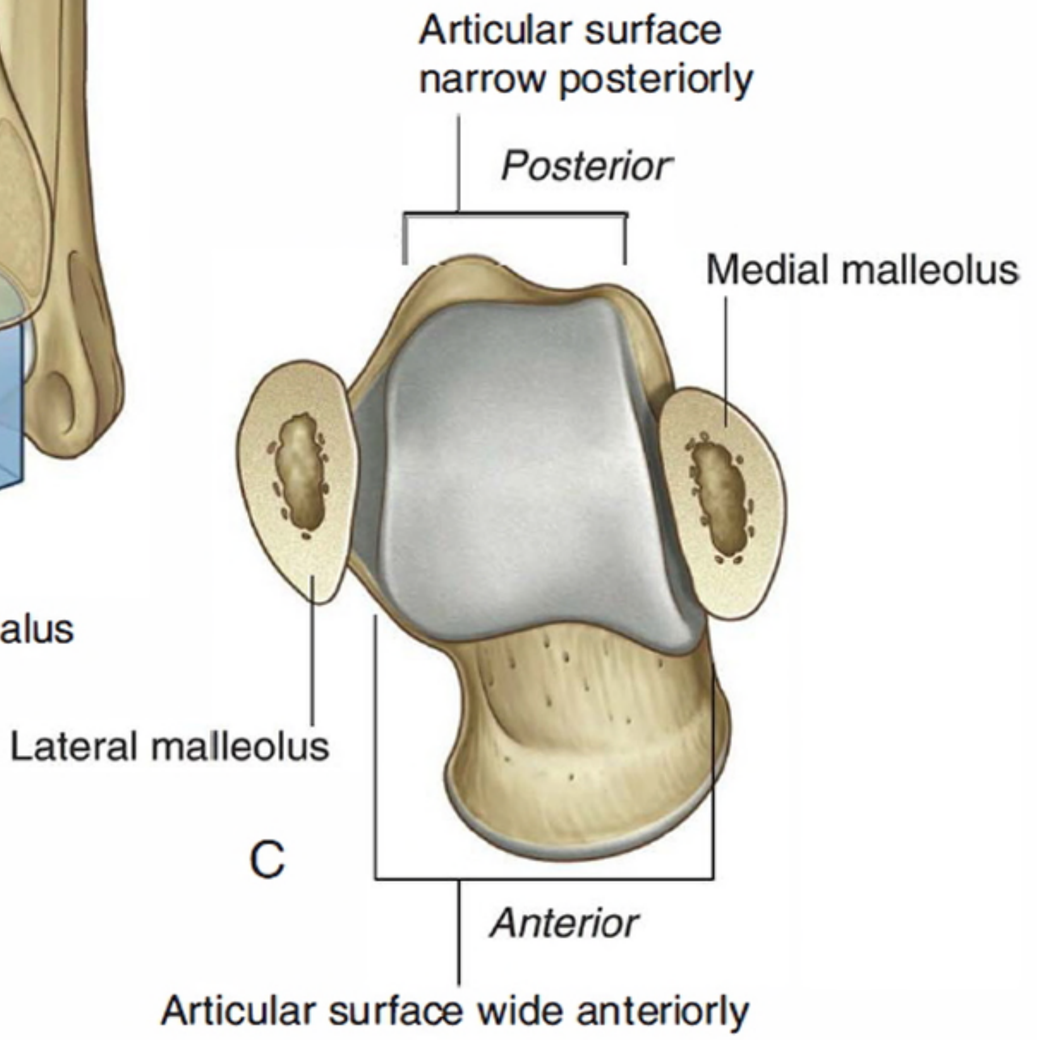


Sever’s Disease: Taping

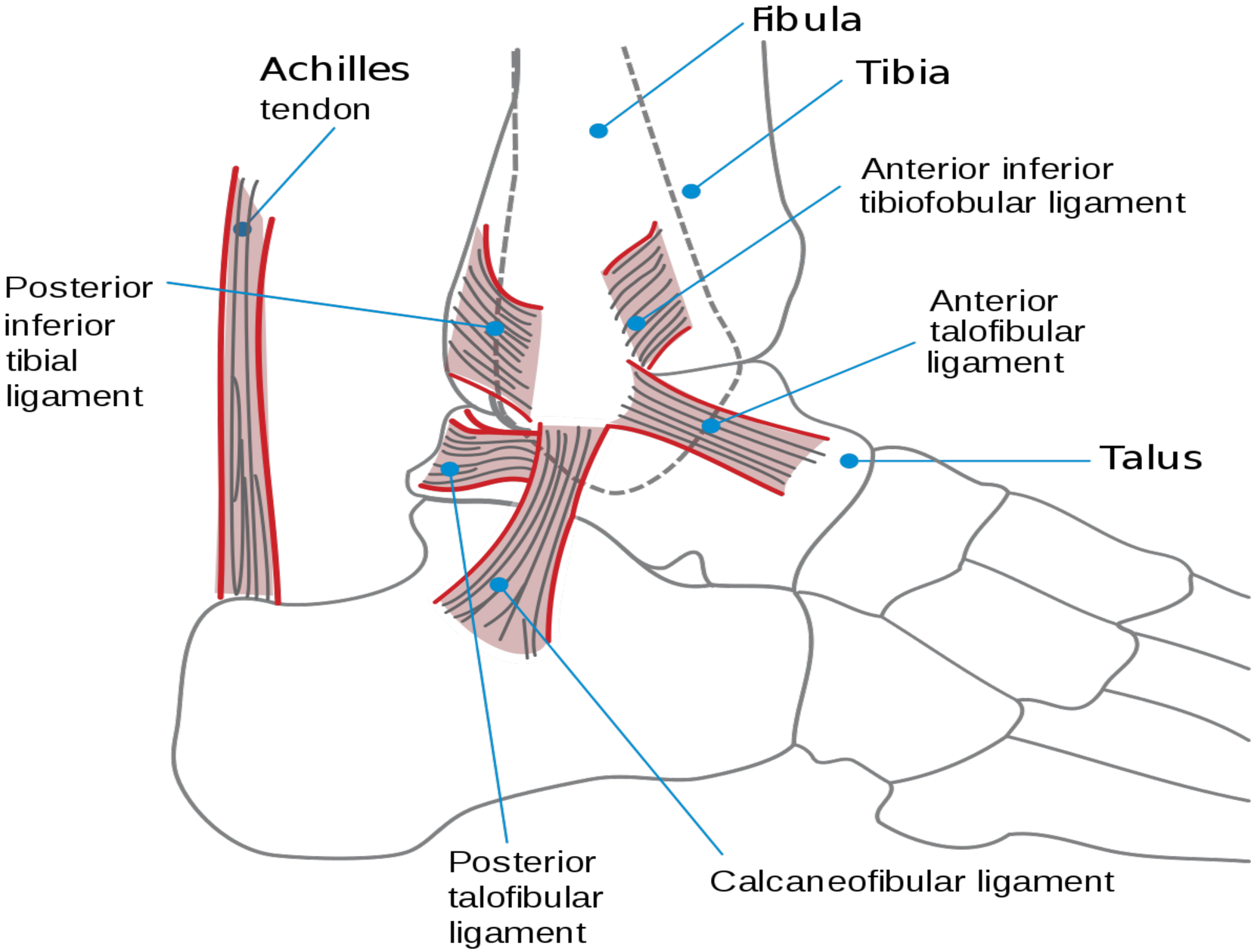
Ankle


Tibia
Interosseous ligament
Fibula
Medial malleolus
Lateral malleolus
Talus
A

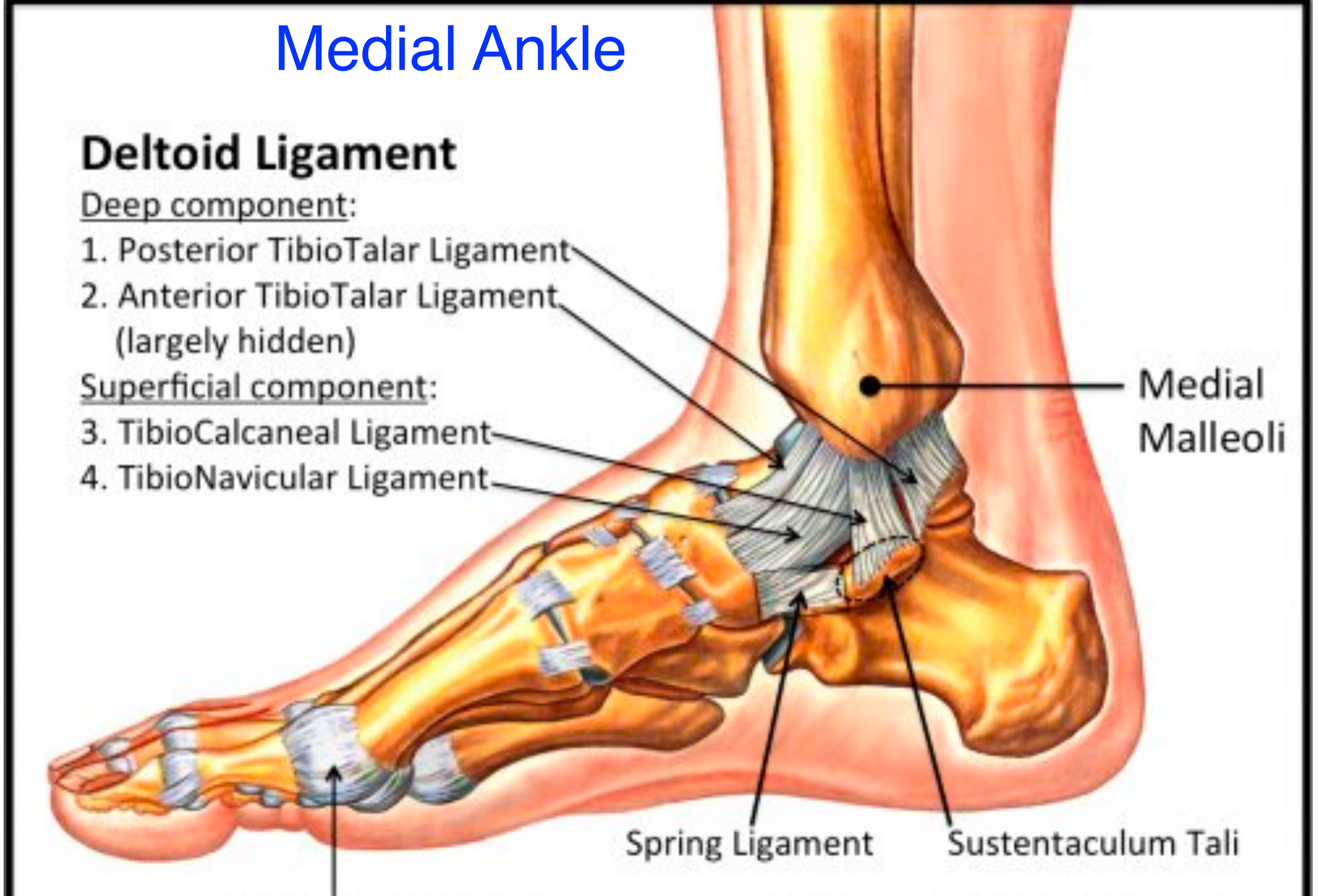

Tibia
Fibula
B
Articular surface of talus


Articular surface narrow posteriorly
Posterior
Medial malleolus
Lateral malleolus
C
Anterior
Articular surface wide anteriorly

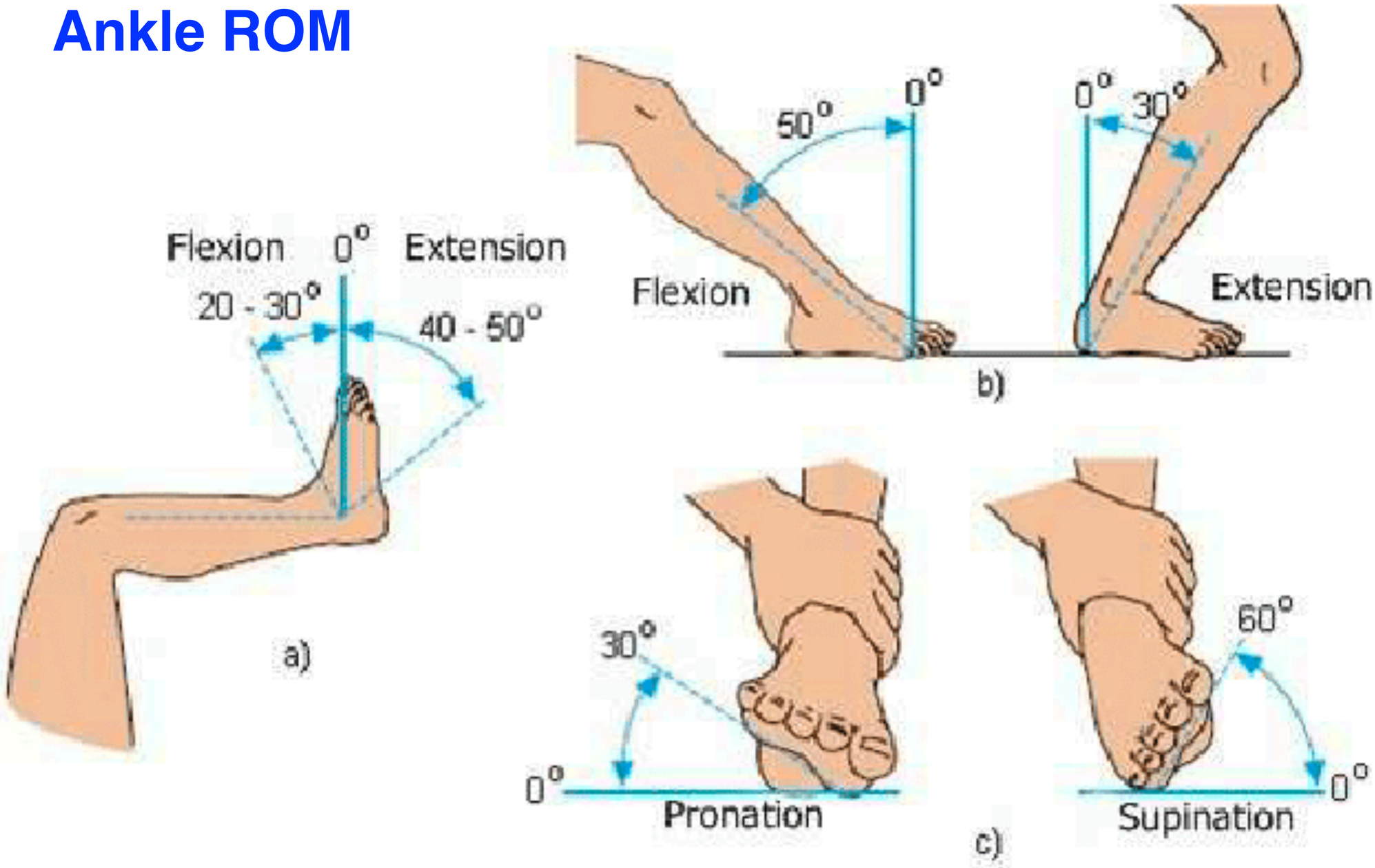
Lateral Ankle



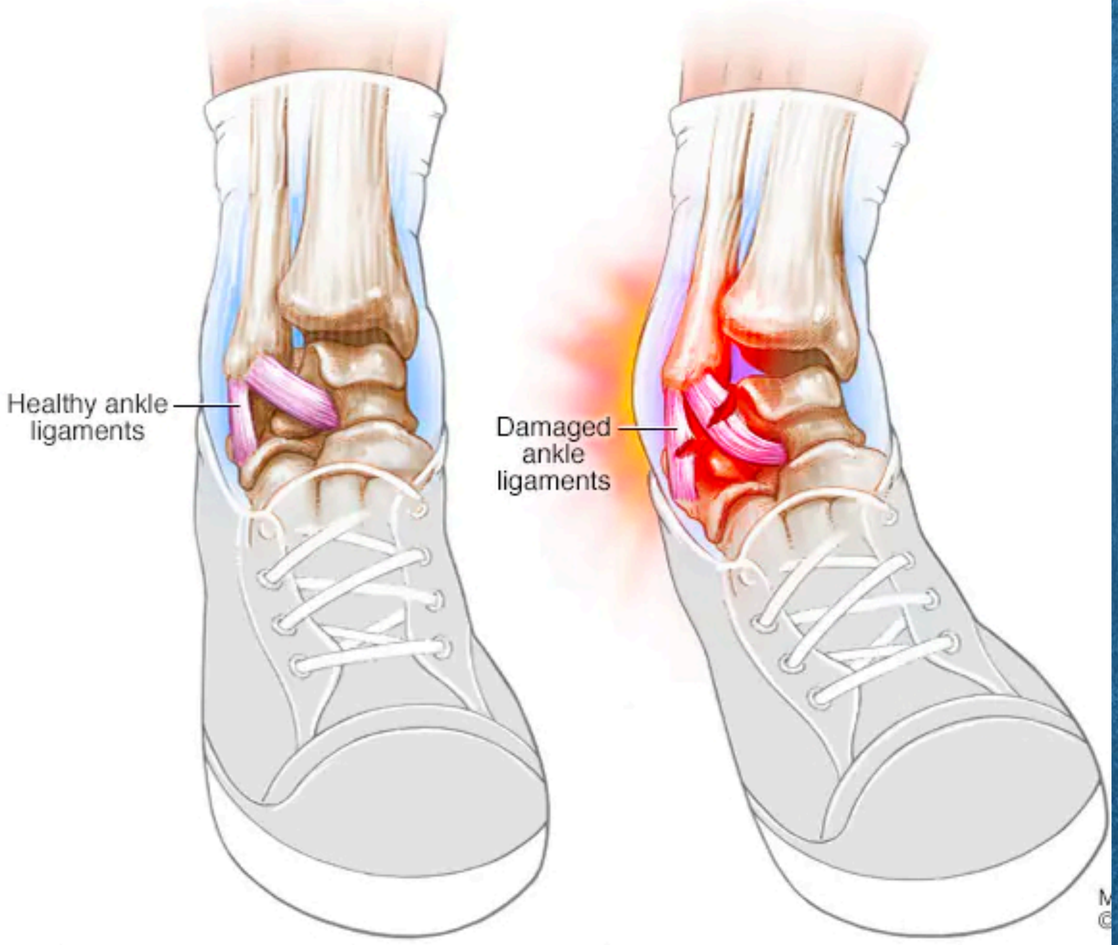
Medial Ankle

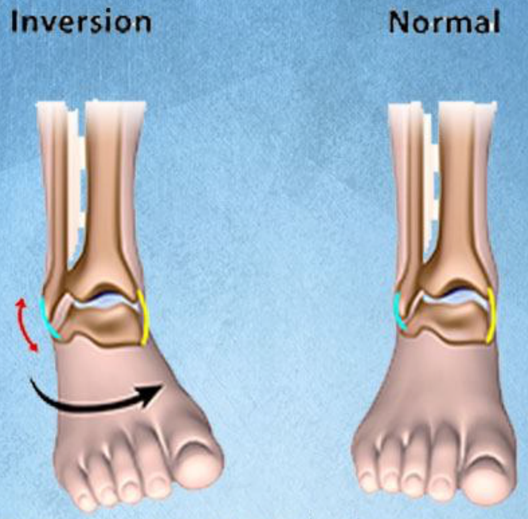


Ankle ROM


Flexion
0°
Extension
20 - 30°
40 - 50°
a)
50°
0°
Flexion
0°
30°
Extension
b)
30°
0°
Pronation
60°
0°
Supination
c)

Sprained Ankle





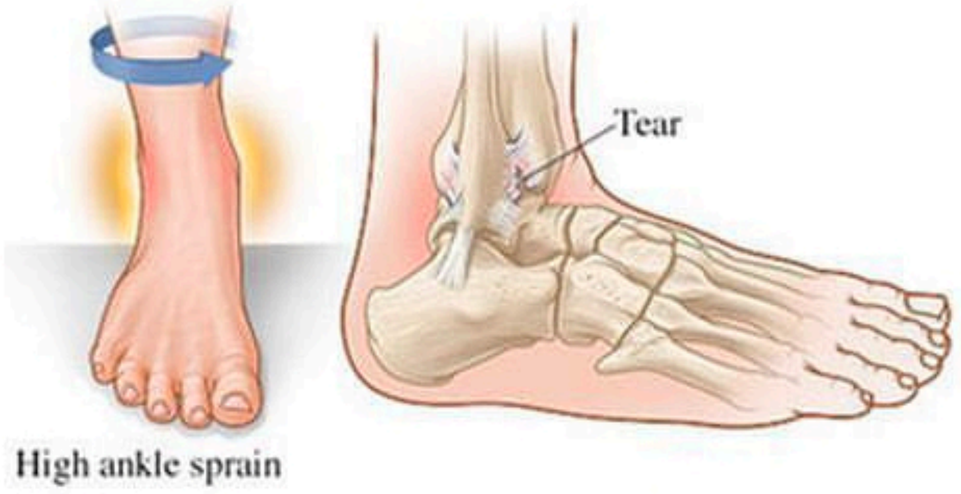
APPROXIMATELY

1 MILLION

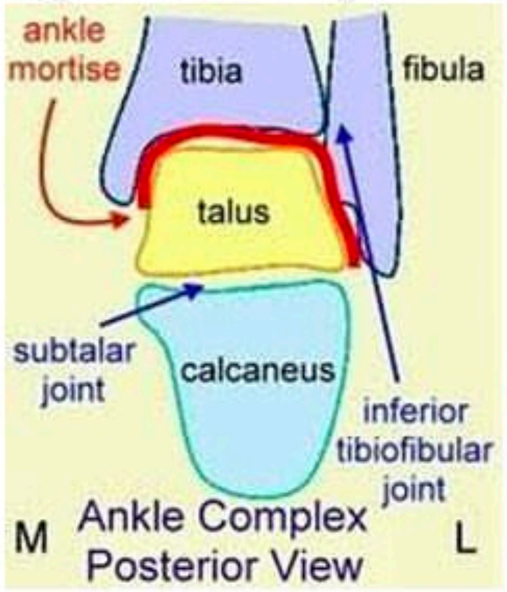
ANKLE INJURIES

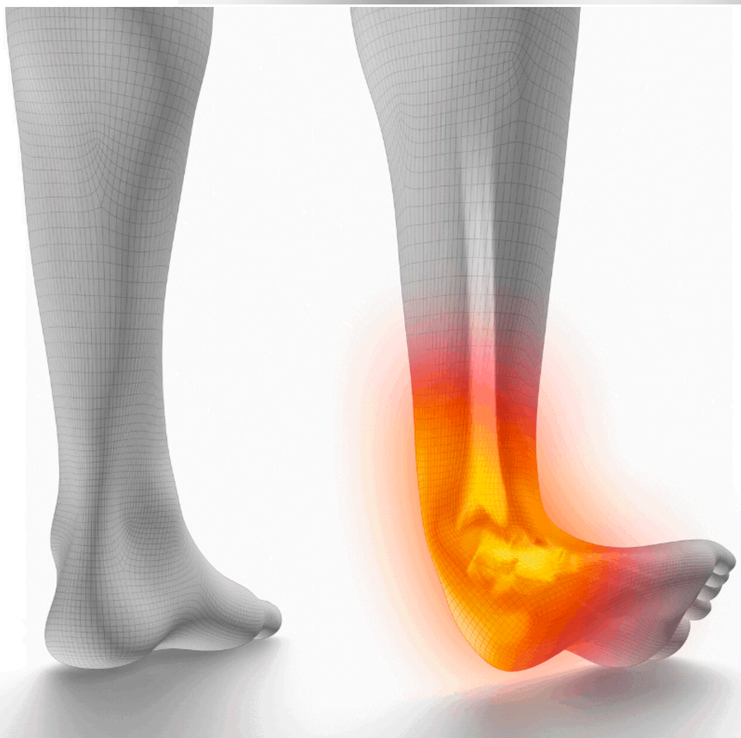
OCCUR EVERY YEAR IN THE U.S., AND MANY OF THEM ARE INVERSION SPRAIN INJURIES.

FOOT LEVELERS

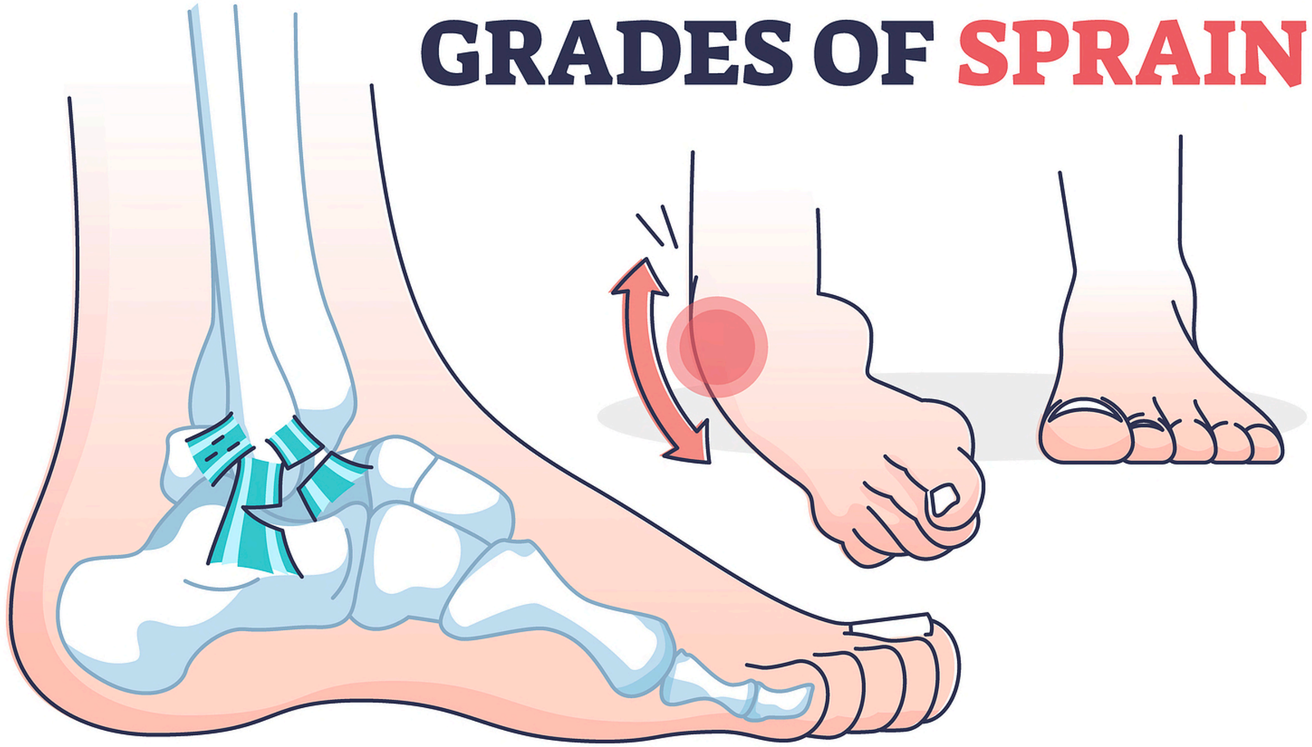


- **Inversion**
  - Anterior Talofibular
  - Calcaneofibular
  - Posterior Talofibular
- **Eversion**
  - Deltoid Ligament
- **Syndesmotic**
  - High ankle sprain





GRADES OF SPRAIN



NORMAL	GRADE 1	GRADE 2	GRADE 3
Healthy	Stretching and Small Tears	Larger Tear	Complete Tear

Sprained Ankle

- Inversion vs. Eversion
- Acute vs. chronic
- Arthritis present?
- End feel (soft or bony?)

SPRAIN vs. STRAIN

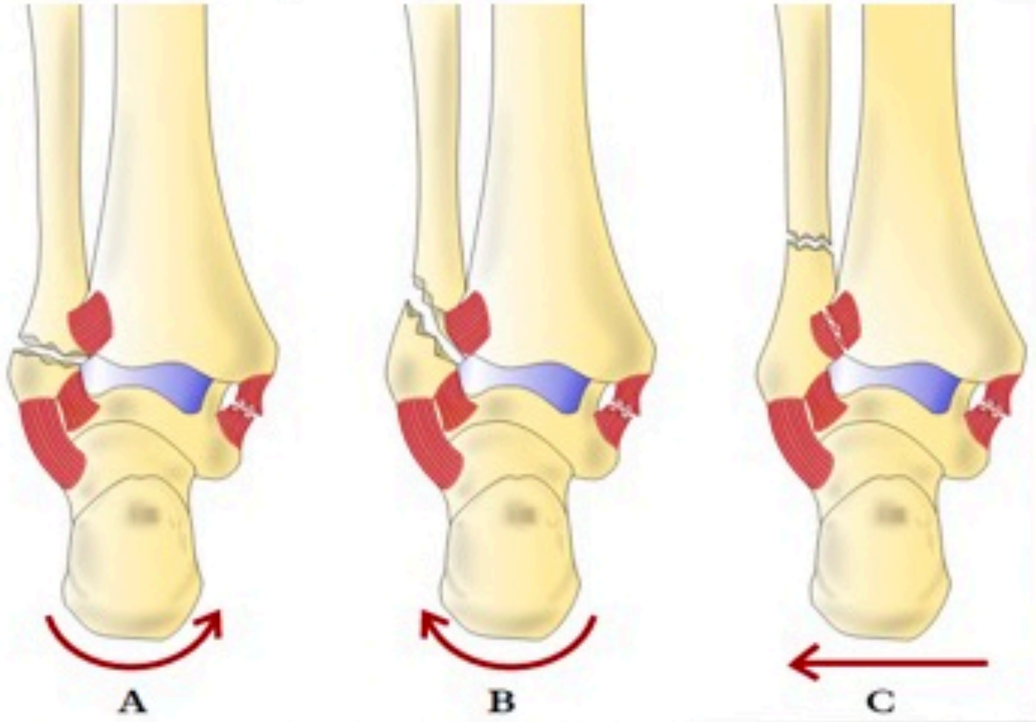
BRACEABILITY

Classification

Weber A
- Fracture inferior to syndesmosis
- Syndesmosis intact
- Medial malleolus may be fractured
- Usually stable
- Reduction and cast
- ORIF occasionally needed

Weber B
- Fracture at level of syndesmosis
- Syndesmosis intact or partially torn
- Possible medial fracture or deltoid damage
- Stability variable
- May require ORIF

Weber C
- Above level of ankle joint
- Tibiofibular syndesmosis damaged → widening of joint
- Usually medial fracture or deltoid injury
- Unstable
- ORIF required



Sprained Ankle: Tx

- Physiotherapy modalities
- Adjust foot/ankle
- Elastic Tape
- Stabilizing Orthotics


1.


Ankle Spiral
1.
2.
3.


ROCKTAPE
Inversion Sprain

TWO TYPES OF ACHILLES TENDONITIS

- **NONINSERTIONAL ACHILLES TENDONITIS**
  Fibers in the middle portion of the tendon begin to break down with tiny tears, causing it to swell, and thicken. Most commonly affects younger, active people.
- **INSERTIONAL ACHILLES TENDONITIS**
  Involves the lower portion of the heel, where the tendon attaches to the heel bone. Can occur at any time, even to people who are not active.

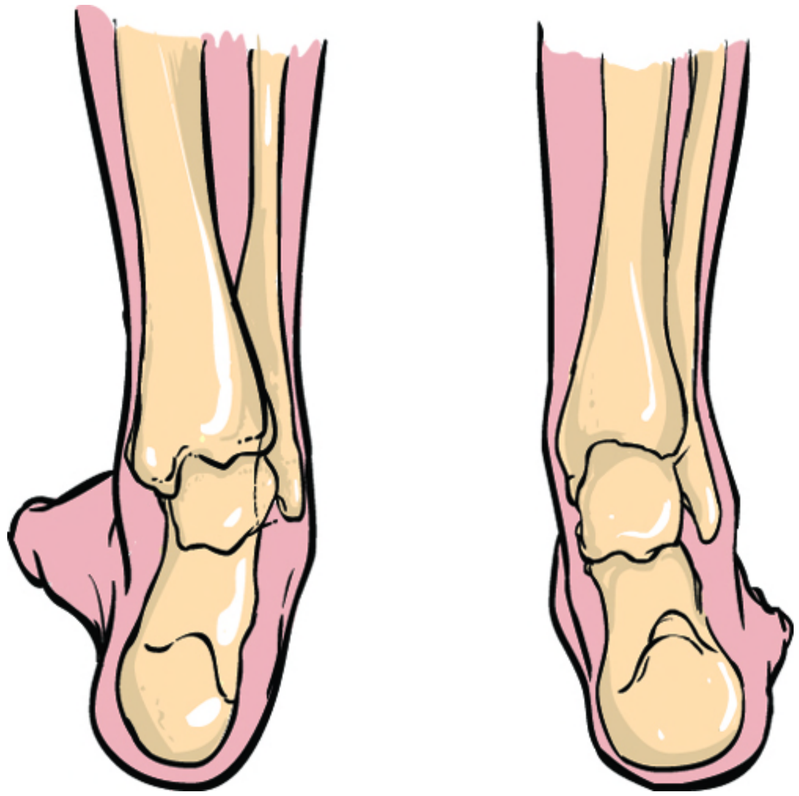
Midportion Achilles tendinopathy

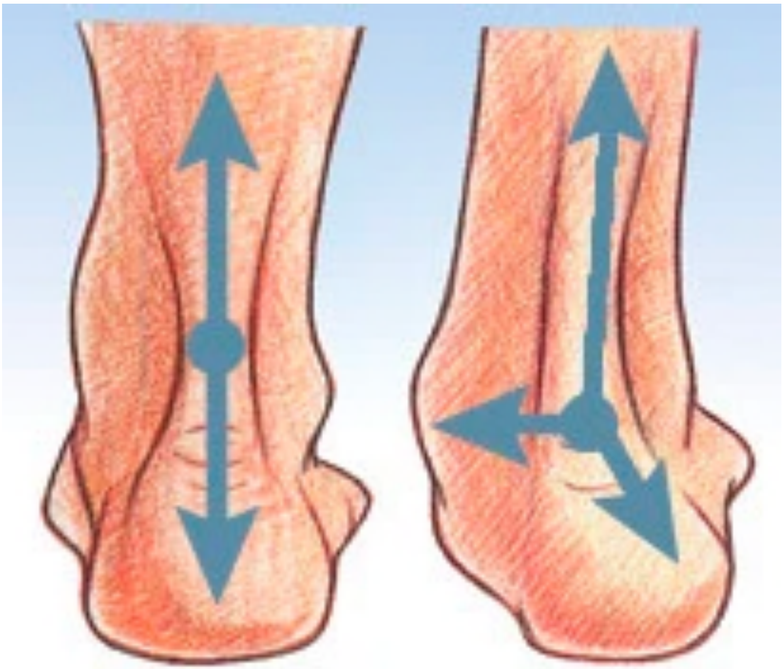
Insertional Achilles tendinopathy


SYMPTOMS OF ACHILLES TENDONITIS
• Severe pain the day after exercising
• Thickening of the tendon
• Pain and stiffness along the Achilles tendon in the morning
• Pain along the tendon or back of the heel that worsens with activity
• Bone spurs (only with insertional tendinitis)
• Swelling that is present all the time and gets worse throughout the day with activity

Achilles Tendonitis: Etiology

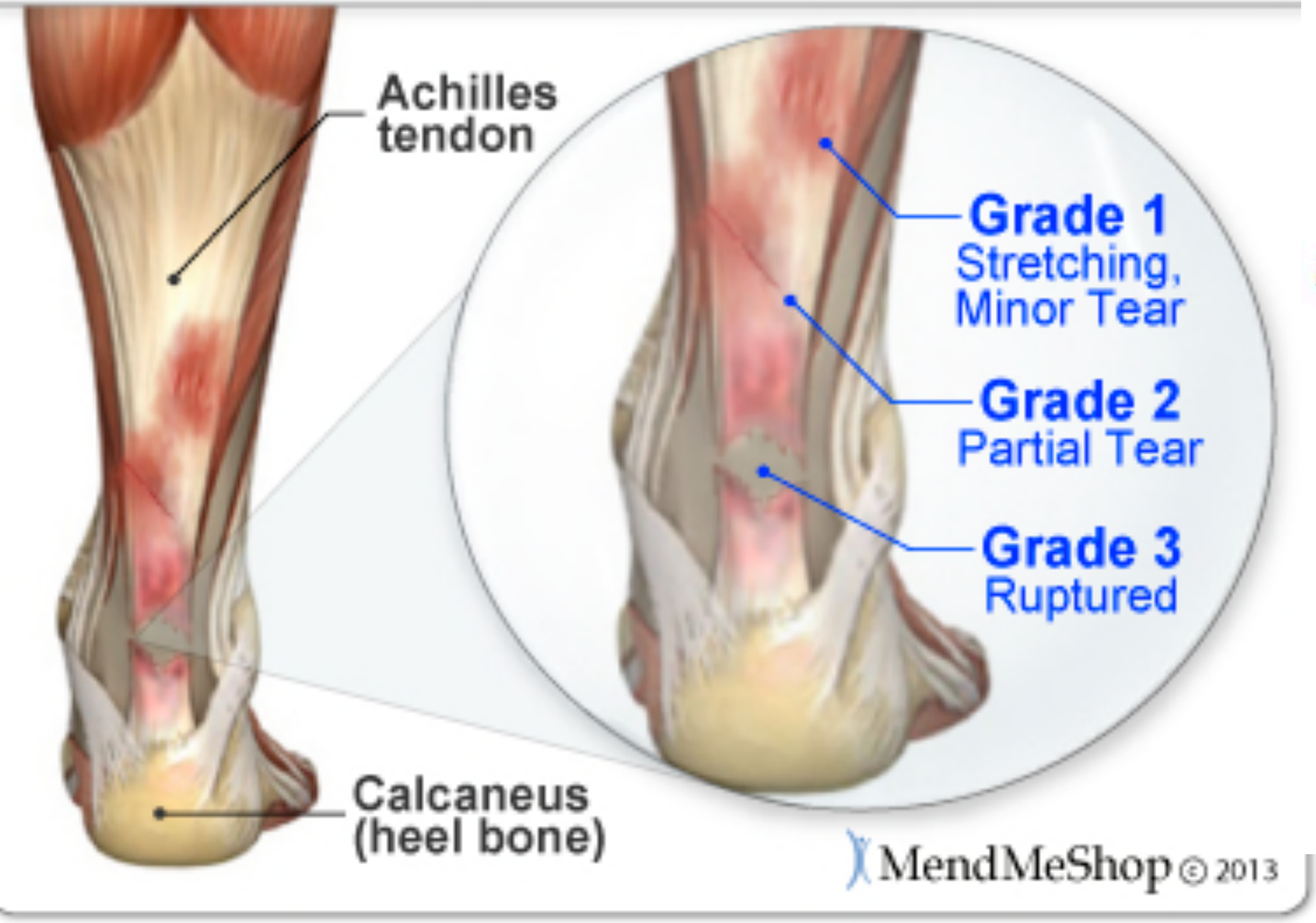
- Excessive Pronation flattens the arches and drops the feet medially.
- Stress on the achilles tendons and they bow inward.

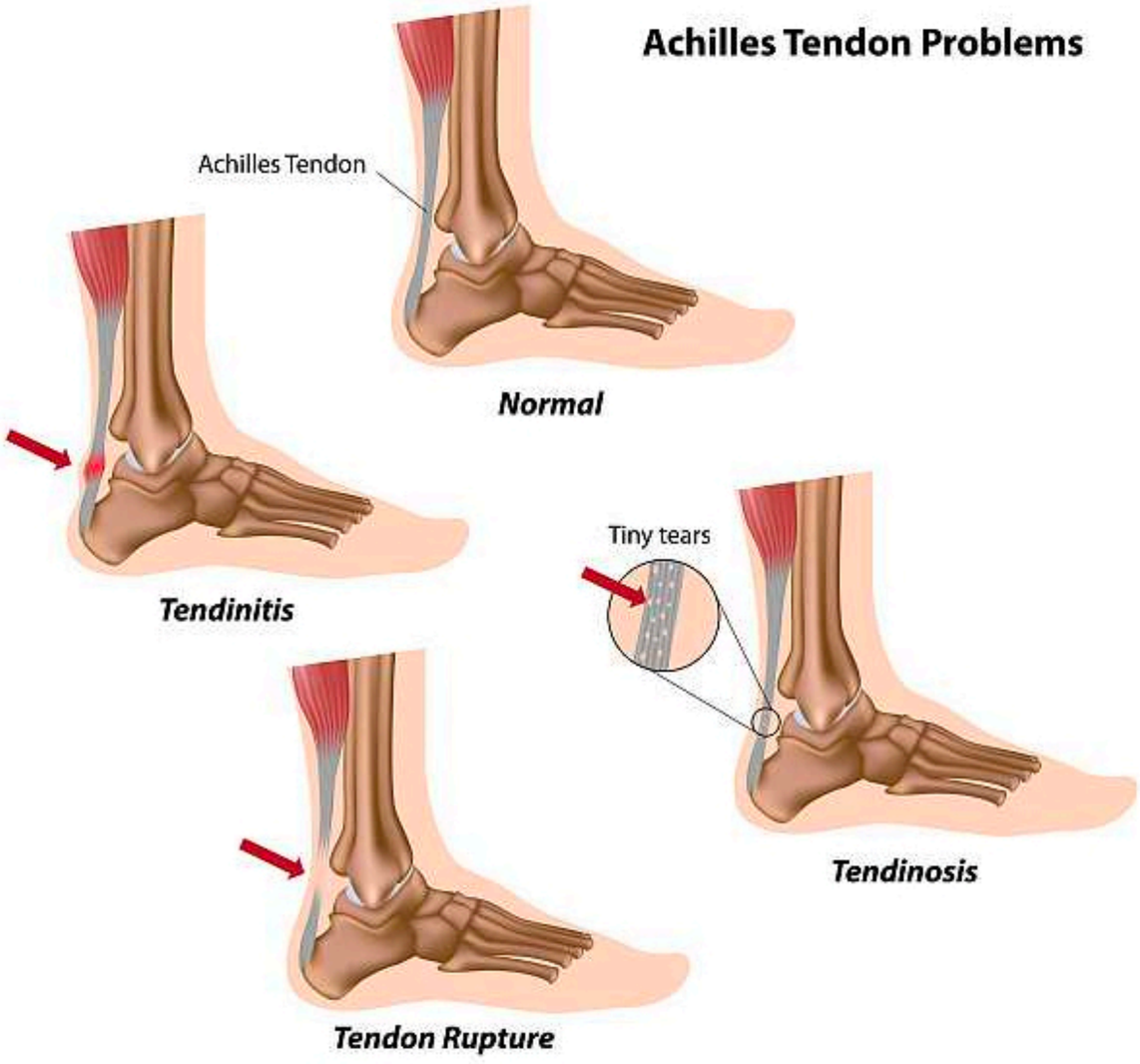




Strained Achilles Tendon

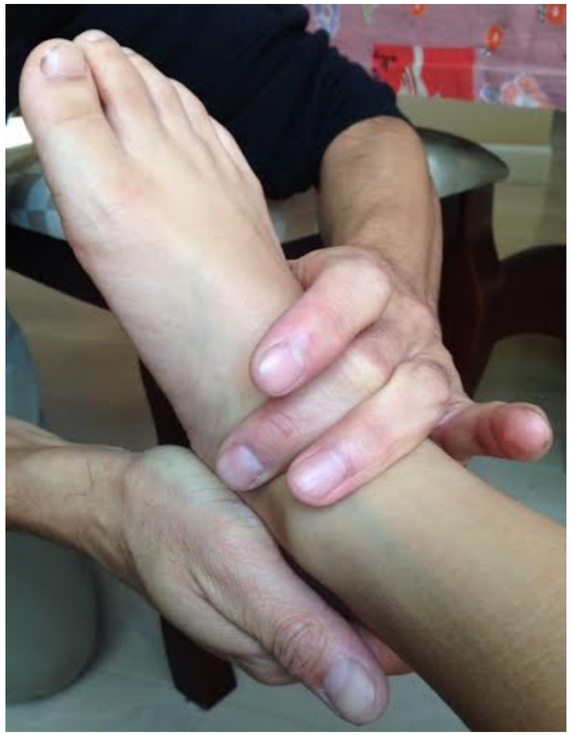
The 3 Different Grades of Tendon Strains



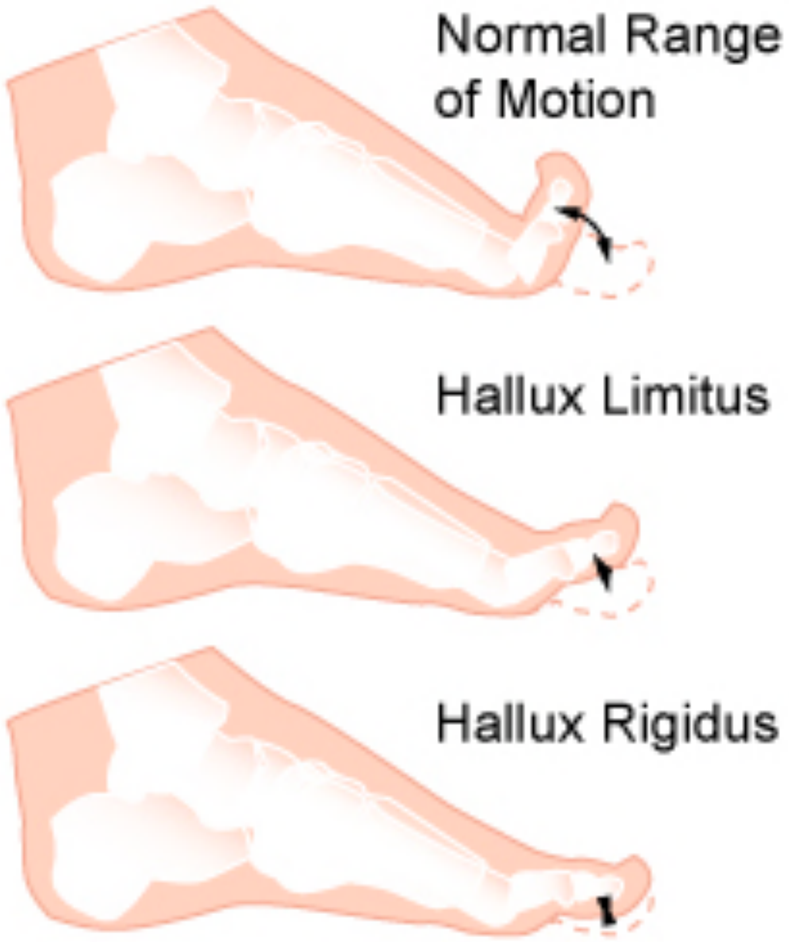


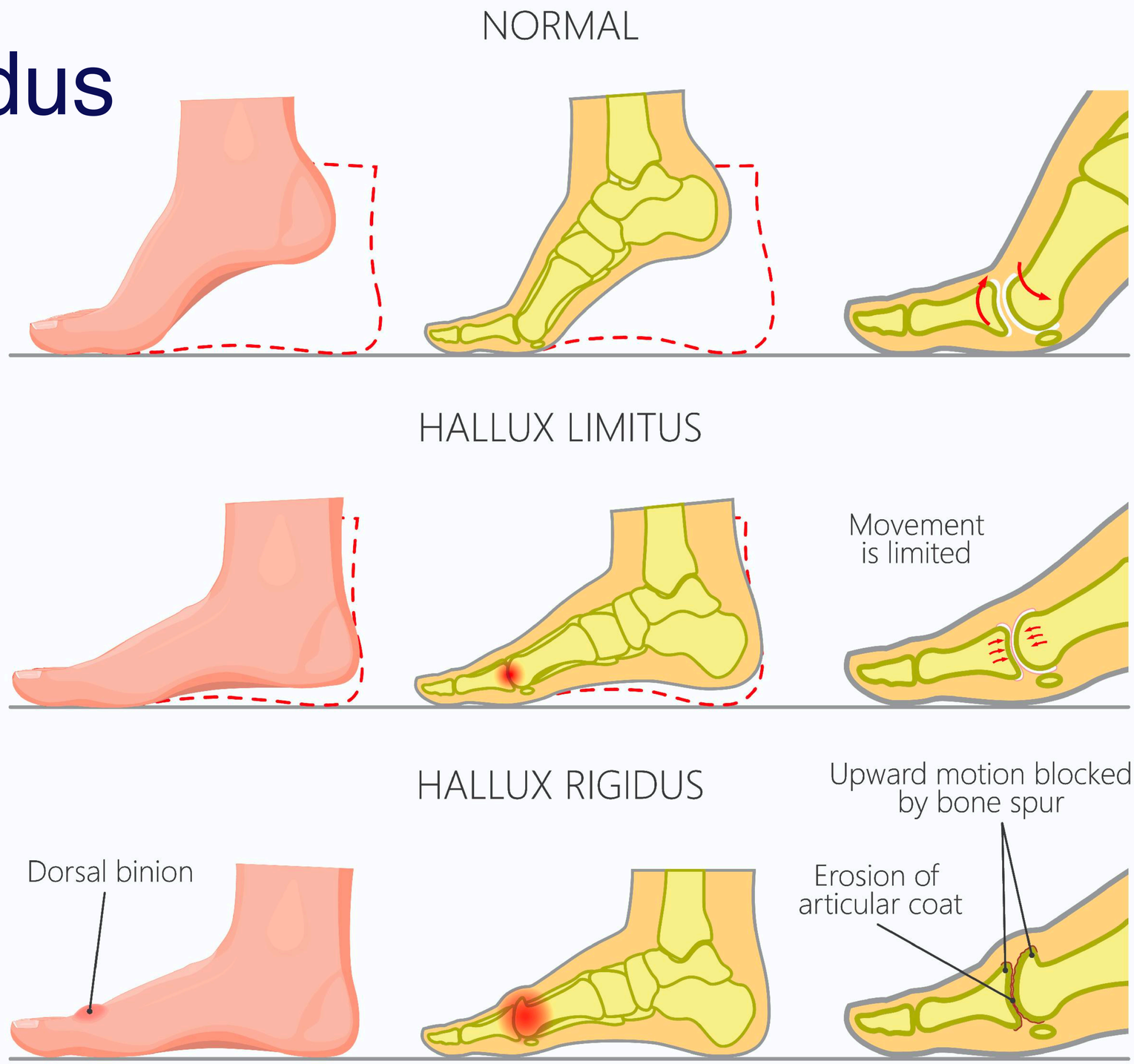
Achilles Tendonitis: Tx

- Physiotherapy Modalities
- Adjust Foot/ ankle
- Elastic Tape
- Stabilizing Orthotics



Hallux Limitus/Rigidus





SYMPTOMS OF HALLUX RIGIDUS

Early symptoms and signs include:

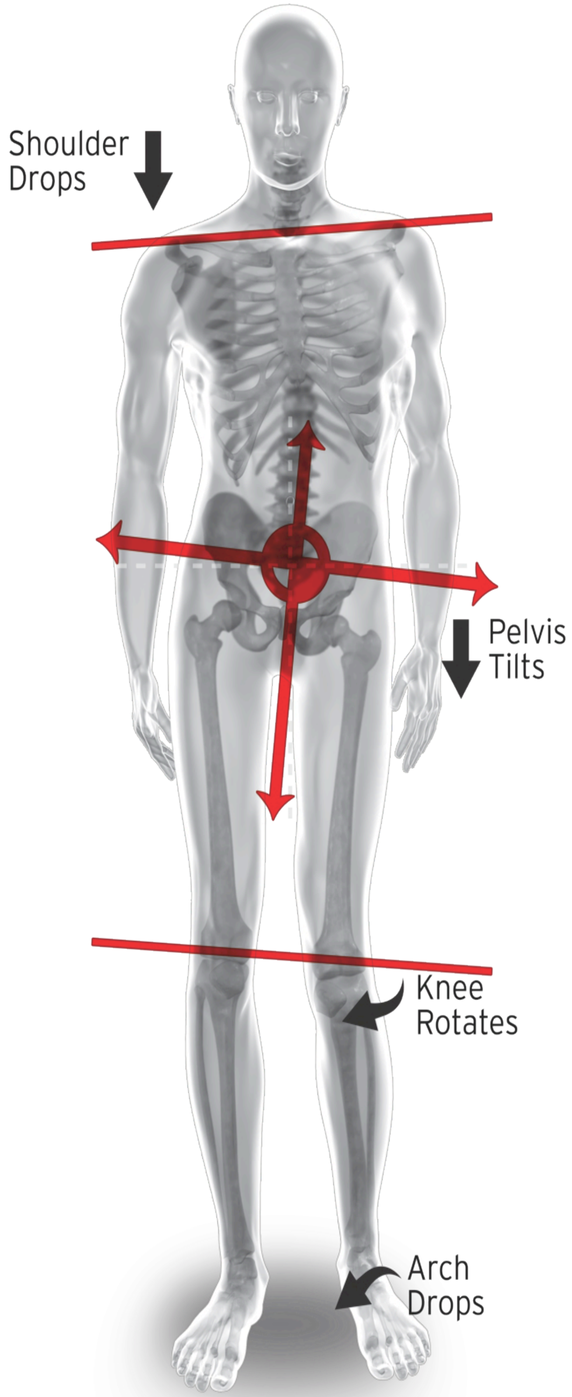
- Pain and stiffness in the big toe.
- Difficulty with certain activities such as running or squatting.
- Swelling and inflammation around the joint.

As the condition gets more severe over time, the following symptoms will begin to appear:

- Chronic toe pain.
- Bone spurs (bone overgrowths).
- Dull pain in the hip, knee, or lower back.
- Limping.

WHY SHOULD YOU CARE ABOUT THE FEET?

- Most Chiropractors NEVER check the feet.
- Medical Professionals are too focused on the location of the pain and they ignore the “Big Picture”.
- The feet support and balance the entire body, including the shoulders, neck and TMJ.
- Without proper support arch issues of the feet only worsen with age; they do not improve.
- Extremity problems will destabilize the spine. Stabilize the extremities and the spine follows.


Shoulder
Drops
Pelvis
Tilts
Knee
Rotates
Arch
Drops