The Feet and Ankles:
The Foundation of Your Body

Kevin M. Wong, DC

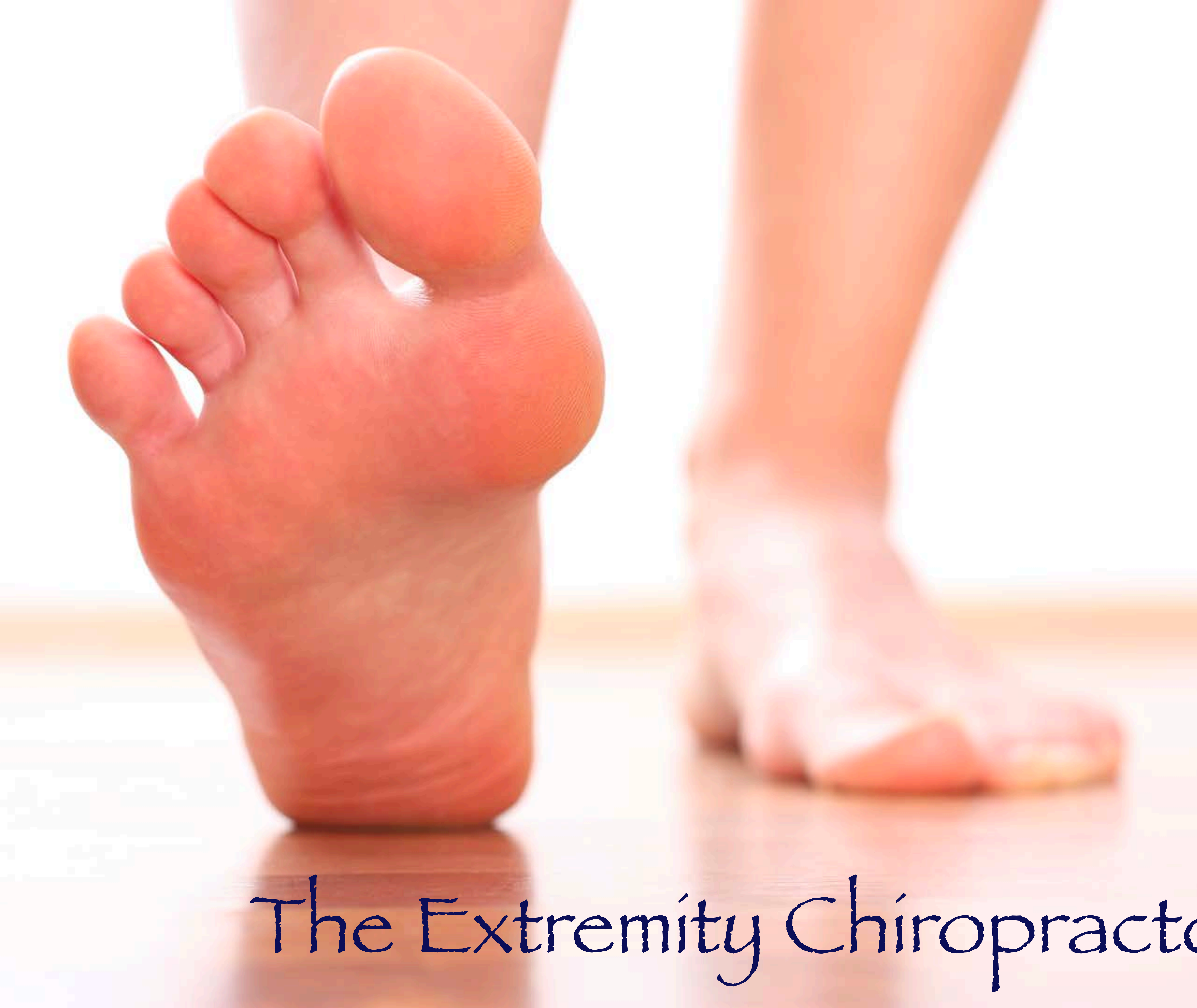
Thank You All for being Here!

FLORIDA

PALMER

FOOT LEVELERS

FOOT LEVELERS



The Extremity Chiropractor

FOOT LEVELERS

UCDAVIS
AGGIES

UCDAVIS
UNIVERSITY OF CALIFORNIA

PALMER
College of
Chiropractic
SAN JOSE
CAMPUS

WEST
PALMER

FOOT LEVELERS
(Since 2004)

FOOT LEVELERS
CERTIFIED
PROVIDER

ROCKTAPE
Go stronger longer

FMT

FMT
CERTIFIED

FMT BASIC
KINESIOLOGY TAPING CERTIFICATION

FMT

MEMBER OF THE
CALIFORNIA CHIROPRACTIC ASSOCIATION
CAL CHIRO

FOOT LEVELERS


Kauai, November 2023

Foot Levelers Florida Territory Representative:

Robert Boardwine

FOOT LEVELERS

GOALS:

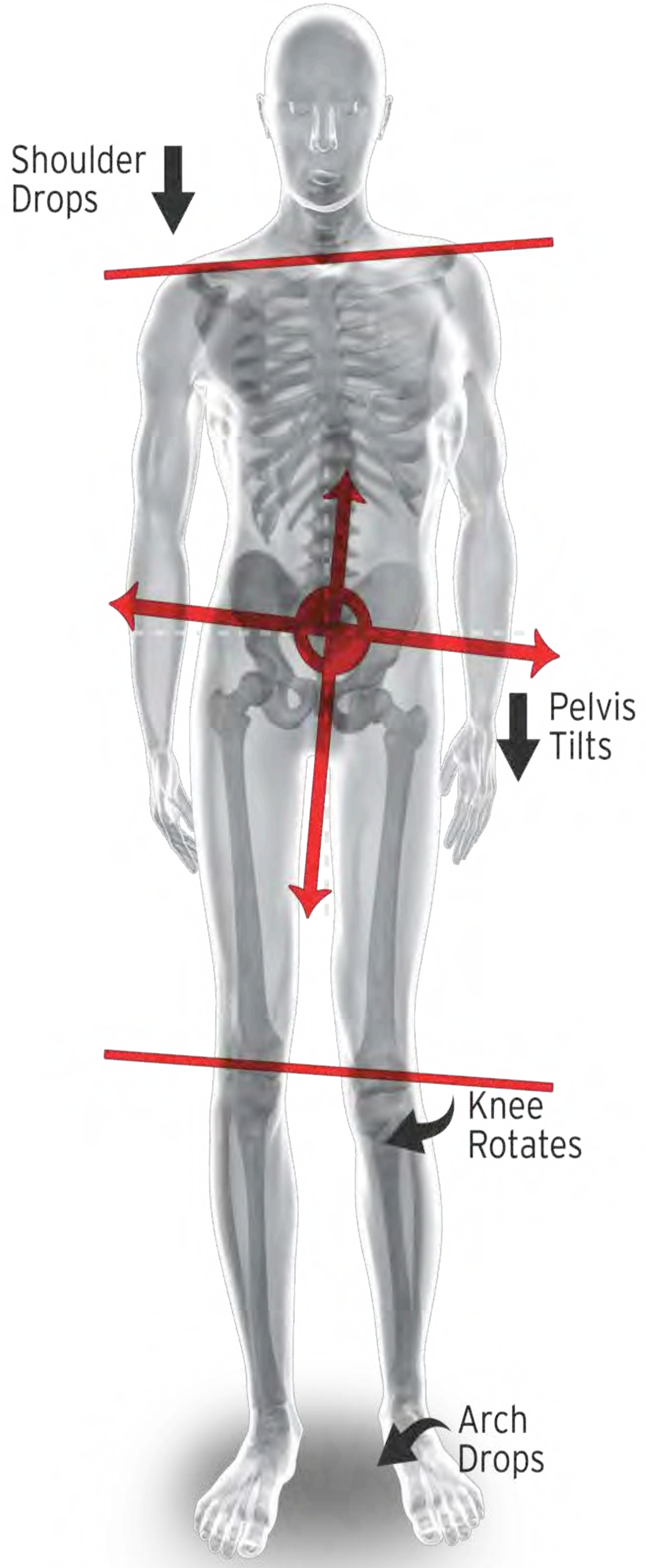
- Confidently evaluate/treat your patients' feet/ankles.
- Understand how the extremities affect the axial spine.
- Introduce/review useful adjustments for the feet/ankles.

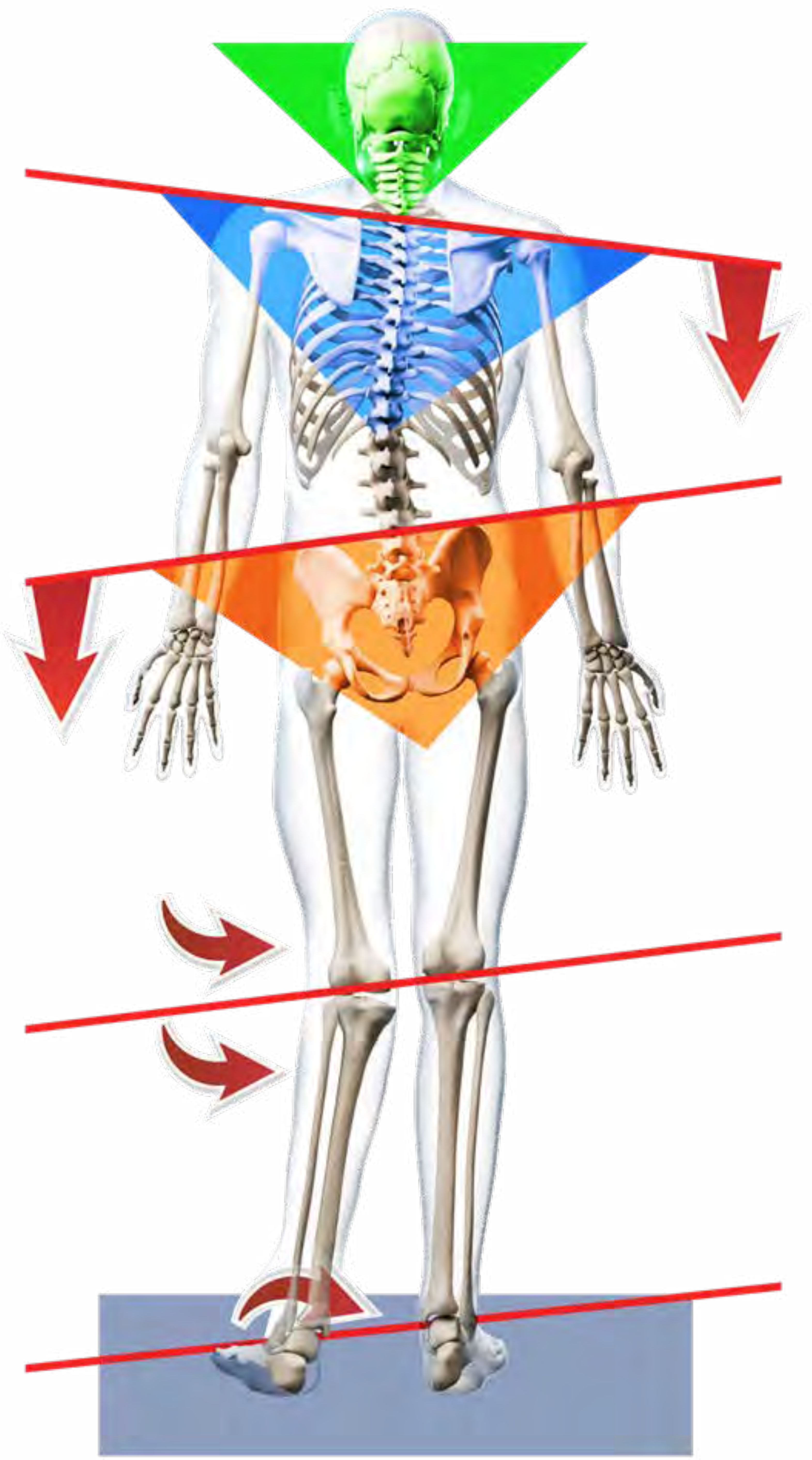
FOOT LEVELERS

Inspire you to evaluate **ALL** of your patients feet..

because you understand **WHY**

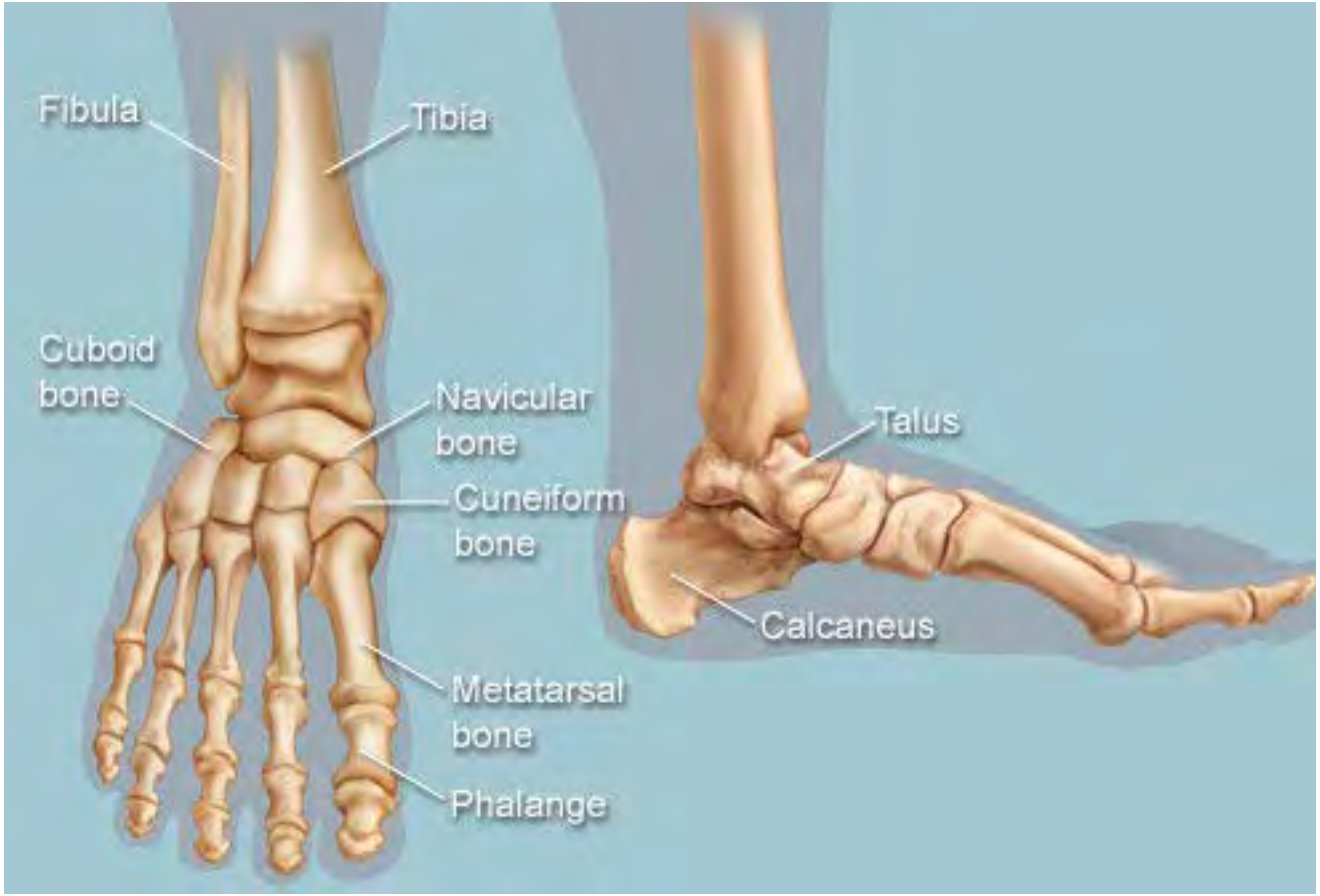

The Riches
Are in
the Niches





FOOT LEVELERS

Game Plan



FOOT LEVELERS

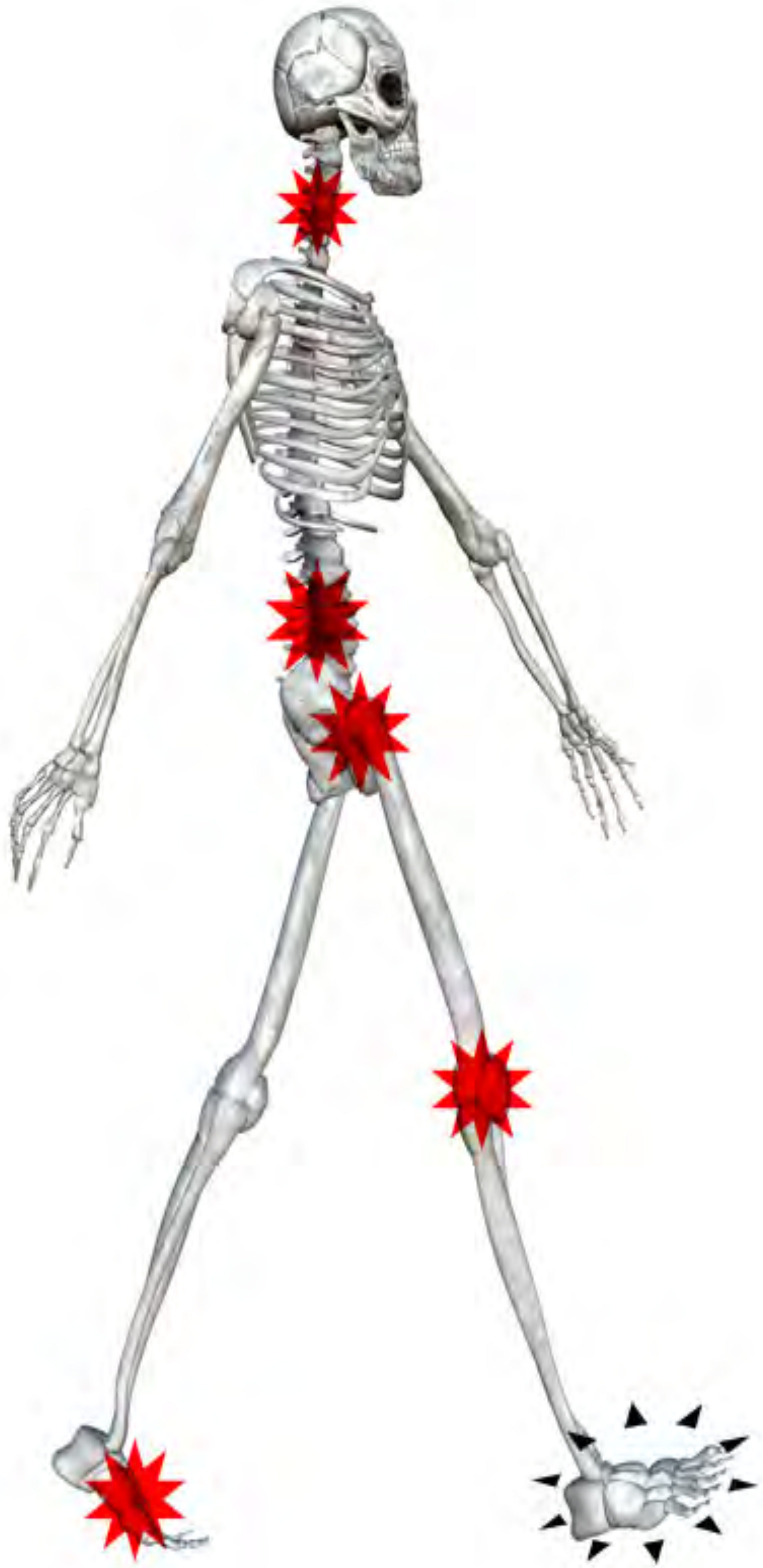
When the foundation of your home is not level, the walls will start cracking and crumbling which can create problems on your top floor.

FOOT LEVELERS

Start with the foundation

FOOT LEVELERS

Every biomechanical imbalance is transmitted to the spine

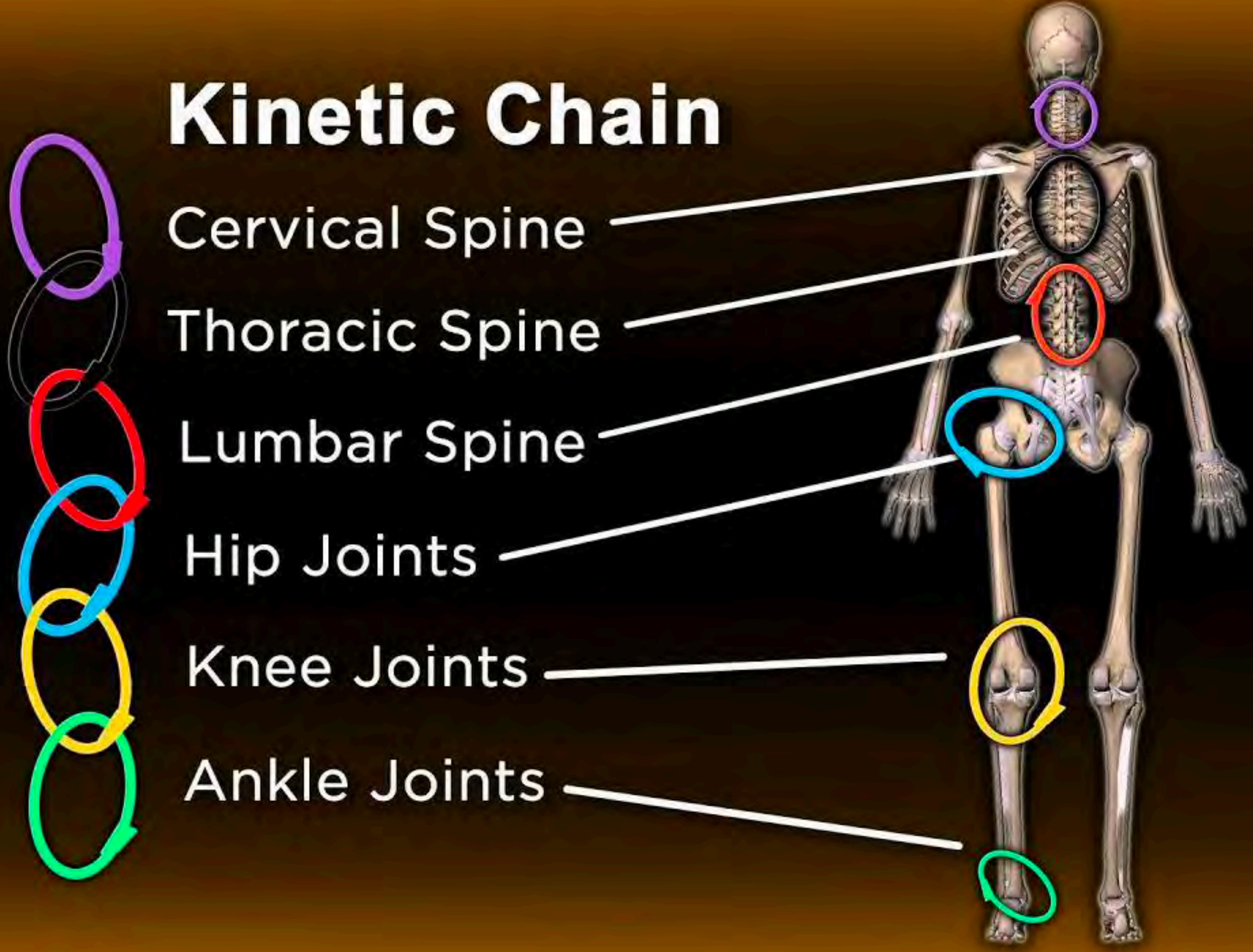


FOOT LEVELERS


Different surfaces effect forces on the LE and body

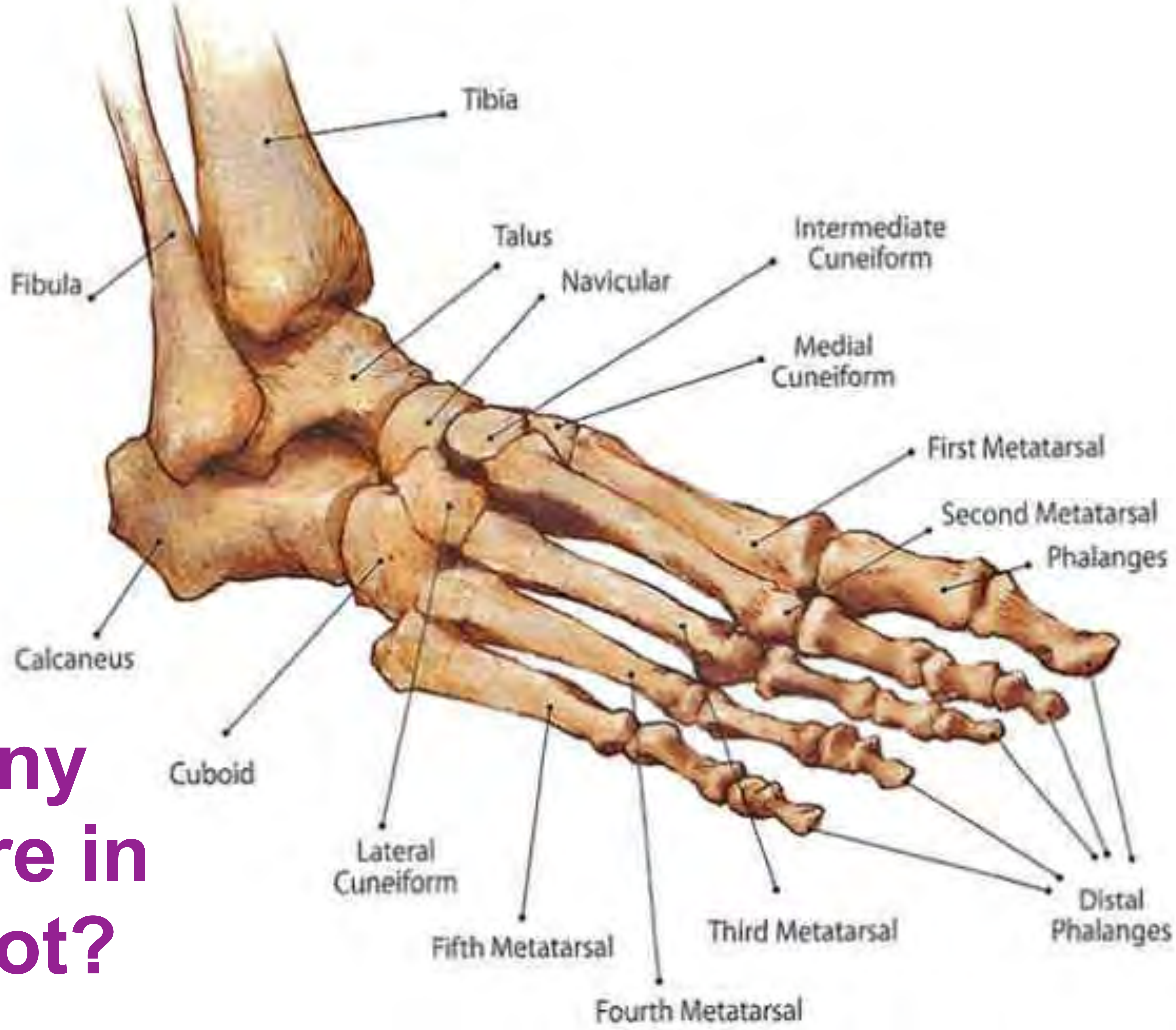
LE significantly affects the body and clinical conditions showing up in your practice.

FOOT LEVELERS


Kinetic Chain
Cervical Spine
Thoracic Spine
Lumbar Spine
Hip Joints
Knee Joints
Ankle Joints

FOOT LEVELERS


LOSE
THE
SHOES



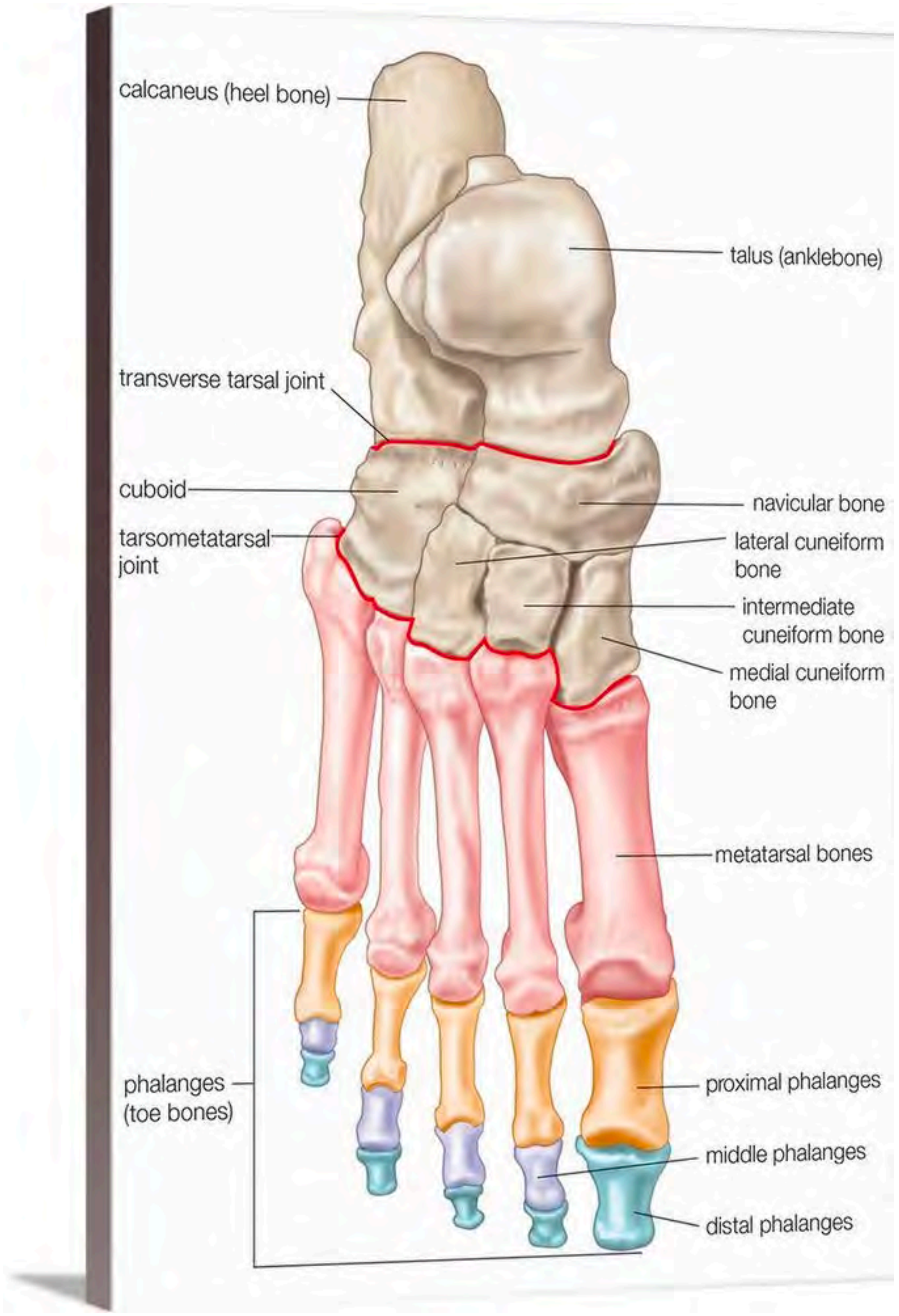
How many bones are in each foot?

FOOT LEVELERS

Medial view


Transverse tarsal joint
Navicular
Tuberosity
Neck
Talus
Head
Trochlea
Posterior process
Cuneiform bones
Intermediate
Medial
Tarsometatarsal joint
Metatarsal bones
2
1
Phalanges
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.

FOOT LEVELERS


posterior
malleolus
tibia
fibula
medial
malleolus
lateral
malleolus
talus
Ankle

PARTNER UP!

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 LEVELERS

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?

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How many arches do patients think we have?

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THE ARCHES

- Plantar vault
- Not present at birth

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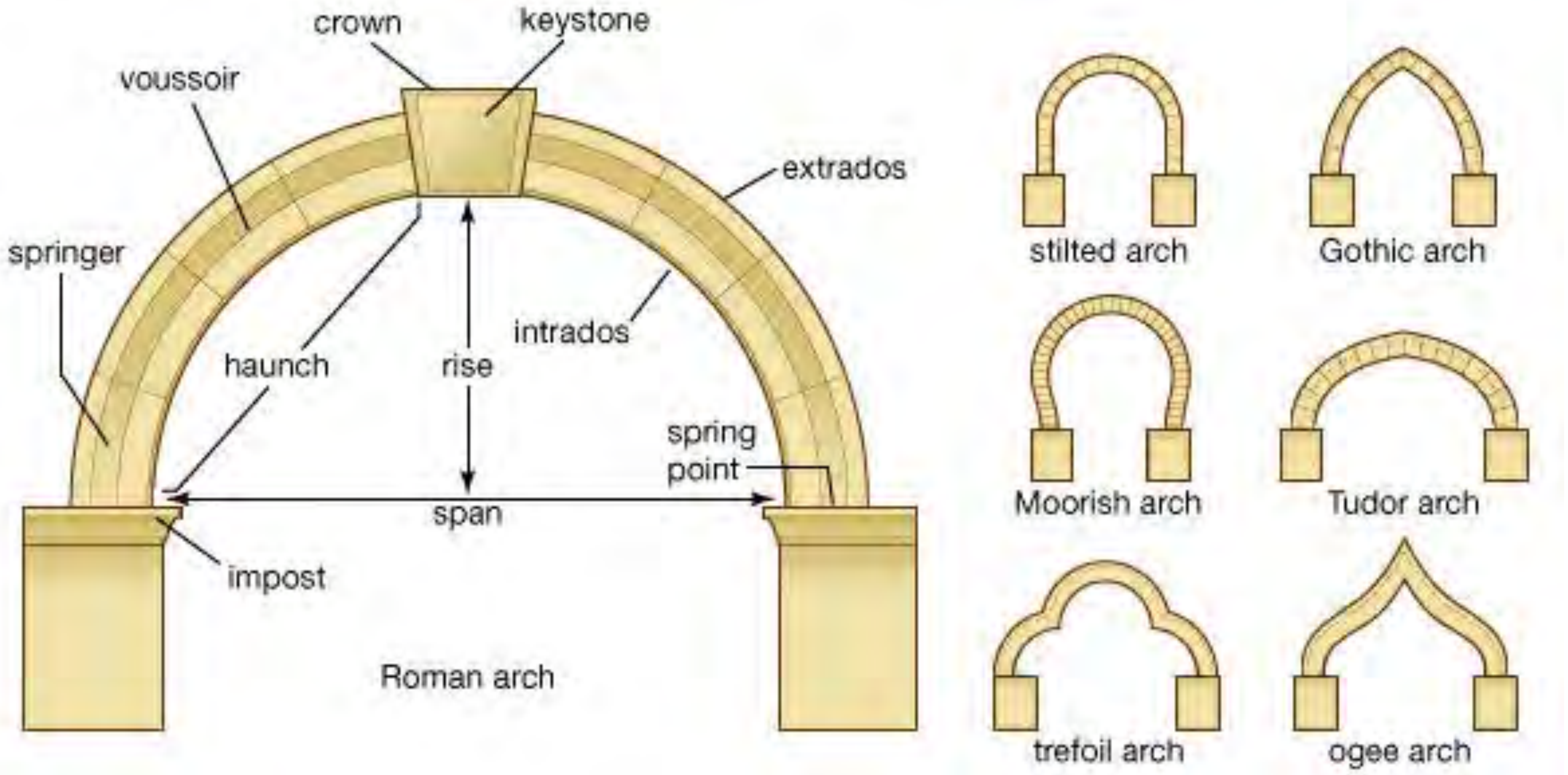
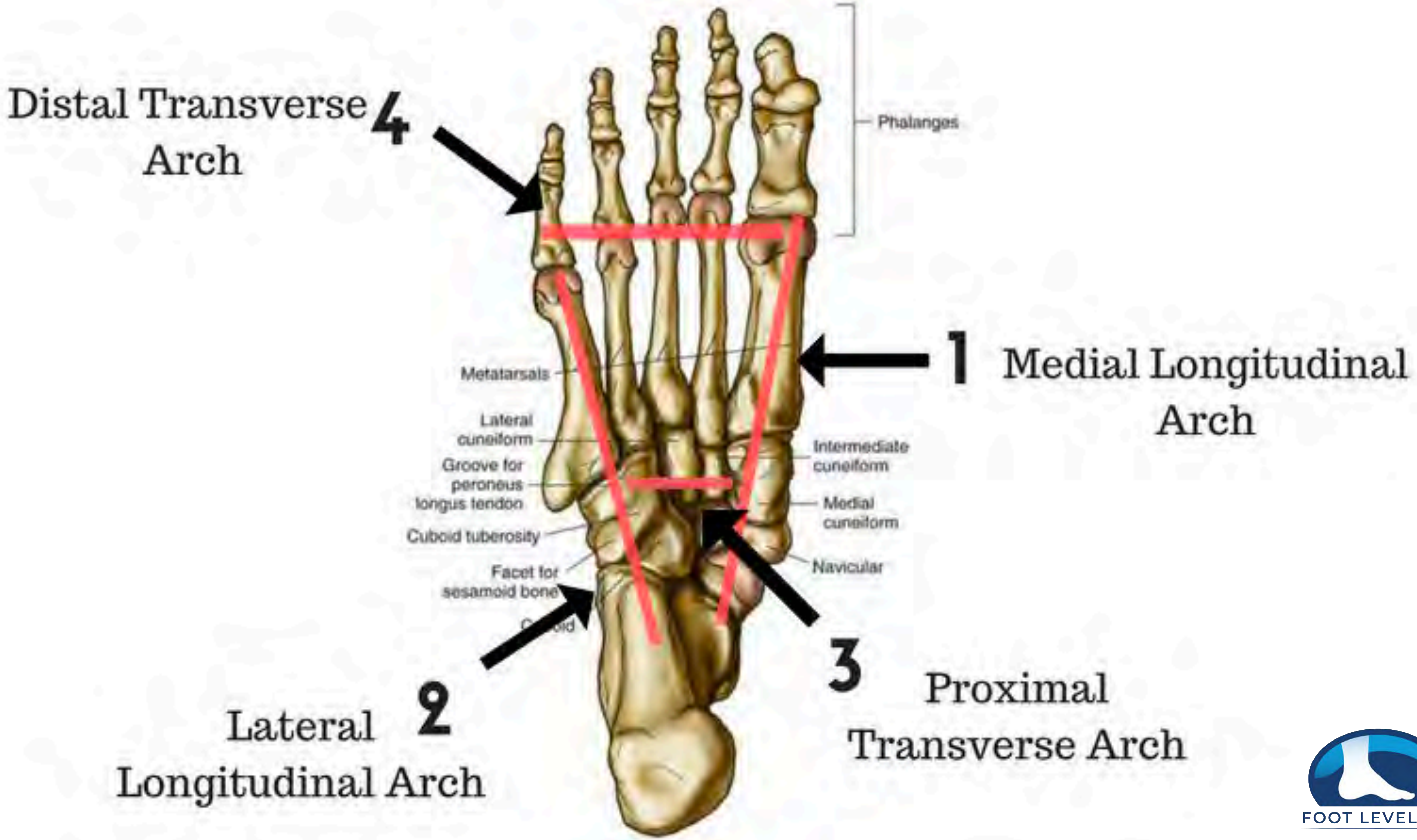
Arch Architecture

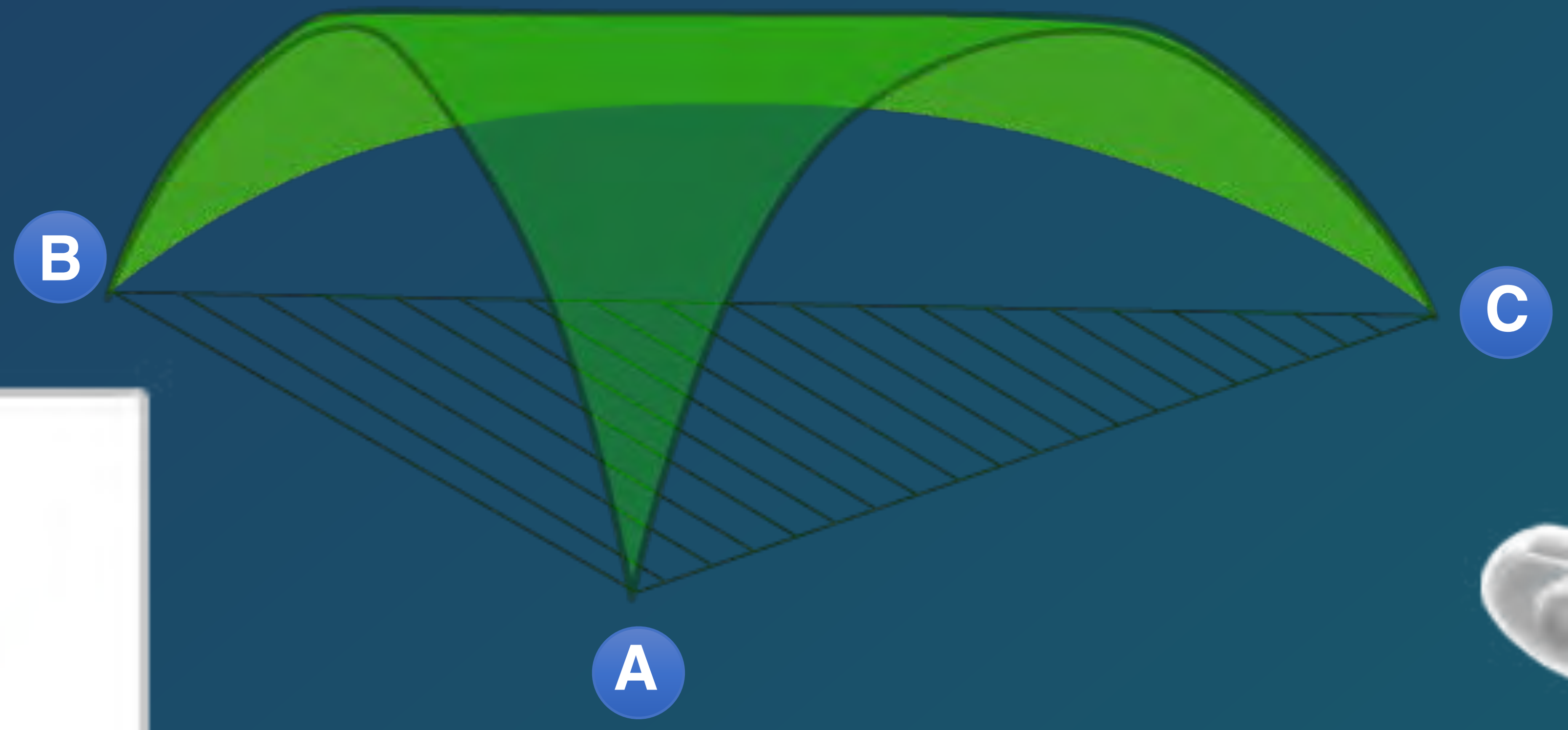


FOOT LEVELERS

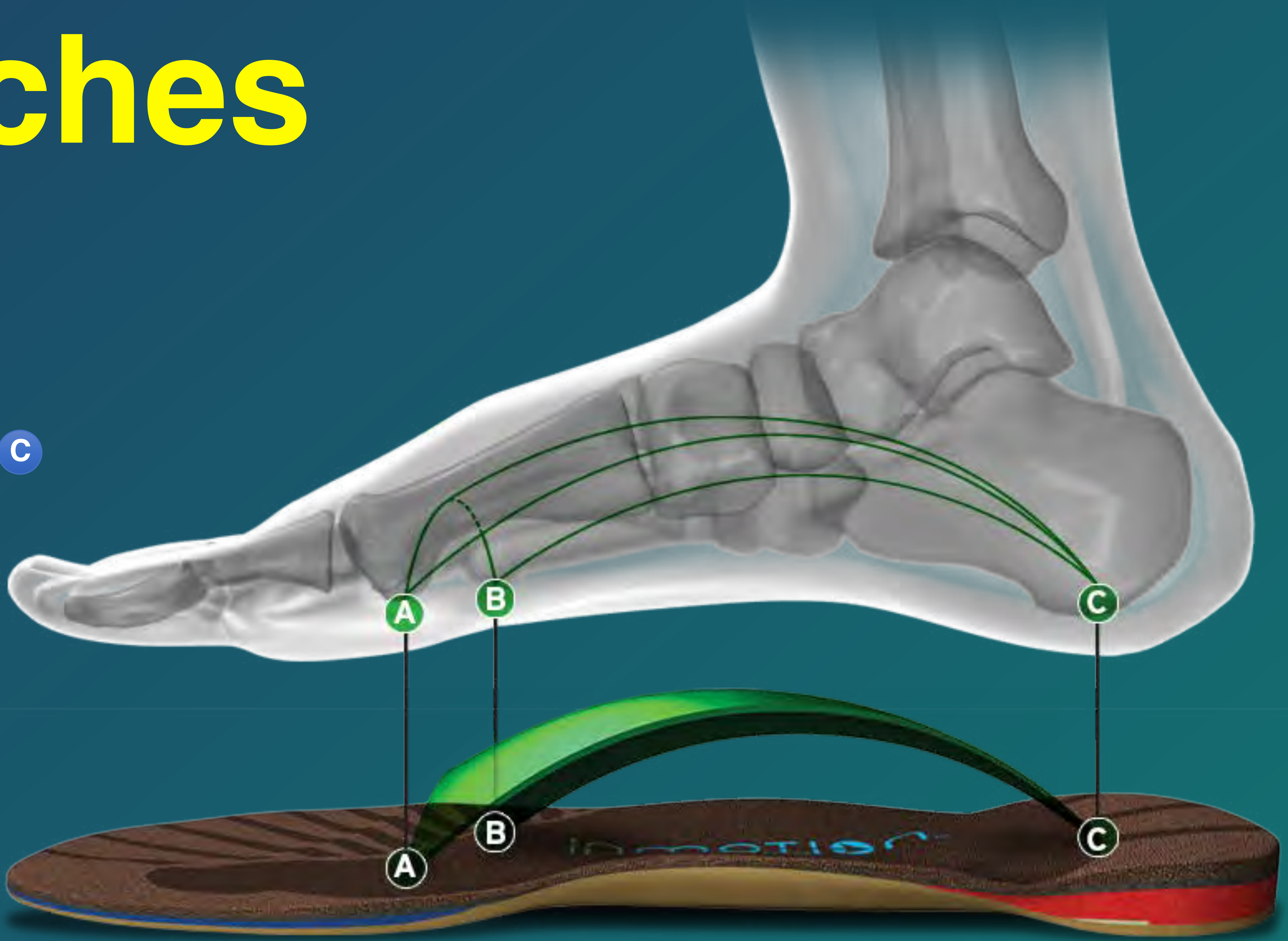
Colloseum - Rome (80 AD)


Distal Transverse Arch
4
Phalanges
1
Medial Longitudinal Arch
Metatarsals
Lateral cuneiform
Intermediate cuneiform
Groove for peroneus longus tendon
Medial cuneiform
Cuboid tuberosity
Navicular
Facet for sesamoid bone
3
Proximal Transverse Arch
2
Lateral Longitudinal Arch

3 Arches



PLANTAR VIEW

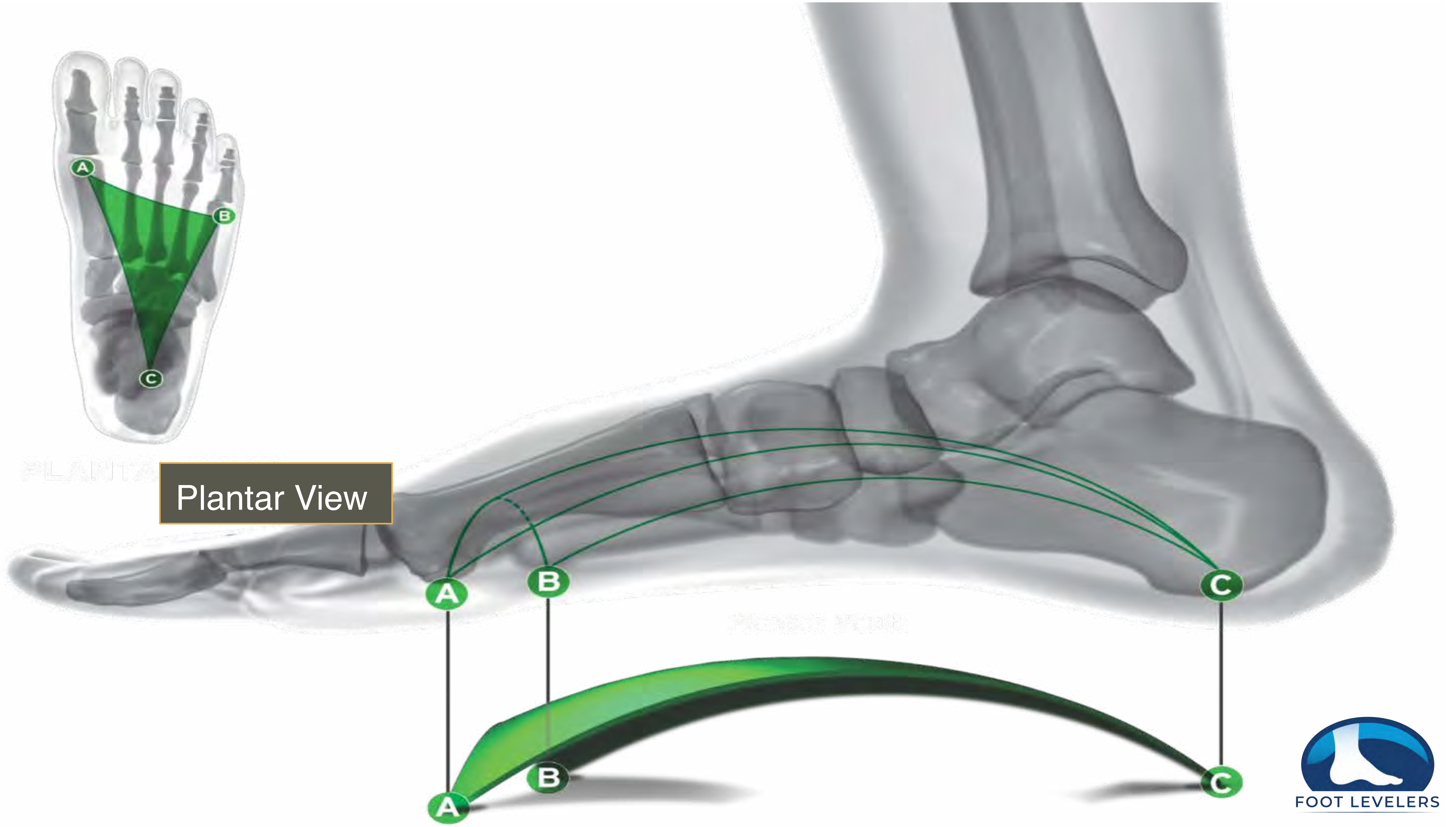


Plantar Vault

A - C = Inner Arch (Medial Longitudinal Arch)

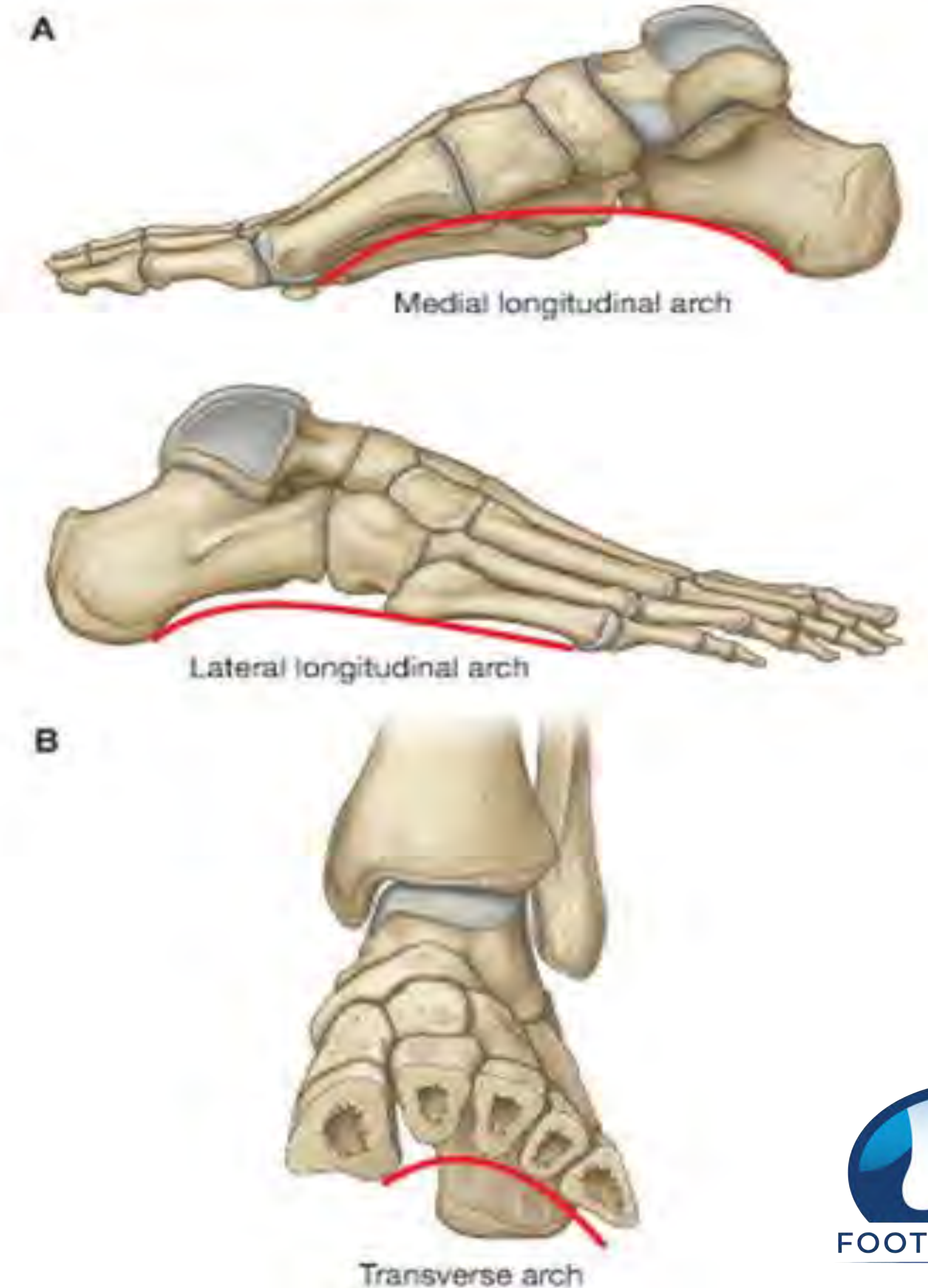
B - C = Outer Arch (Lateral Longitudinal Arch)

A - B = Across the Balls of Feet (Anterior Transverse [Metatarsal] Arch)


A
B
C
Plantar View
A
B
C
A
B
C
FOOT LEVELERS

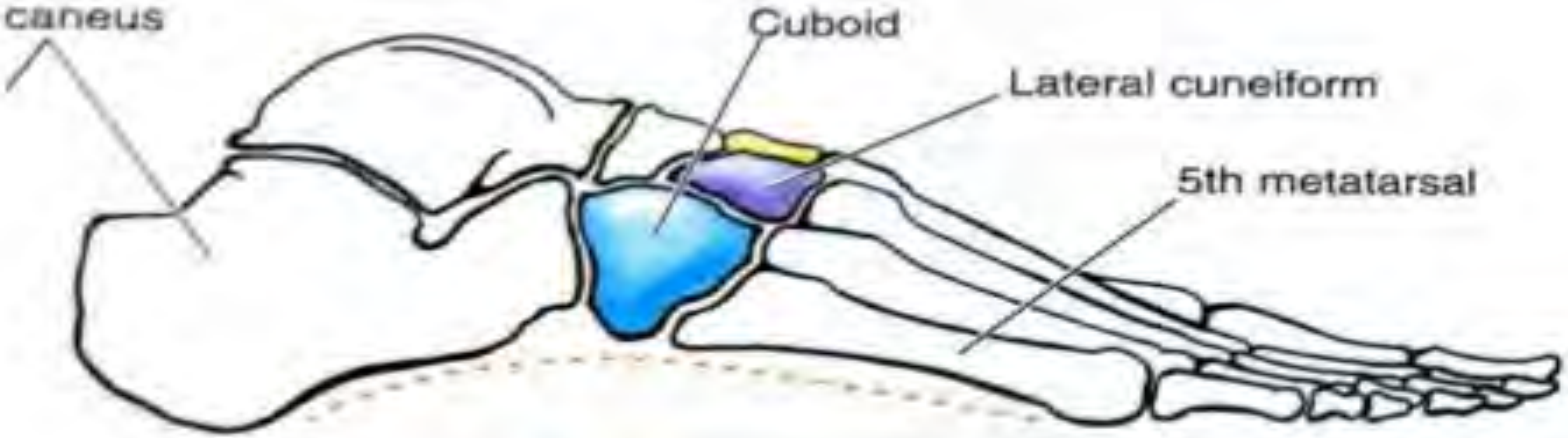
Arches of Foot

- **Medial longitudinal arch**
- Is formed of calcaneum, talus, navicular, 3 cuneiform bones, and first medial 3 metatarsal bones.
- **Lateral longitudinal arch** Is formed of calcaneum, cuboid & lateral 4th & 5th metatarsal bones
- **Transverse arch**
- Lies at the level of tarso-metatarsal joints, formed of bases of metatarsal bones, cuboid & 3 cuneiform bones.



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)

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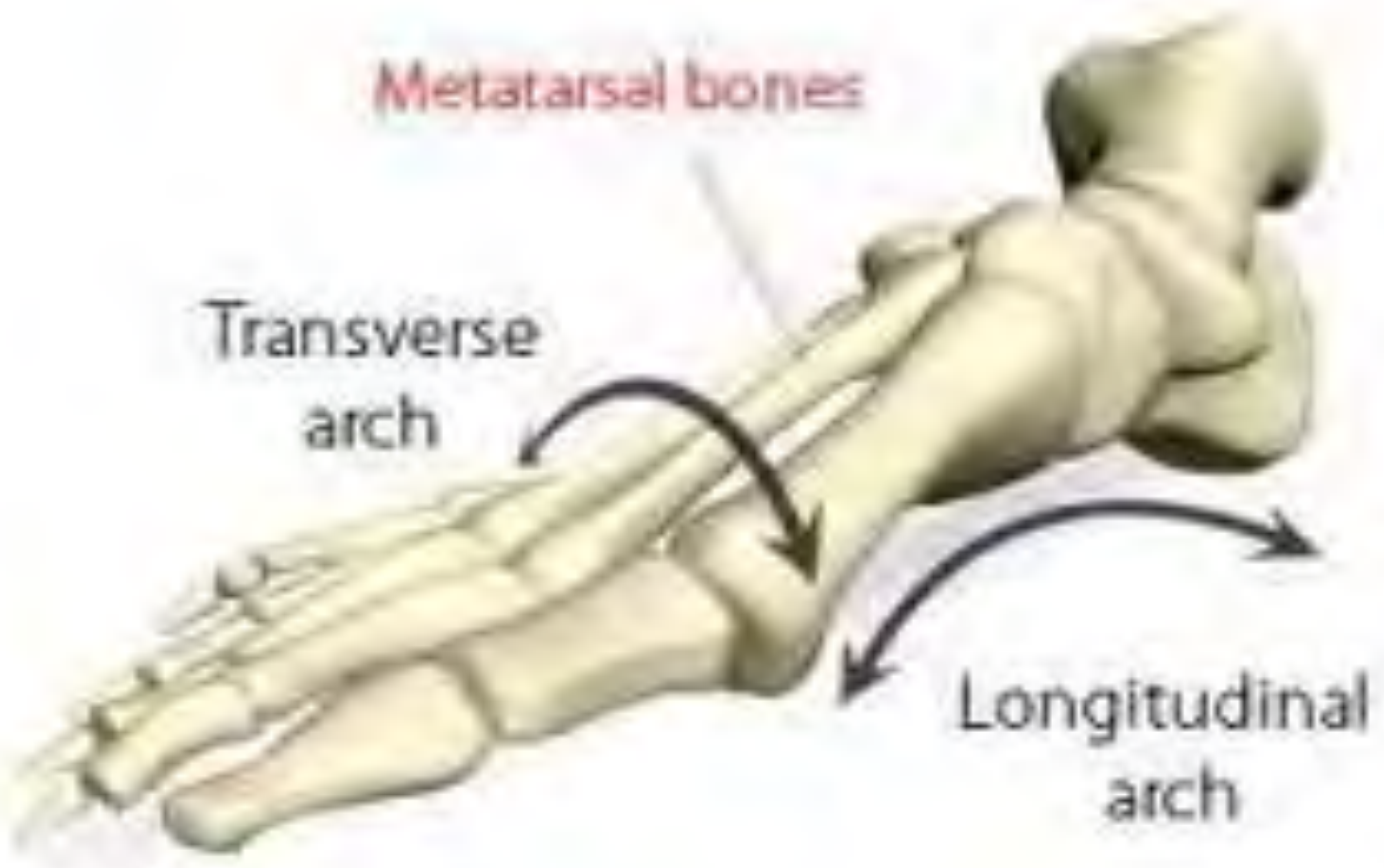
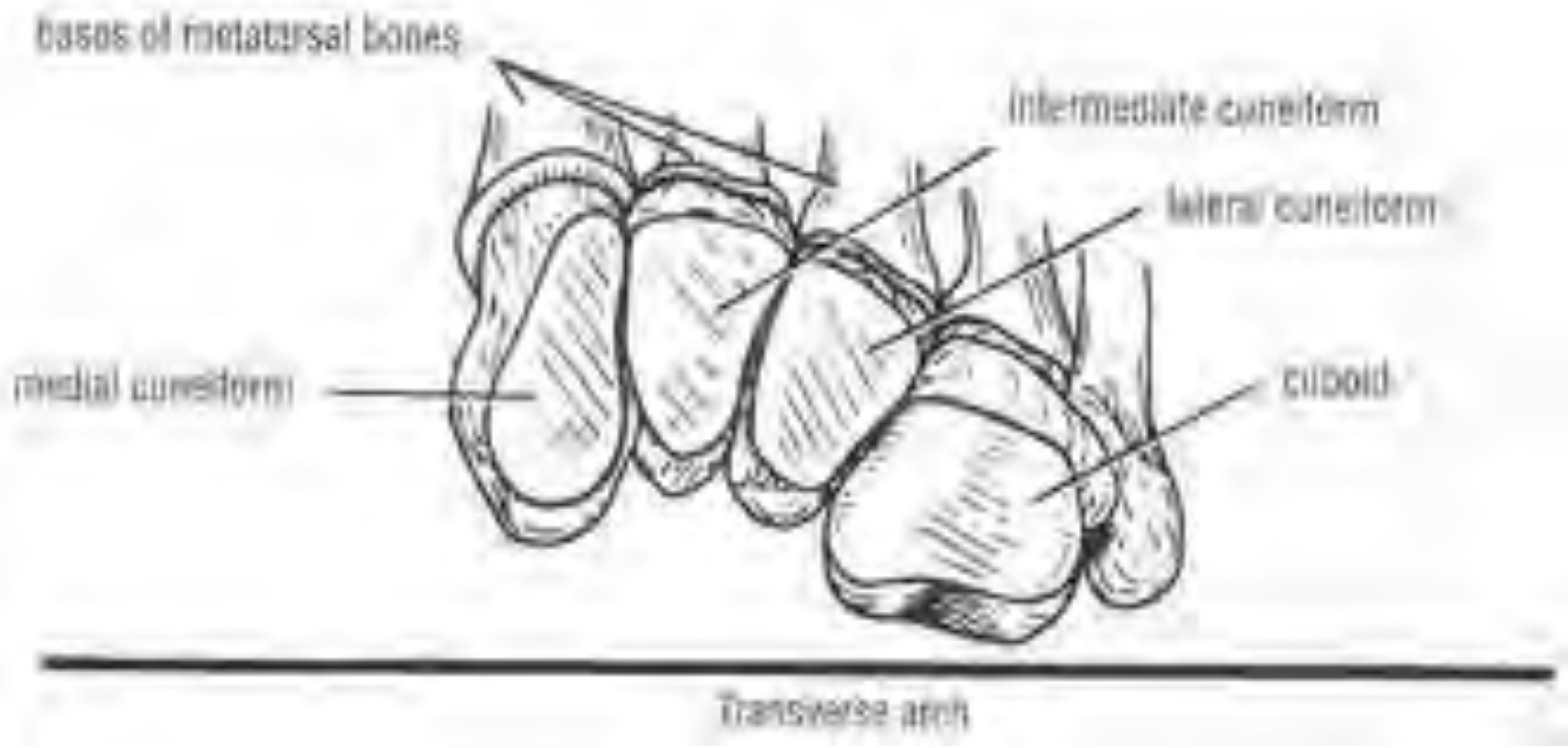
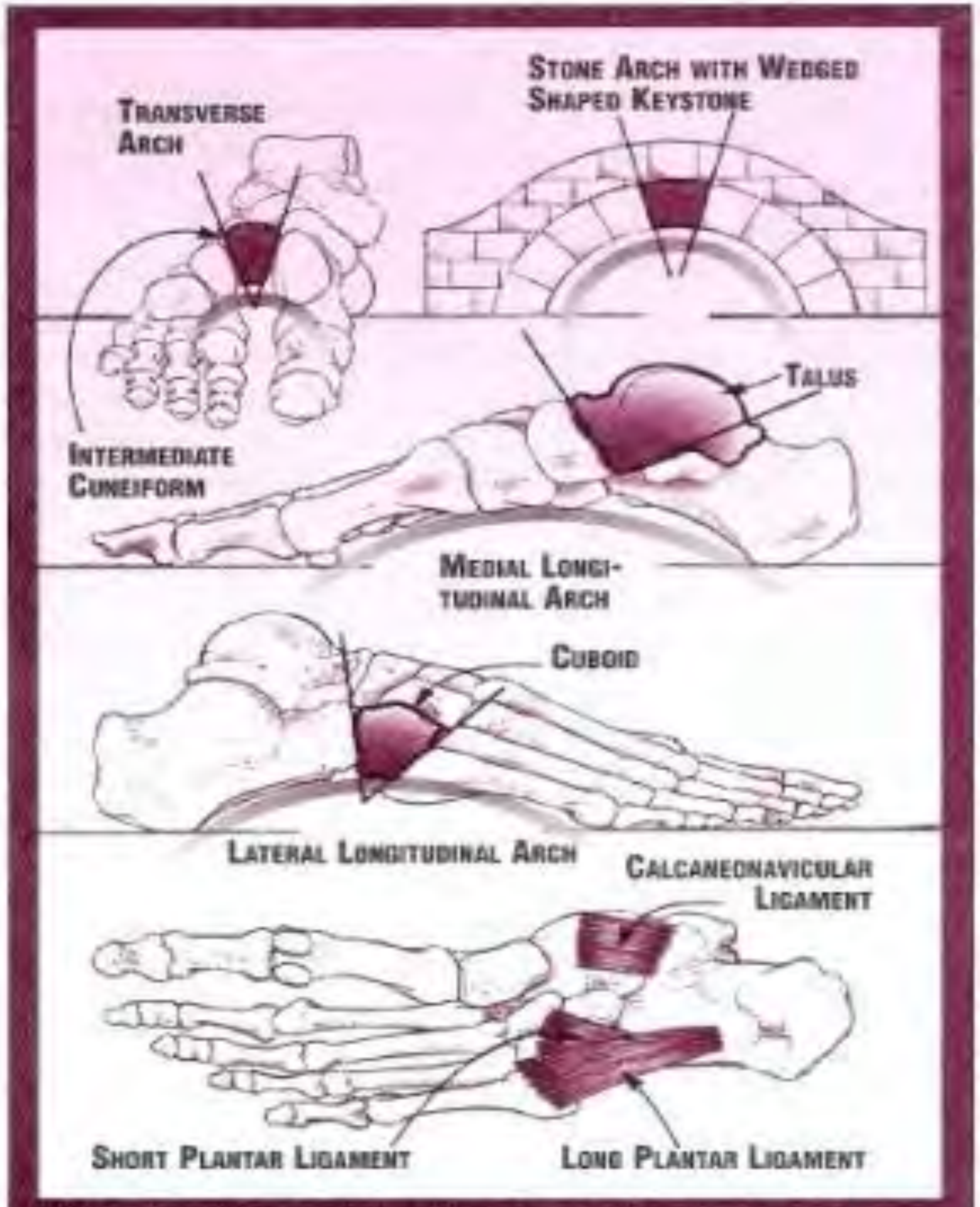
Medial Longitudinal Arch

FOOT LEVELERS







Used by permission Sports Research Review. August/November 1996, Nike, Inc.

Foot Development

Not all foot bones formed at birth

Avg. Foot length is 7.6 cm

Navicular last to ossify (age 2-5)

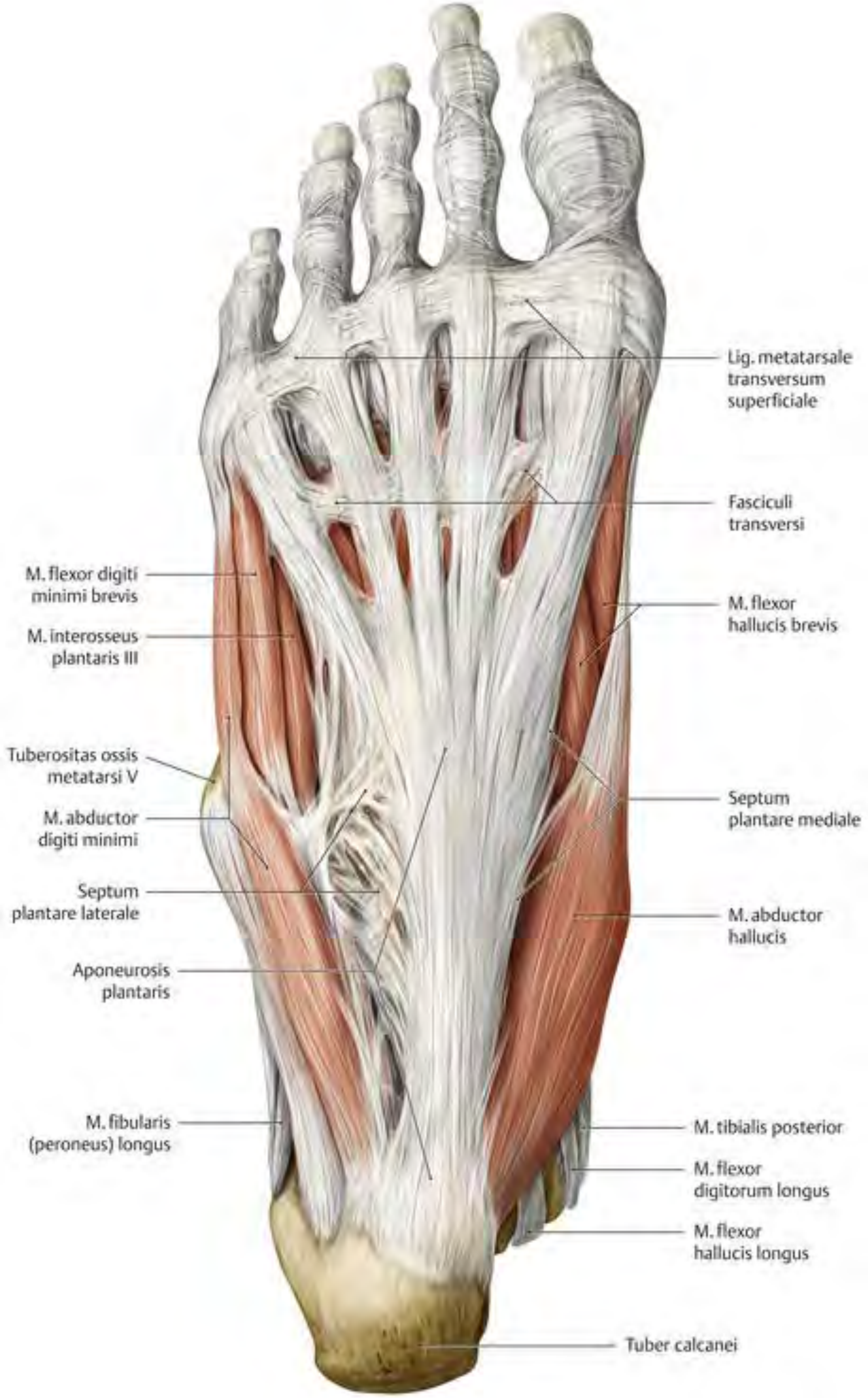
Walking starts 10-16 months

Skeletal maturity of the feet is age ~ 13 for girls and age ~ 15 for boys

- ***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*



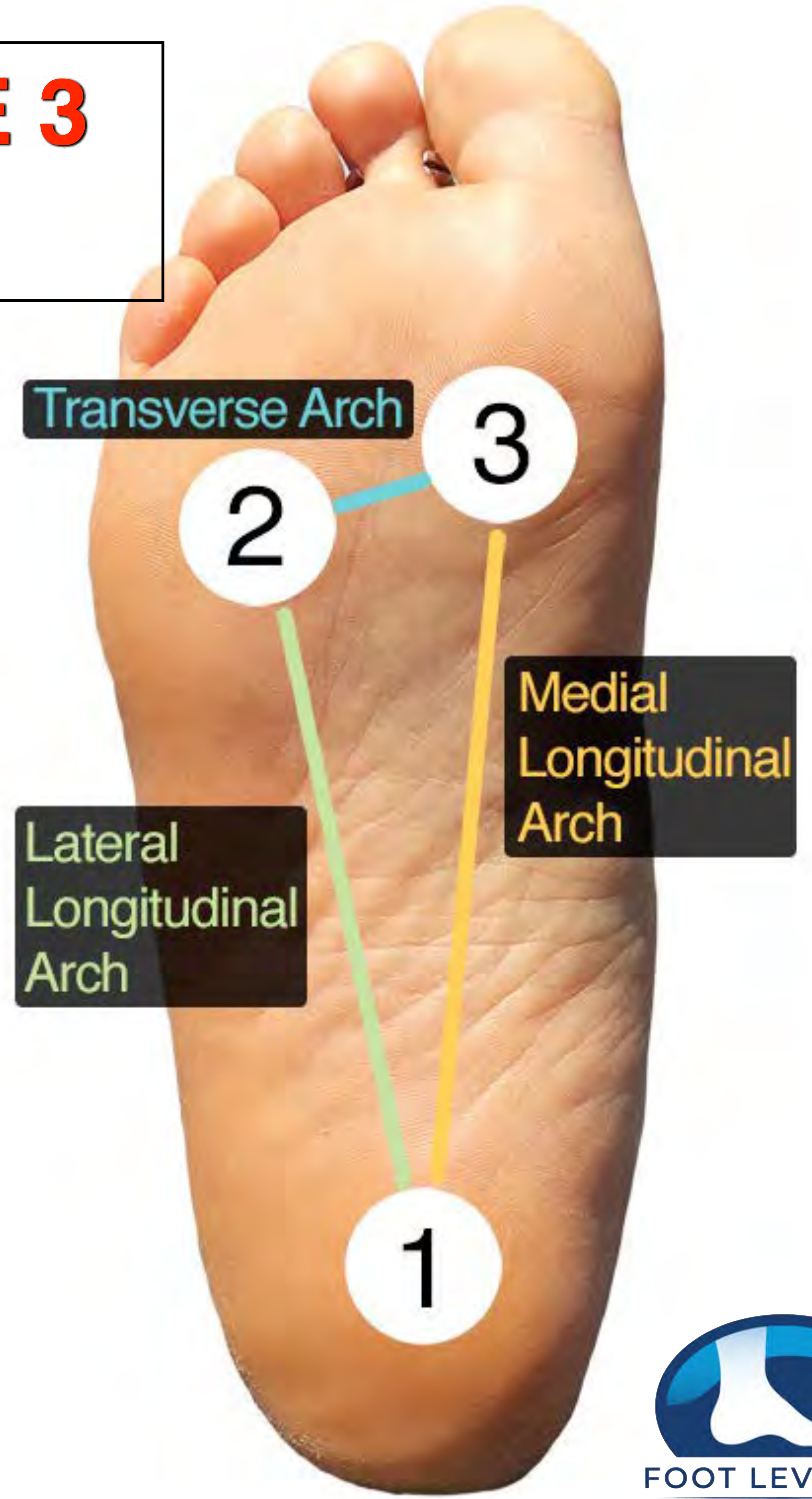
Arch Support

- "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.*

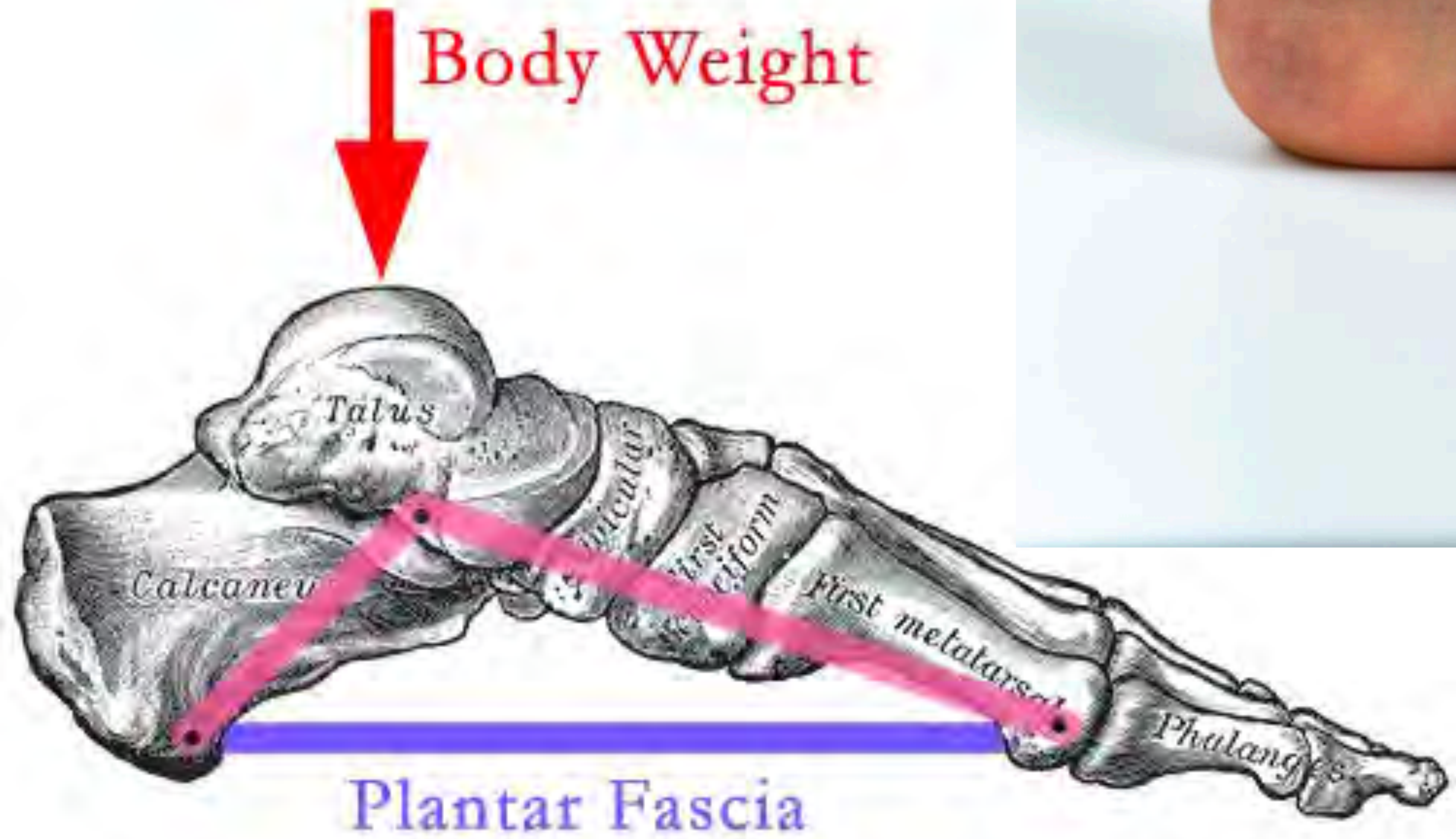
FOOT LEVELERS

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



FOOT LEVELERS

FOOT LEVELERS



FOOT LEVELERS


PLEASE
STAND
UP!
...ON YOUR BARE FEET

Weight Shift Exercise

- Equal
- Non-Dominant
- Dominant

Patient Awareness Demo: hands on greater trochanters

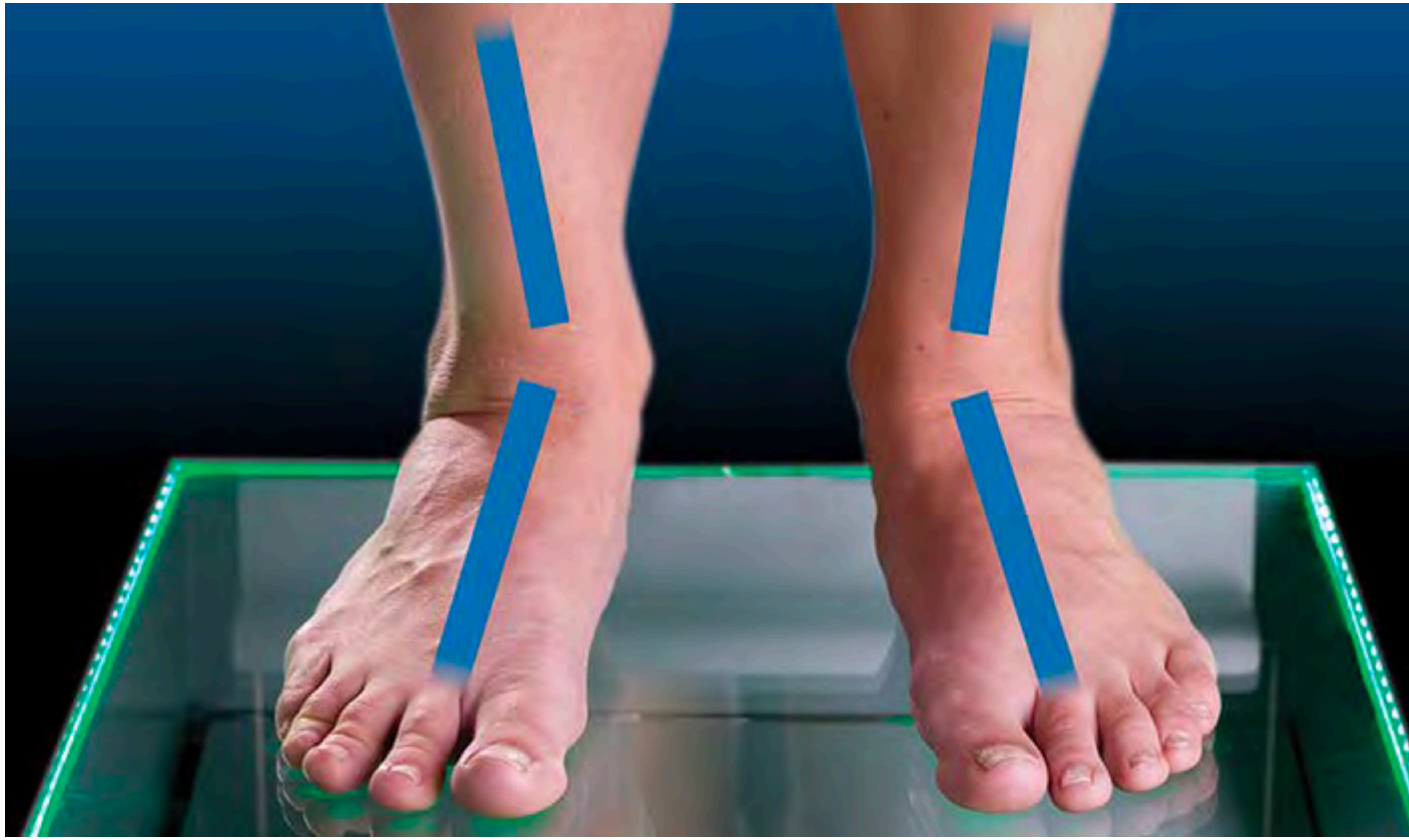
Excessive Supination

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

FOOT LEVELERS

Patient Awareness Demonstration:

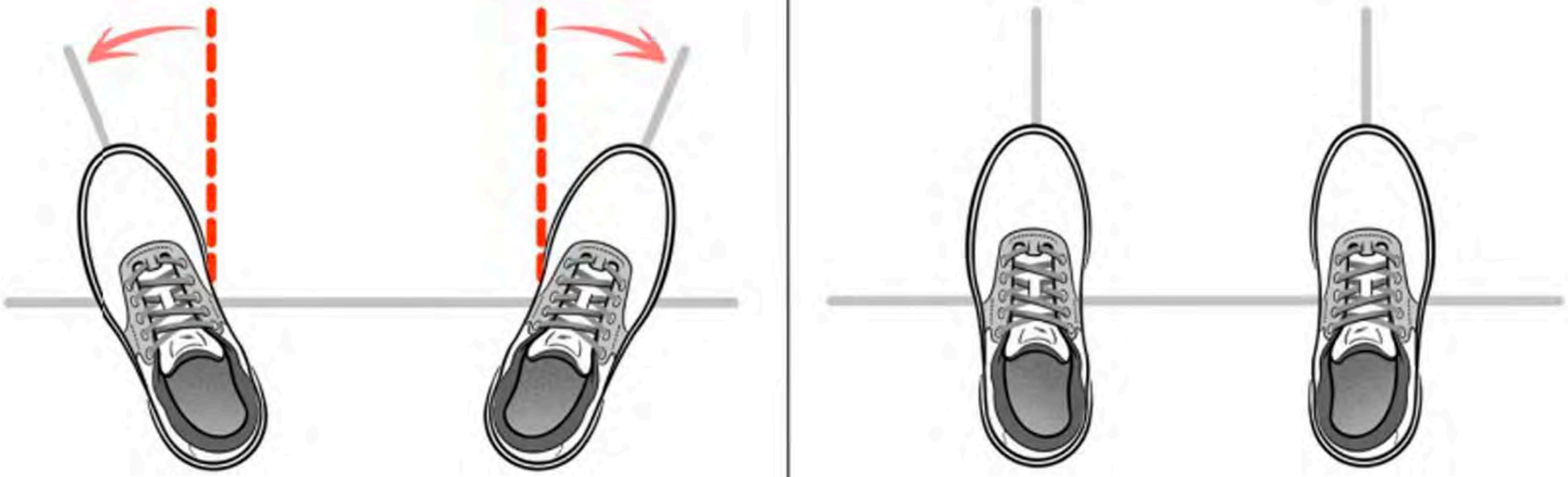
Excessive Pronation



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

(Makes Foot-Spine-NS Connection)

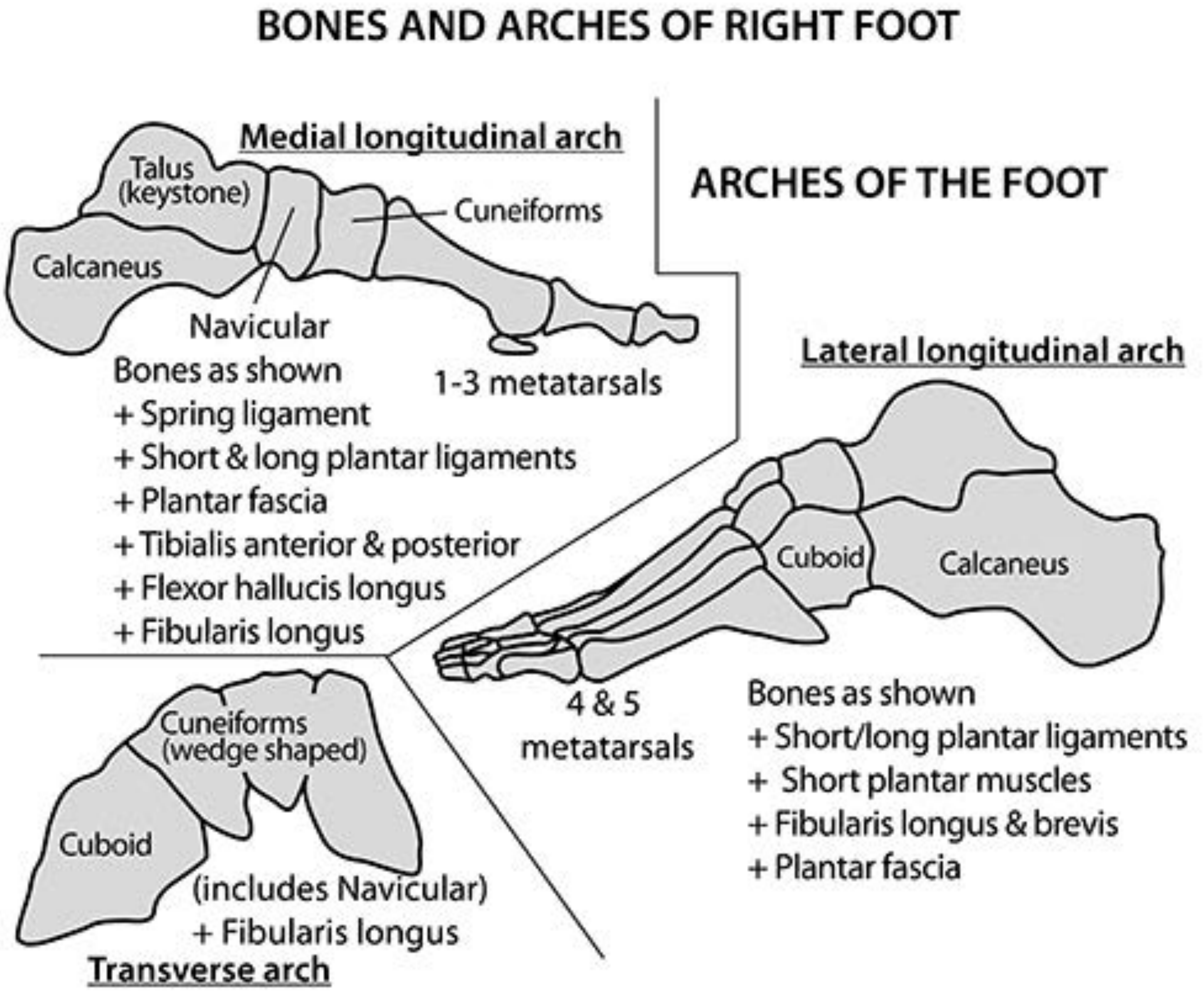
FOOT LEVELERS

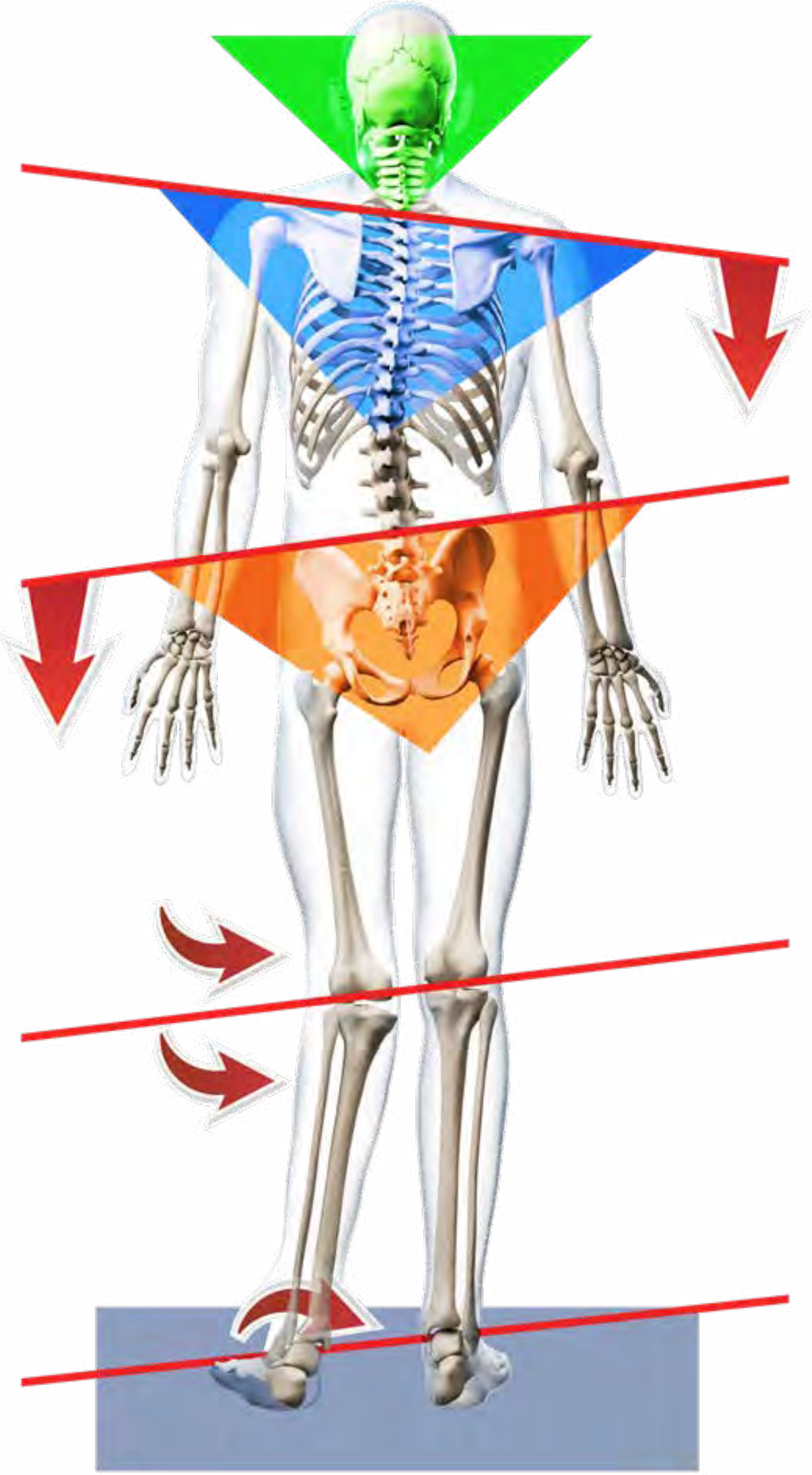


Foot Flare: normal is 12-18 degrees

ARCH FUNCTIONS

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






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

FOOT LEVELERS

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

FOOT LEVELERS

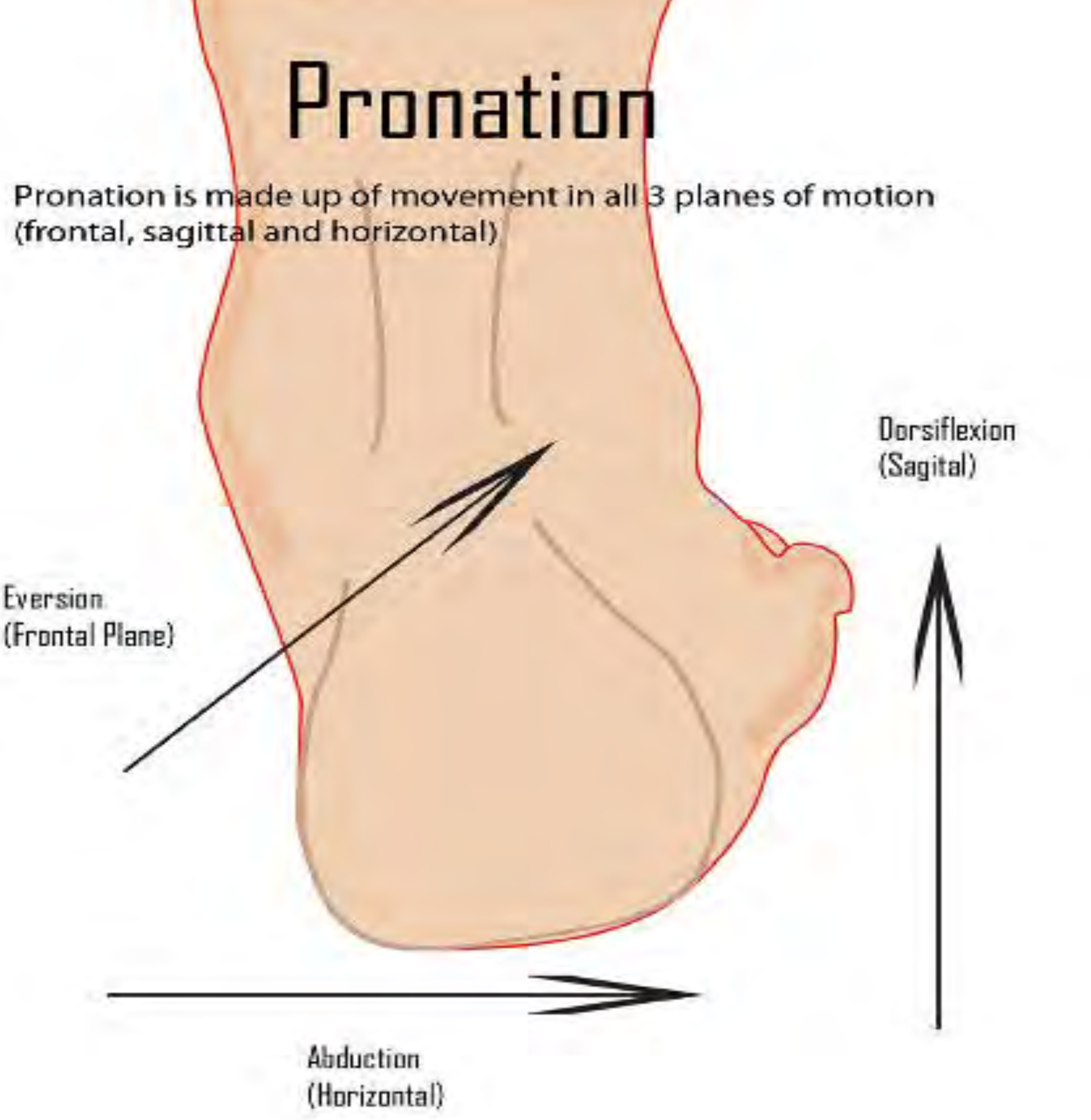
5 G's of force on the foot/ankle
becomes

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

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

FOOT LEVELERS

- 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.
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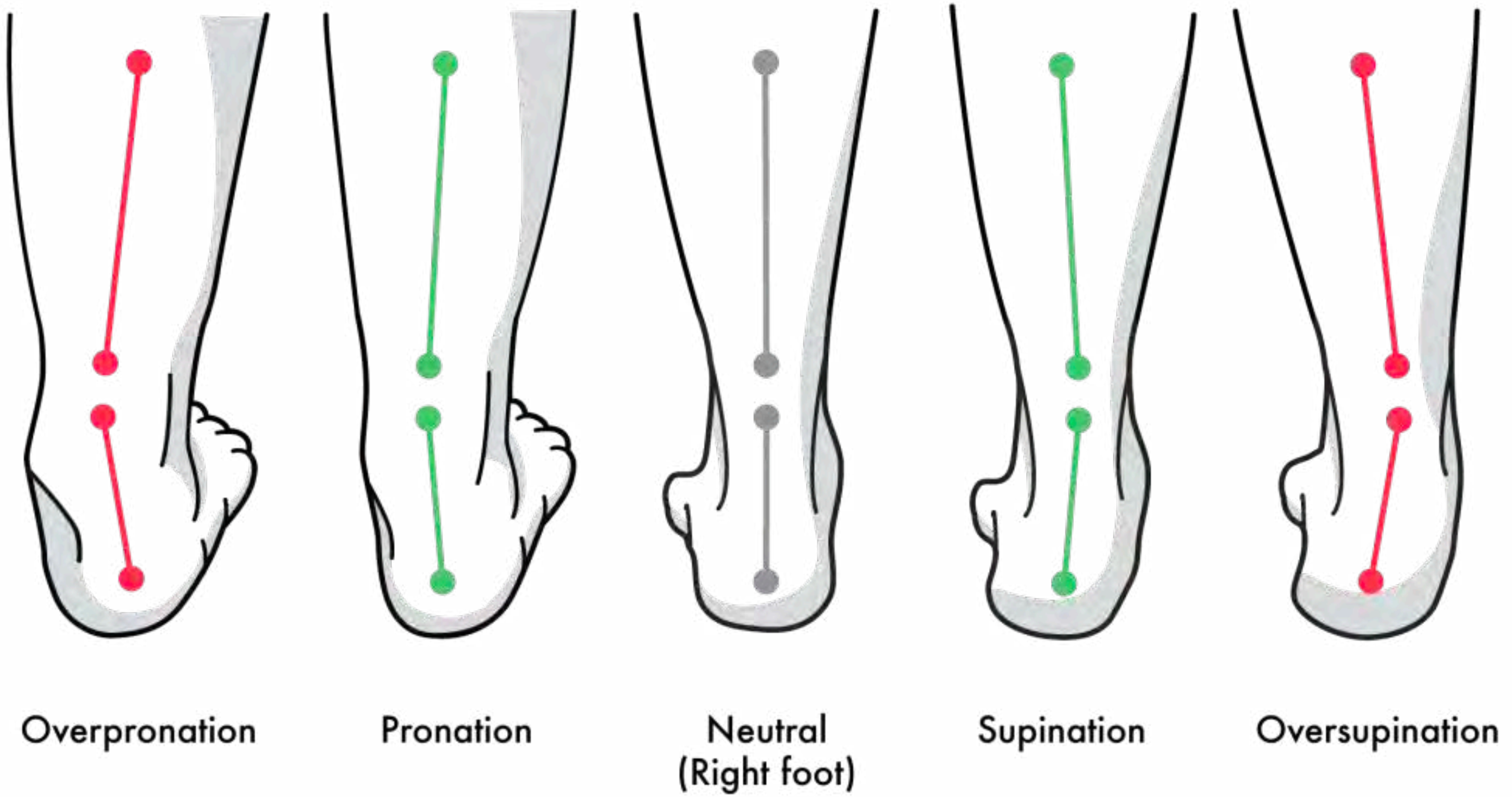
Pronation is necessary for correct biomechanics.



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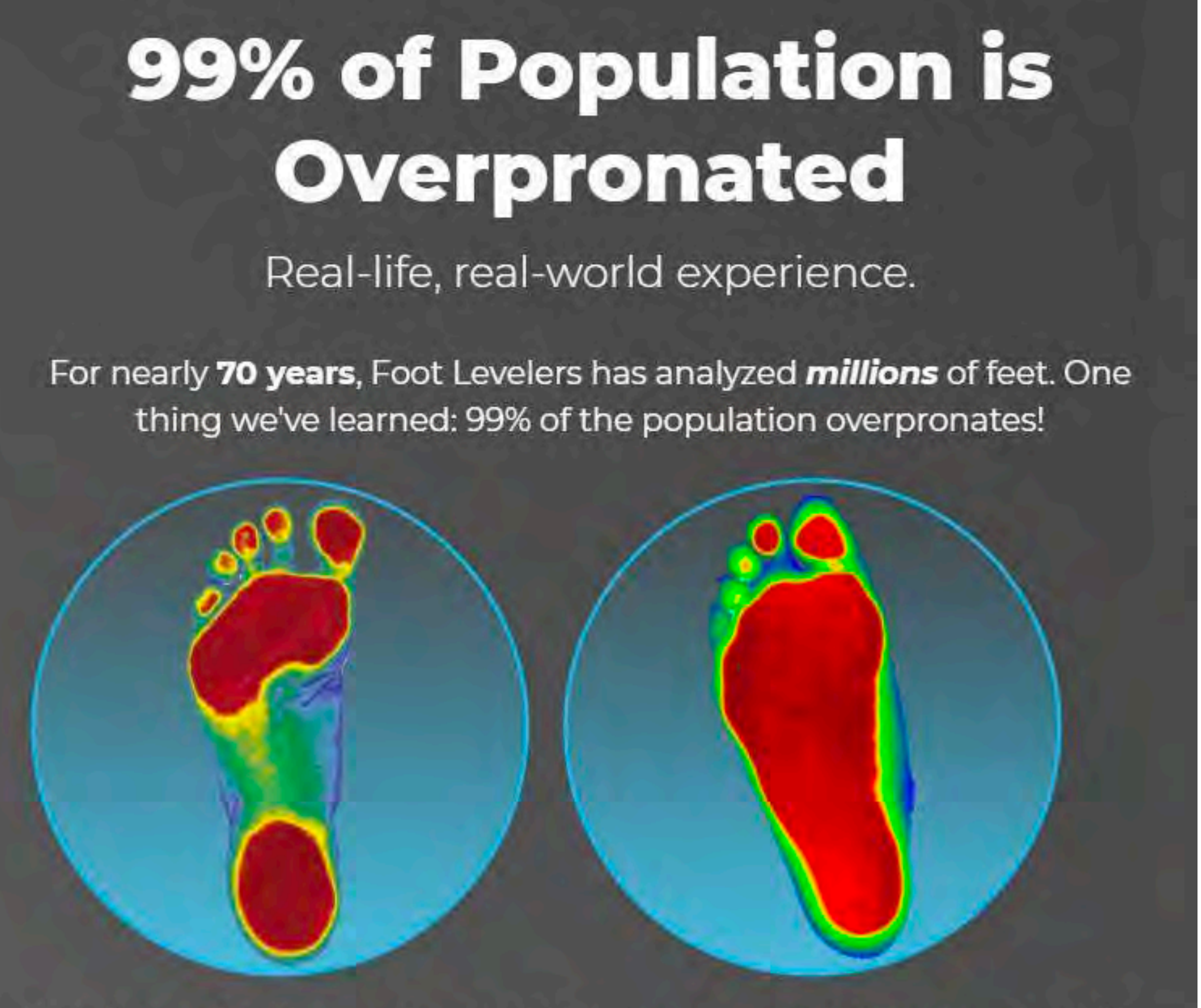
ELASTIC VS. PLASTIC DEFORMATION

Plastic Deformation

Plastic deformation takes over….



The remaining 1% is a mix of supinators and “healthy” weight bearing individuals.

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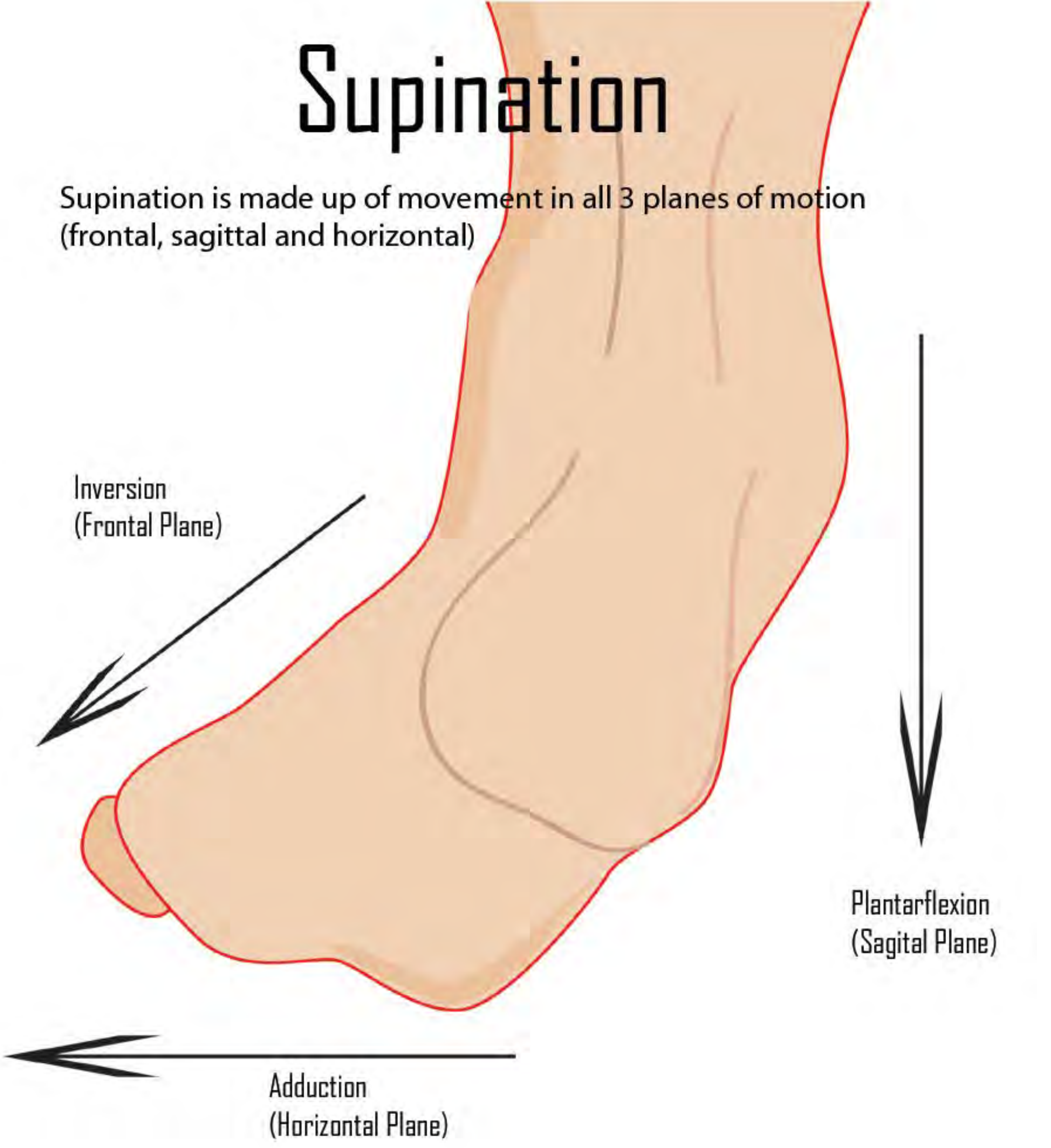
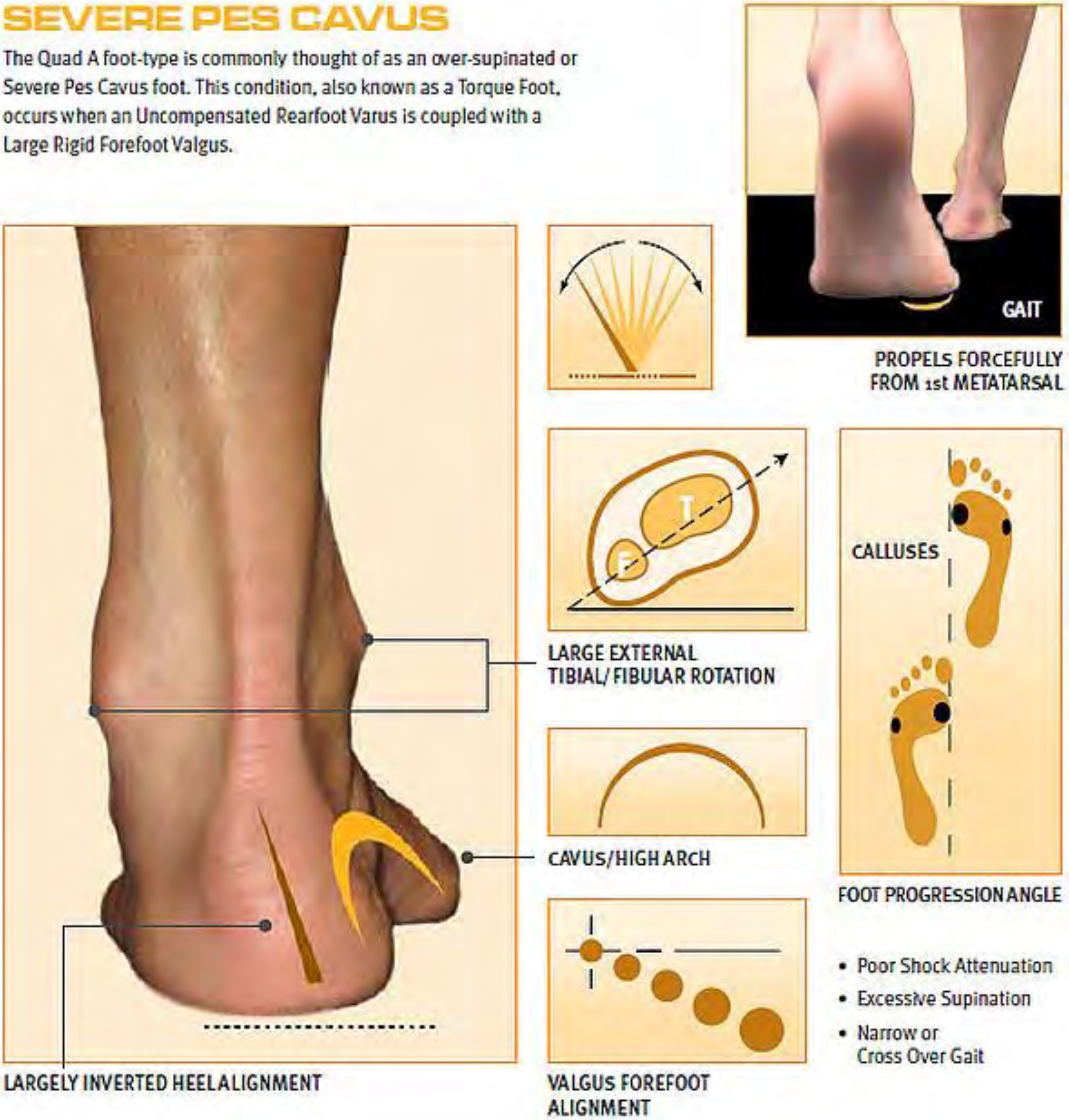
Supinators (<1%)

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

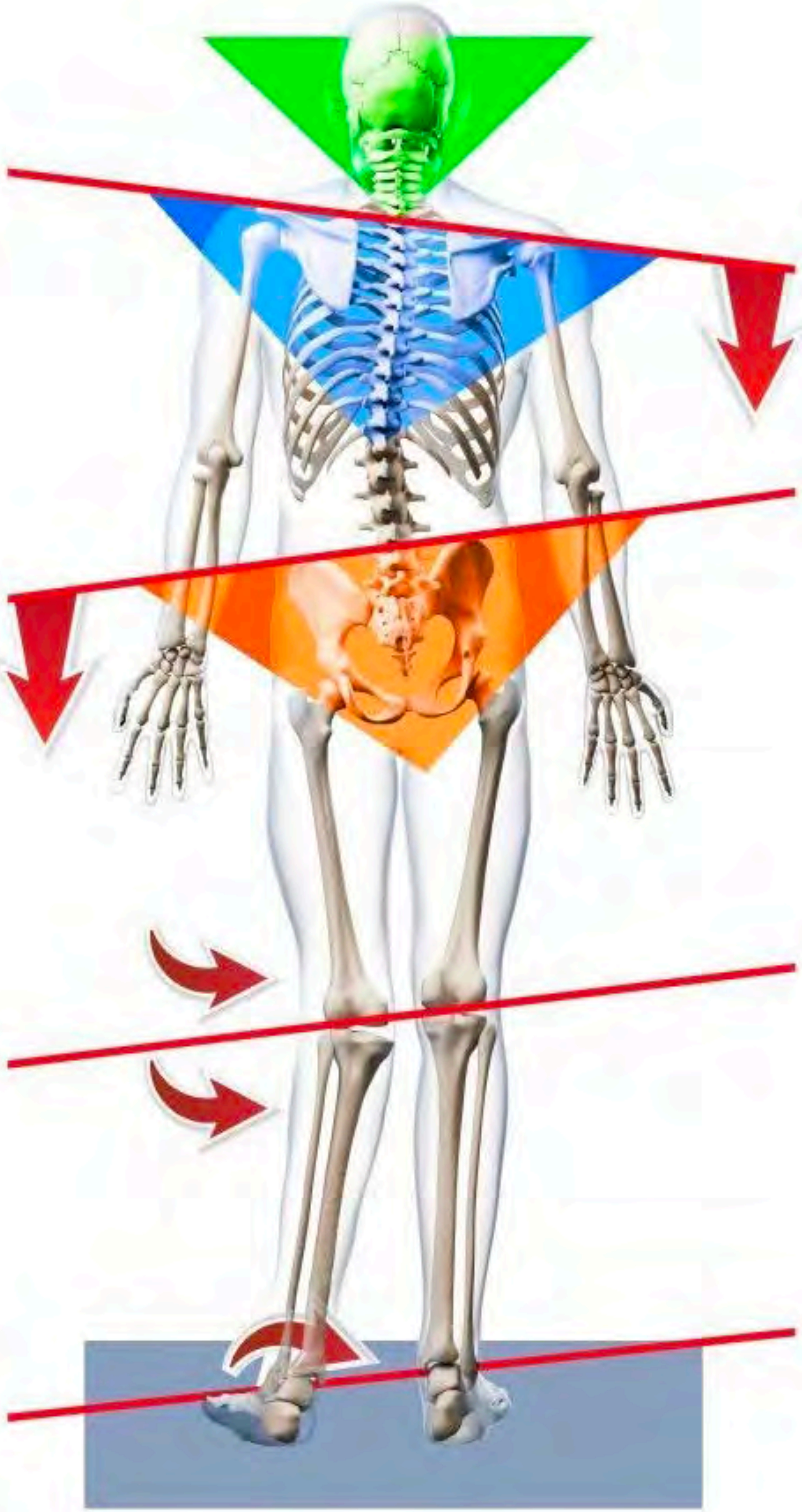



SEVERE PES CAVUS
The Quad A foot-type is commonly thought of as an over-supinated or Severe Pes Cavus foot. This condition, also known as a Torque Foot, occurs when an Uncompensated Rearfoot Varus is coupled with a Large Rigid Forefoot Valgus.
GAIT
PROPELS FORCEFULLY FROM 1st METATARSAL
LARGE EXTERNAL TIBIAL/ FIBULAR ROTATION
CALLUSES
CAVUS/HIGH ARCH
FOOT PROGRESSION ANGLE
• Poor Shock Attenuation
• Excessive Supination
• Narrow or Cross Over Gait
LARGELY INVERTED HEEL ALIGNMENT
VALGUS FOREFOOT ALIGNMENT

LOWER EXTREMITY ASSESSMENT TOOLS:

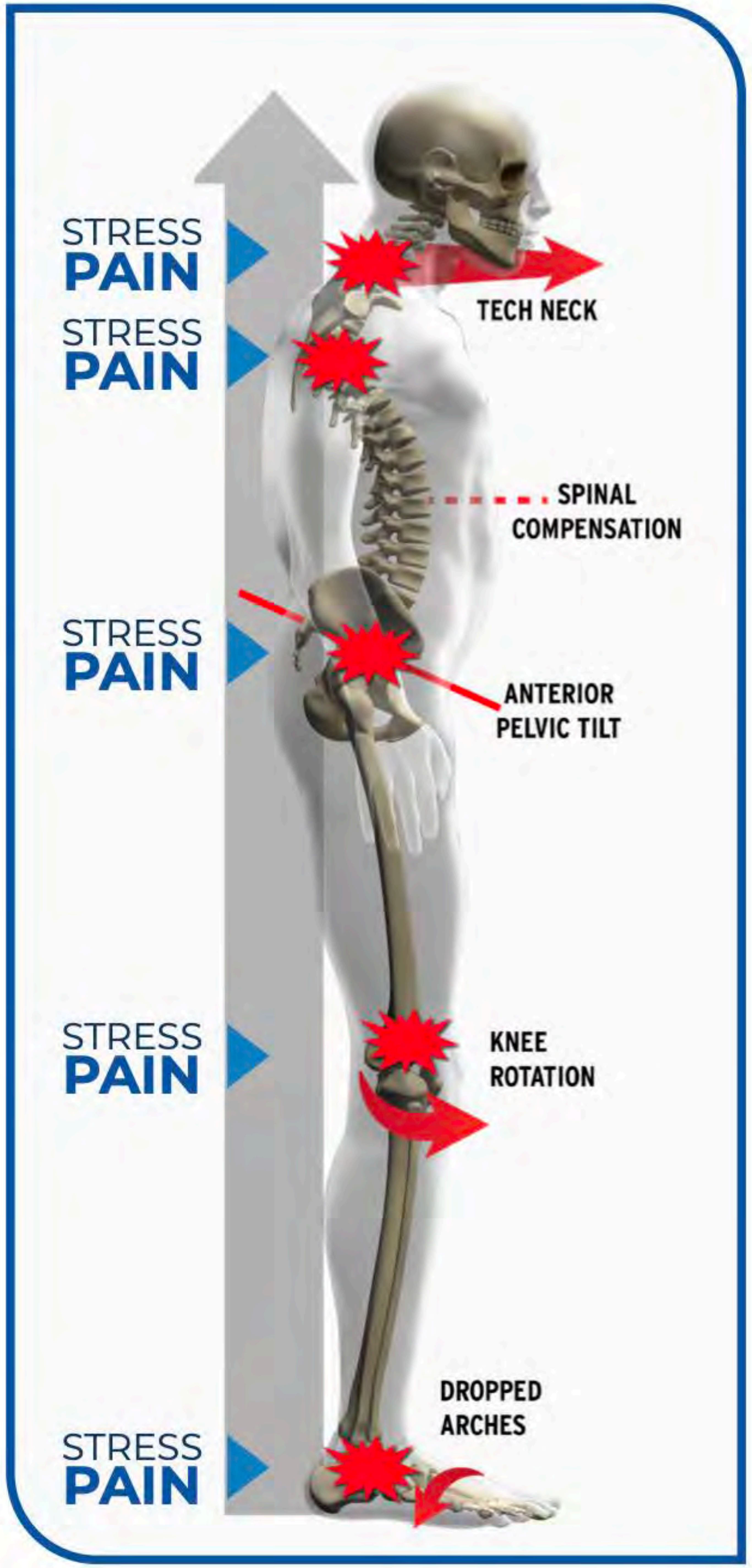
- Standing posture
- Gait analysis
- Manual Muscle Testing
- 3-D, Digital, Laser Scan

Do your patients look like this during your posture exam?



4 Global Posture Distortions

3. Kyphotic posture with thoracic extension



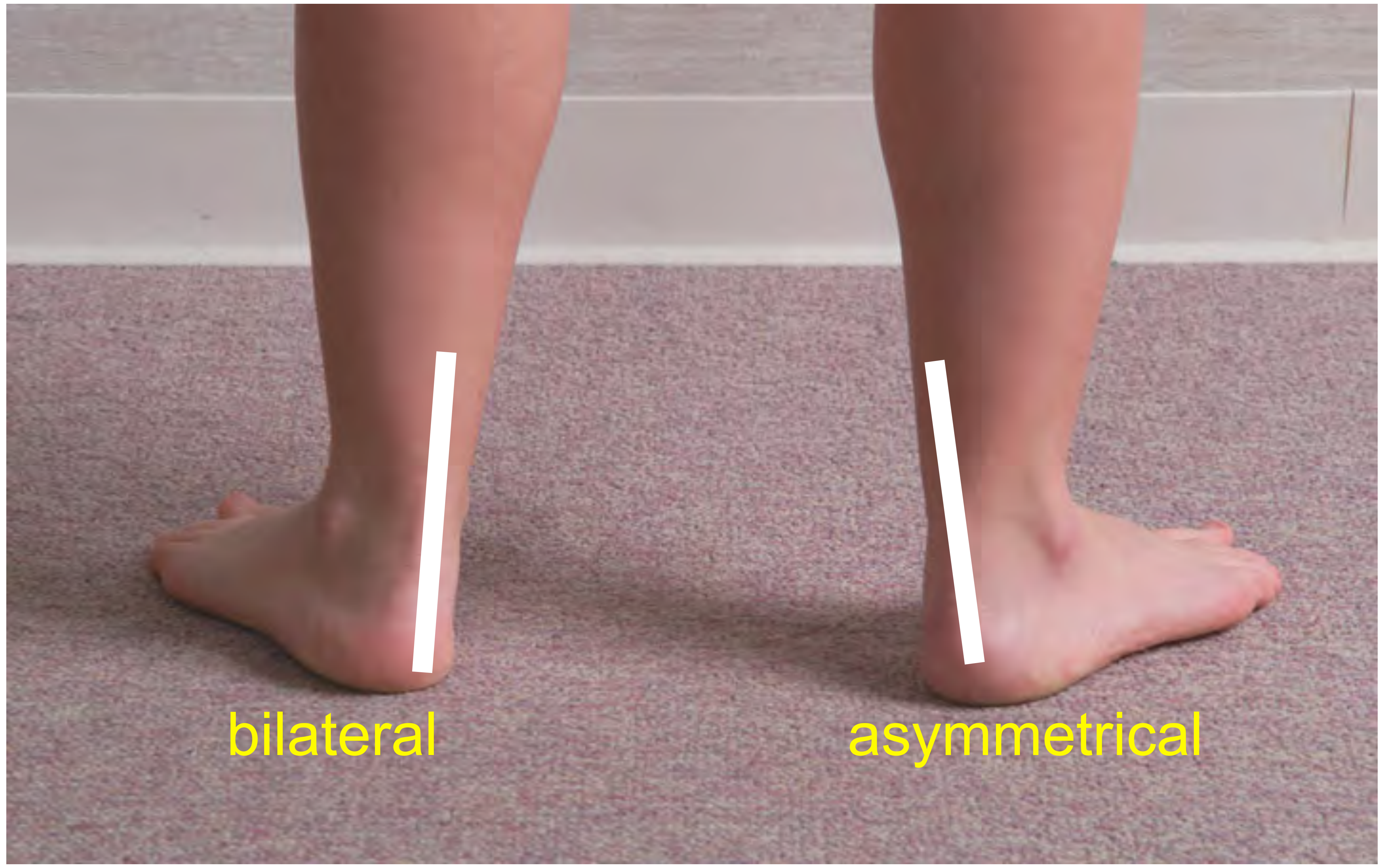
4. Forward head Translation or carriage

2. Anterior Pelvic Rotation and Translation

1. Bilateral, asymmetrical Foot pronation

FOOT LEVELERS

FOOT LEVELERS

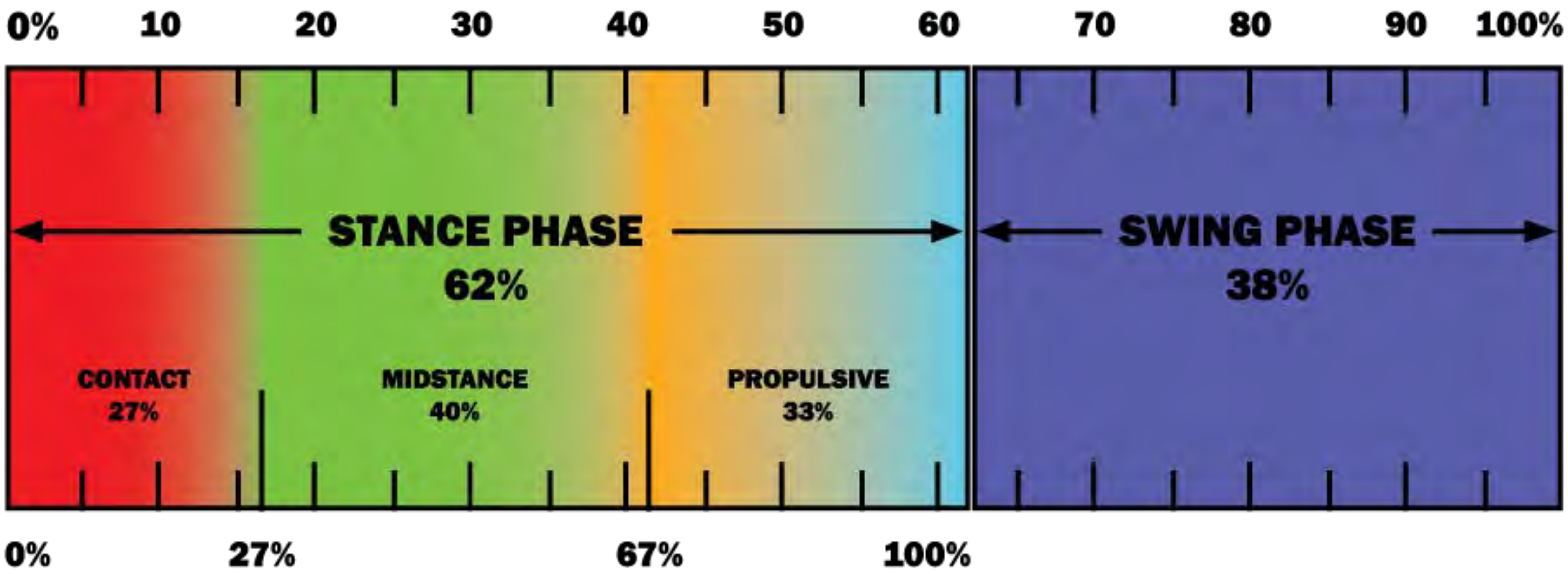


Why Am I over pronating?

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

FOOT LEVELERS

Gait Cycle



FOOT LEVELERS

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

FOOT LEVELERS

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

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

FOOT LEVELERS

Foot/Ankle Limits of Normal Movement

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

FOOT LEVELERS

Walking 1 Mile puts approximately

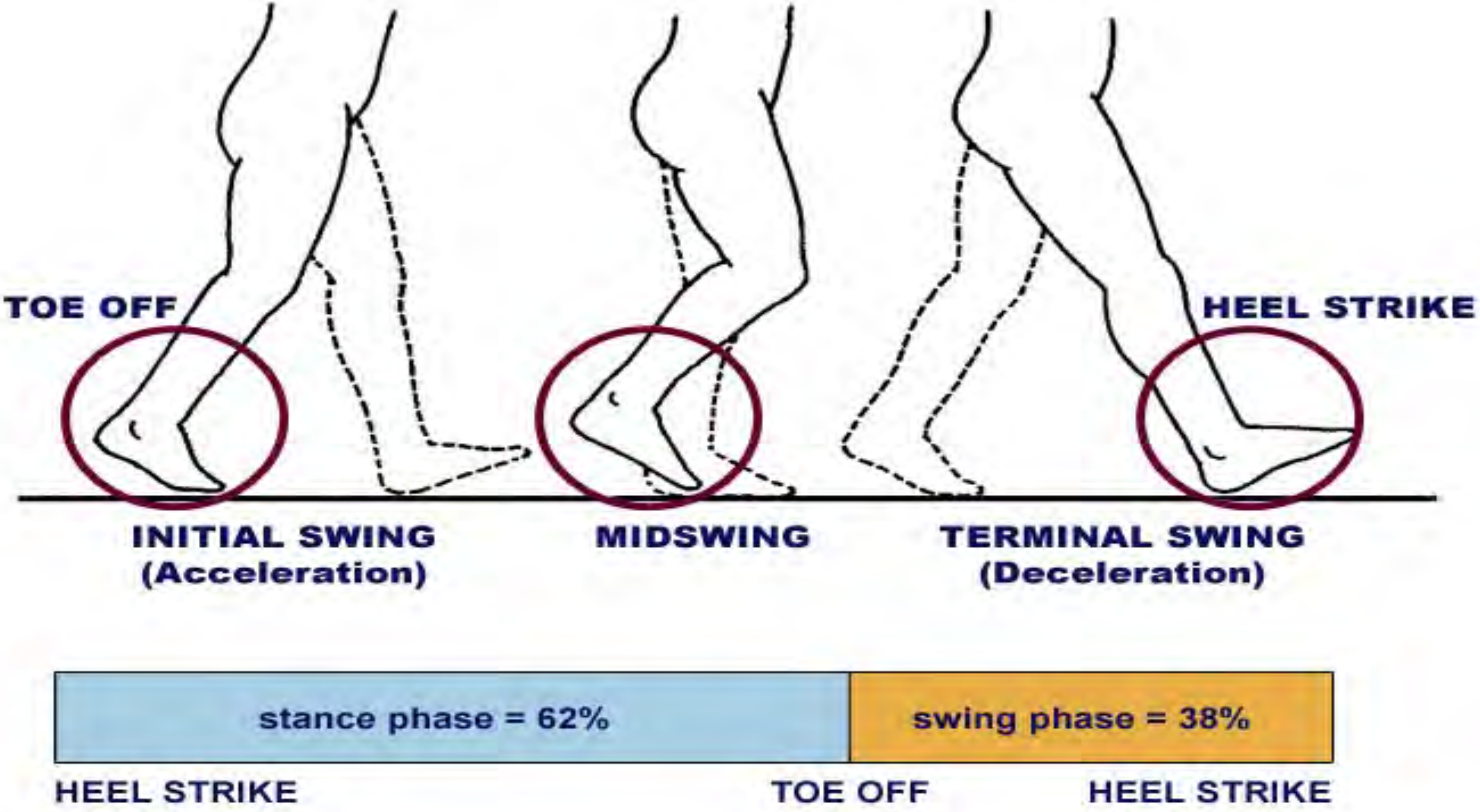
50 tons

of pressure on

your arches.

Running = 3x-5x more

FOOT LEVELERS

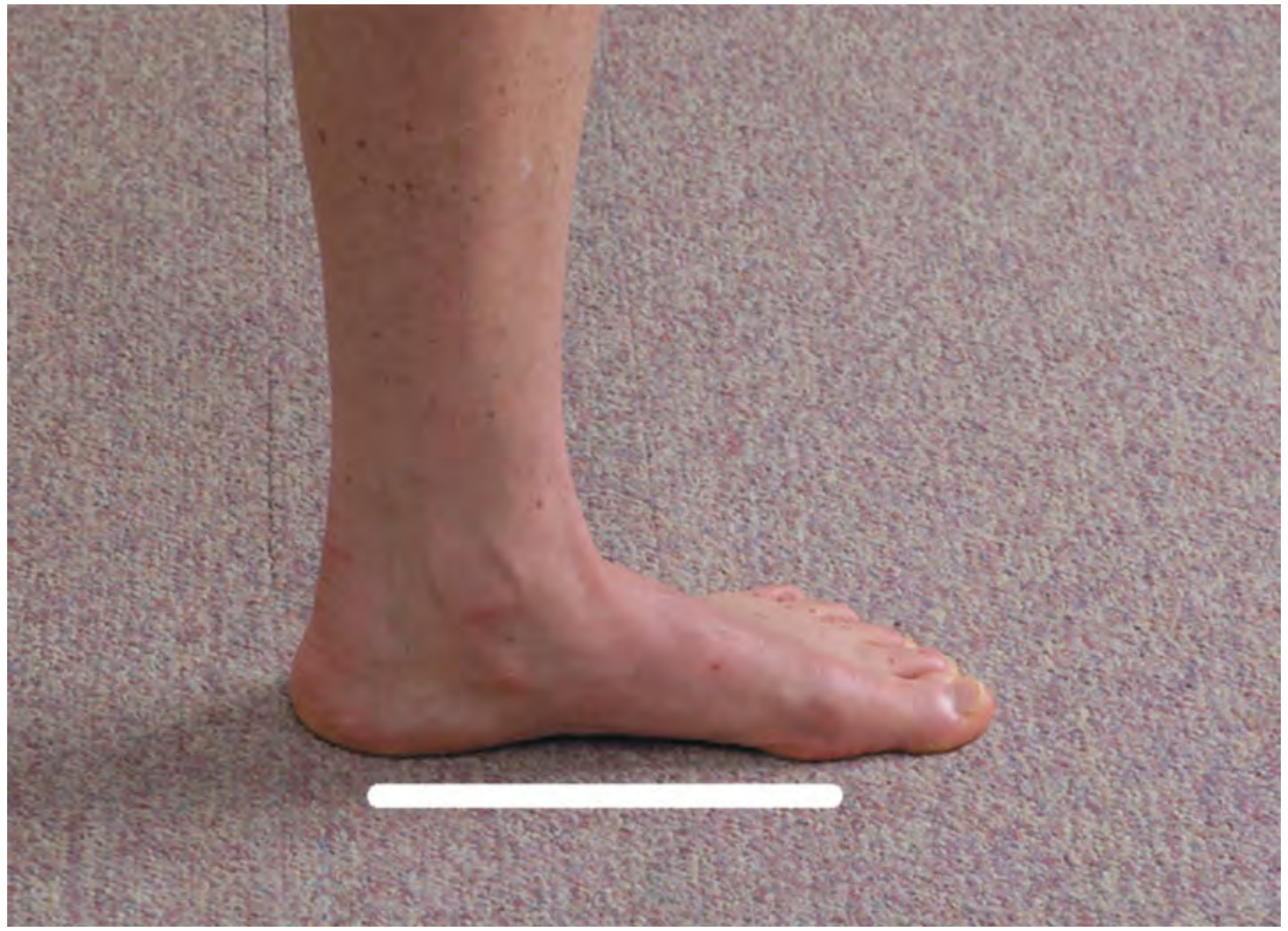

TOE OFF
HEEL STRIKE
INITIAL SWING
(Acceleration)
MIDSWING
TERMINAL SWING
(Deceleration)
stance phase = 62%
swing phase = 38%
HEEL STRIKE
TOE OFF
HEEL STRIKE

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

FOOT LEVELERS

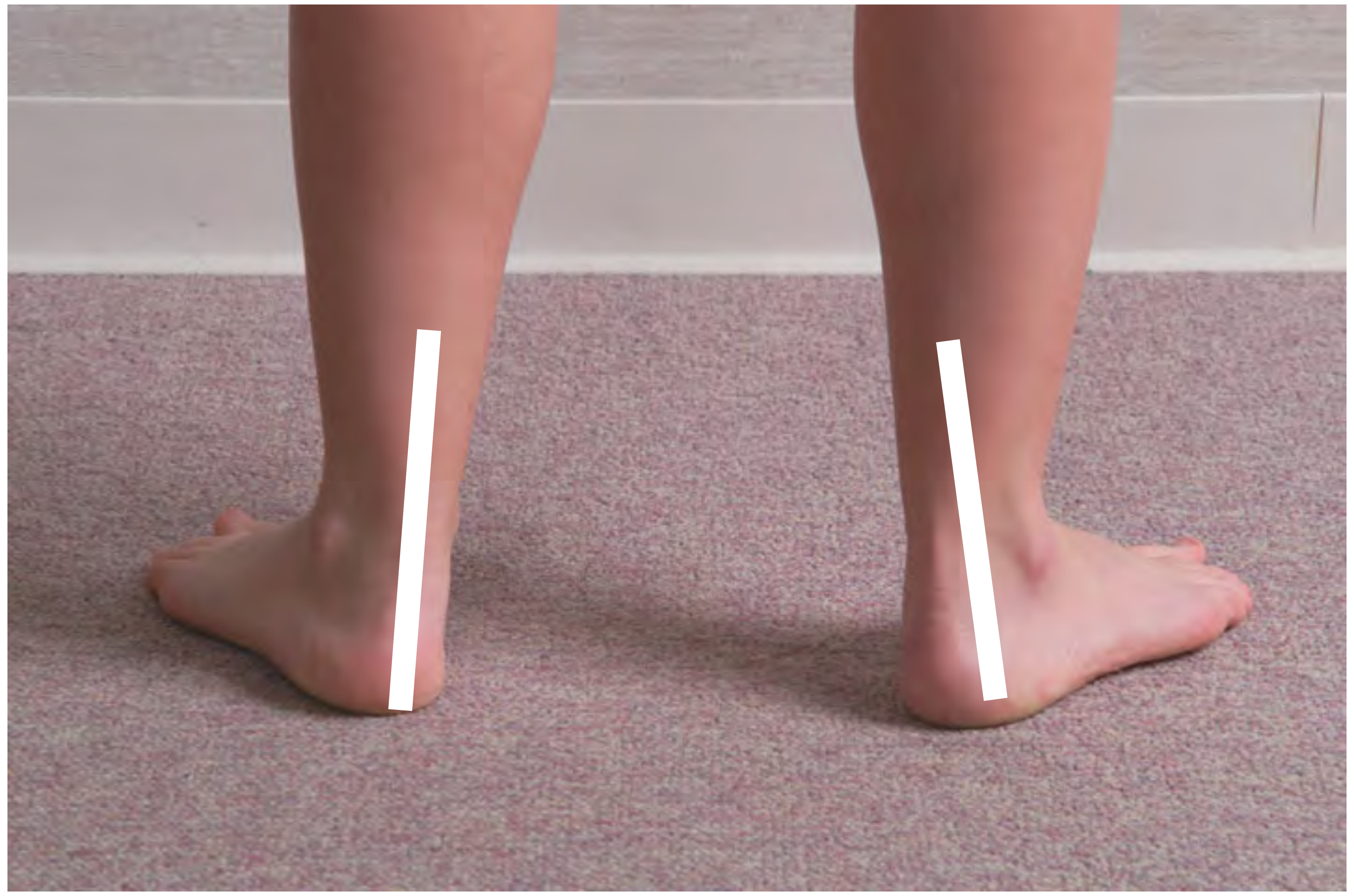
What Else Do You See With Over Pronation?



Knee pain

Current/previous injury

DJD



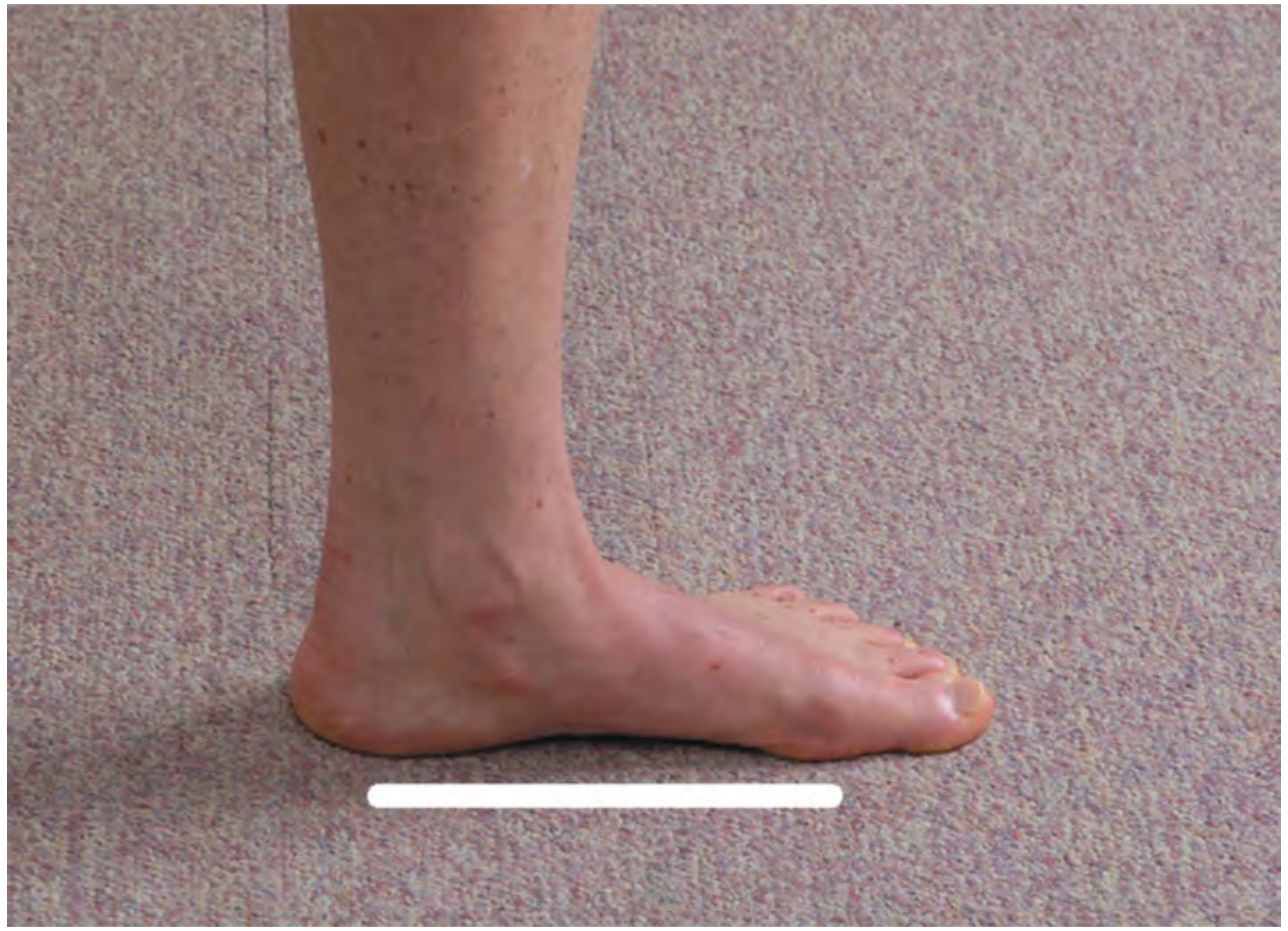
Ankle Sprains

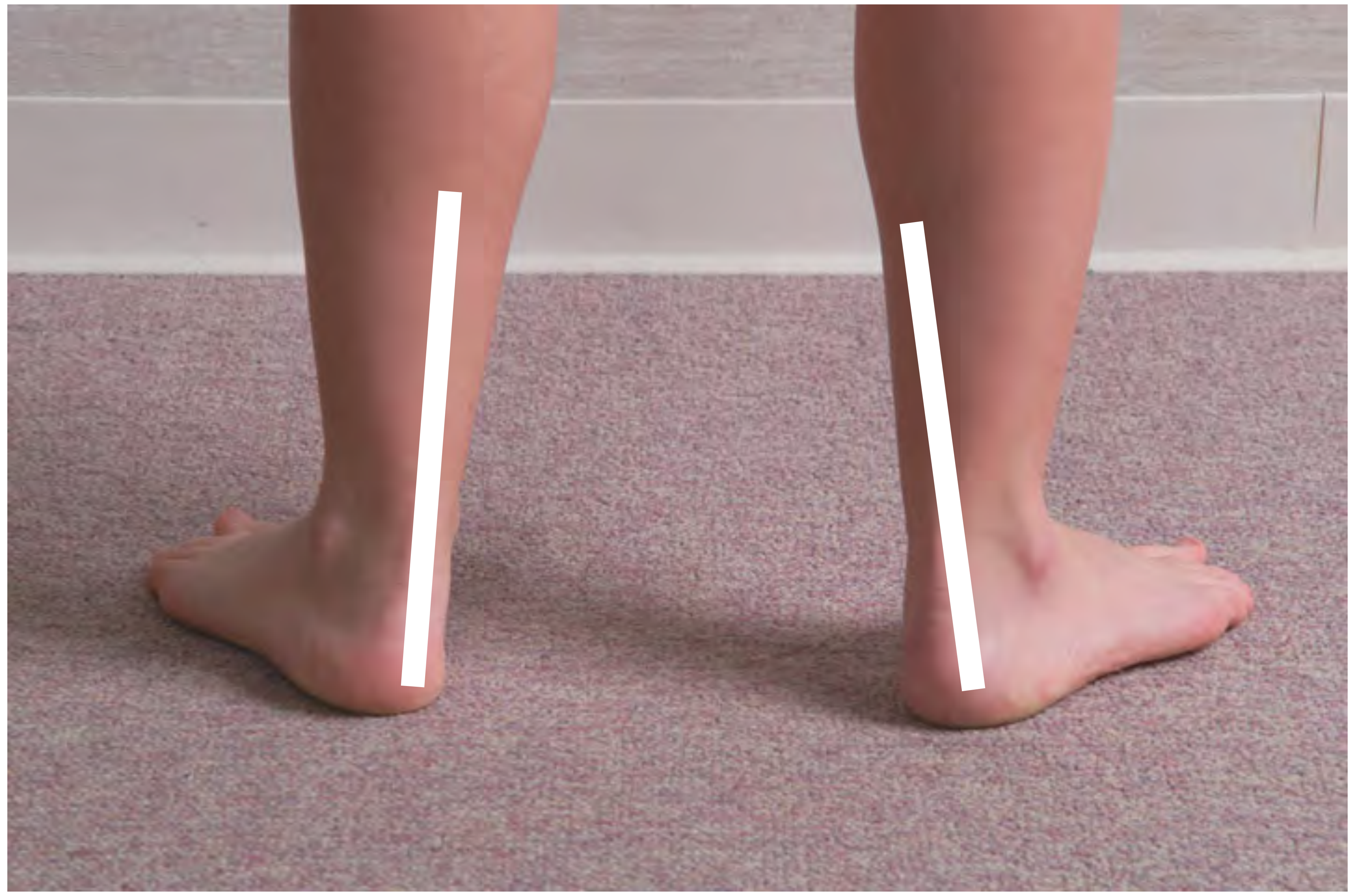
Plantar Fasciitis

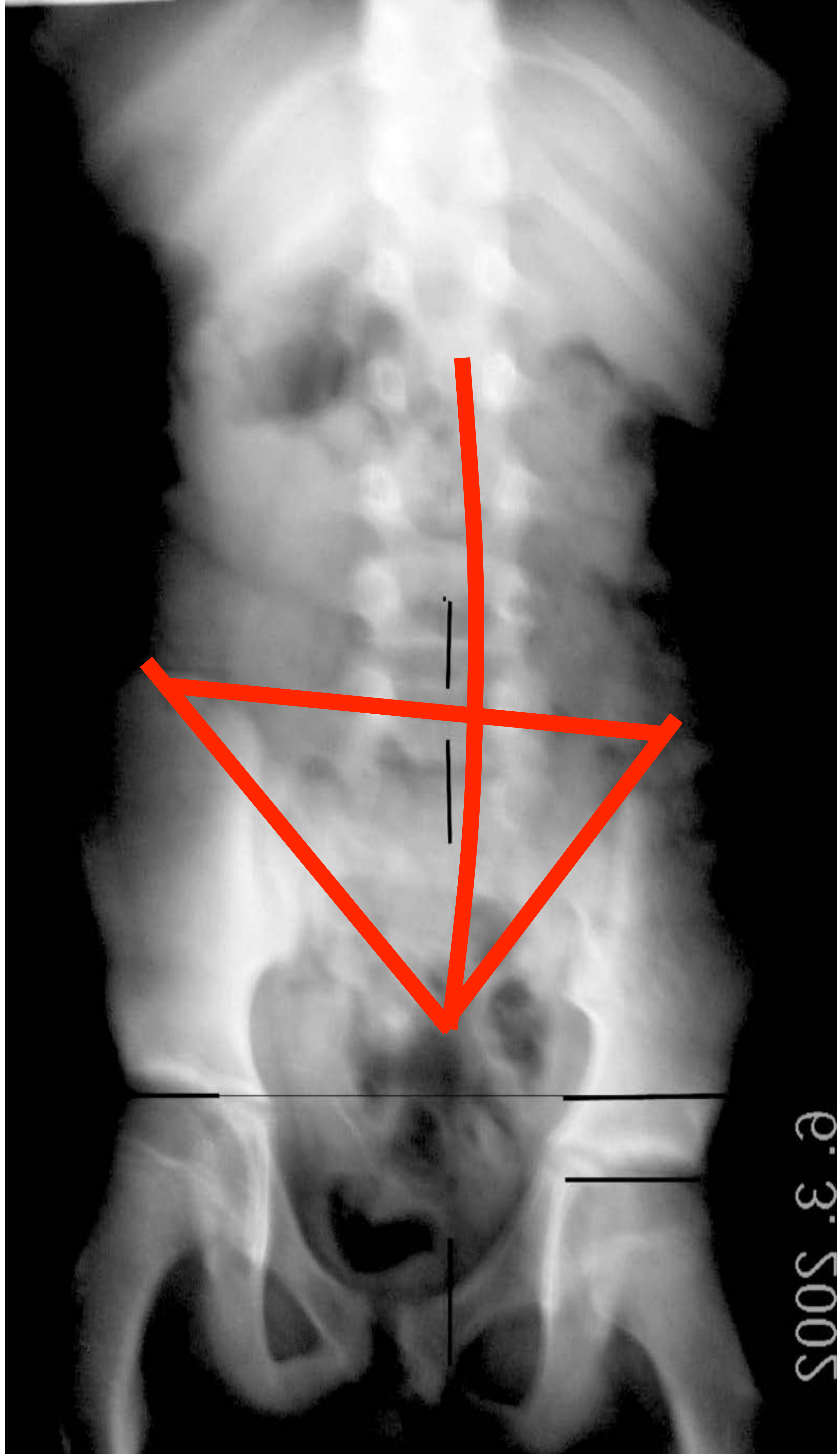
Heel Spurs

FOOT LEVELERS

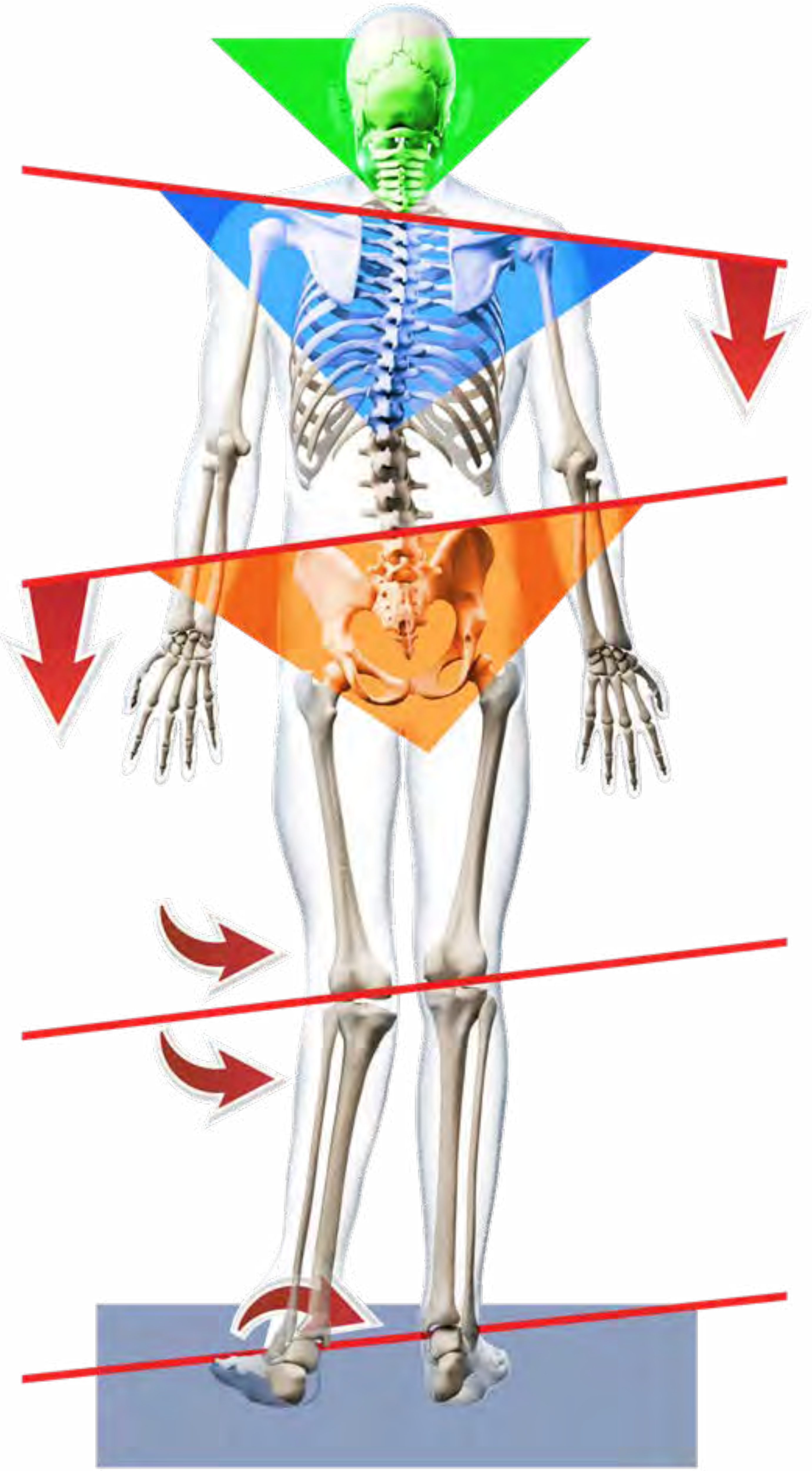
With Over Prontation, What Else Do You See?







Don’t Overlook the Lower Extremities!



(4400 steps min.)

In 1965 in Japan, the Yamasa Clock and Instrument Company wanted a snappy name for a new pedometer. It chose "Manpo-kei."

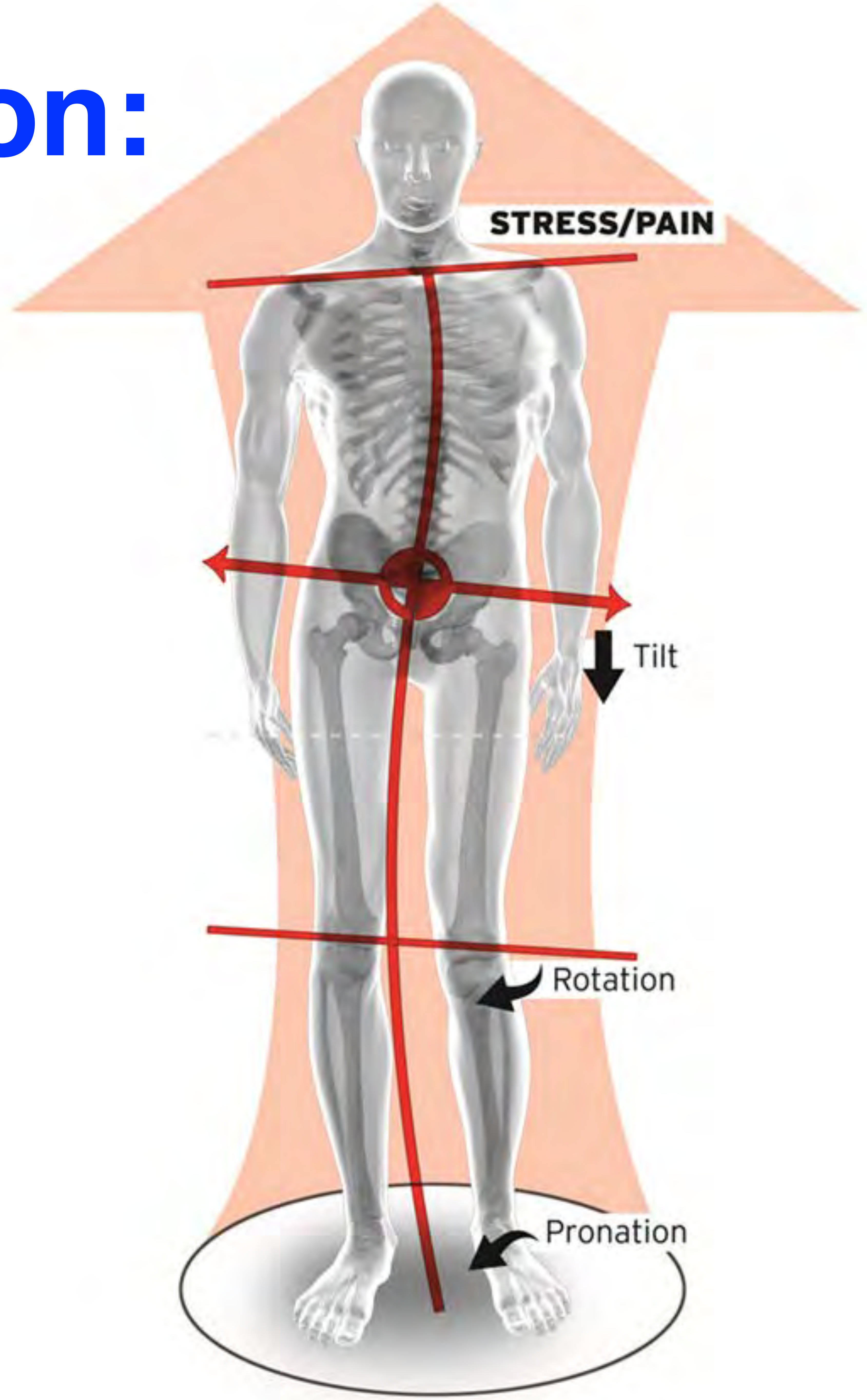
It translates, literally, as "10,000-steps meter."

FOOT LEVELERS

The Effects of Over Pronation:

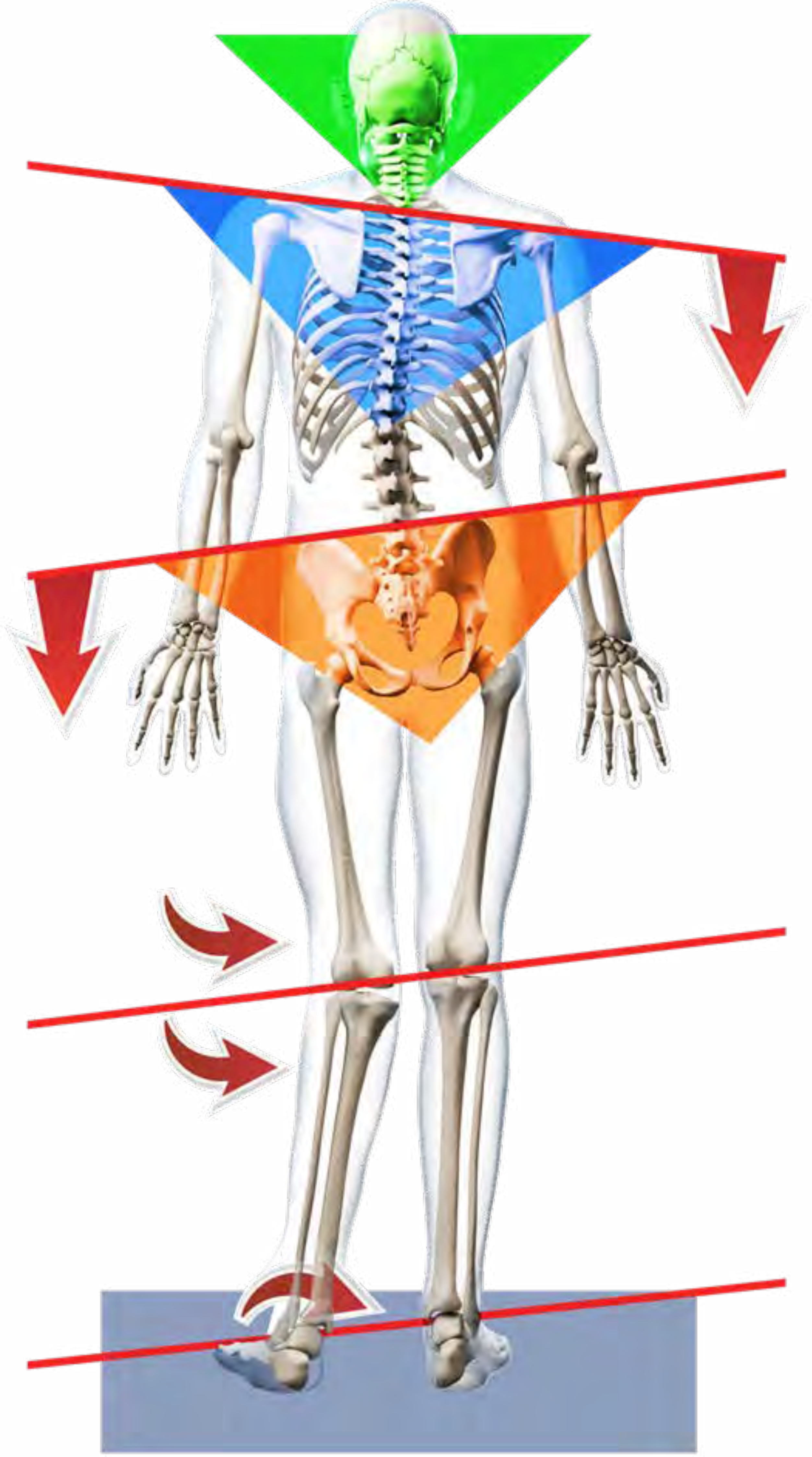
- Excessive spinal rotational stress

- Chronic SI joint stress



The Effects of Over Pronation:

- Excessive shock transmission
- Pelvic unleveling due to LLI



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Factors of Pronation

Symptoms of Over Pronation

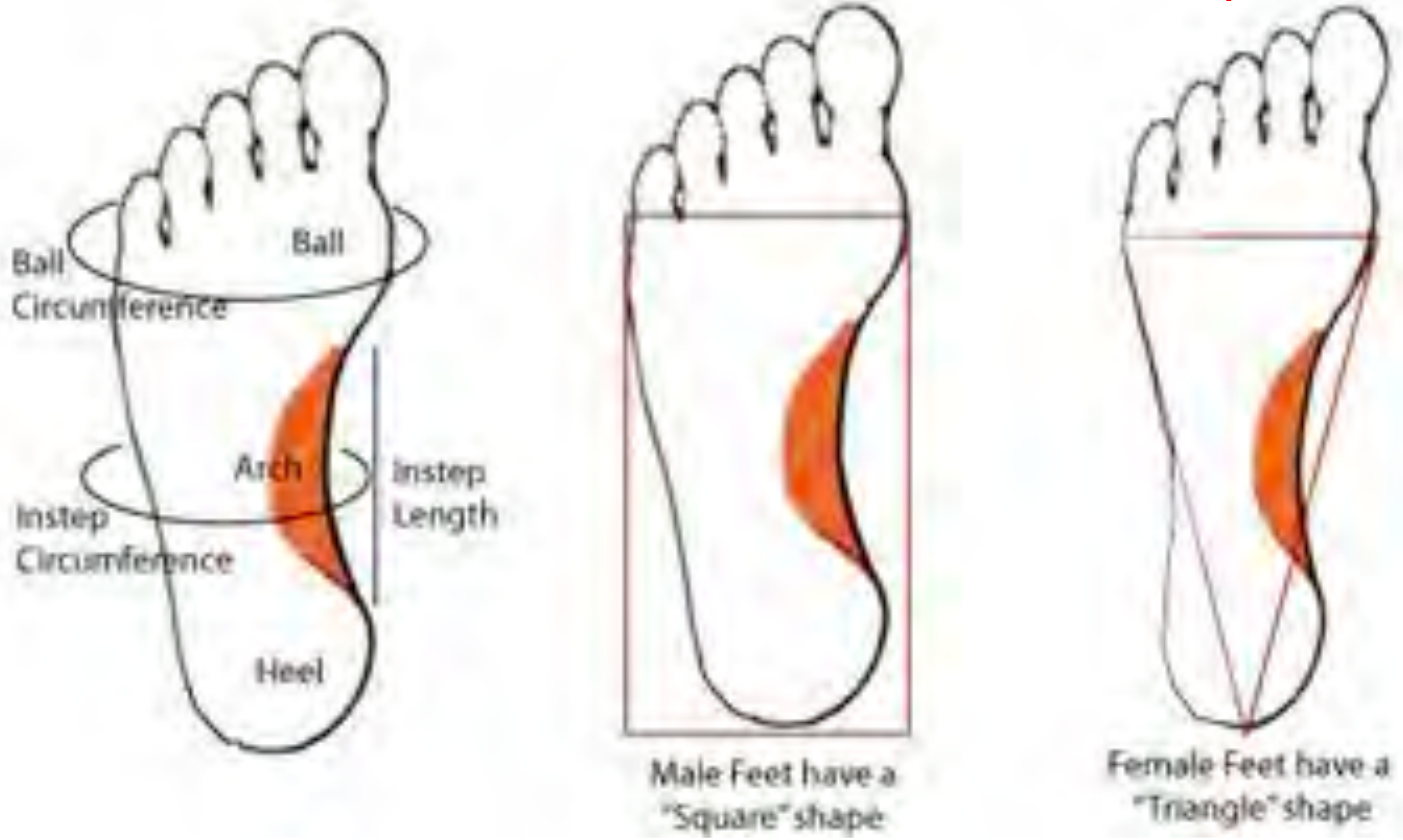
- History or chronicity of symptoms
- Spinal/extremity symptoms worse with WB.
- Short-term response to Chiro. Adjustments

FOOT LEVELERS

How do the Sexes Differ?

Woman have a narrower heel/midfoot with a wider forefoot

Their biomechanical forces are distributed differently!



FOOT LEVELERS

Are Female Feet Different?

Biomechanical, forefoot conditions in women > men

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

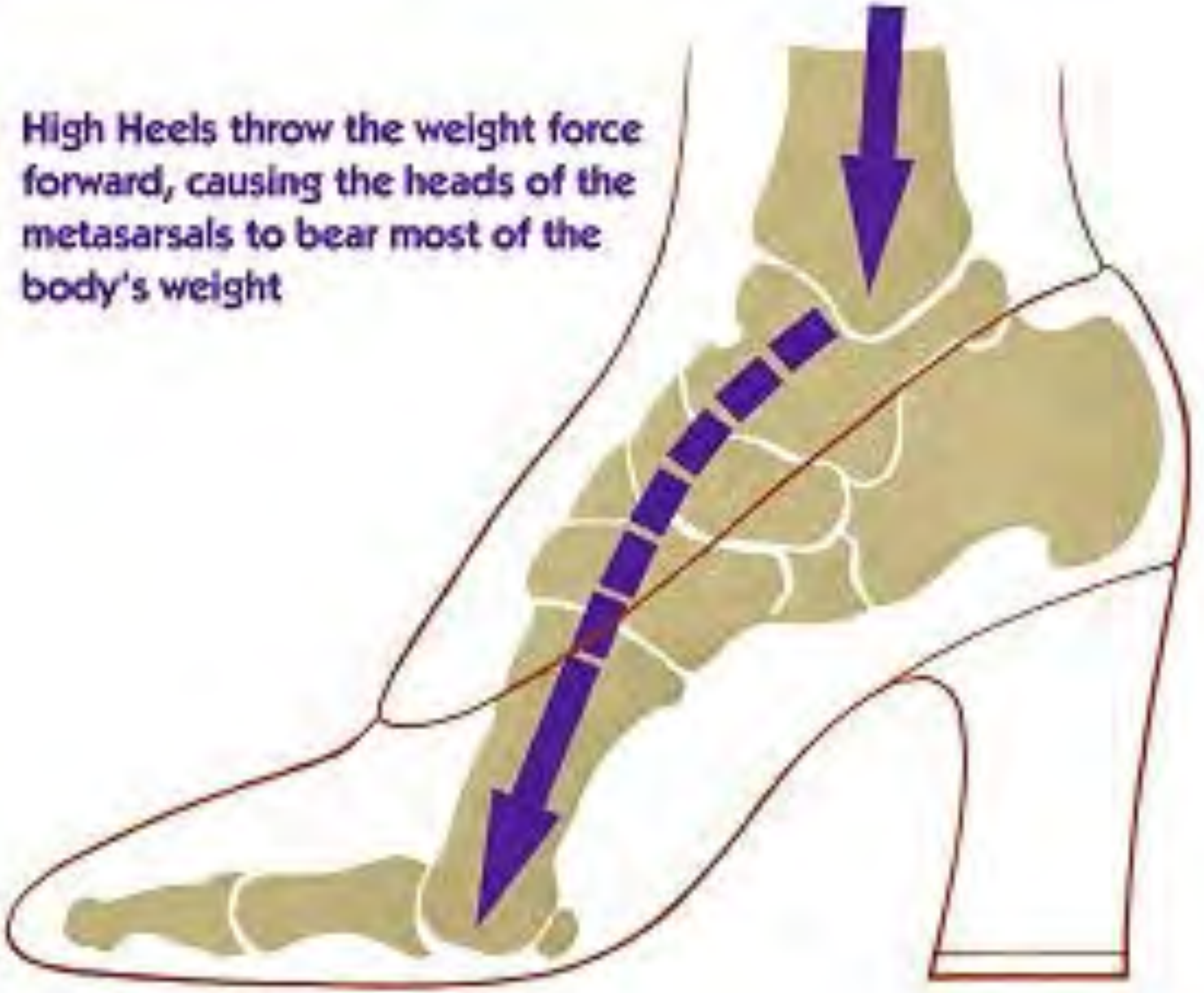
- **MT arch support is key!**

FOOT LEVELERS

Footwear

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

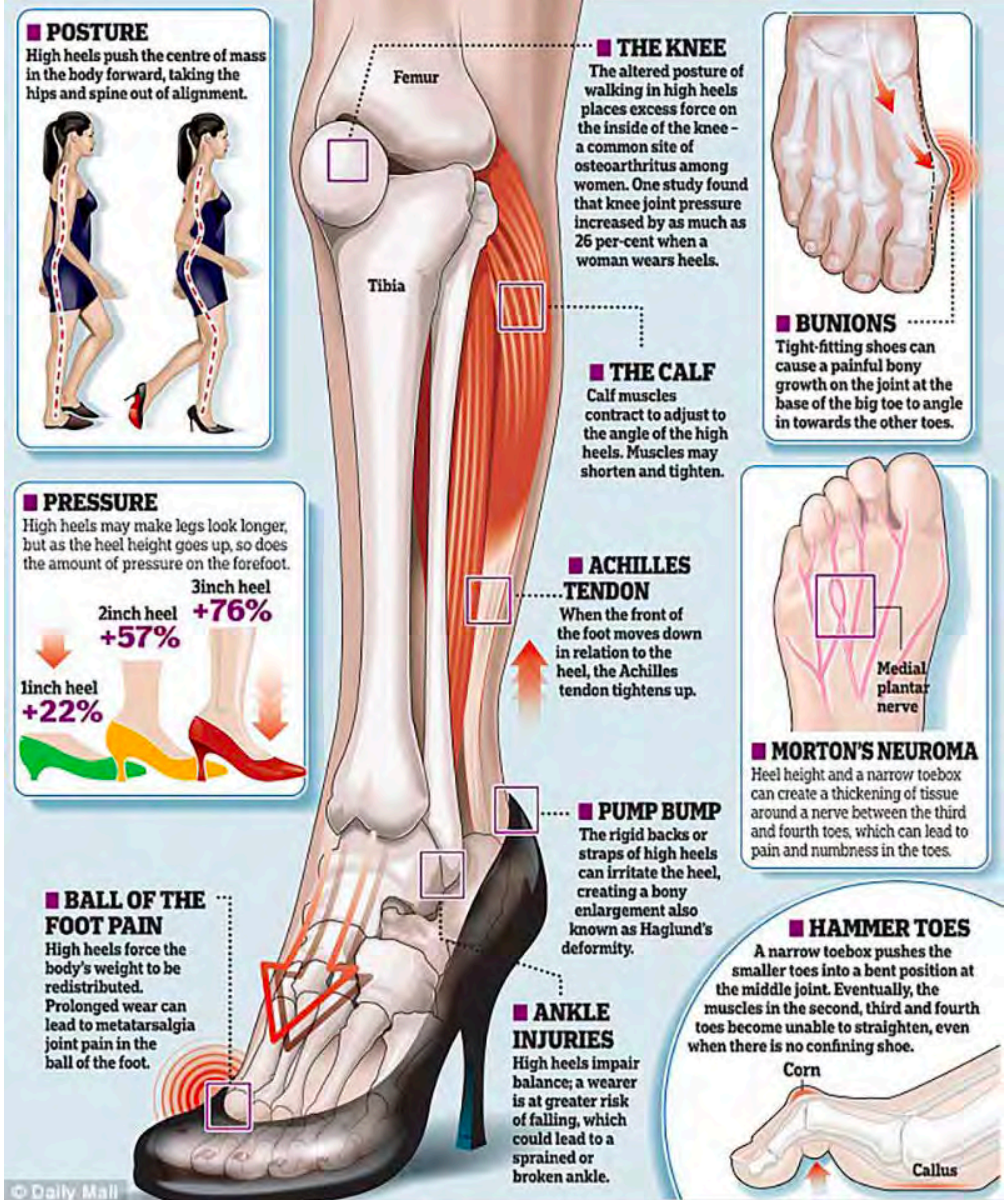
High Heels throw the weight force forward, causing the heads of the metasarsals to bear most of the body's weight




Dangers of Heels

Forefoot pressure increases by:

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

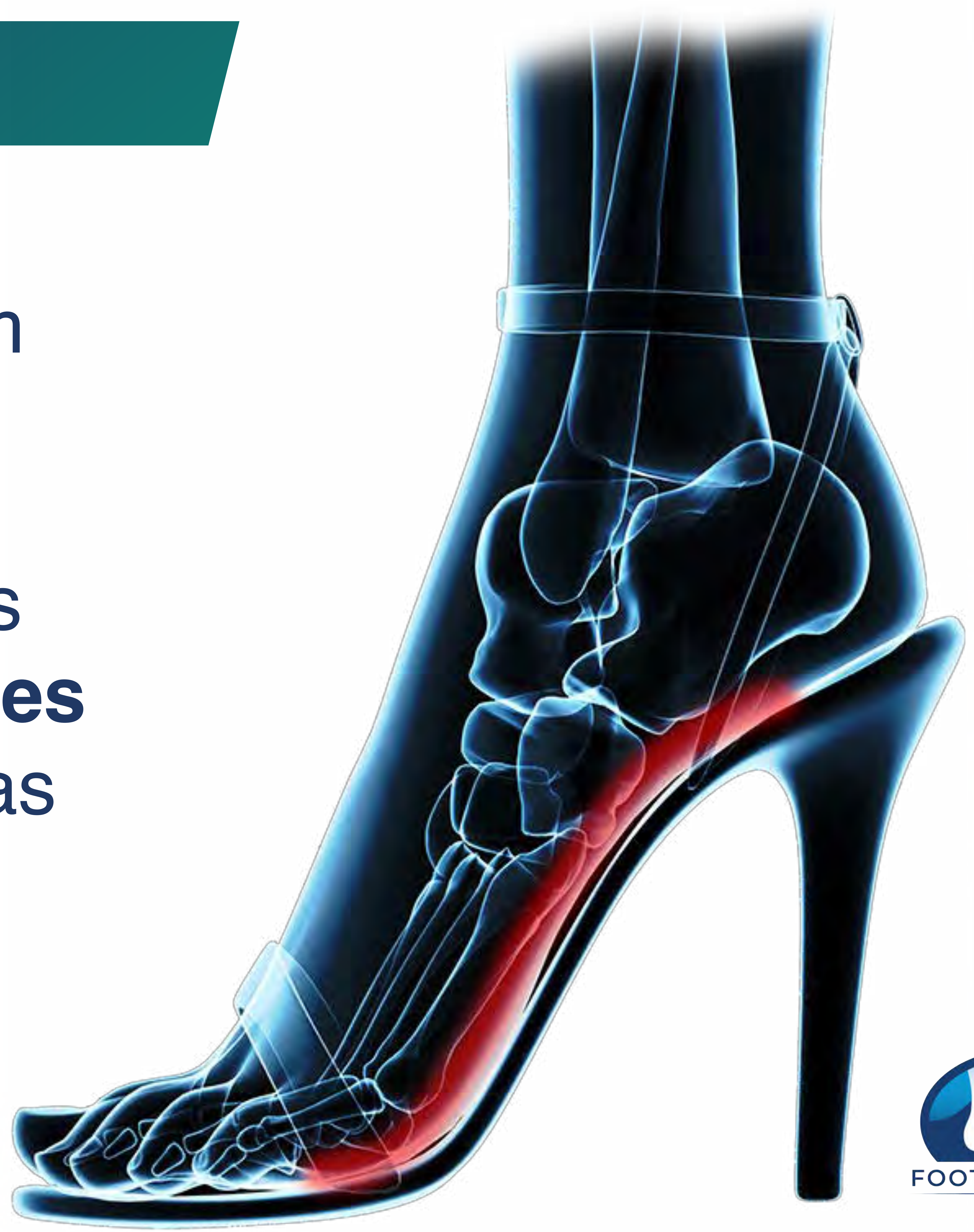


Foot Facts

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



FOOT LEVELERS

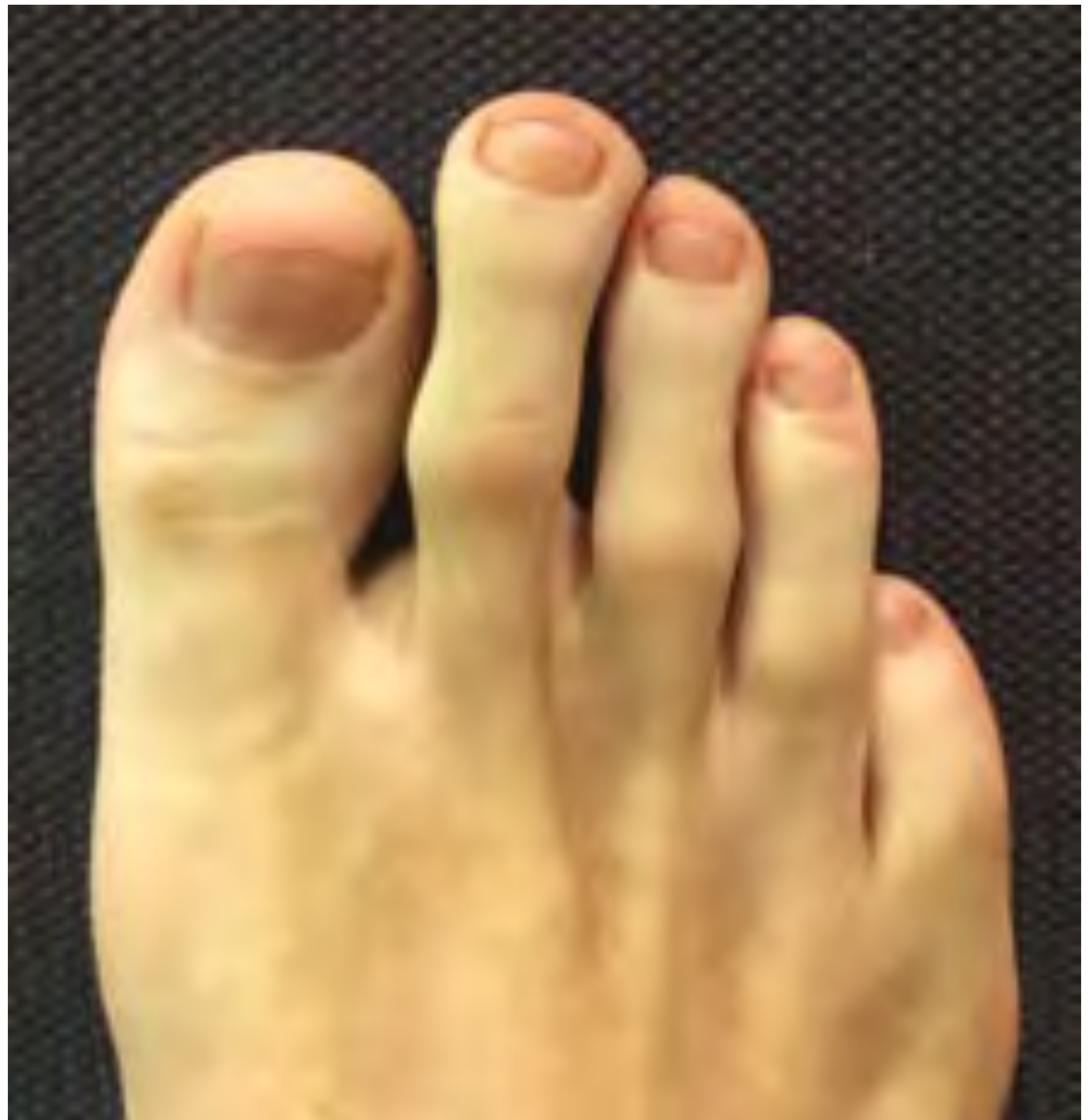
Visual/Palpatory Findings:

- 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

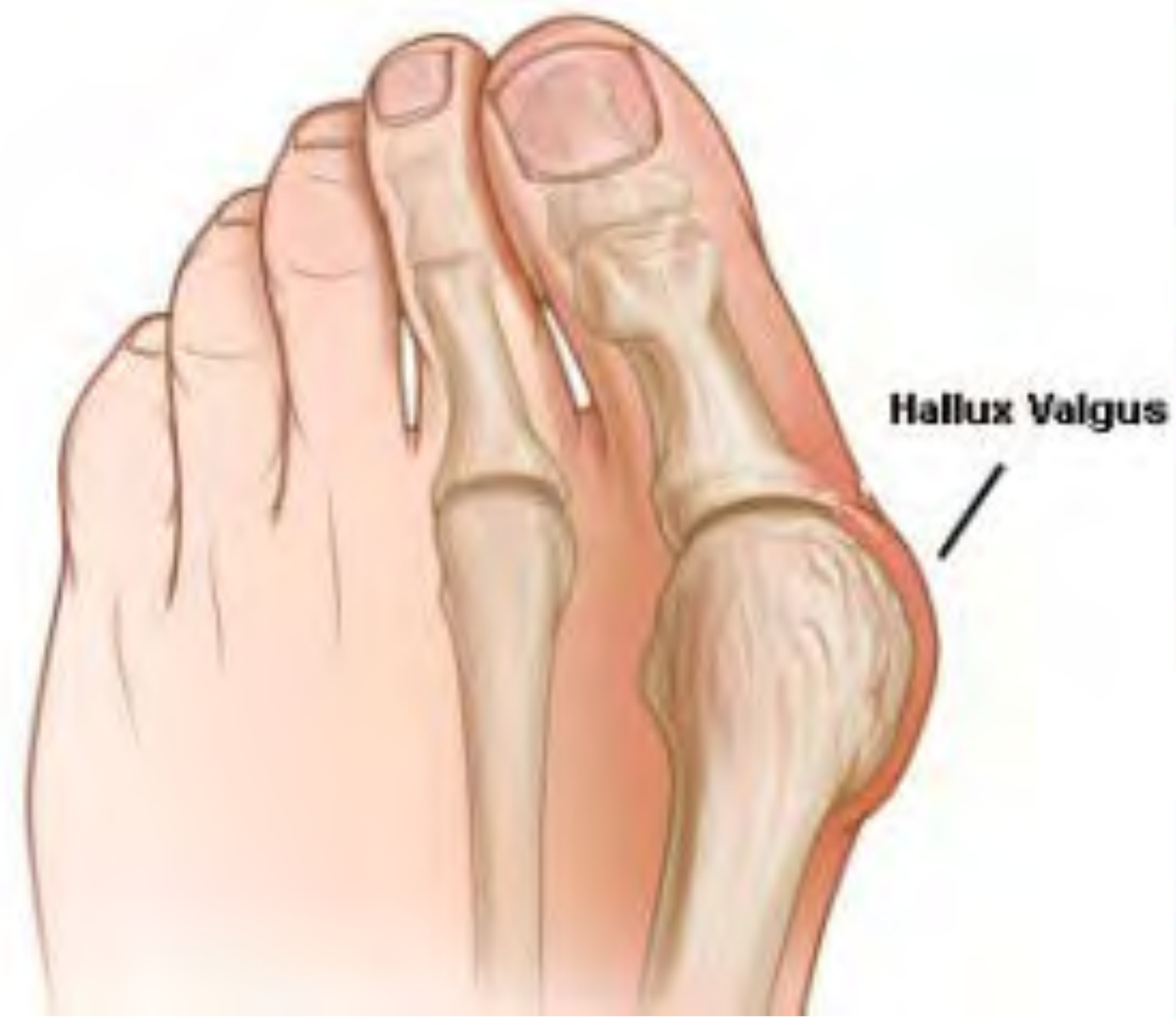
High heels (3 inches or more)

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.

FOOT LEVELERS


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

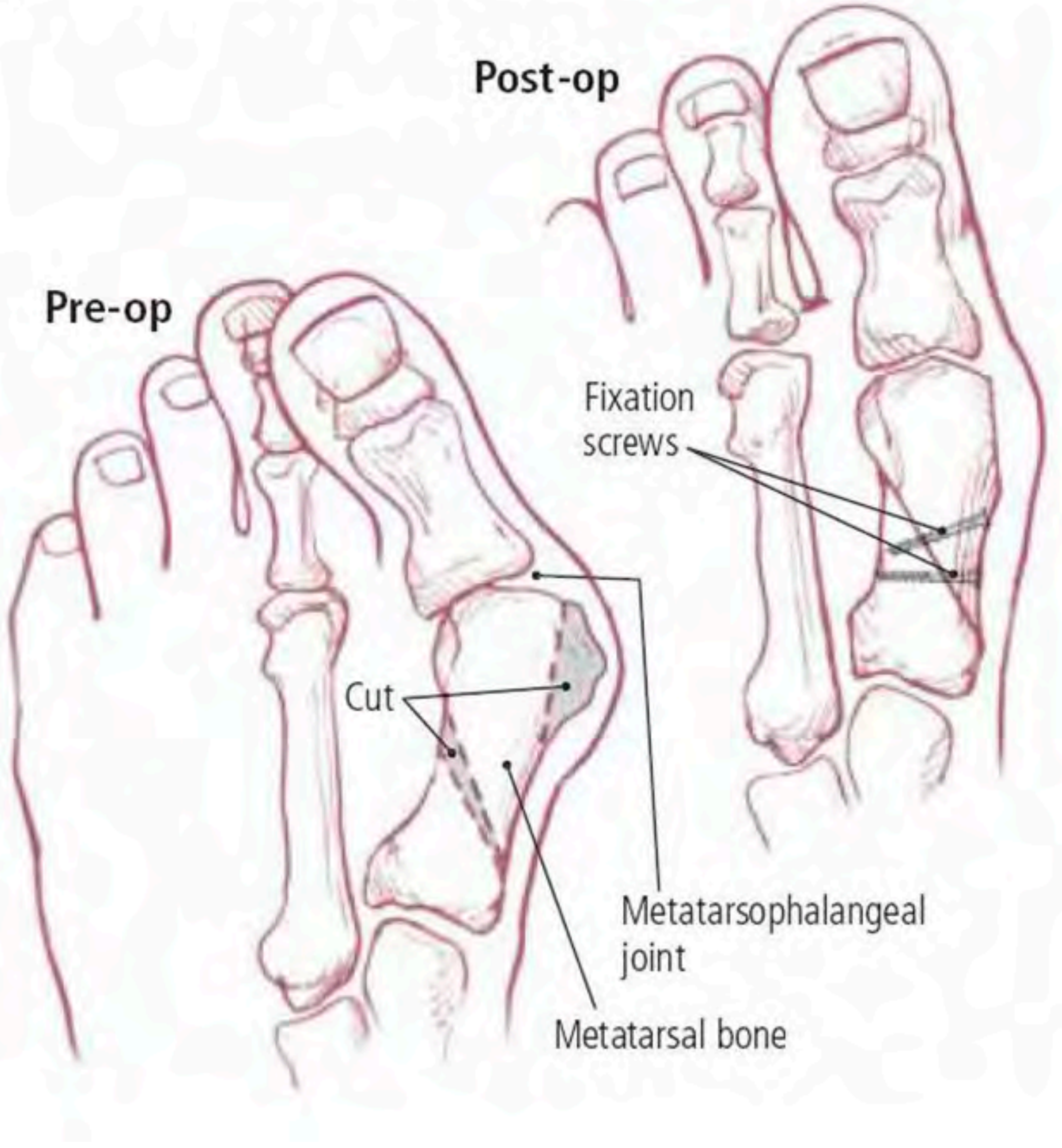
FOOT LEVELERS


Hallux Valgus

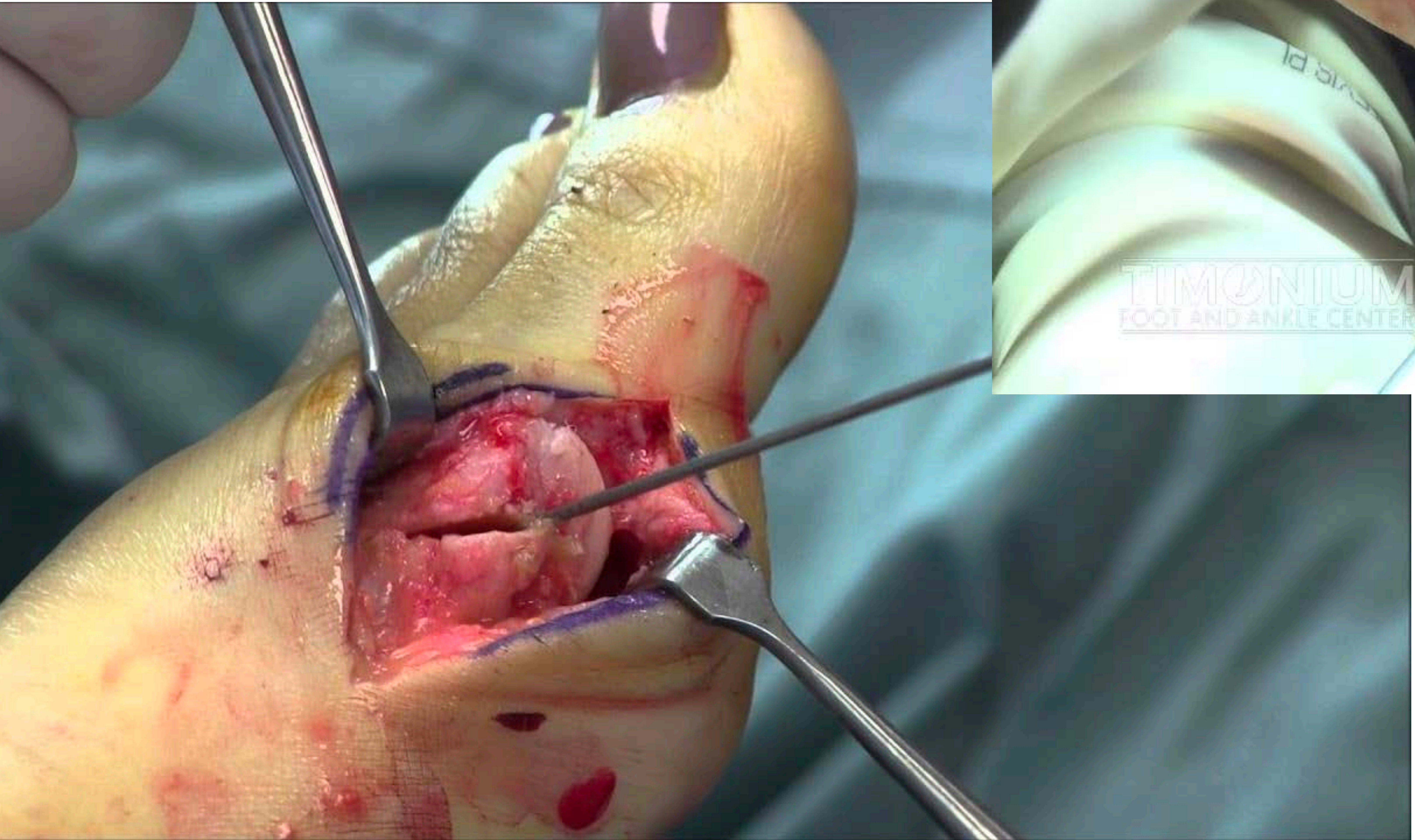

A
B

FOOT LEVELERS

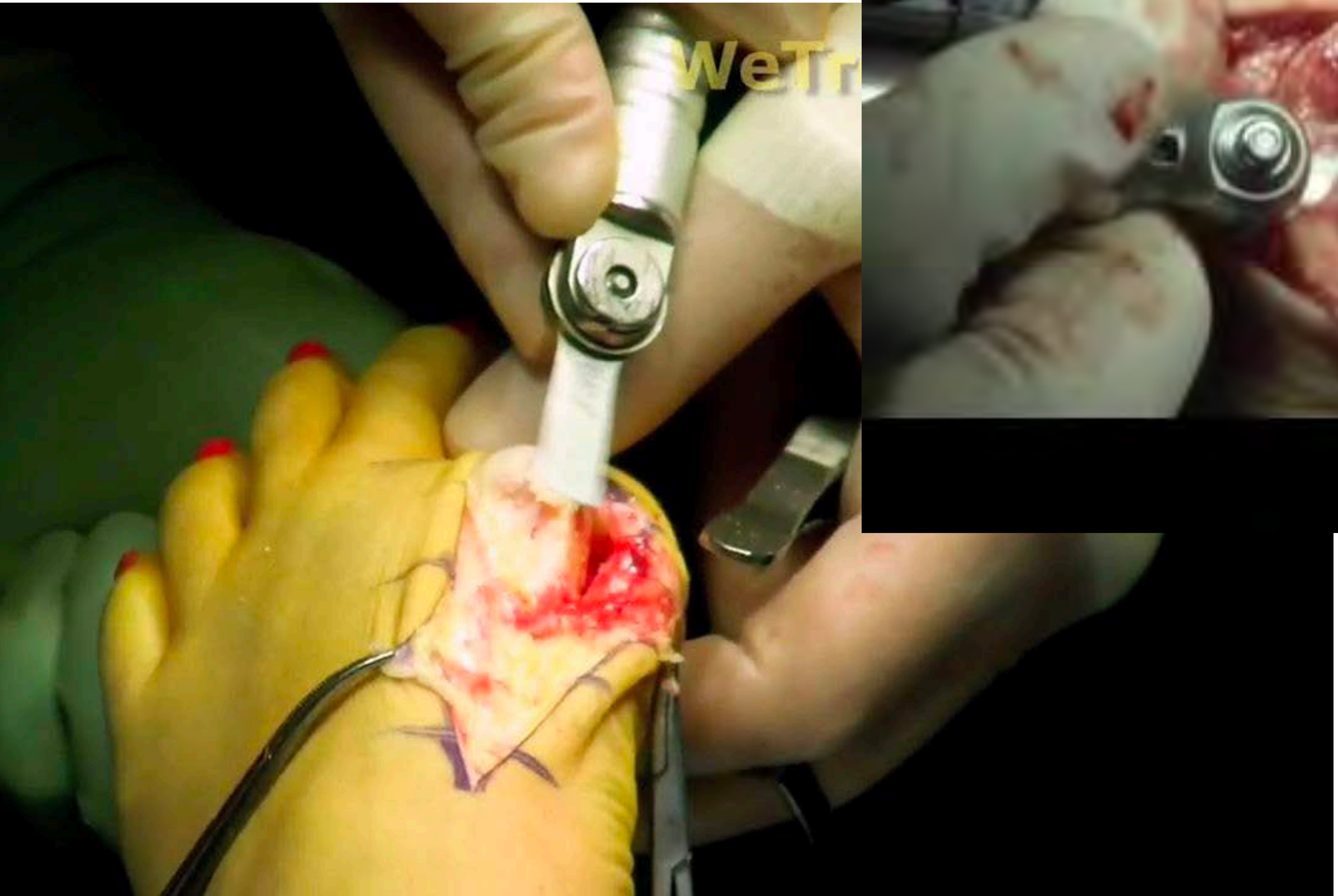
Surgical correction of a bunion

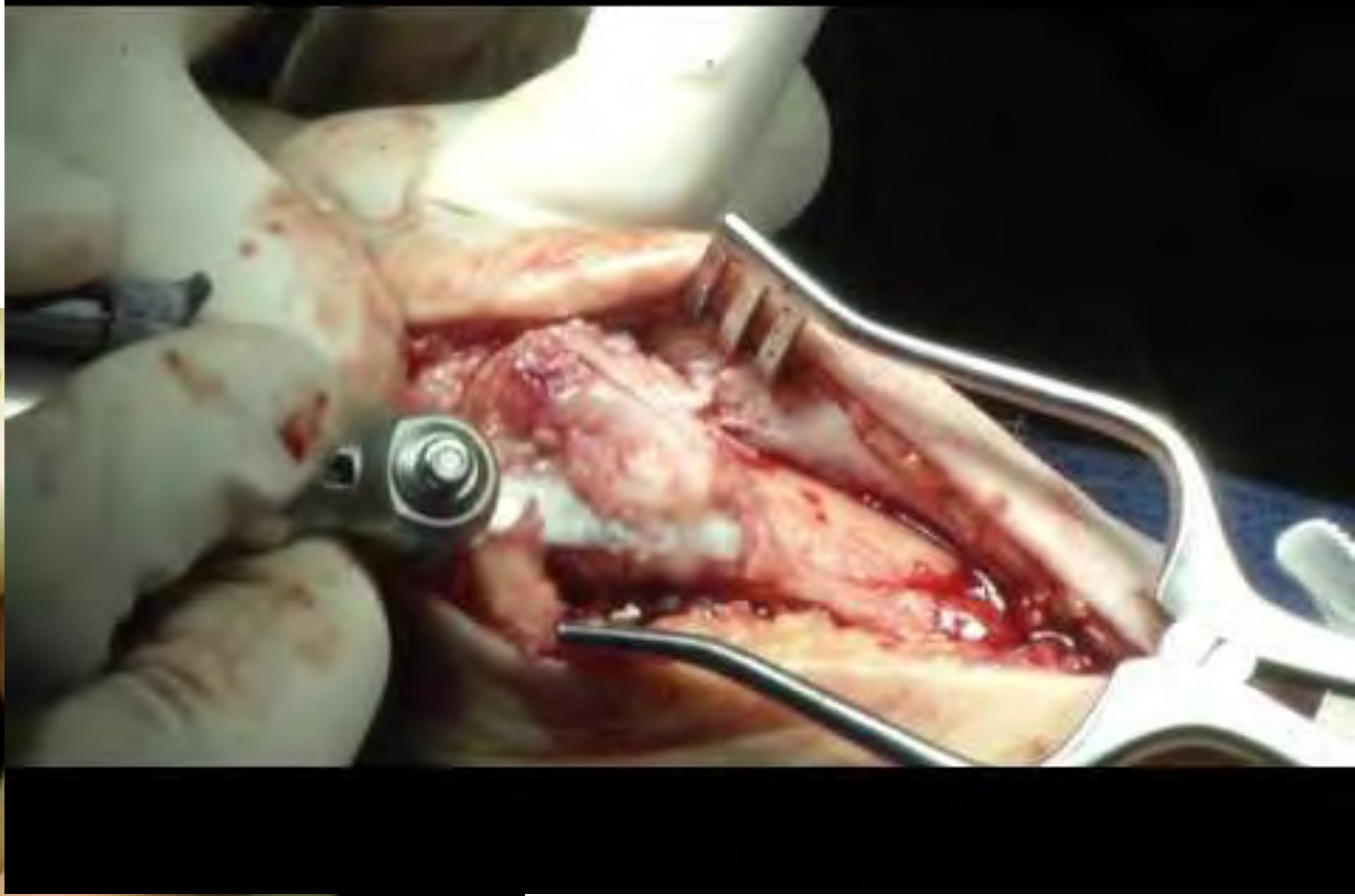


Bunionectomy

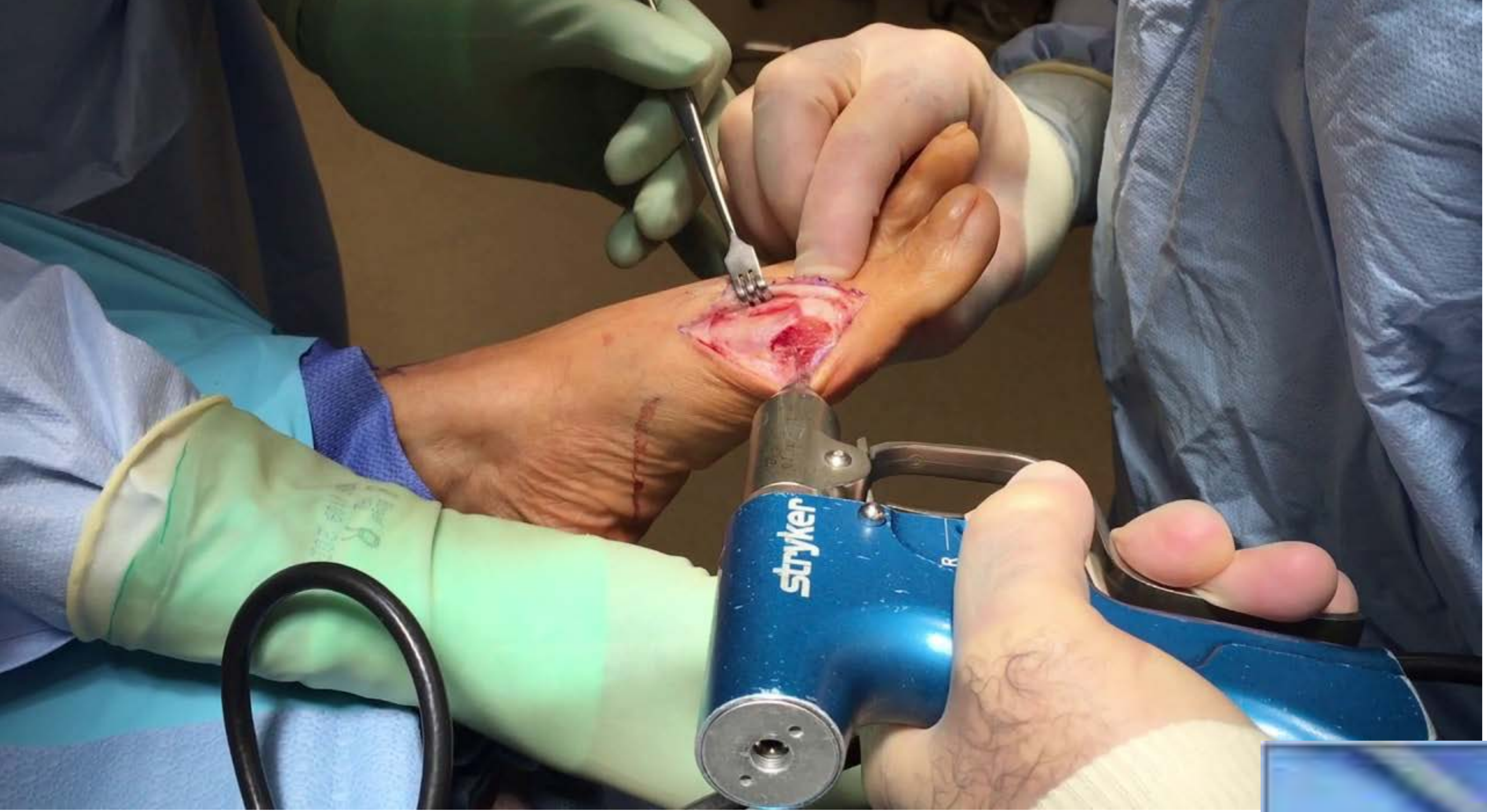


Bunionectomy





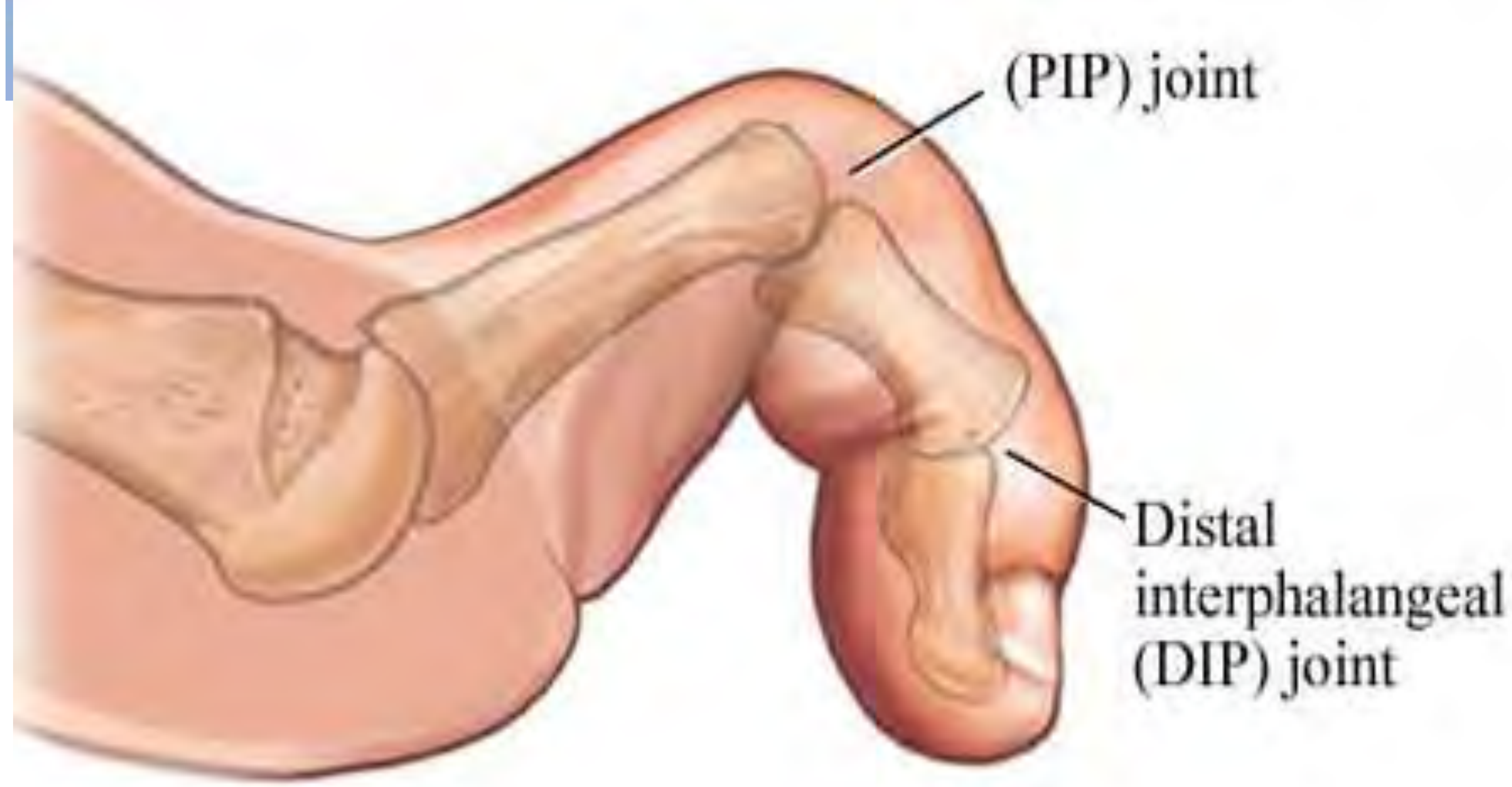
FOOT LEVELERS

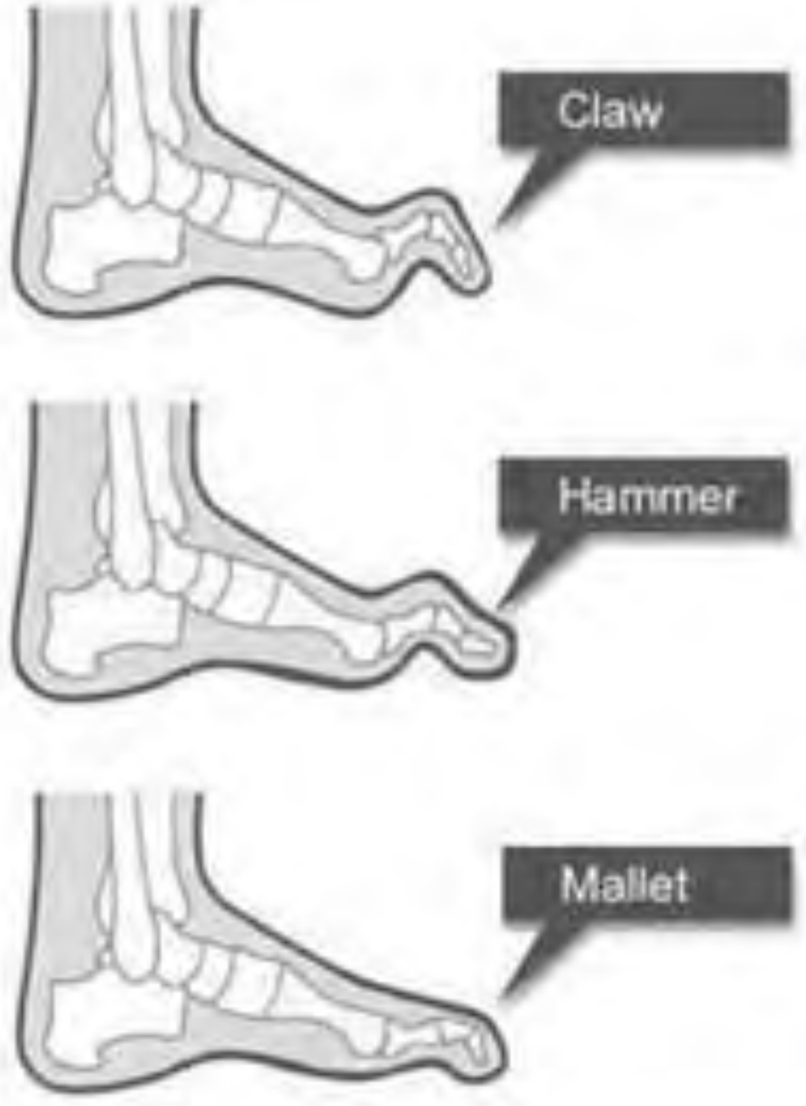


Bunionectomy

HAMMER TOES

FOOT LEVELERS


(PIP) joint
Distal
interphalangeal
(DIP) joint

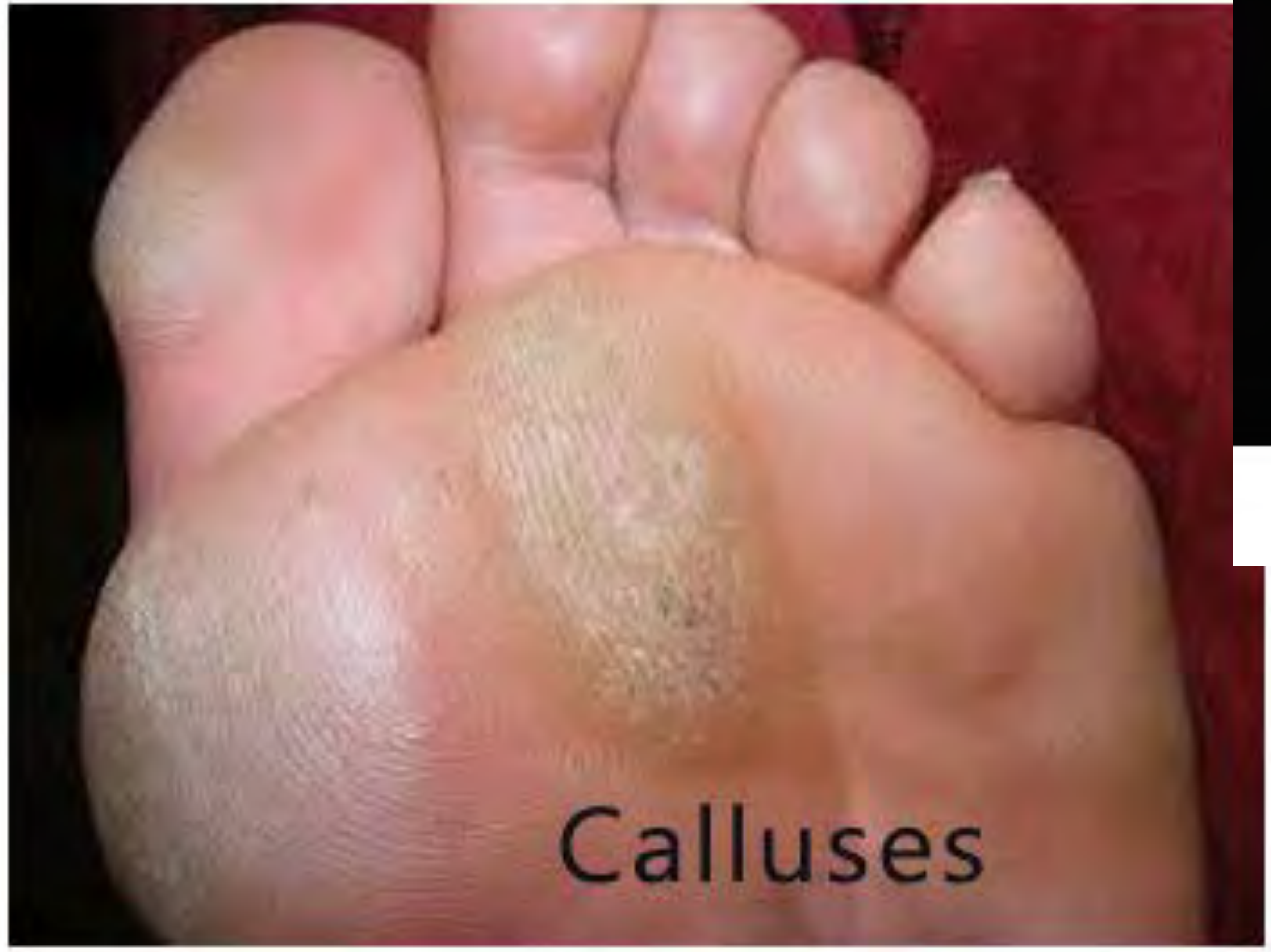

Claw
Hammer
Mallet

Hammer Toes

Hammer Toes

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

FOOT LEVELERS



CORNS CALLUSES

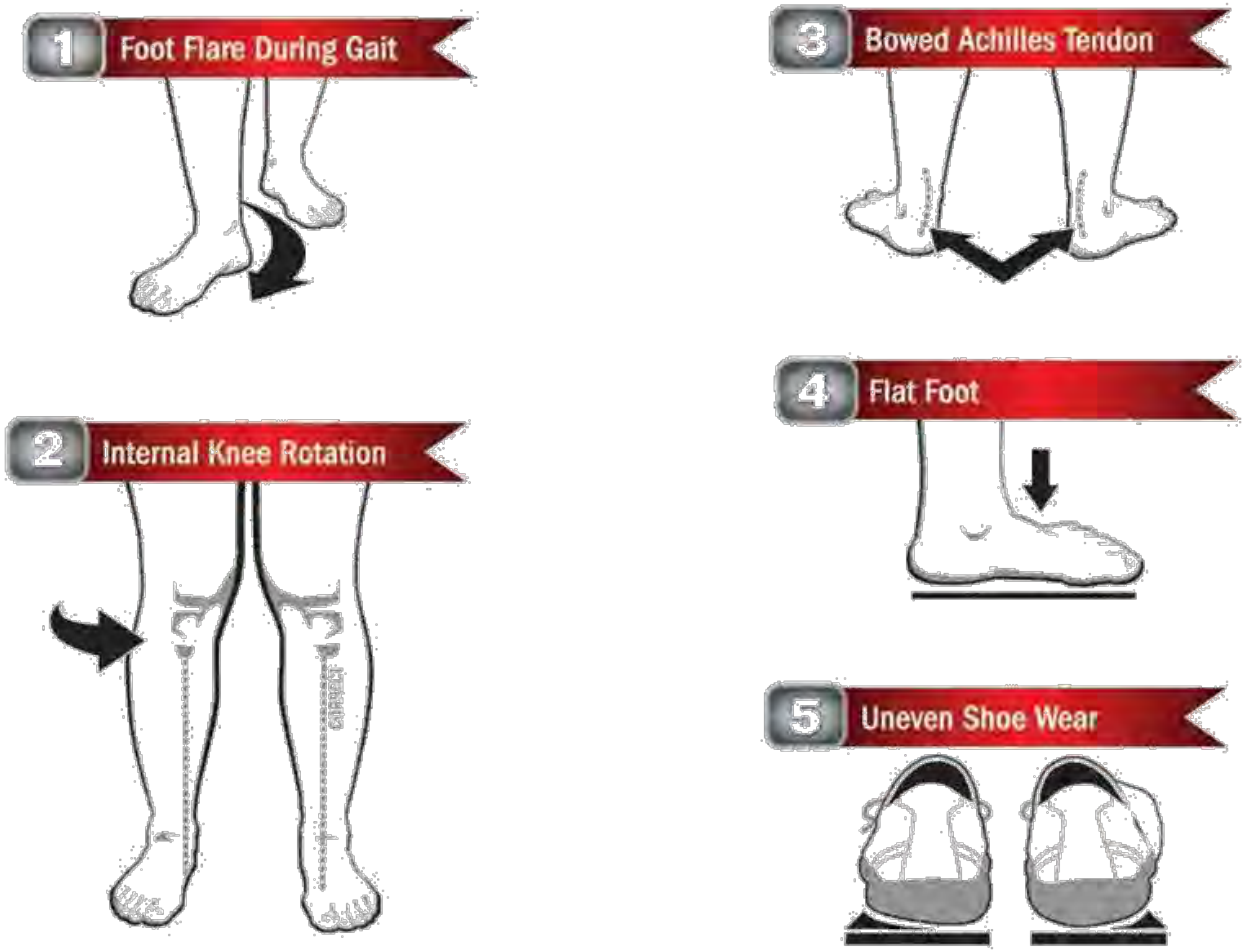
3 PRIMARY FOOT TYPES IN NORTH AMERICA

Morton's Toe/Foot

Morton’s Foot

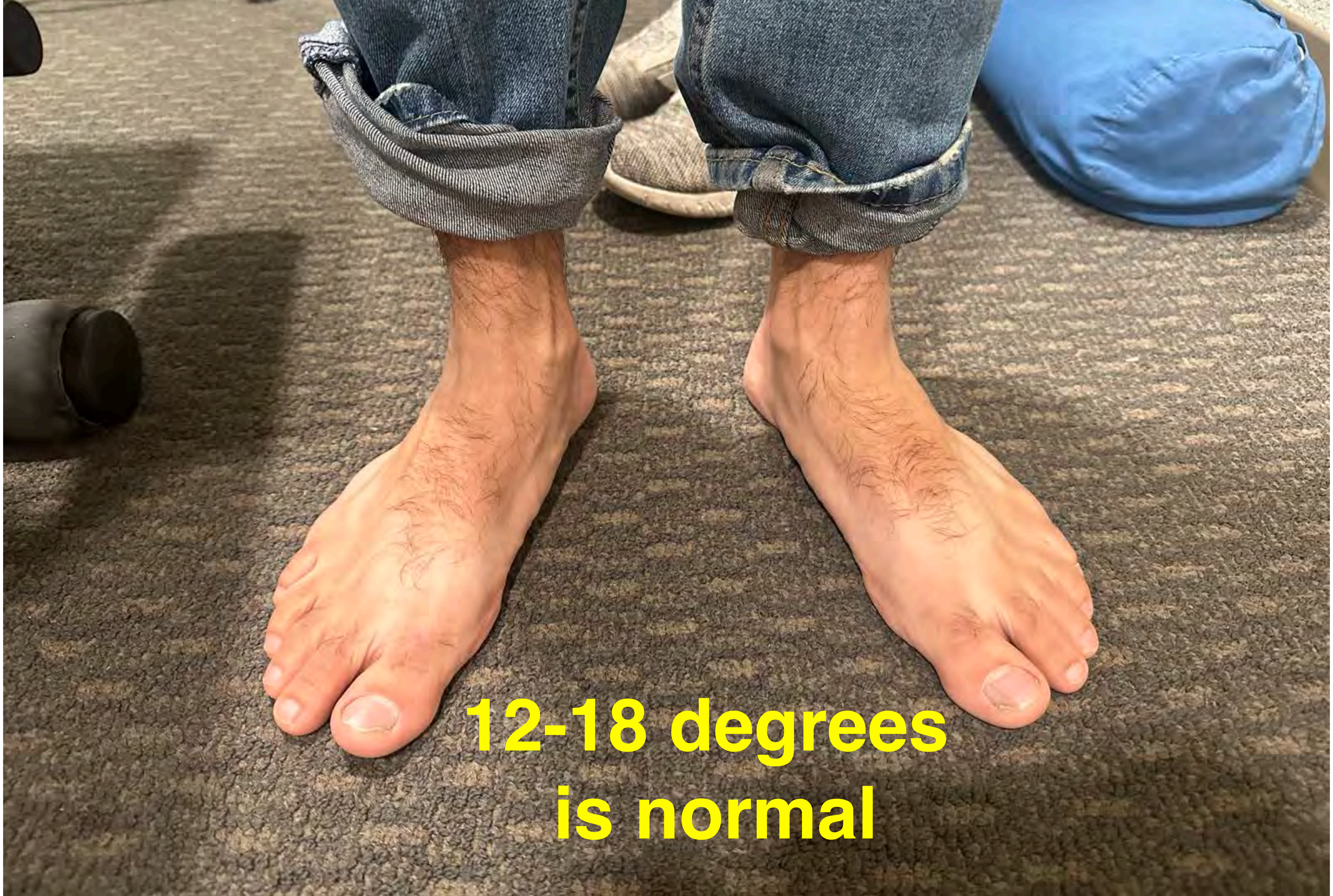
FOOT LEVELERS

5 RED FLAGS OF PRONATION

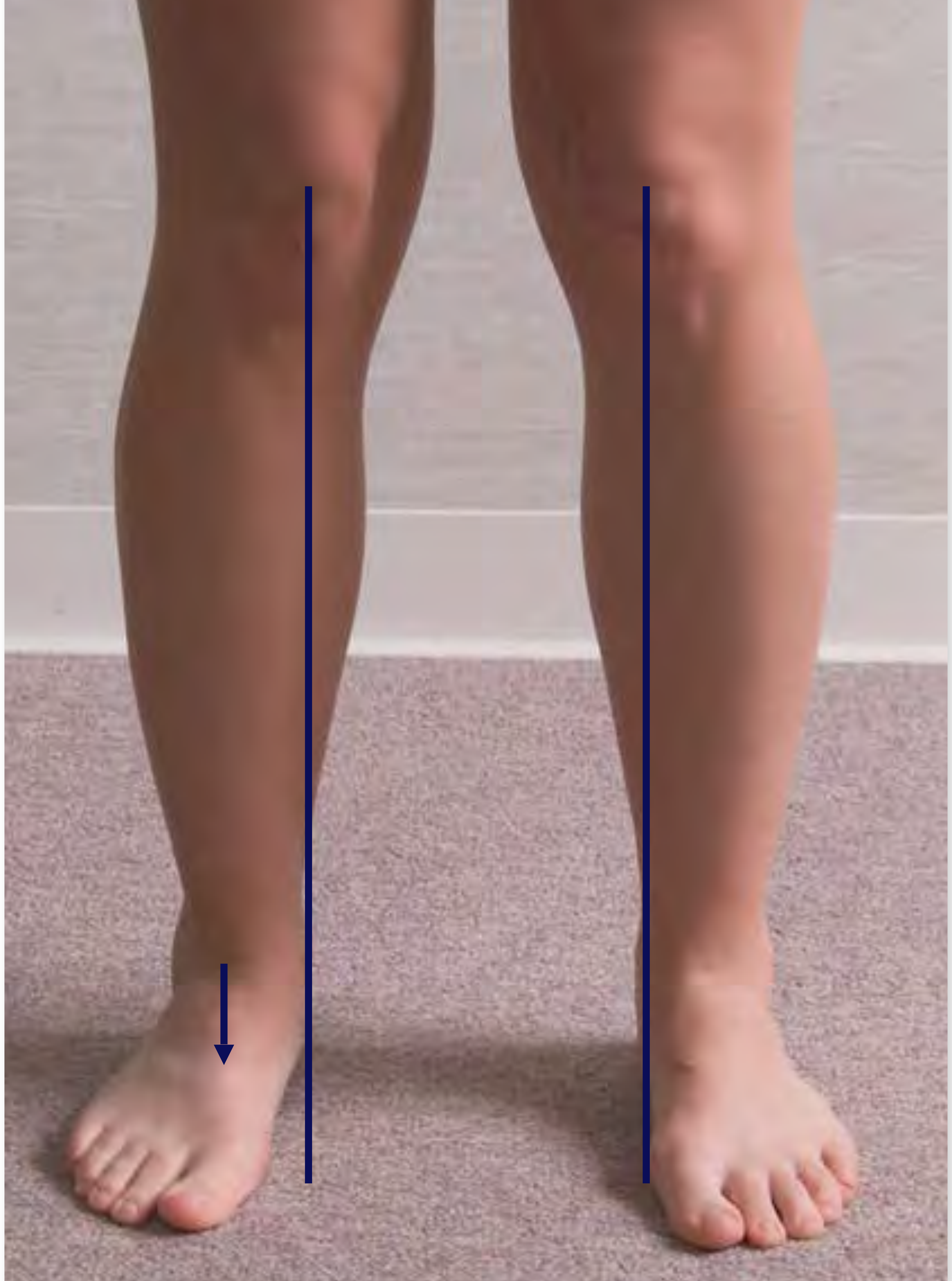


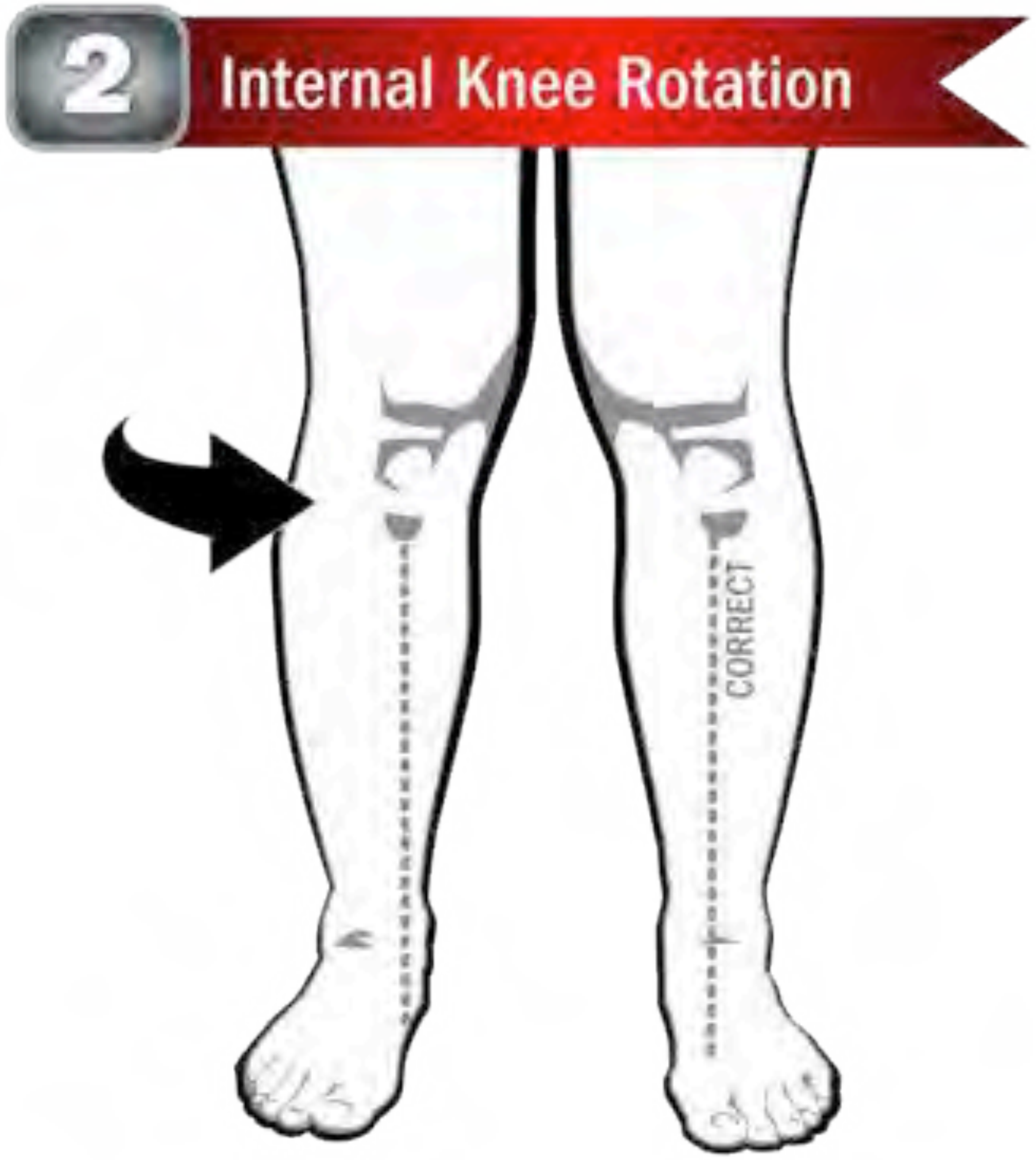
FOOT LEVELERS


1
Foot Flare During Gait



FOOT LEVELERS





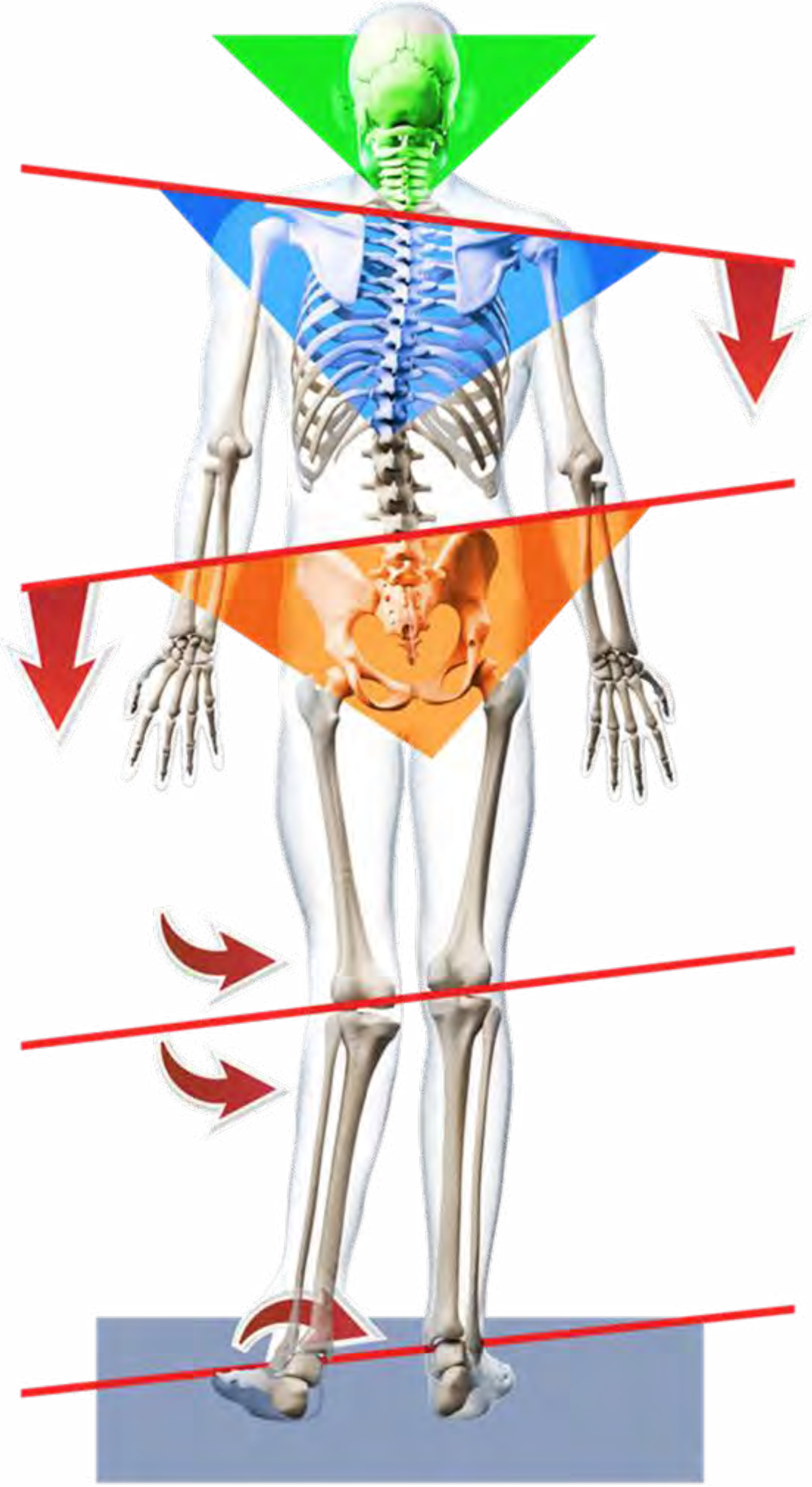
FOOT LEVELERS


3
Bowed Achilles Tendon


4
Flat Foot


5
Uneven Shoe Wear

Structural stress produces muscle imbalances



FOOT LEVELERS


BEFORE
FULL BODY PAIN
FUNCTIONAL ORTHOTICS
AFTER
FULL BODY RELIEF
STRESS PAIN
STRESS PAIN
STRESS PAIN
STRESS PAIN
STRESS PAIN
STRESS PAIN
STRESS PAIN
FOOT LEVELERS
Without functional orthotics flat feet aren't supported
With functional orthotics flat feet are supported
THE PERFORMANCE EDGE

SAME PERSON
DIFFERENT FEET

Scanning the feet shows immediately
asymmetrical overpronation

How do You Know Who Can Benefit from orthotics?

FOOT LEVELERS

SCAN EVERY PATIENT!

SCAN EVERY PATIENT! (Part of your 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

Cutting Edge Technology

1. Patient engagement and education.

2. Comprehensive Report of Findings

3. Earth-friendly and quick

FOOT LEVELERS

The Foot Levelers Kiosk

Standard Design
Dual-Foot Kiosk

Ease Your Pain Design
Dual-Foot Kiosk

Spanish Design
Dual-Foot Kiosk

Performance Design
Dual-Foot Kiosk

PROBLEM:

"I know I need to scan all of my patients but I don't always have time."

SOLUTION:

THE FOOT LEVELERS KIOSK

Your patients scan themselves!

https://vimeo.com/299742943

RESULTS:

- Improved Outcomes
- Happier, Healthier Patients
- Practice Growth

FOOT LEVELERS

3-D Kiosk

Our Best
Scanning Technology

- **TIME SAVER** - Designed so patients can 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

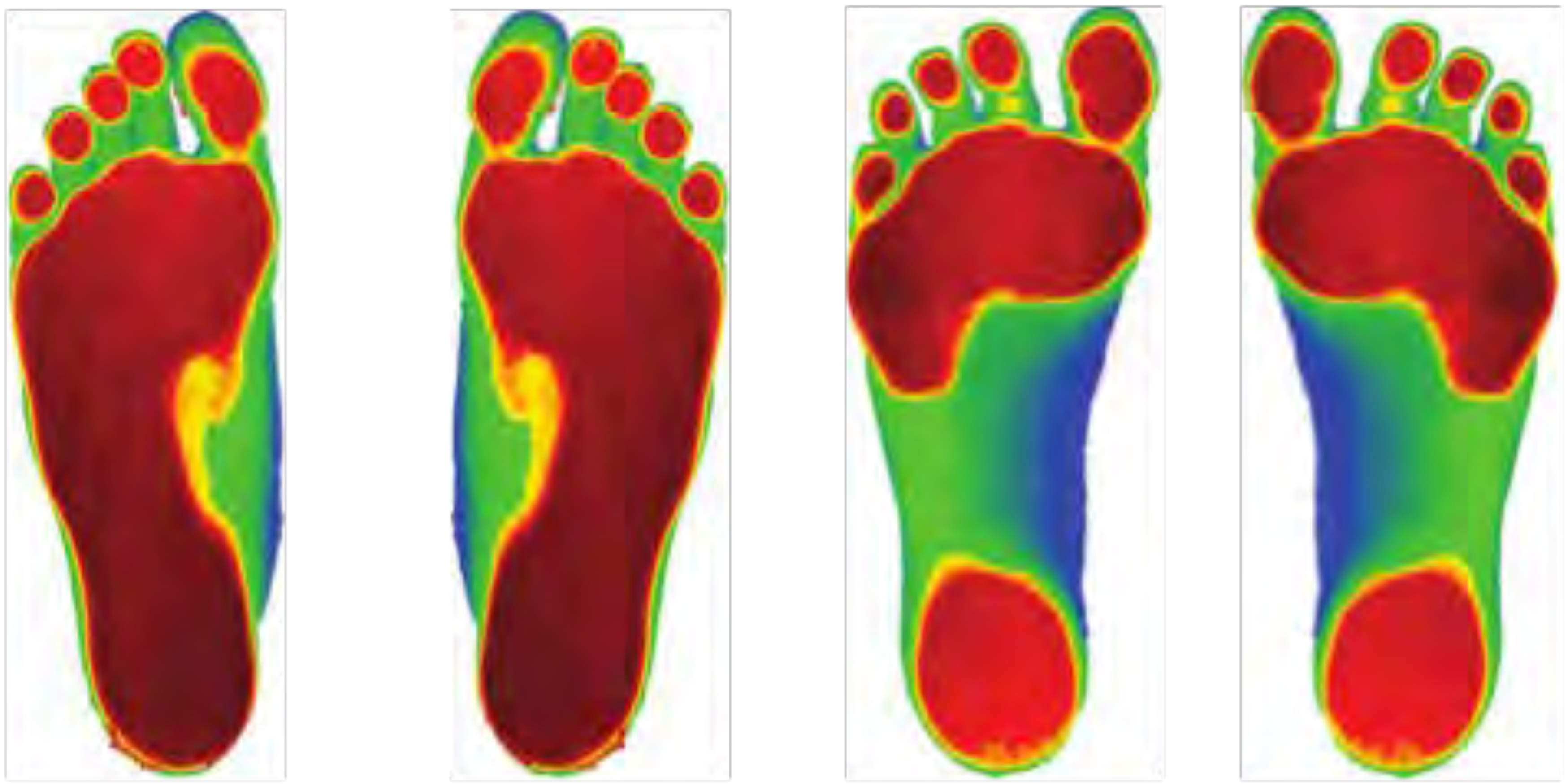
Report of Findings

		Results	Optimal
Patient: Jane Doe	Pronation/Stability Index	123	0-34
Date: 01/02/1234	Arch Height Difference	6.04	<=1
Exam Date: 01/02/1234	Left to Right Balance	3.0	<1%
Examiner: Test	Orthotic Recommendation	VITAL	

Your Practice Name Here
Dr. Jane Doe
123 Main St., Roanoke VA
800-553-4860 | www.yourwebsite.com

your logo here

Your Scan Optimal Feet



Pronation Stability Index ™ (PSI)

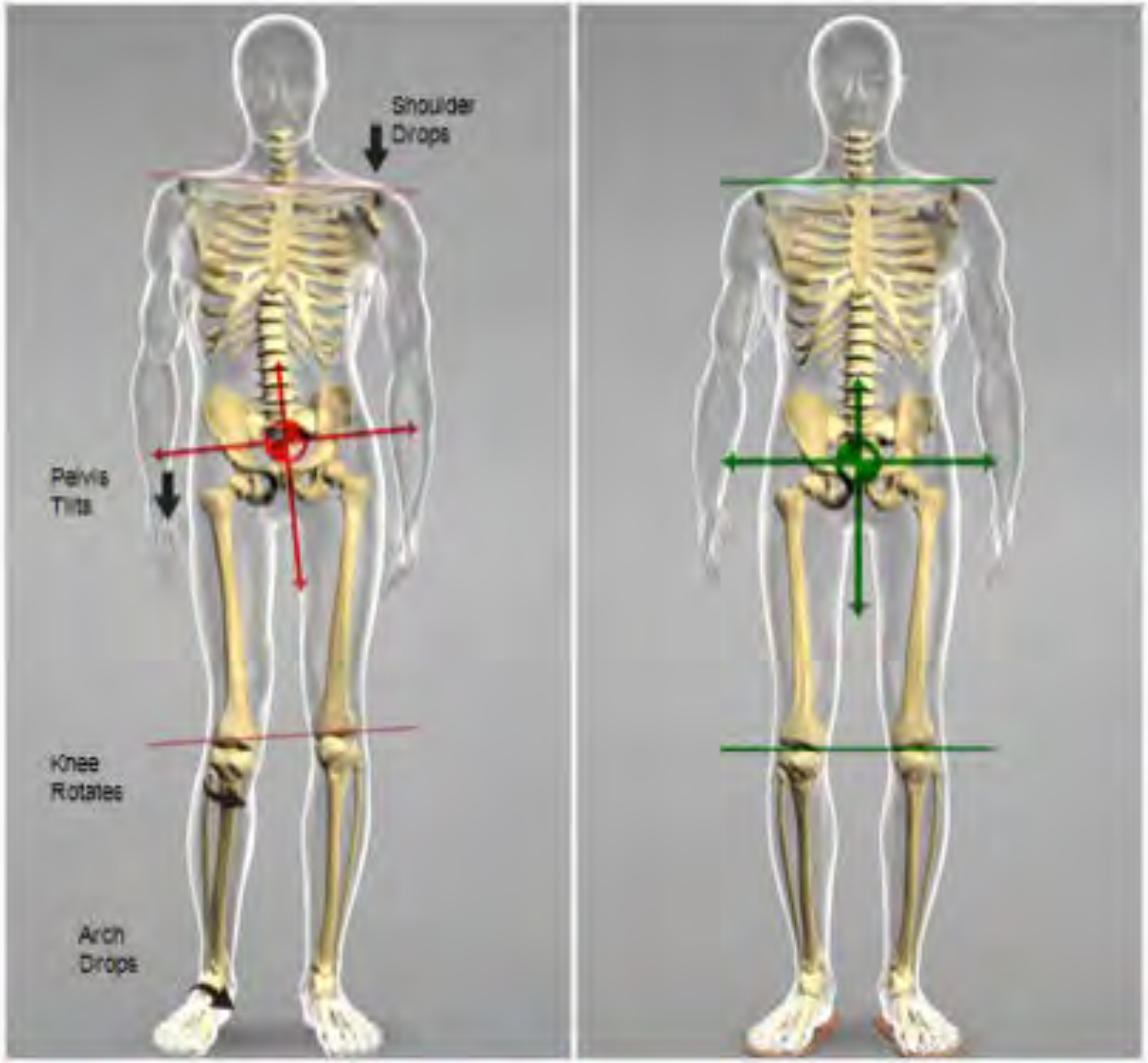
0-34	35-84	85-124	125+
Optimal	**Mild**	**Moderate**	**Severe**

Arch Height Difference

PSI
123 Recommendation
Custom Orthotics

Foot Levelers is the only custom orthotic that restores healthy function of all three arches.

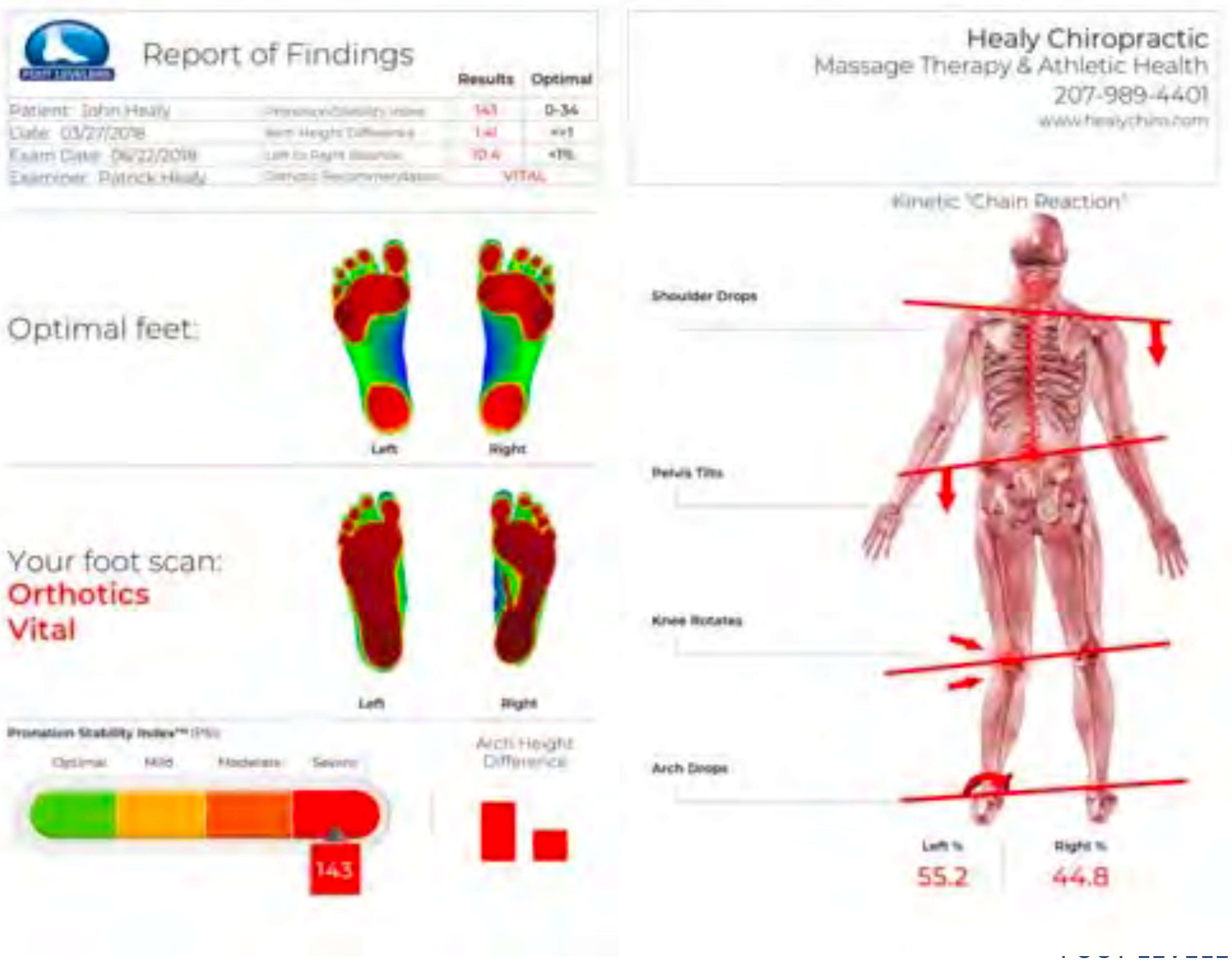
Imbalanced **Balanced**



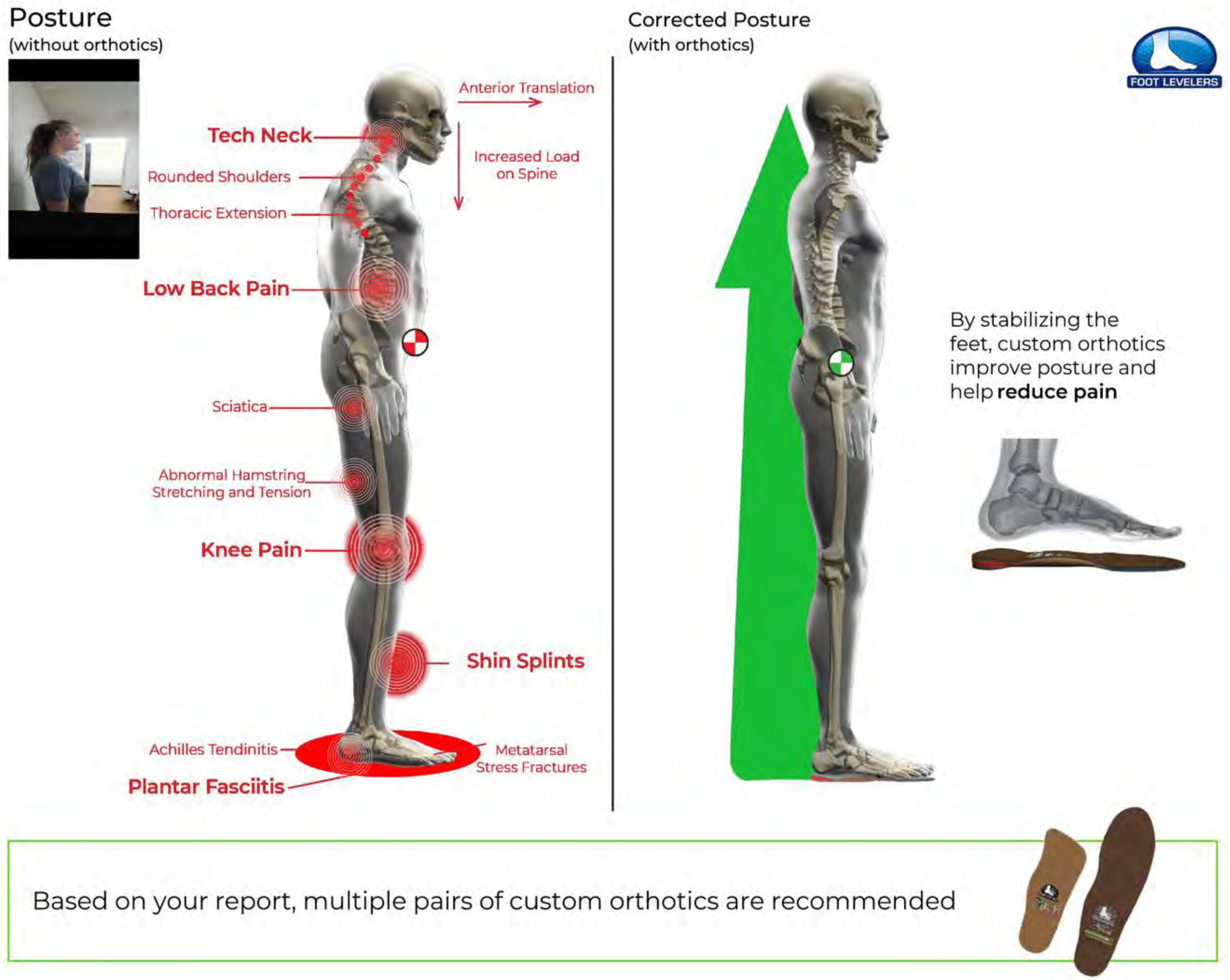
Right 51.52%	Balance	Left 48.48%	Orthotics Recommended

FOOT LEVELERS

- Shows patient’s scan next to Optimal feet
- Shows left-to-right balance and arch height difference
- Educates the patient on the Kinetic Chain and how custom orthotics can help
- Includes your logo and contact information



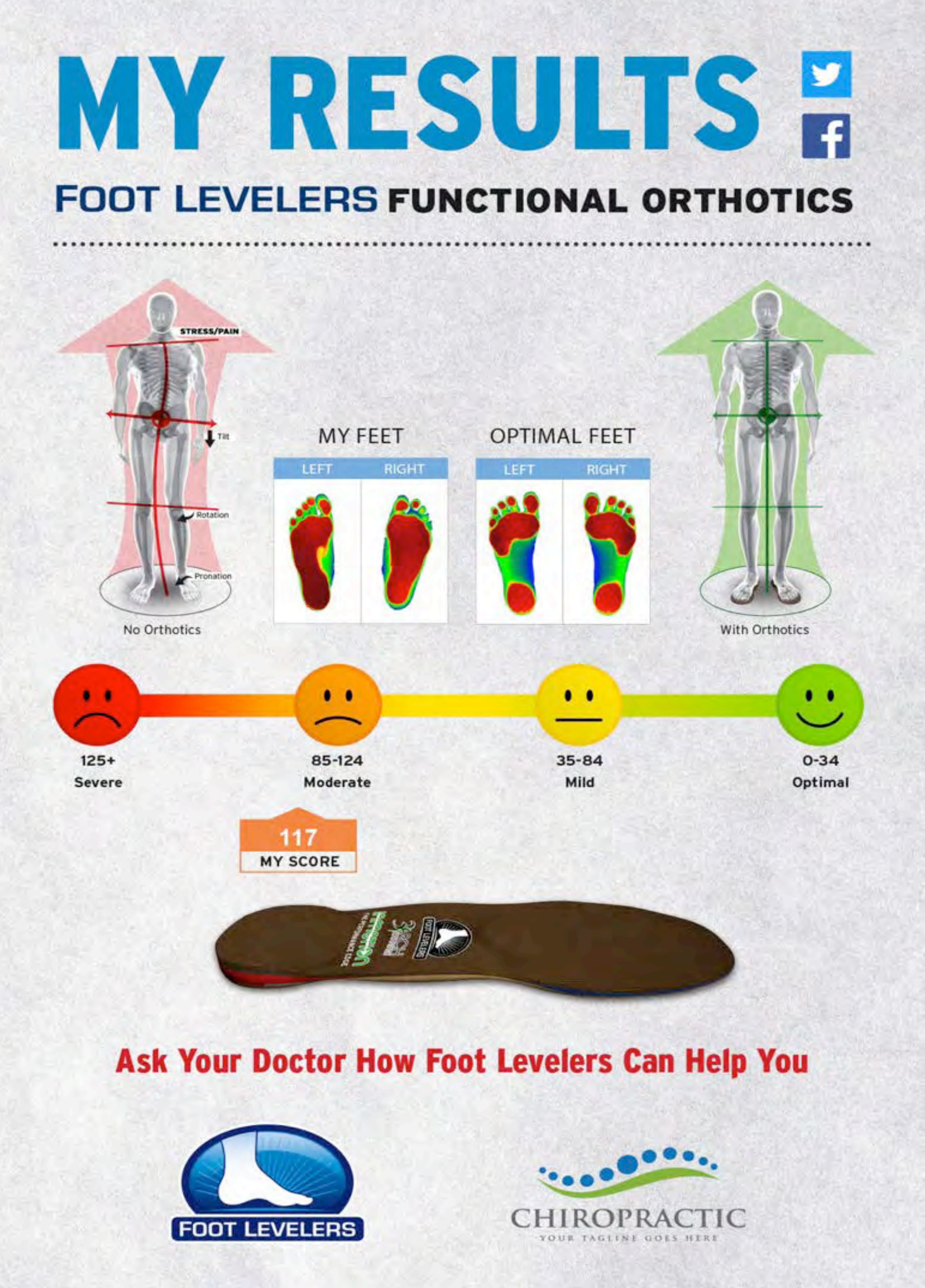
2nd Page of Report of Findings

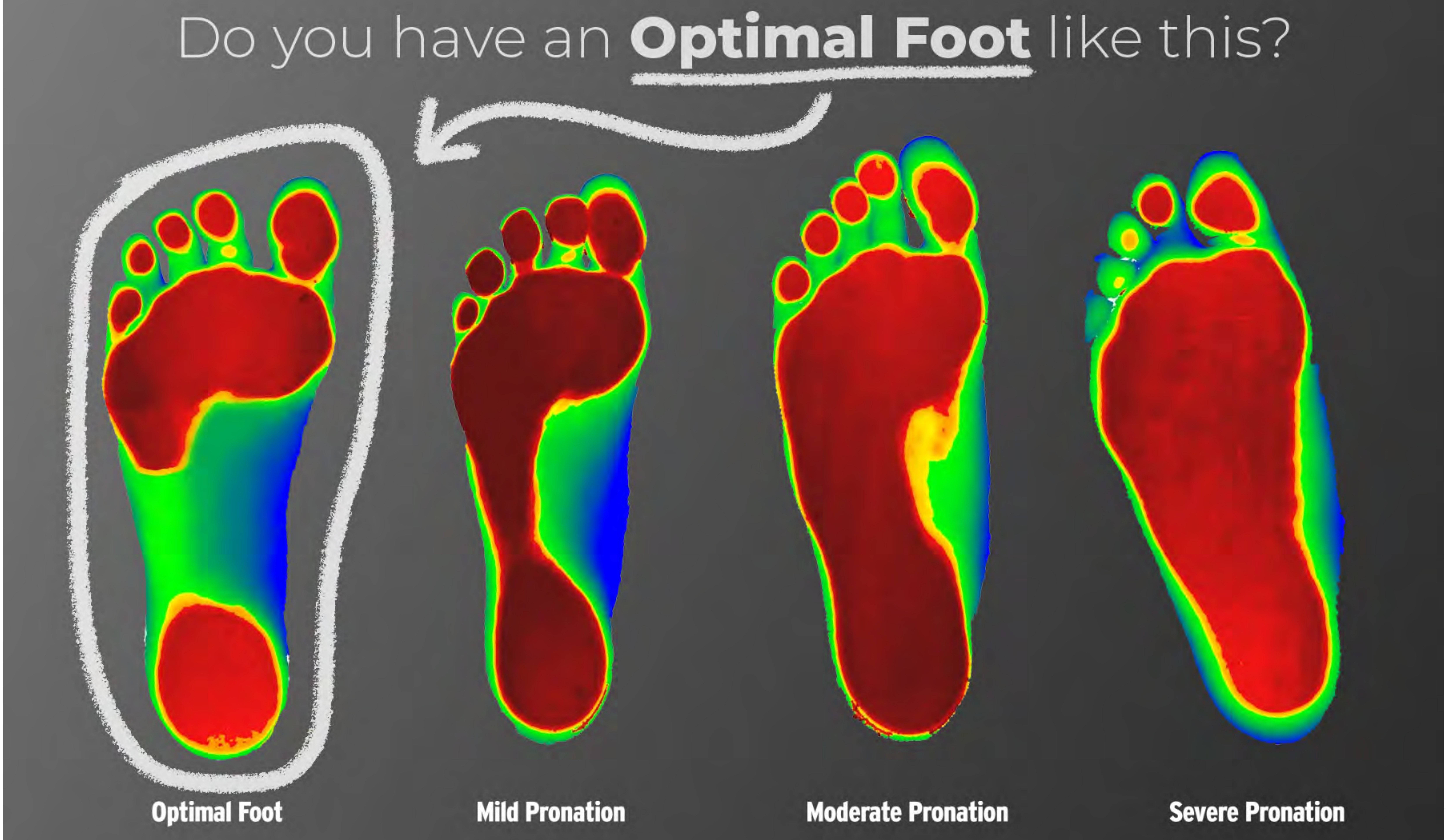


Shareable Patient ROF

After the scan, patients are emailed their own Report of Findings (ROF)

- Patient ROF is emailed before patient steps off scanner
- Shareable on social media – **REFERRALS!**
- Branded with your practice's logo and contact information
- Helps educate on the need and value of orthotics
- Shows PSI score




Do you have an Optimal Foot like this?
Optimal Foot
Mild Pronation
Moderate Pronation
Severe Pronation

Foot Imbalances Cause Serial Distortions

Medial
Arch

Lateral
Arch

Transverse
Arch

Excessive Pronation

SUPINATION

FOOT LEVELERS

Over-pronated feet

Optimal Feet

FL orthotics help your feet perform like the Optimal Feet.

This reduces imbalances **and helps prevent pain in other parts of the body.**

FOOT LEVELERS

- 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

FOOT LEVELERS

Consequences of Pronation

FOOT LEVELERS

77%

of Patients Improve Body Balance with Stabilizing Orthotics

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

FOOT LEVELERS

Foot Facts

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

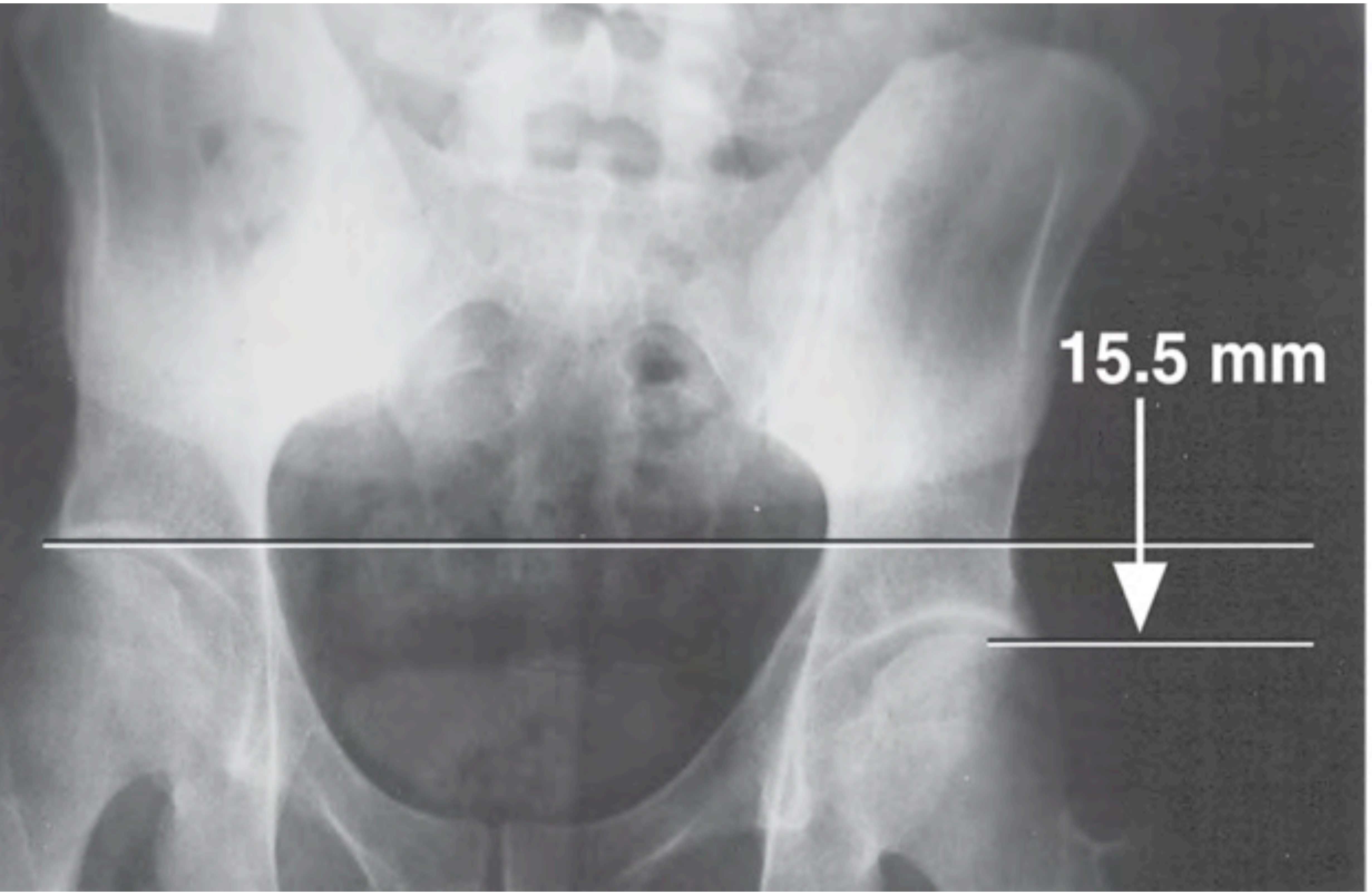
Similar numbers for foot and low back pain

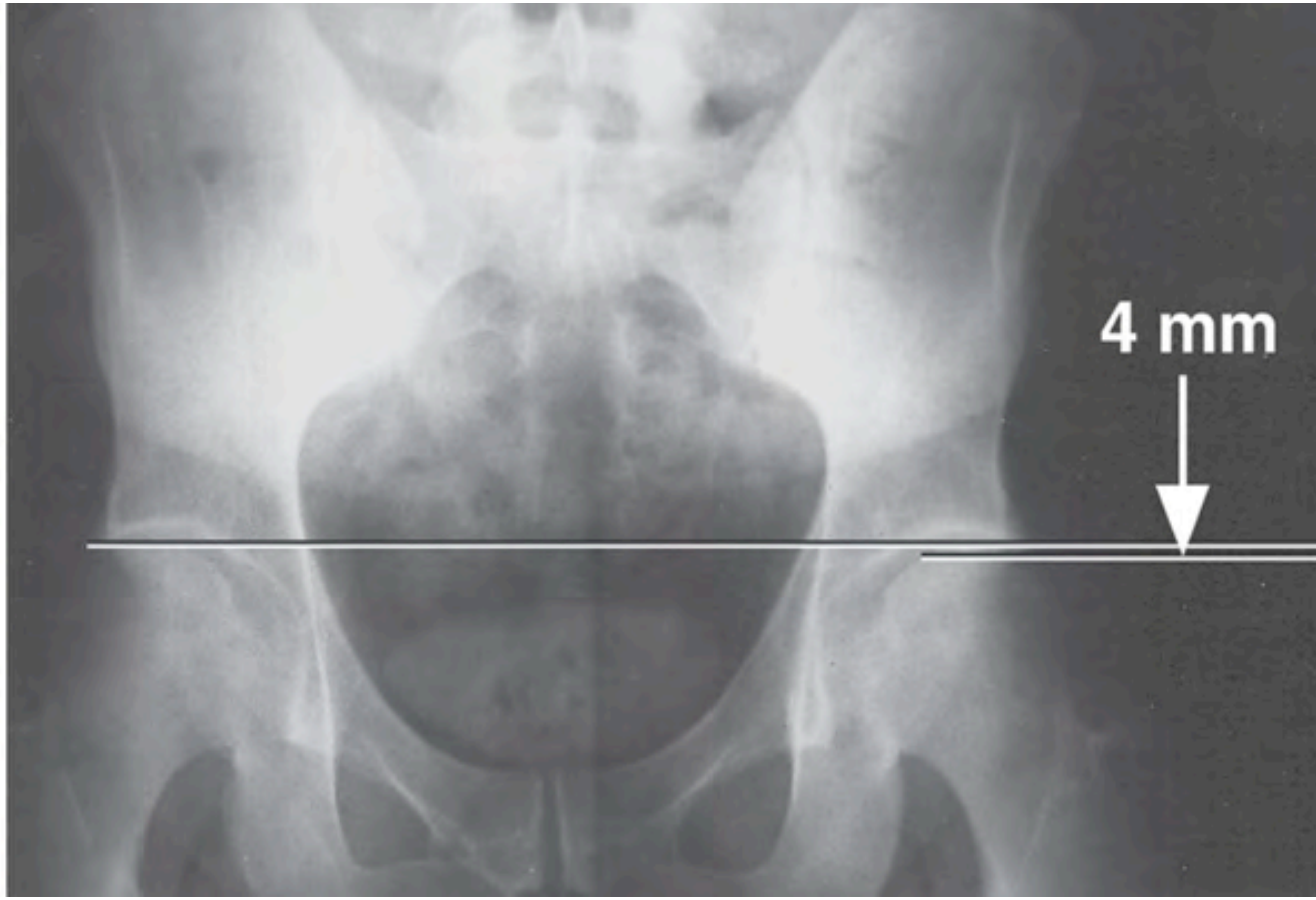
Coincidence?

*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

FOOT LEVELERS

Leg Length Inequality

ANATOMICAL

(Bone Discrepancy)

Trauma

Degeneration

Congenital

Systemic

Neoplasms

FUNCTIONAL

(Rotational Patterns)

Pelvis

Hips

Knees

Ankles

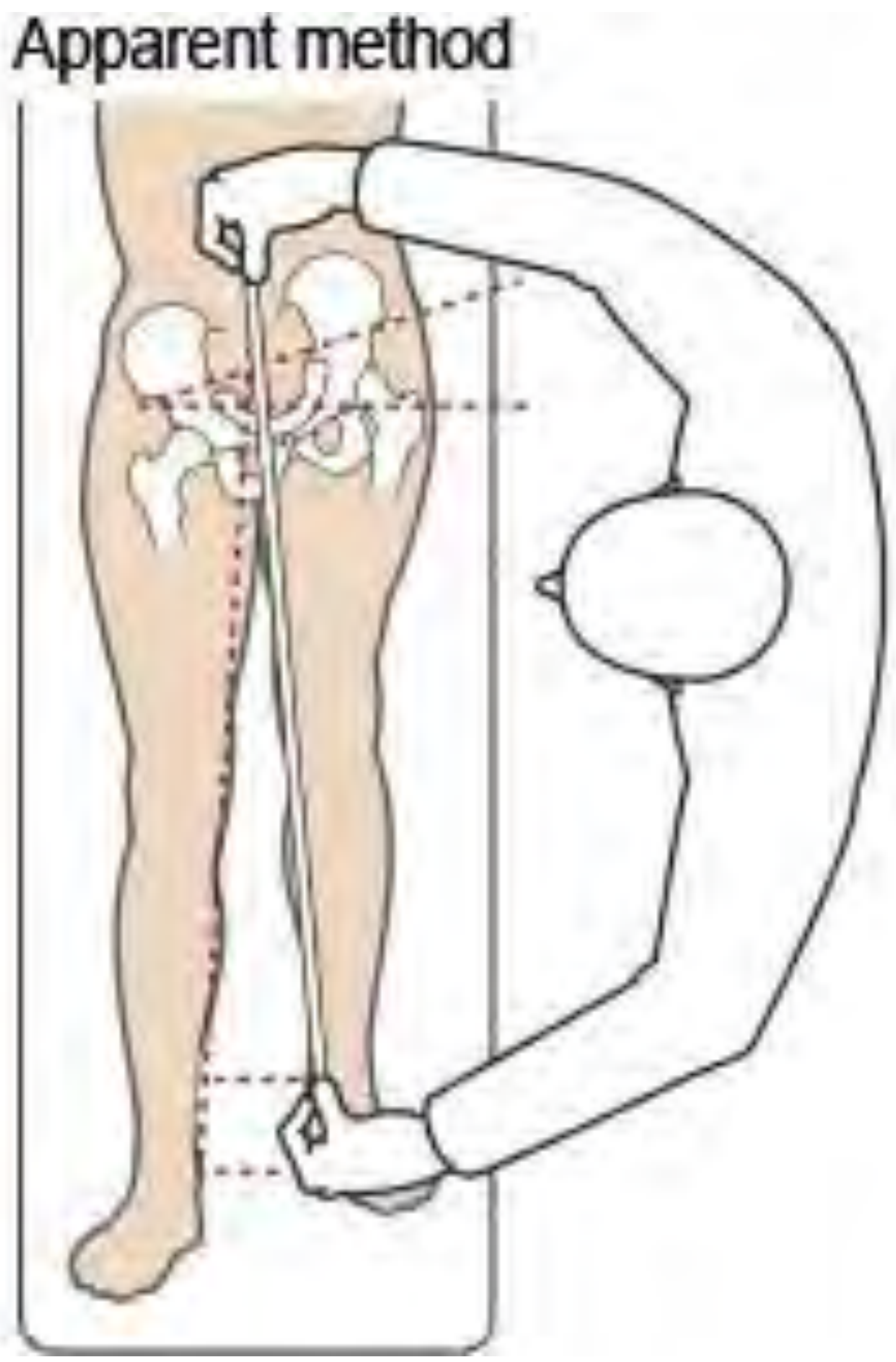
Feet

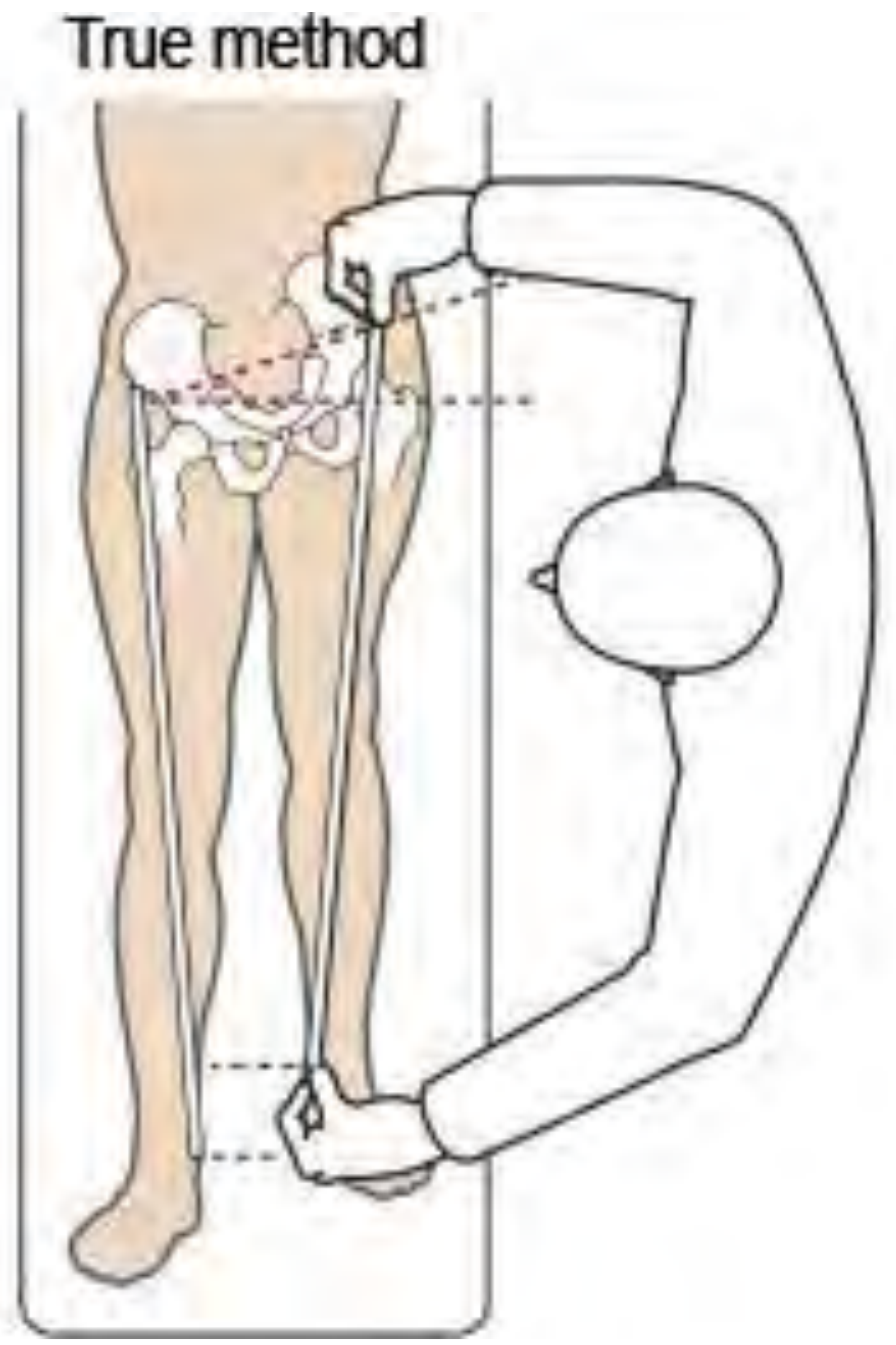
Apparent leg Length Test:

Umbilicus to medial/lateral malleolus

True (Actual) Leg Length Test:

ASIS to medial/Lateral malleolus

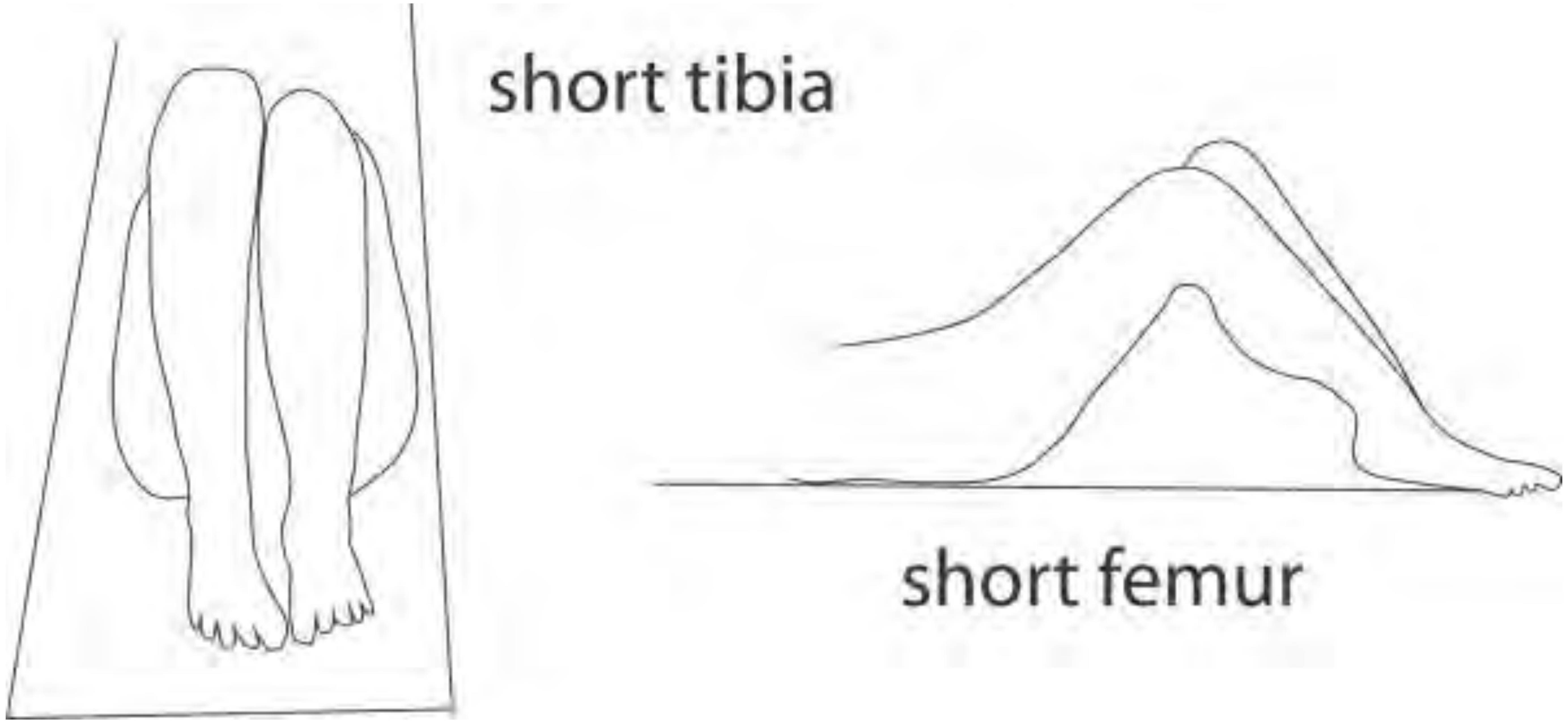

Apparent method


True method

Structural Short Leg:

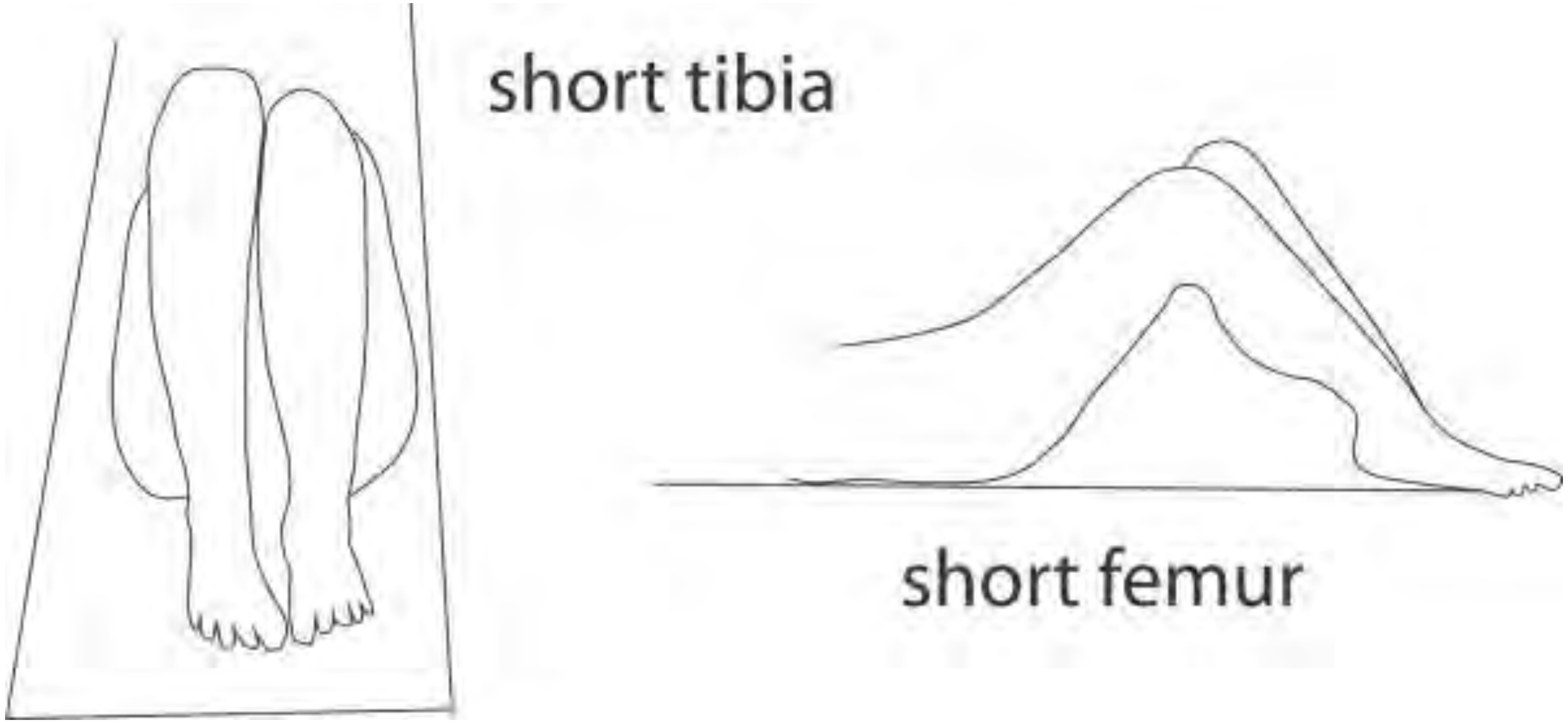
Allis Test: Supine, knees bent, feet aligned.

- Compare evenness of knees.



FOOT LEVELERS

Allis Test

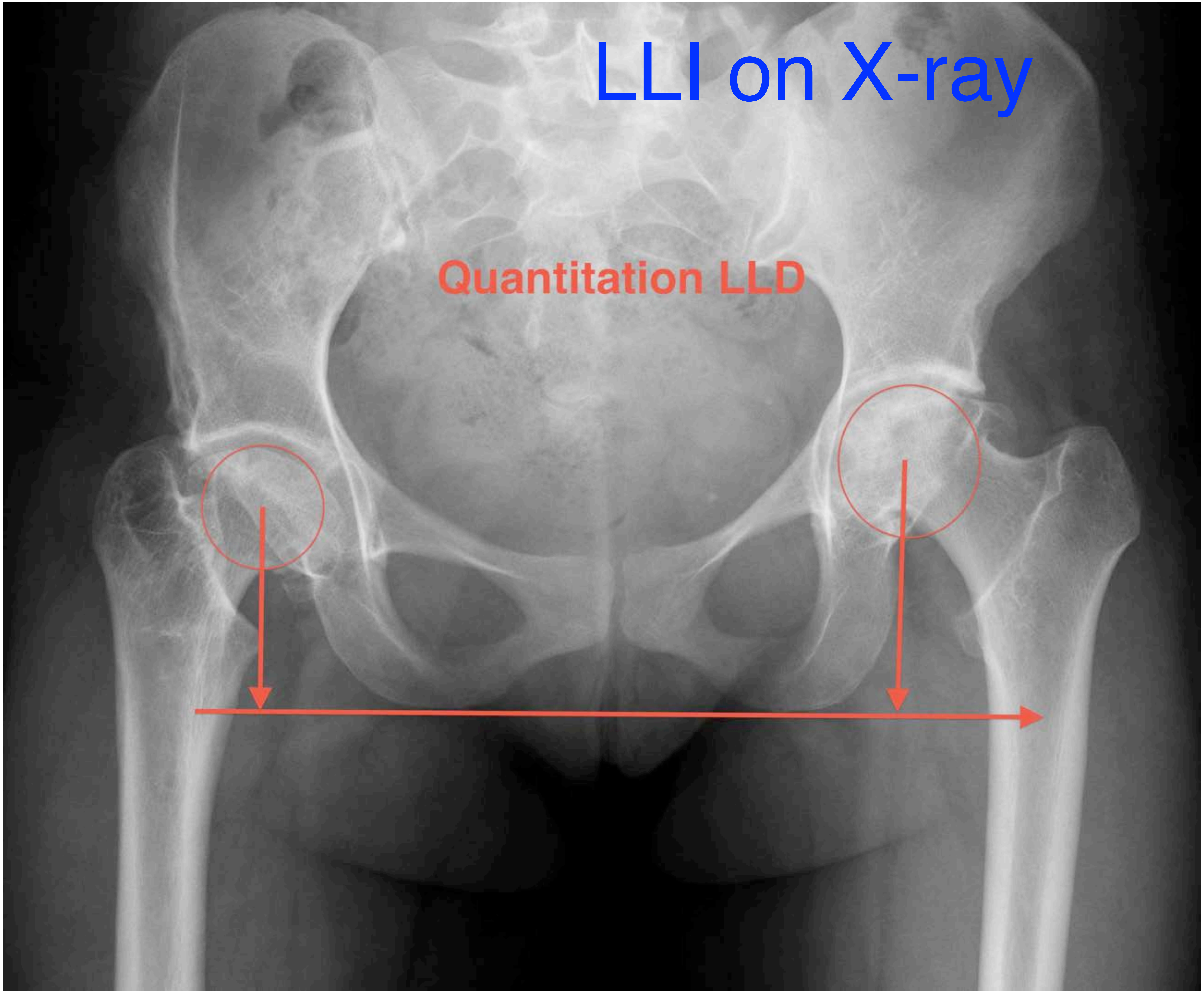


If one knee extends past the other = short femur on the short side.

If one knee is higher than the other = short tibia on the low side.

FOOT LEVELERS

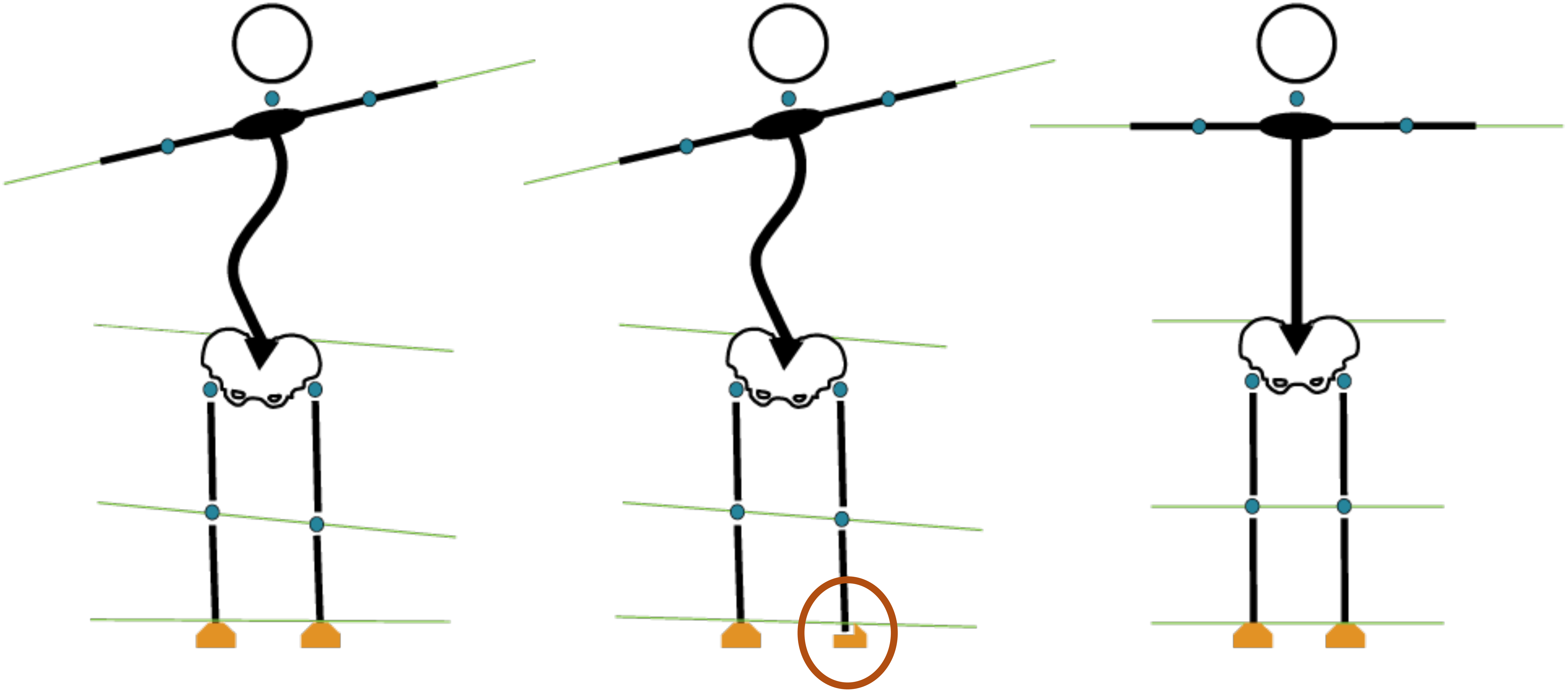
LLI on X-ray



FOOT LEVELERS

LLI on X-ray

Pronation Affects Spine



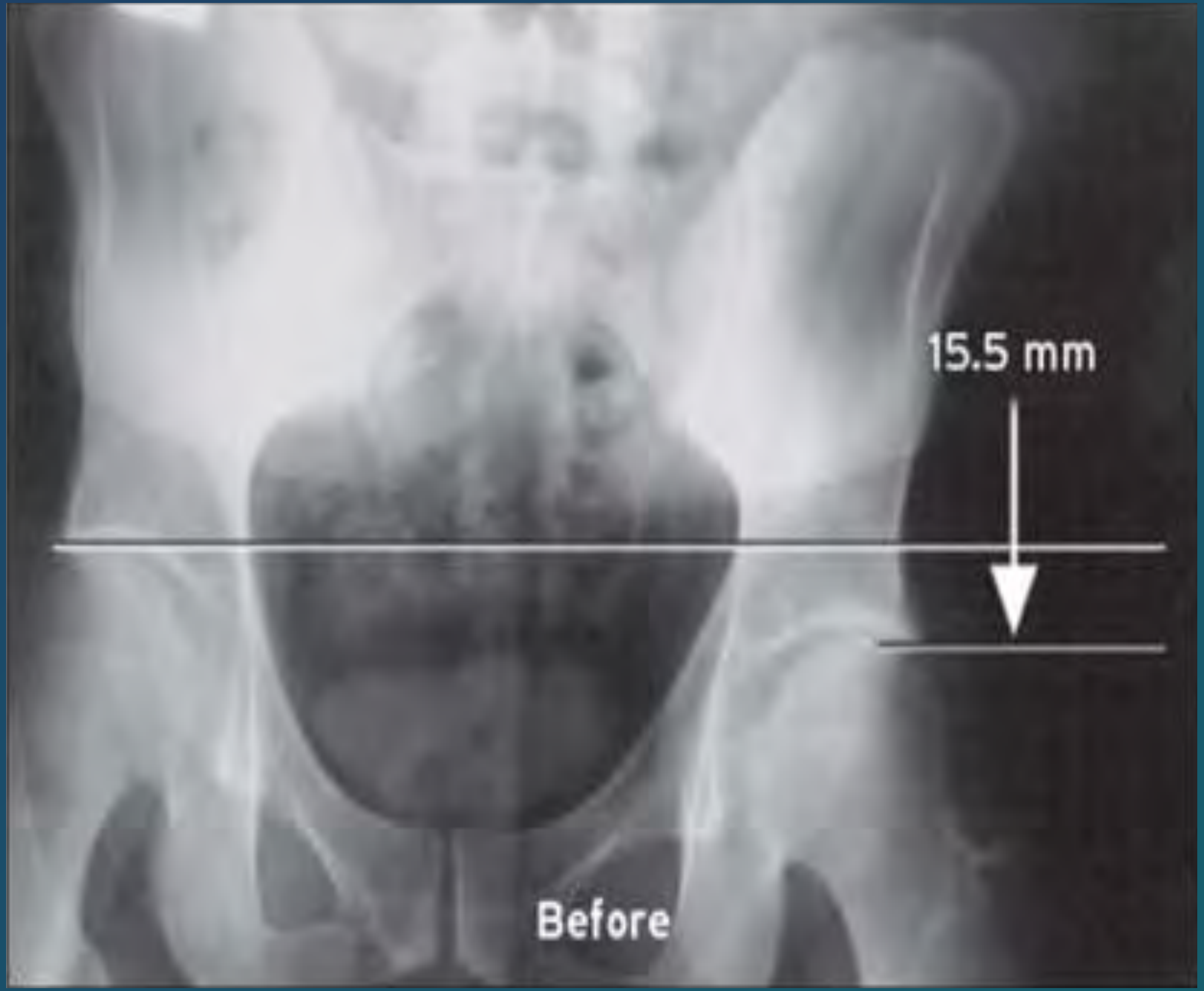
ANATOMICAL LLI

FUNCTIONAL LLI =
FUNCTIONAL SCOLIOSIS

SPS

FOOT LEVELERS

Leg Length Inequality
Dramatic results using Stabilizing Orthotics



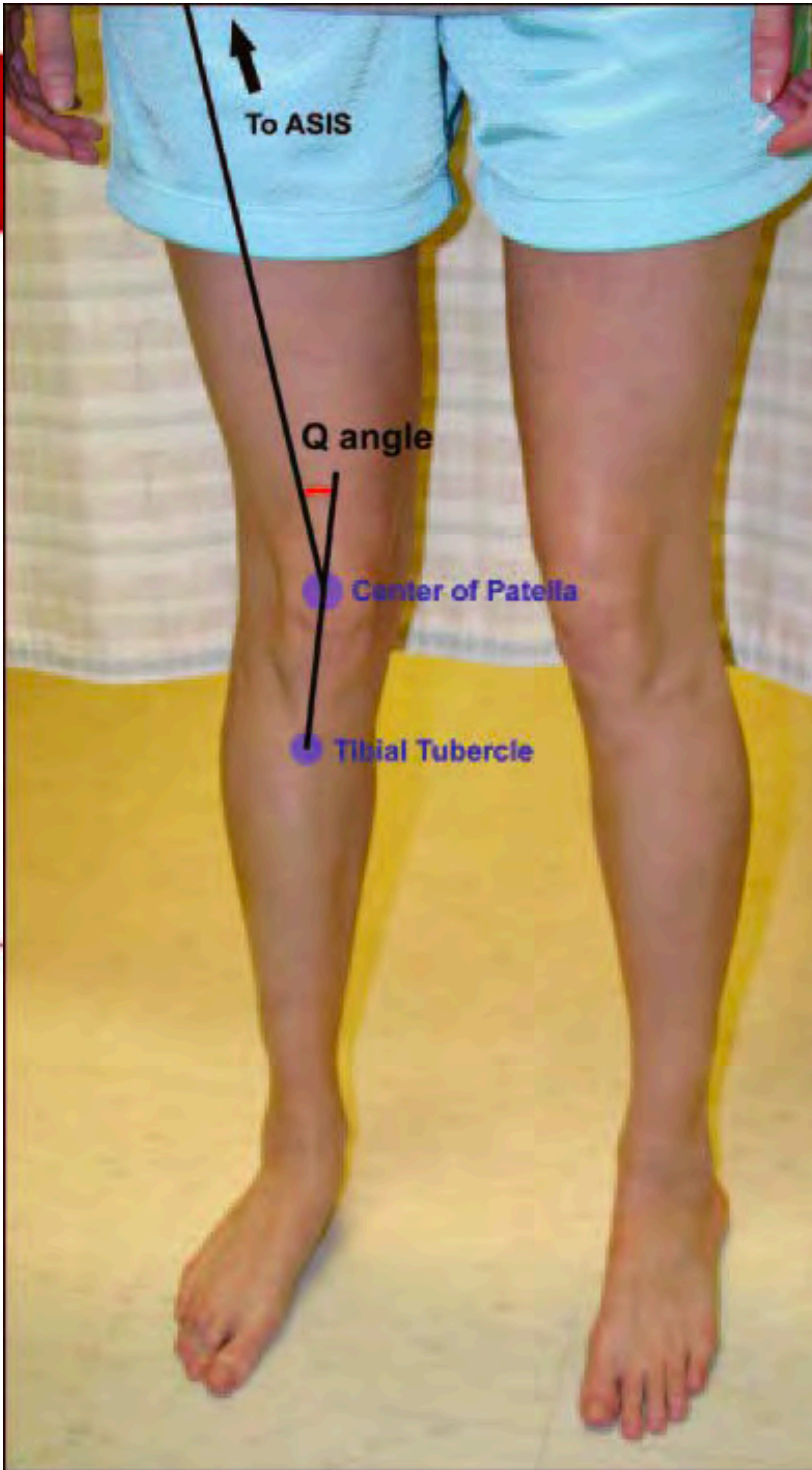
Images Courtesy of **Terry R. Yochum**, DC, DACBR

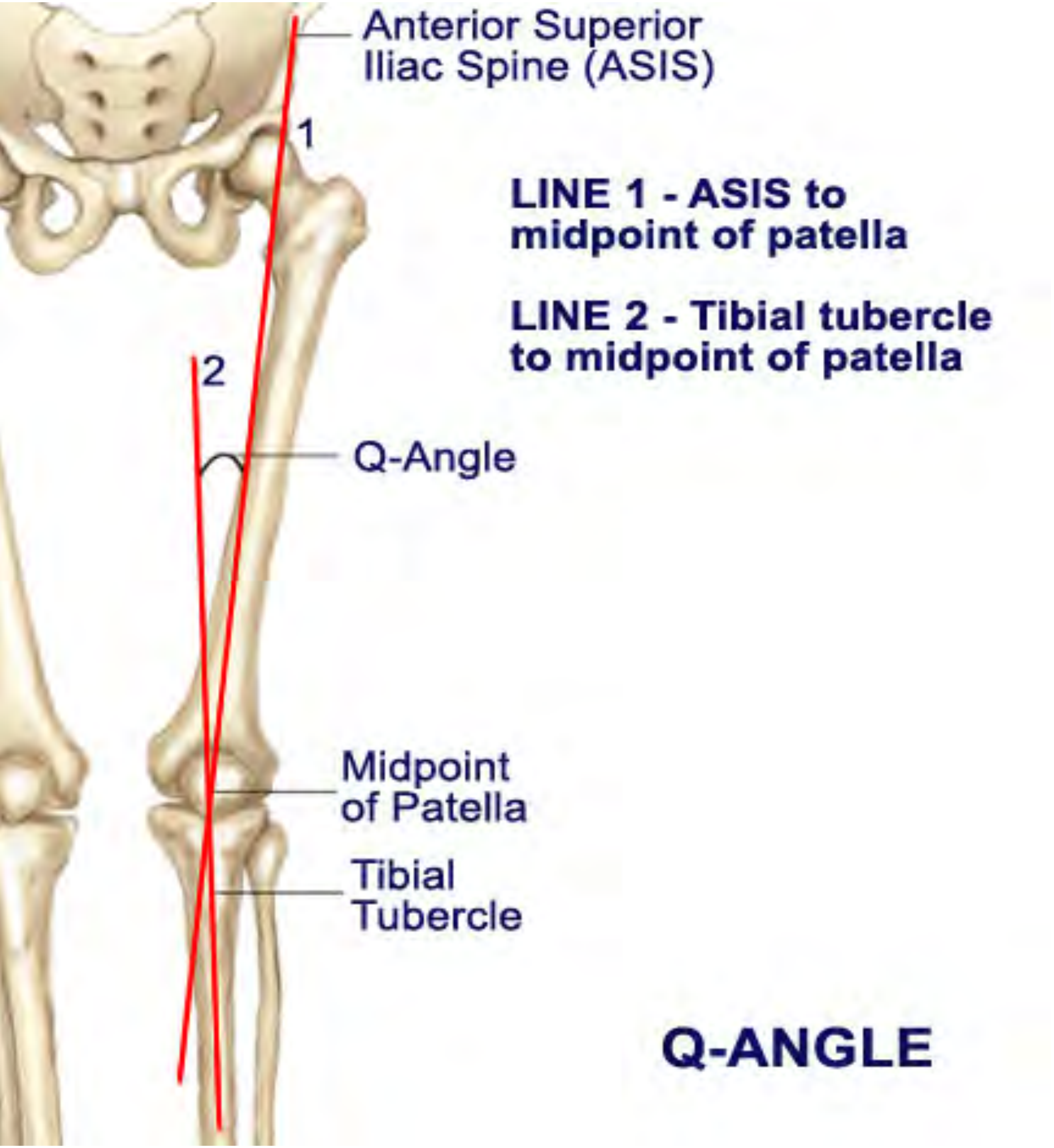
SPS REDUCES LLI

FOOT LEVELERS

Q Angle

- Assessment of
  - Lower extremity alignment
  - Patella position
- Most efficient angle for quadriceps to function is ~10º
  - Males: 10-14º
  - Females: 15-17º
- Genu valgum (knock kneed)
  - > 17º = excessive
- Genu varus (bowlegged)
  - Negative
- ↑ Q angle => ↑ stress on MCL





Research at Logan CC by Robert Kuhn D.C., DACBR demonstrates Foot Levelers' orthotics improve Q-angle and patellar tracking.

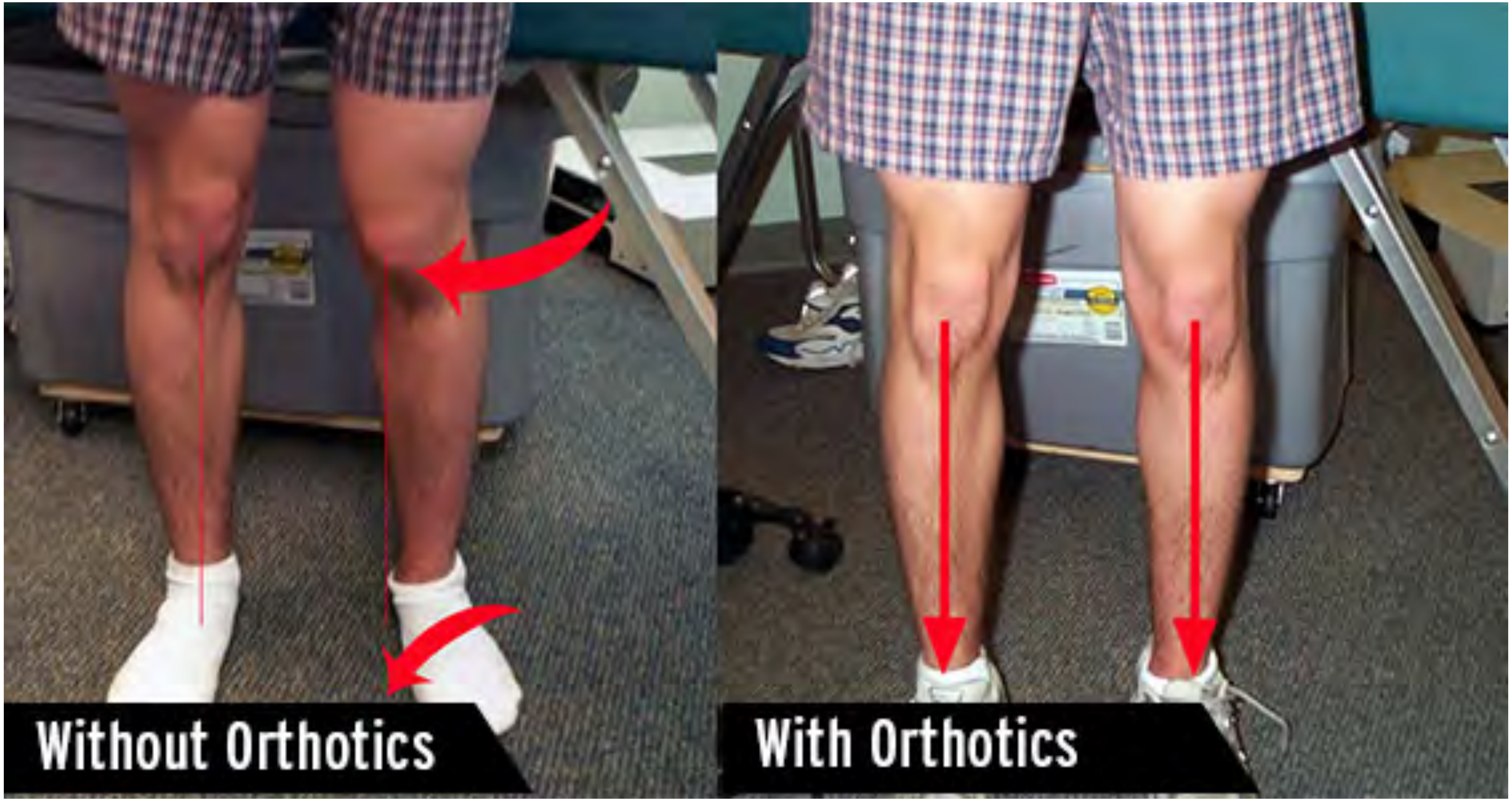
2002 Sept Vol. 25 #7 Q-Angle and Patellar Tracking Study

FOOT LEVELERS

Do SPS Reduce Q-Angle?

Effect on Q-Angle with insertion of an Orthotic Device

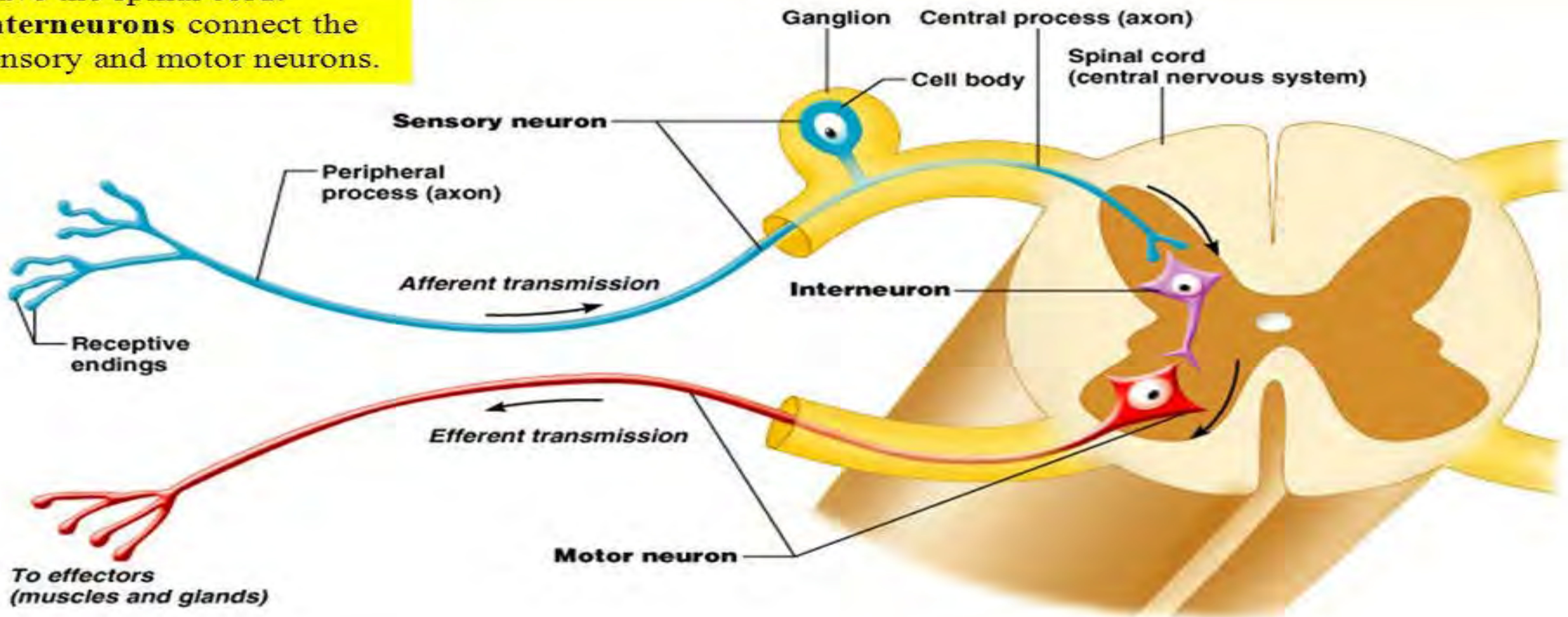
Robert Kuhn DC, Terry Yochum DC, Anton Cherry DC, Sean Rodgers DC, Dennis Nosco PhD
Accepted as a Platform Presentation, 2003 ACC – RAC VII, New Orleans, March 13-15, 2003



FOOT LEVELERS

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.



Why Muscle Test?

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

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

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

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

FOOT LEVELERS

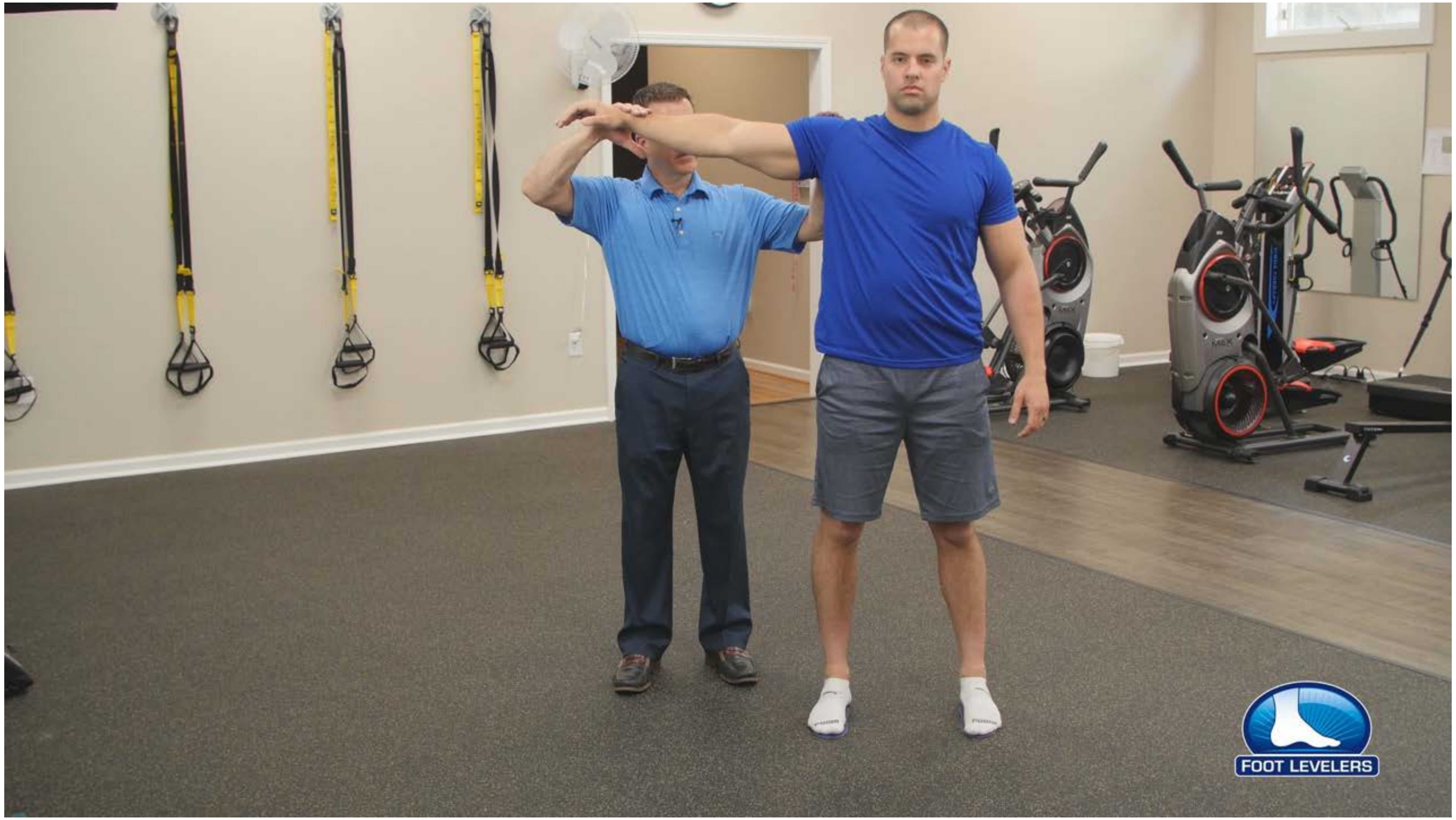
Manual Muscle Testing or Applied Kinesiology

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

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*.



FOOT LEVELERS

Proprioceptive Test Kit

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

FOOT LEVELERS

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.

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	**With Orthotics**
Less Resistance	More Resistance

Unsupported	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.

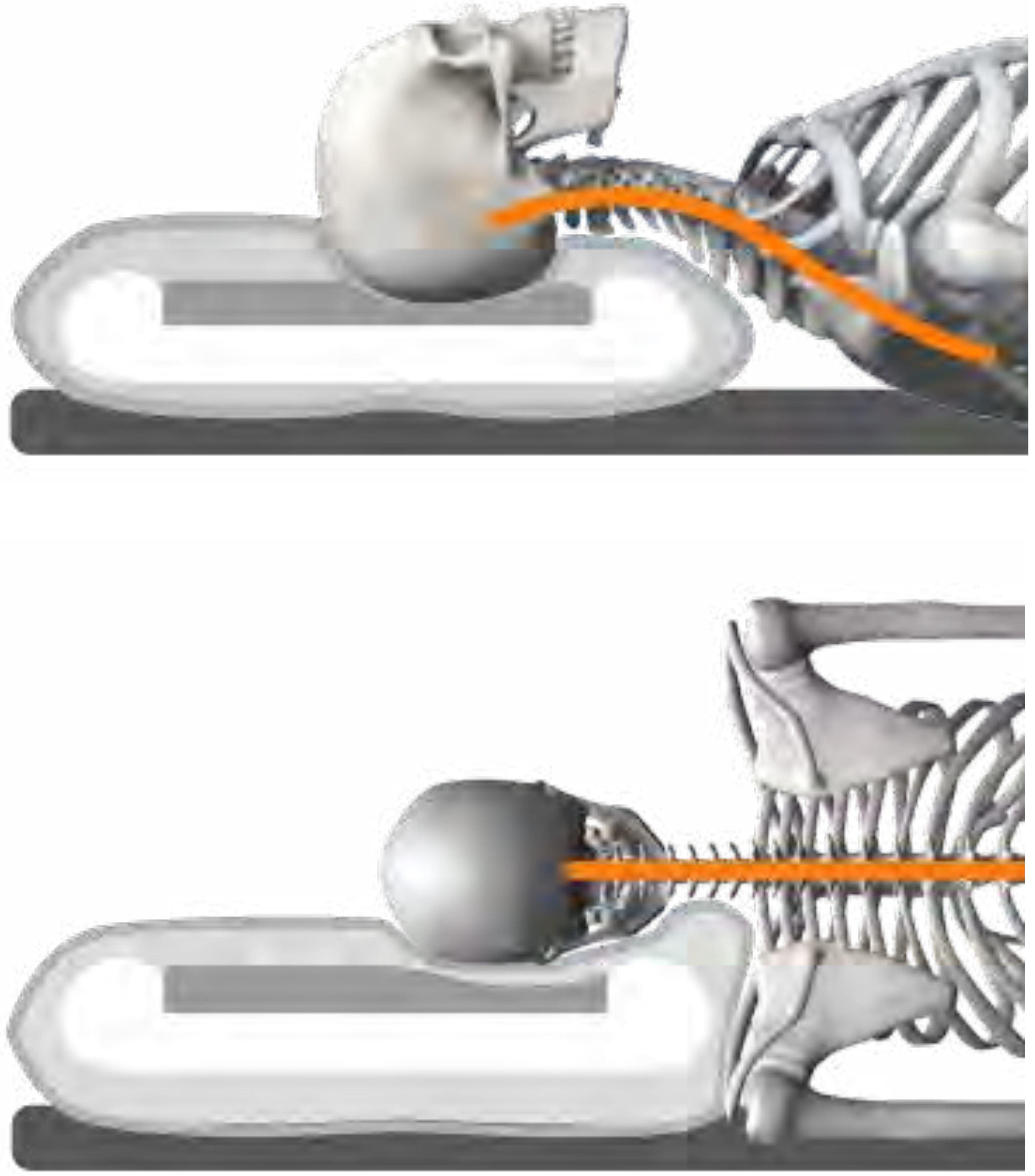
4. While the patient is still turned to the left, have them stand on the Proprioceptive Test Orthotics and repeat the maneuver. Note how patient's arm does cover ear.

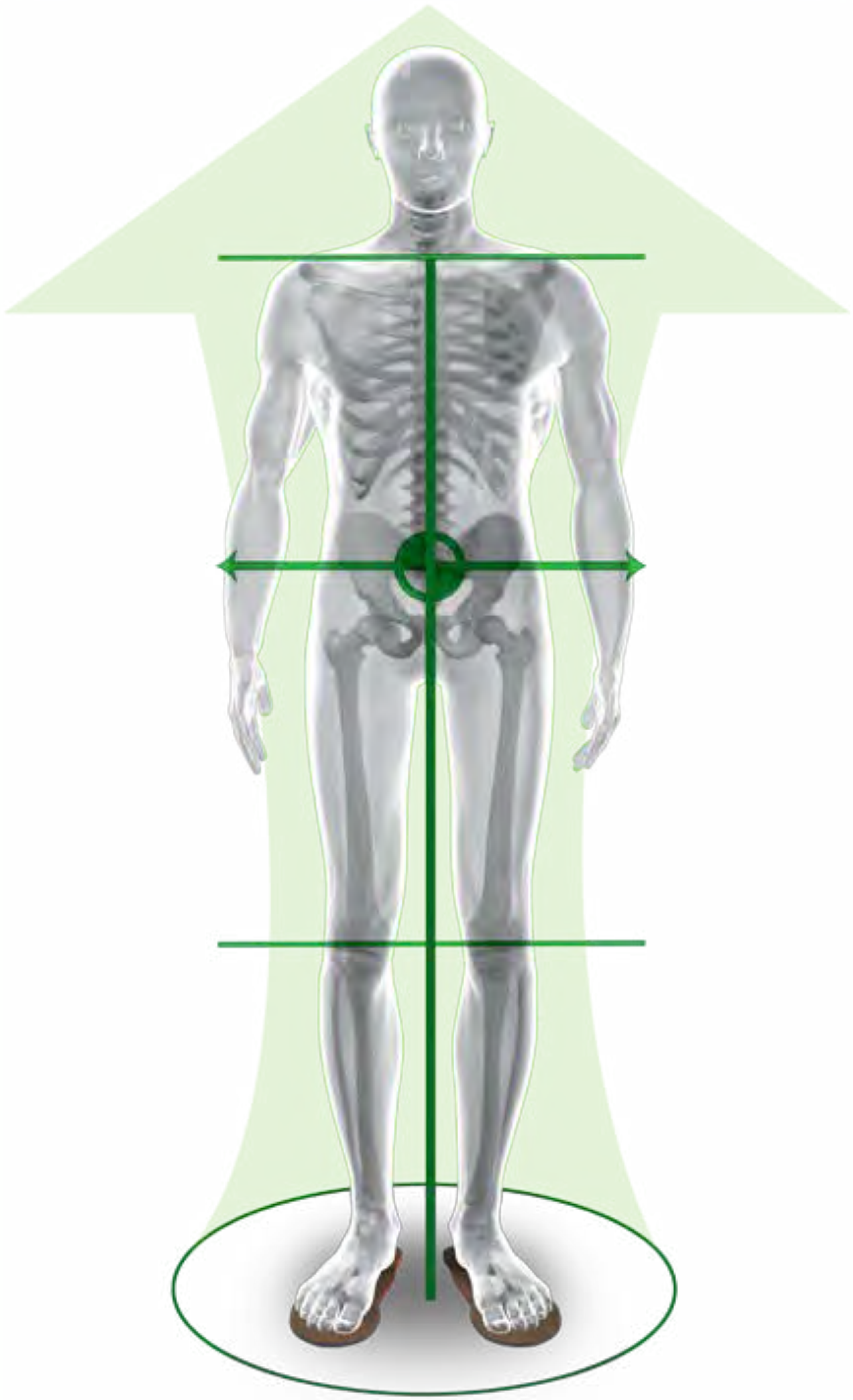
FOOT LEVELERS

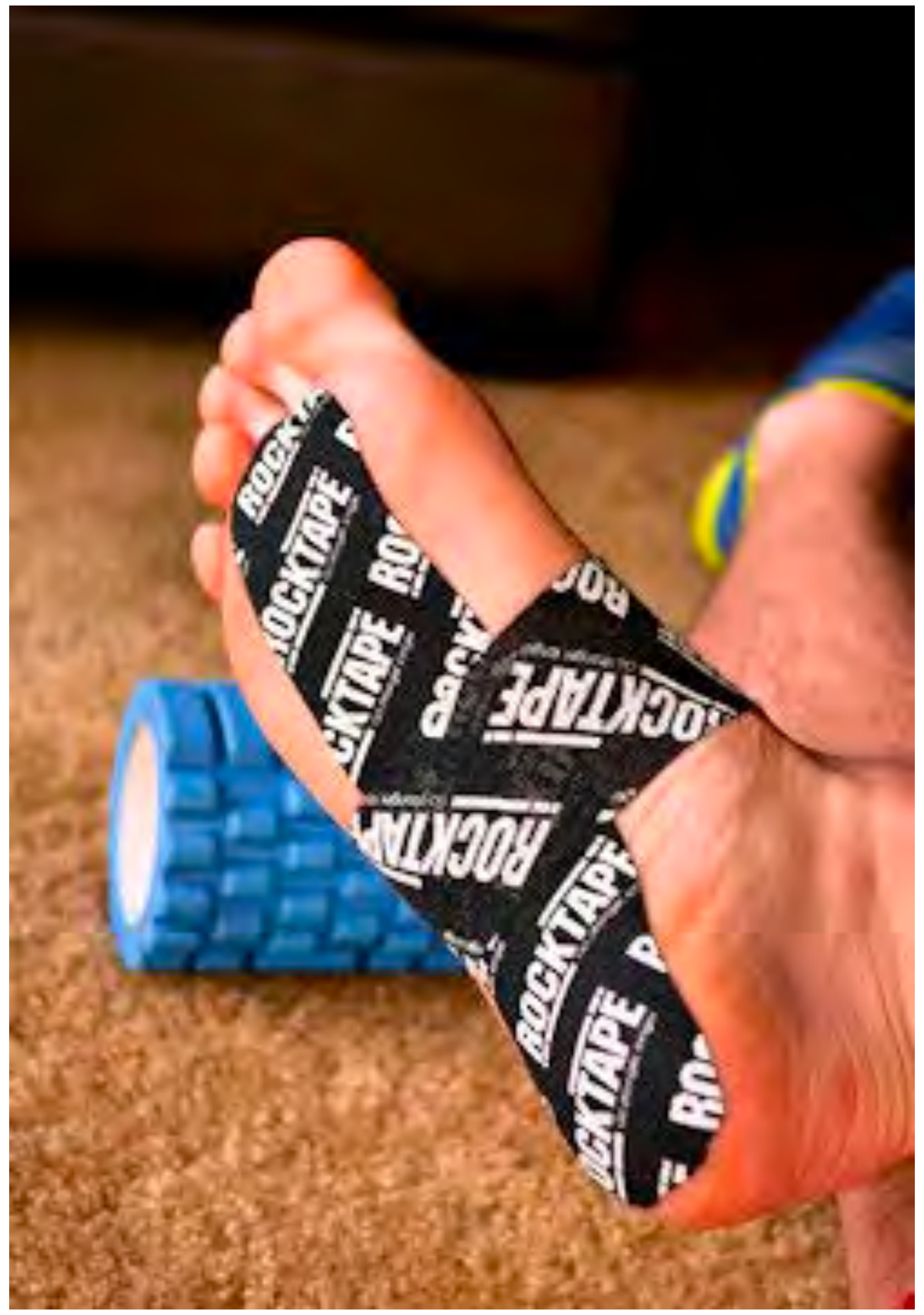
Healthcare trends are moving towards **active care.**


Adjust
FOOT LEVELERS

Support

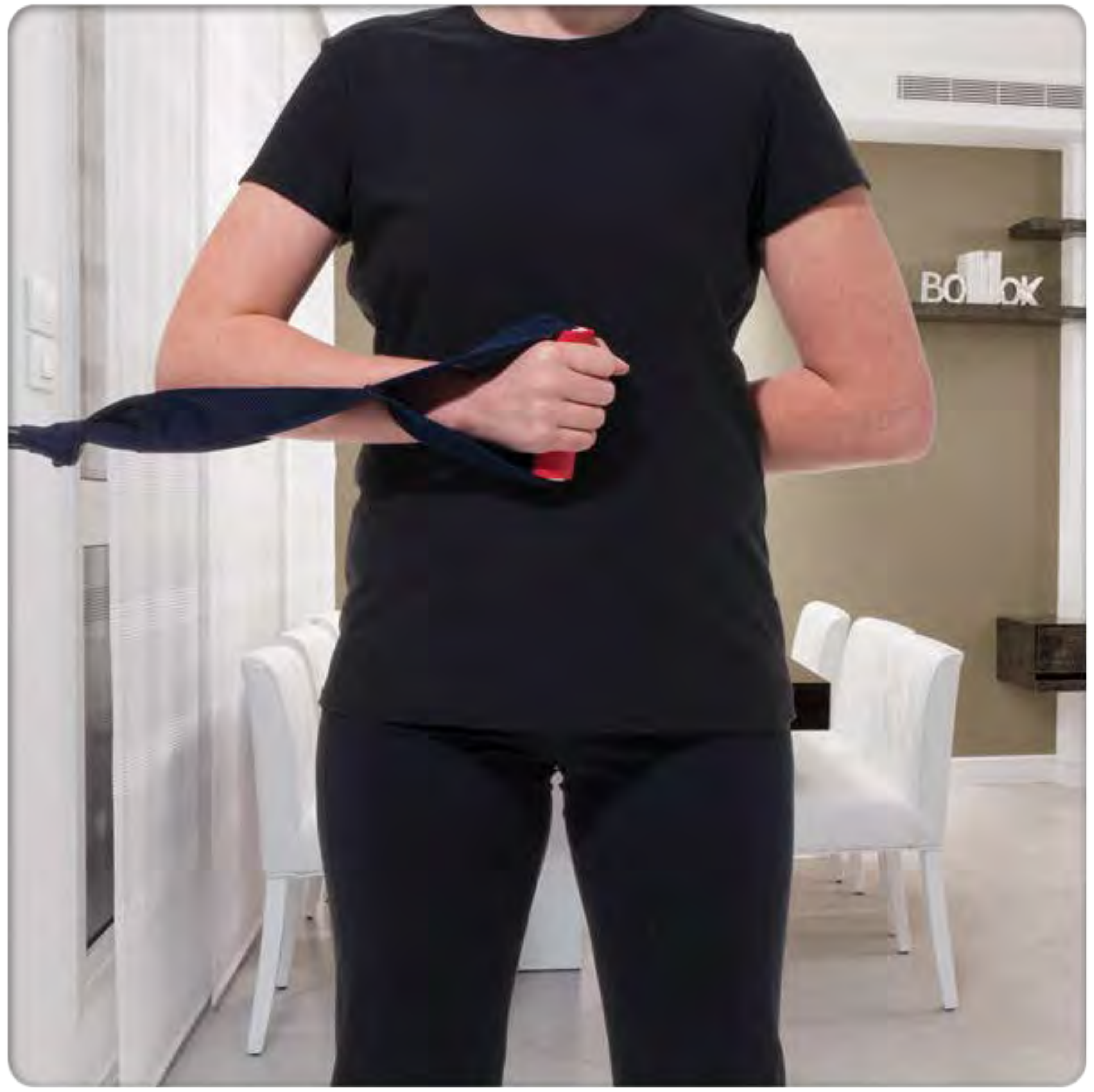


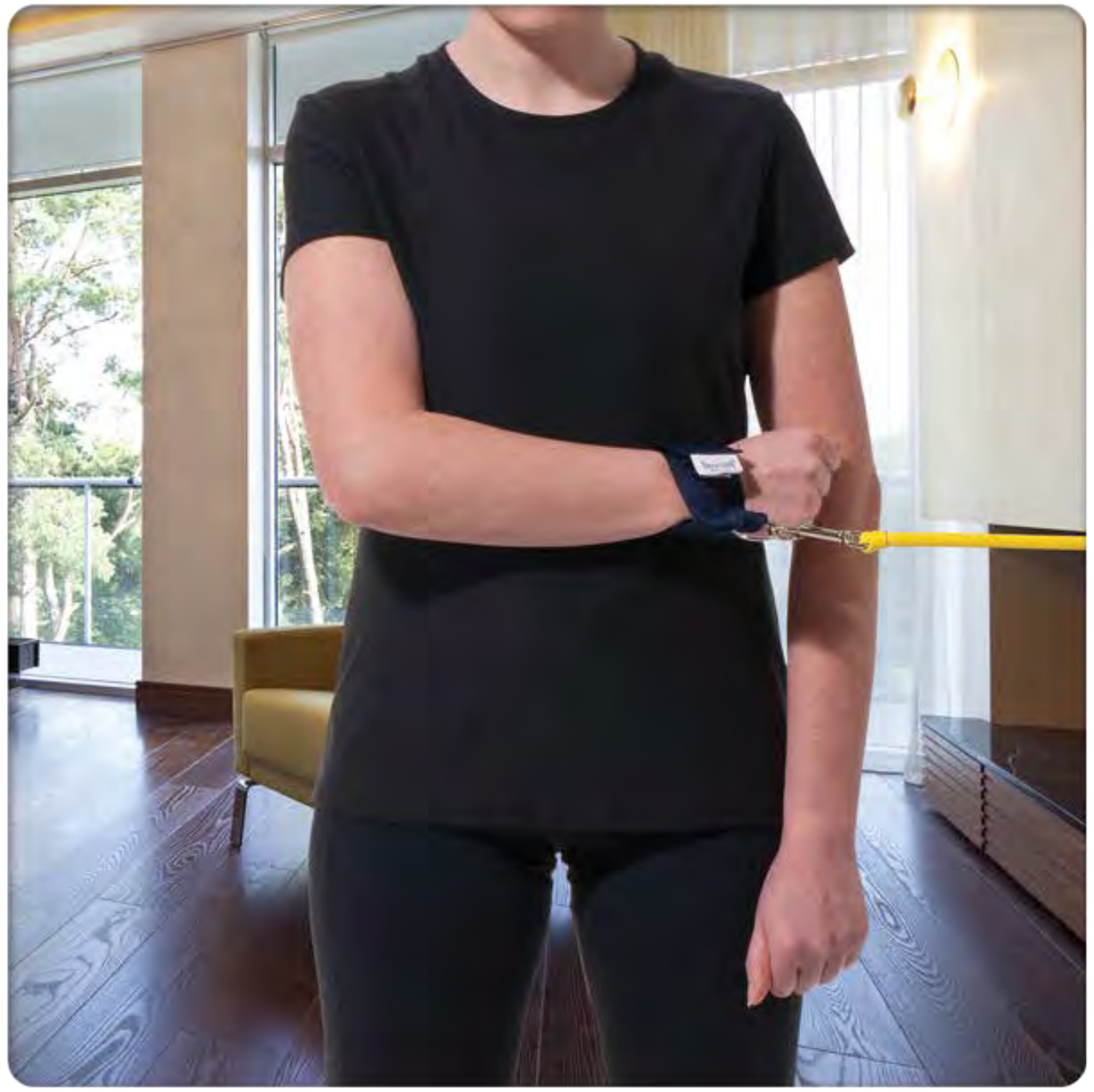


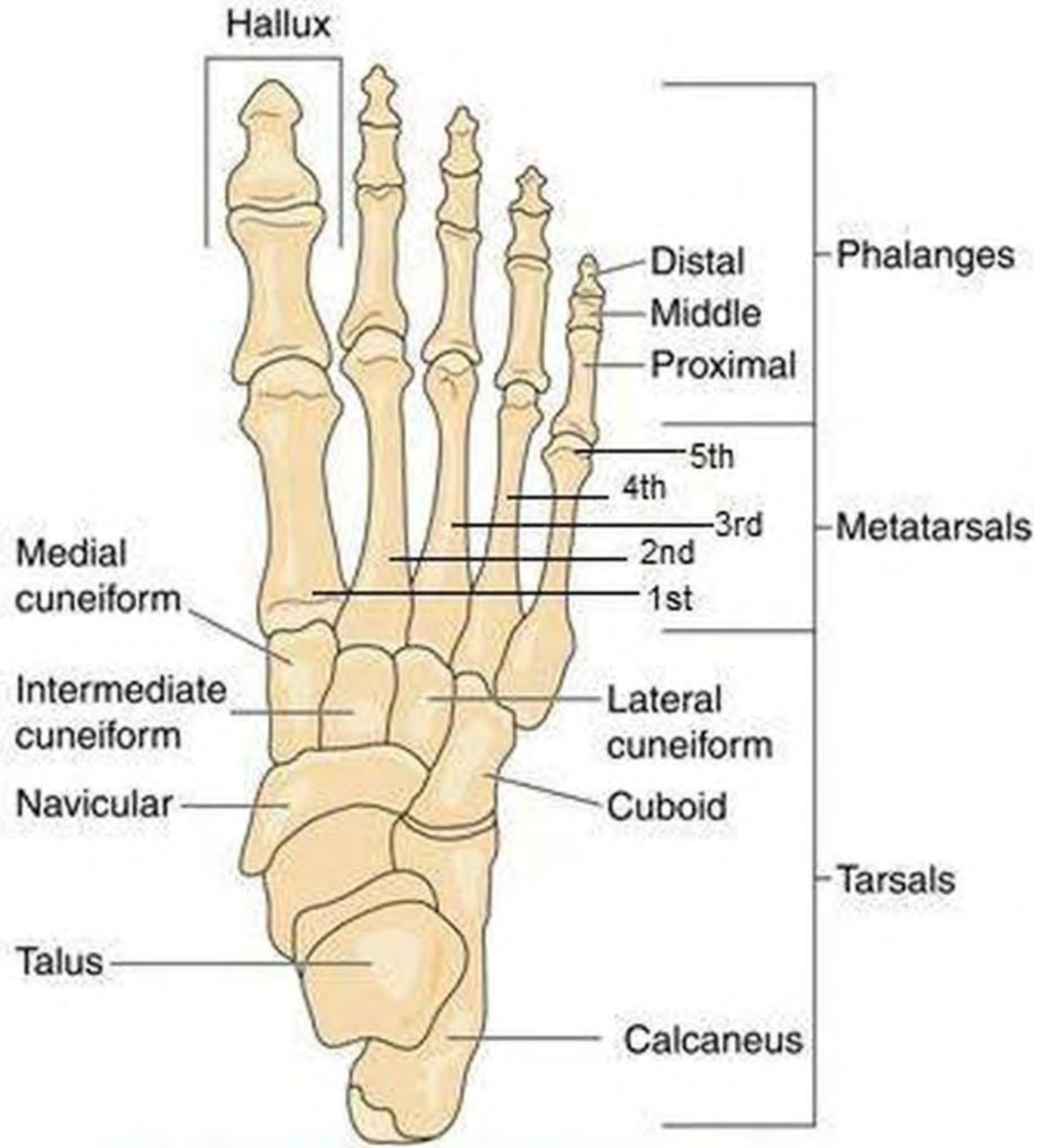


FOOT LEVELERS

Rehabilitate







BONES OF THE FOOT (FROM ABOVE)

How do you want to adjust the 26 bones?

FOOT LEVELERS

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

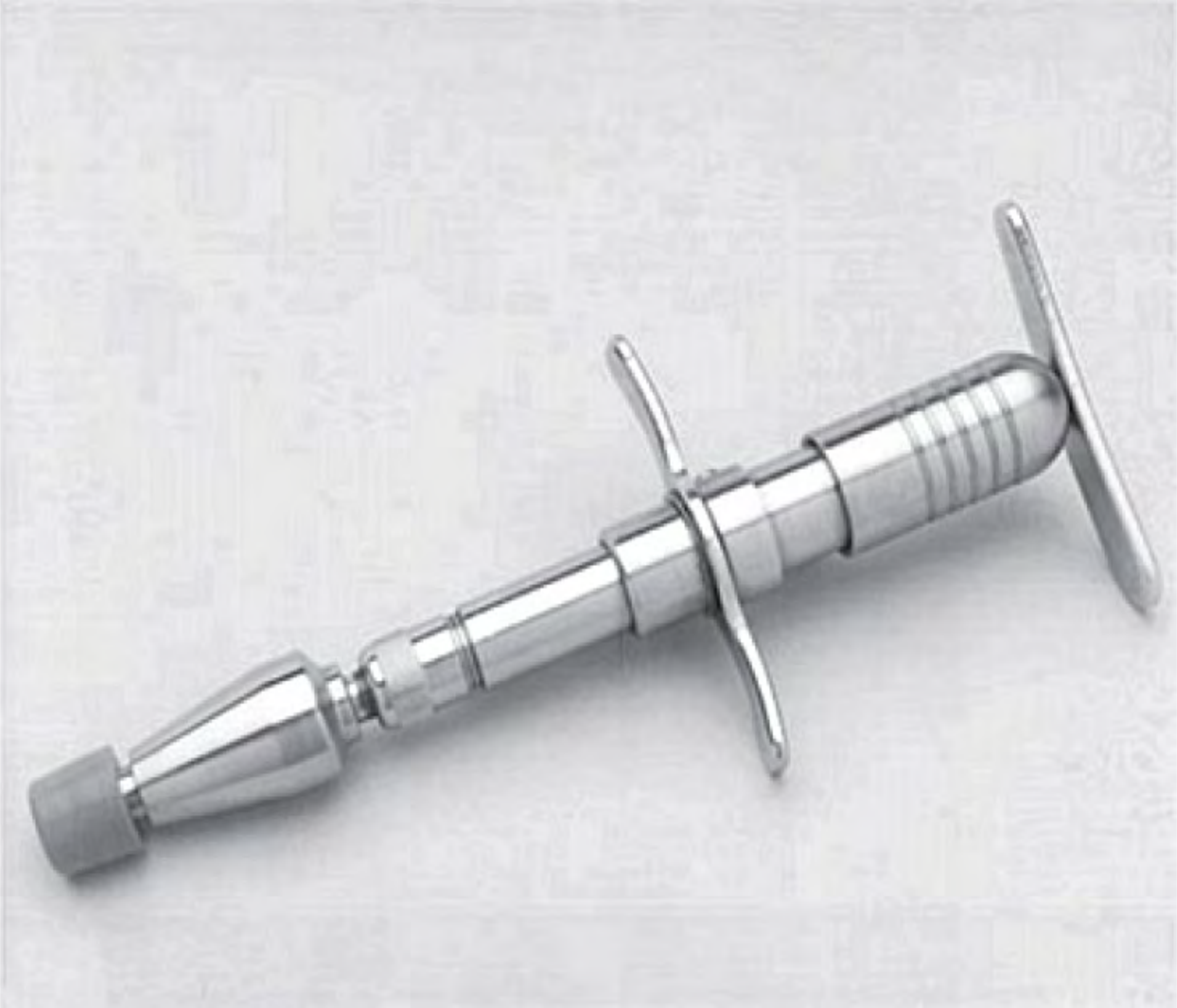
FOOT LEVELERS

Portable Drop/Speeder Board:

- Tension
- Inhale/exhale
- Mind Spinal contours

FOOT LEVELERS

Activator



Computerized Adjusting in Your Hands

iQ impulse
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

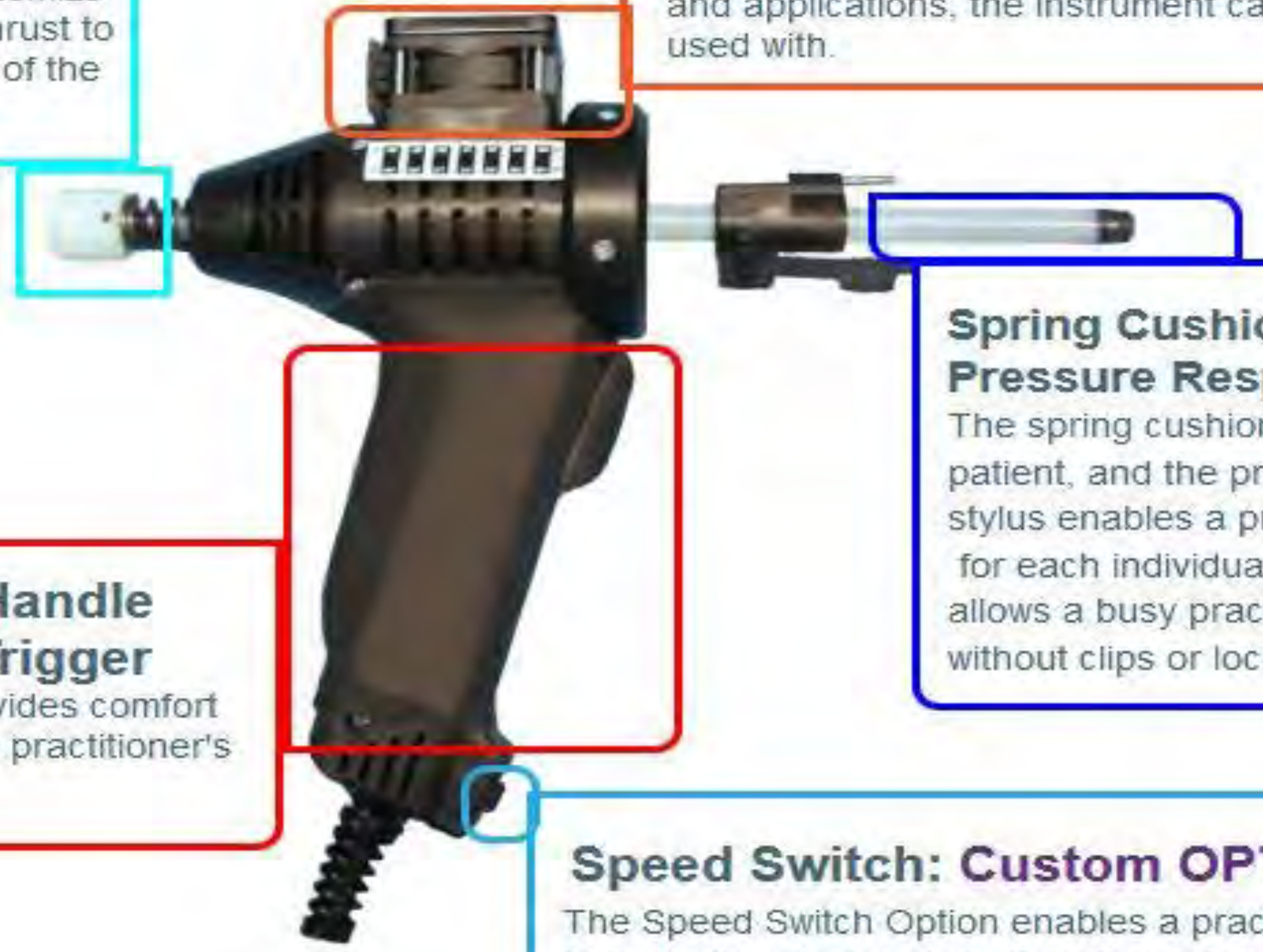
The Pro-ArthroStim® Instrument

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.

FOOT LEVELERS


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
PALMER
College of Chiropractic

Navicular - Index Finger

FOOT LEVELERS

Navicular - Index Finger

FOOT LEVELERS

Navicular - Thenar

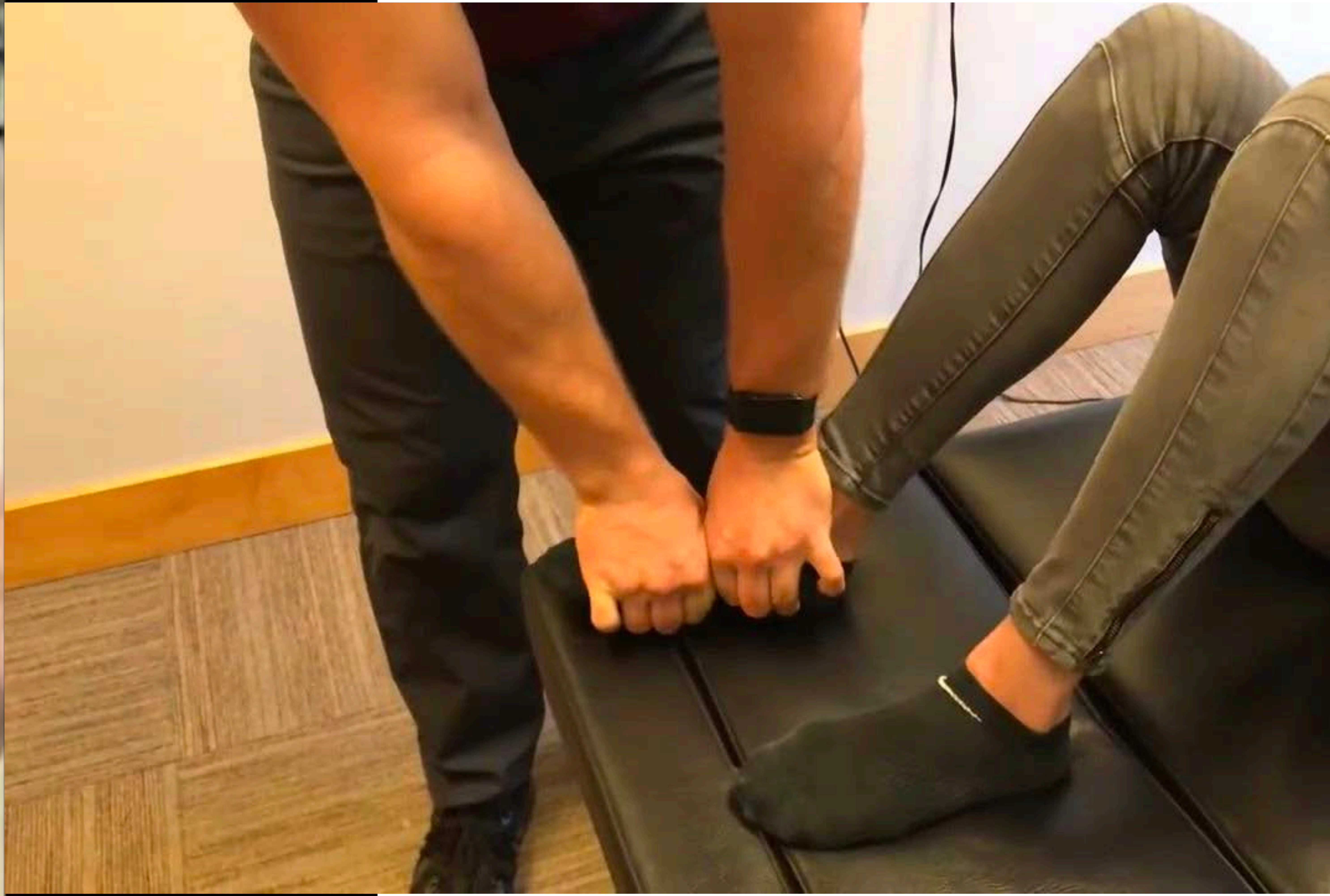
FOOT LEVELERS

Navicular - Hypothenar/Pisiform

Navicular

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

Navicular



FOOT LEVELERS

Cuboid Bone

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

"**<u>Pull</u>**" cuboid inferior and medial **(down and in)**


Cuboid
PALMER
College of Chiropractic
ALUMNI

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

FOOT LEVELERS

Cuboid - double index


Talus Bone

Misaligns: **anterior and lateral**

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


Talus
PALMER
College of Chiropractic
ALUMNI

Talus - Double index

Talus Bone:

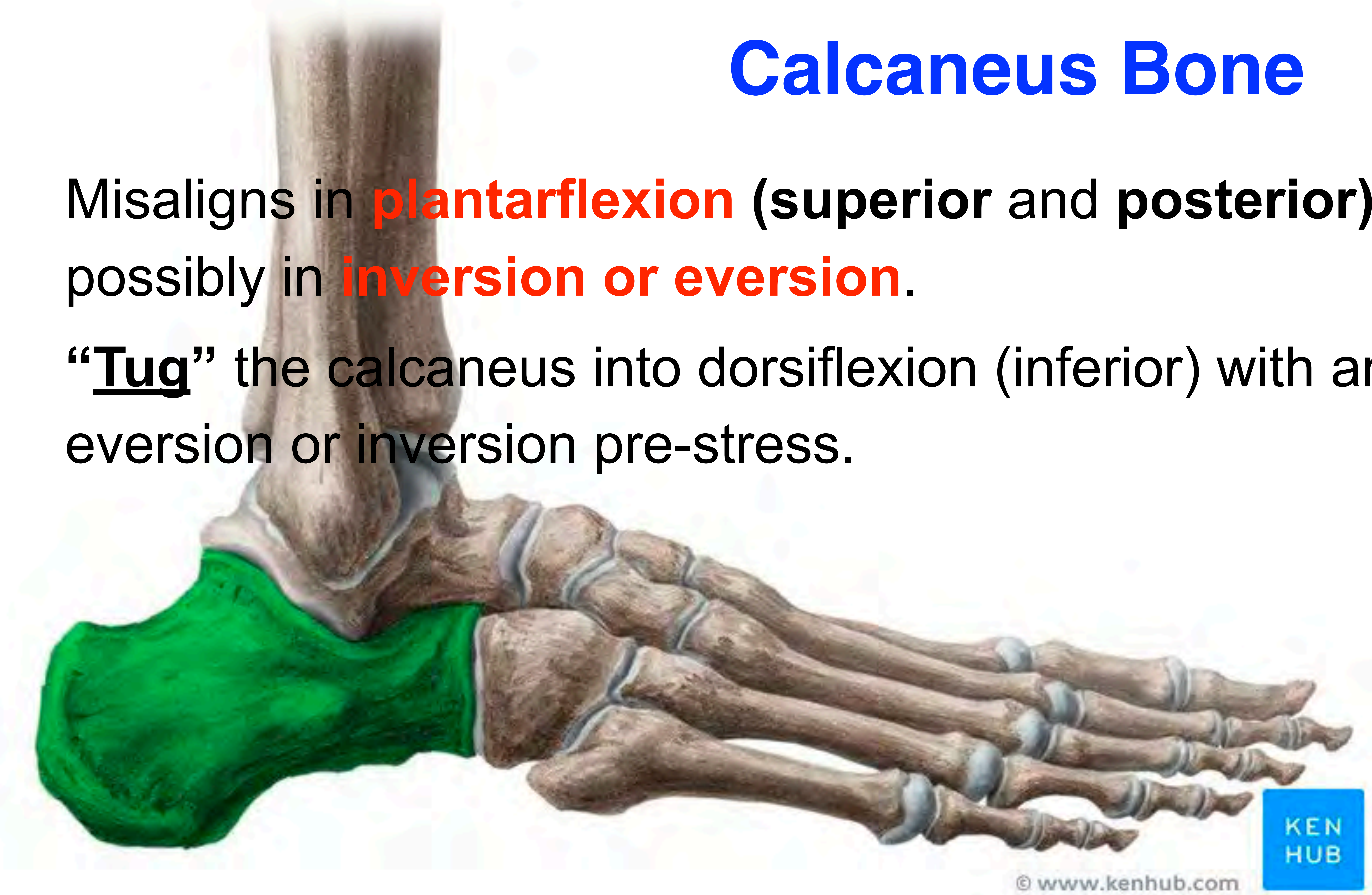
- Supine: CP - double middle or index finger
- Drop table: foot dorsal side up. CP is Pisiform or double thumb with foot slightly dorsiflexed
- Spring loaded instrument: watch LOD

FOOT LEVELERS

Calcaneus Bone

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

“**<u>Tug</u>**” the calcaneus into dorsiflexion (inferior) with an eversion or inversion pre-stress.

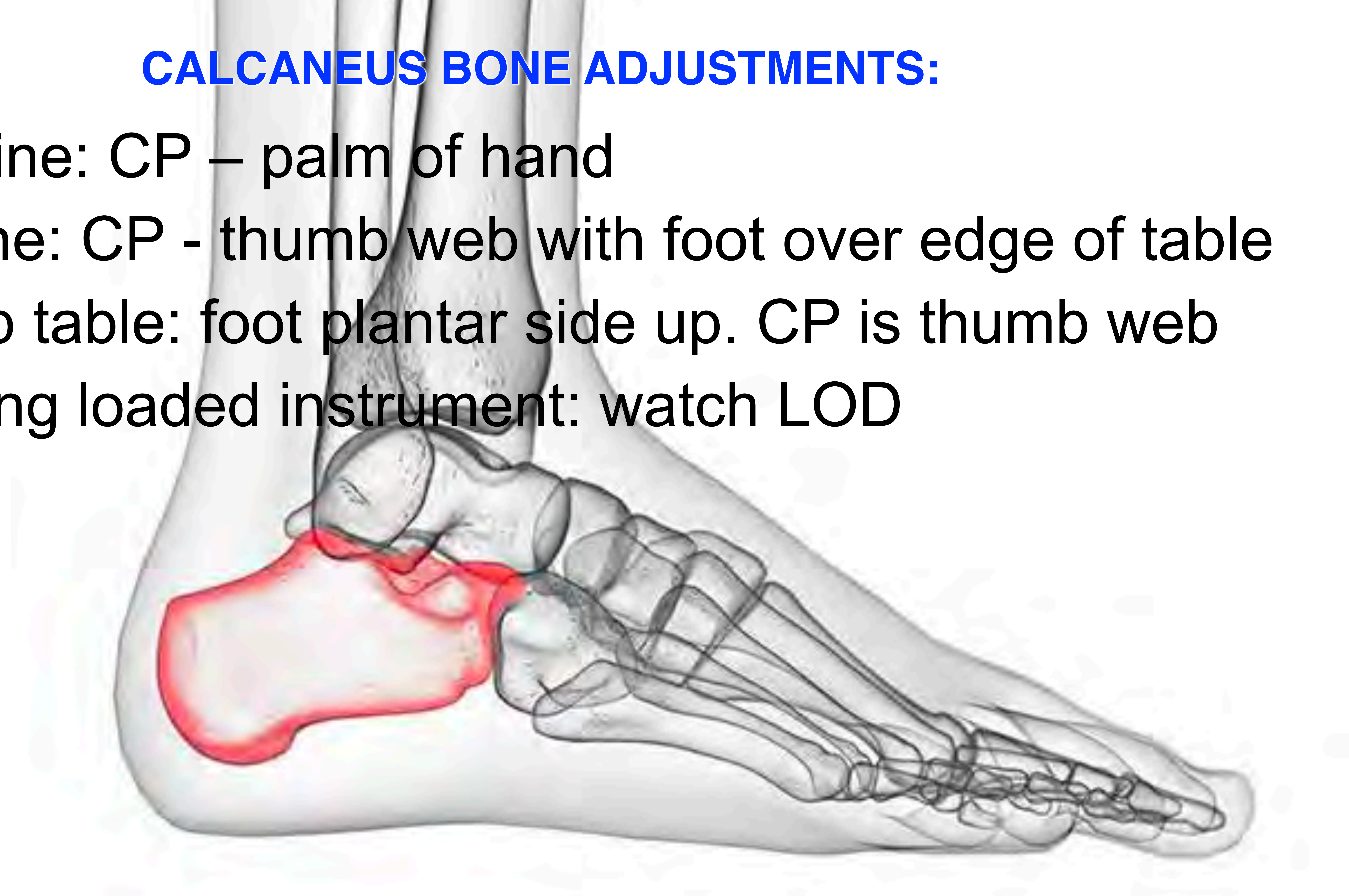


FOOT LEVELERS


Calcaneus
PALMER
College of Chiropractic

CALCANEUS BONE 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

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

“**<u>Bicycle</u>**” the foot

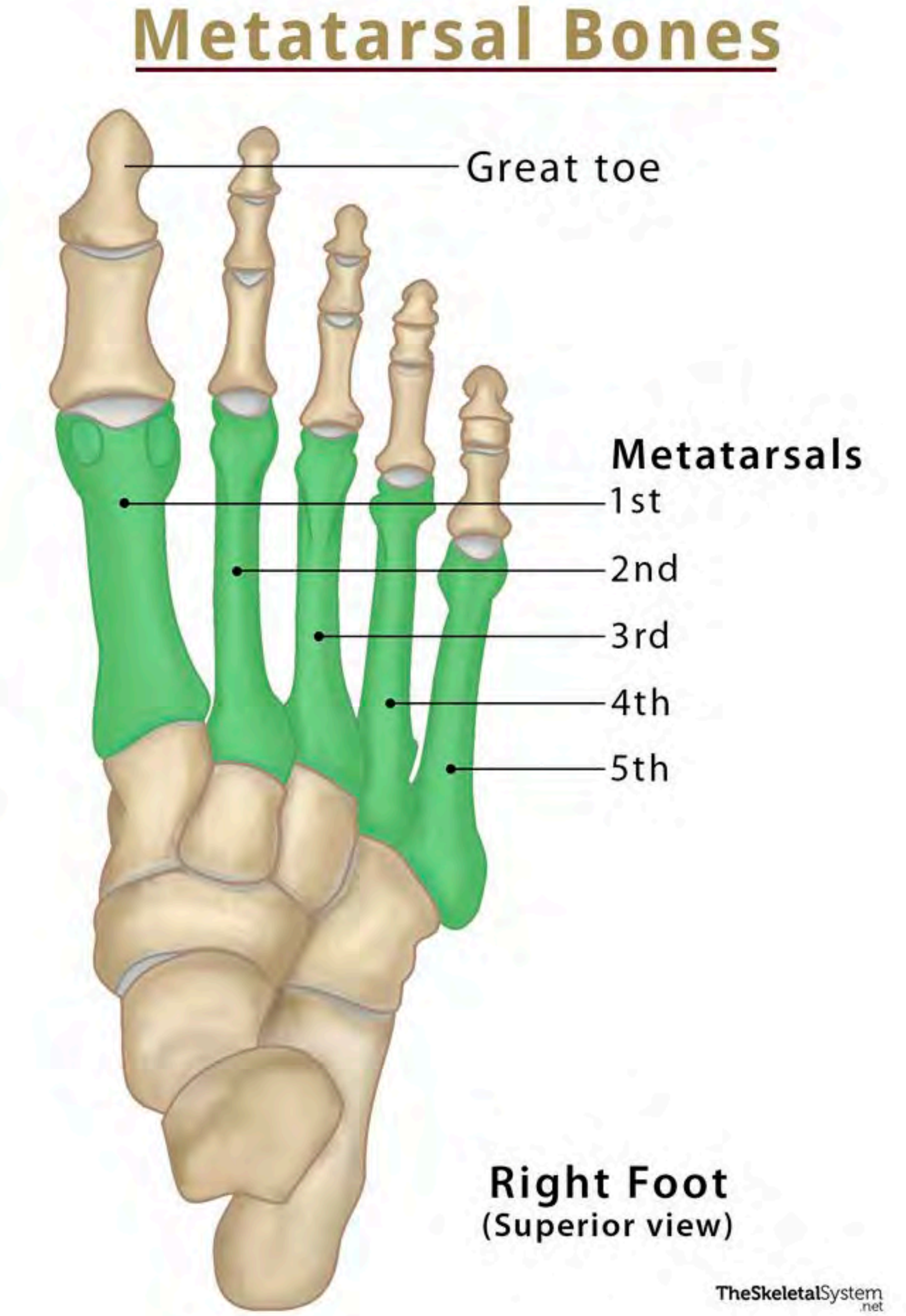
MT head #1 misaligns **superior and medial**

MT head #5 misaligns **superior and lateral**


Cuneiforms &
Metatarsals

Cuneiforms/MT's

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



Cuneiforms/MT's

FOOT LEVELERS

Cuneiforms/MT's

FOOT LEVELERS

Phalanges

Phalanges

"All In One"

Navicular → talus → cuboid → calcaneus → hip


"All In One Move"
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College of Chiropractic
ALUMNI

Supinated Foot

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

FOOT LEVELERS


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

ROCKTAPE® (2009)

Go stronger, longer

implus® (2018)

meyerDC™

FOOT LEVELERS

Foot taping protocol

FOOT LEVELERS


ROCKTAPE


ROCKTAPE

Tape Care:

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

FOOT LEVELERS

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

FOOT LEVELERS

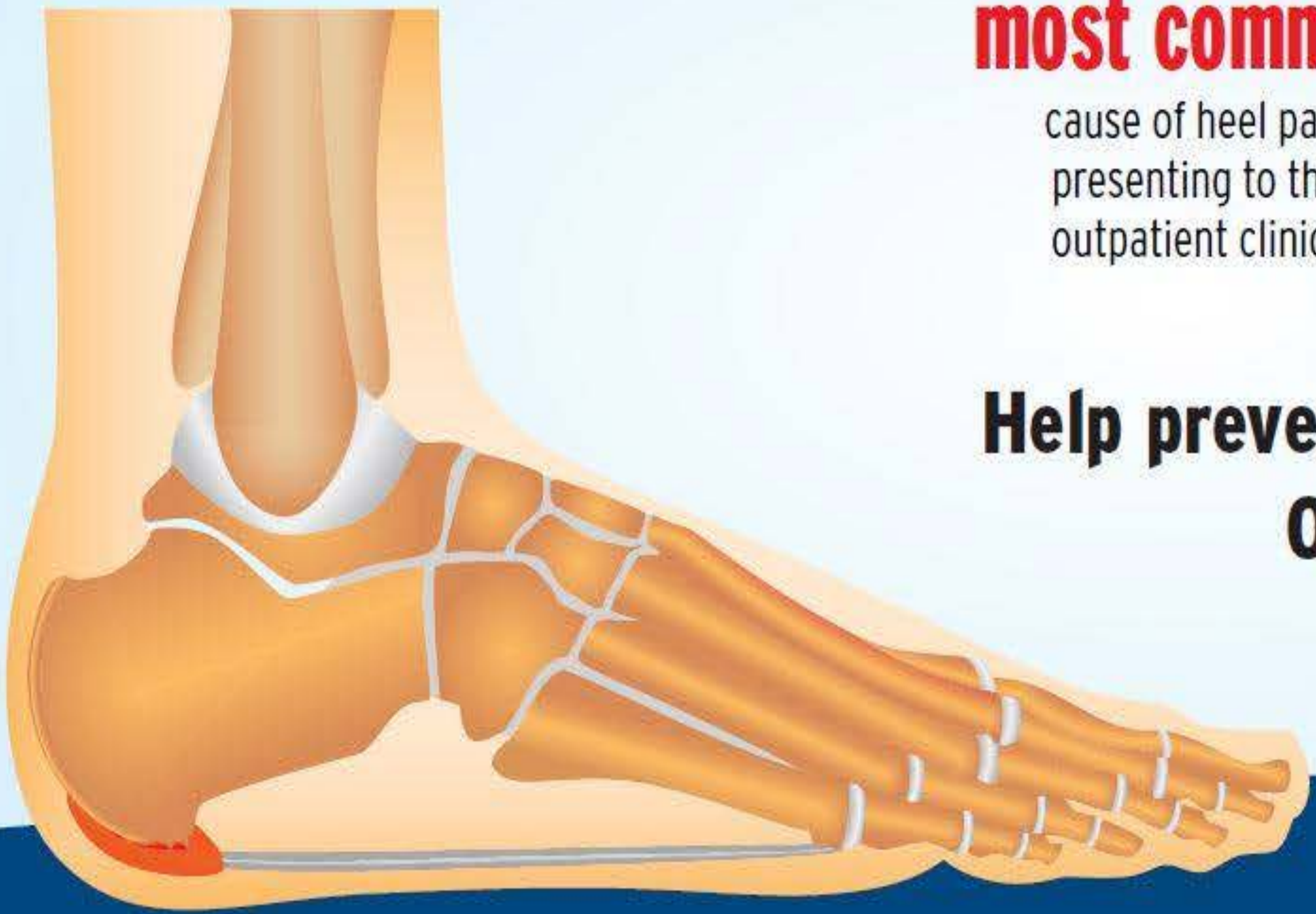
WITHOUT ORTHOTICS

WITH FOOT LEVELERS CUSTOM ORTHOTICS

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. Order their orthotics today!

800.553.4860

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

FOOT LEVELERS

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

FOOT LEVELERS

Treatment:

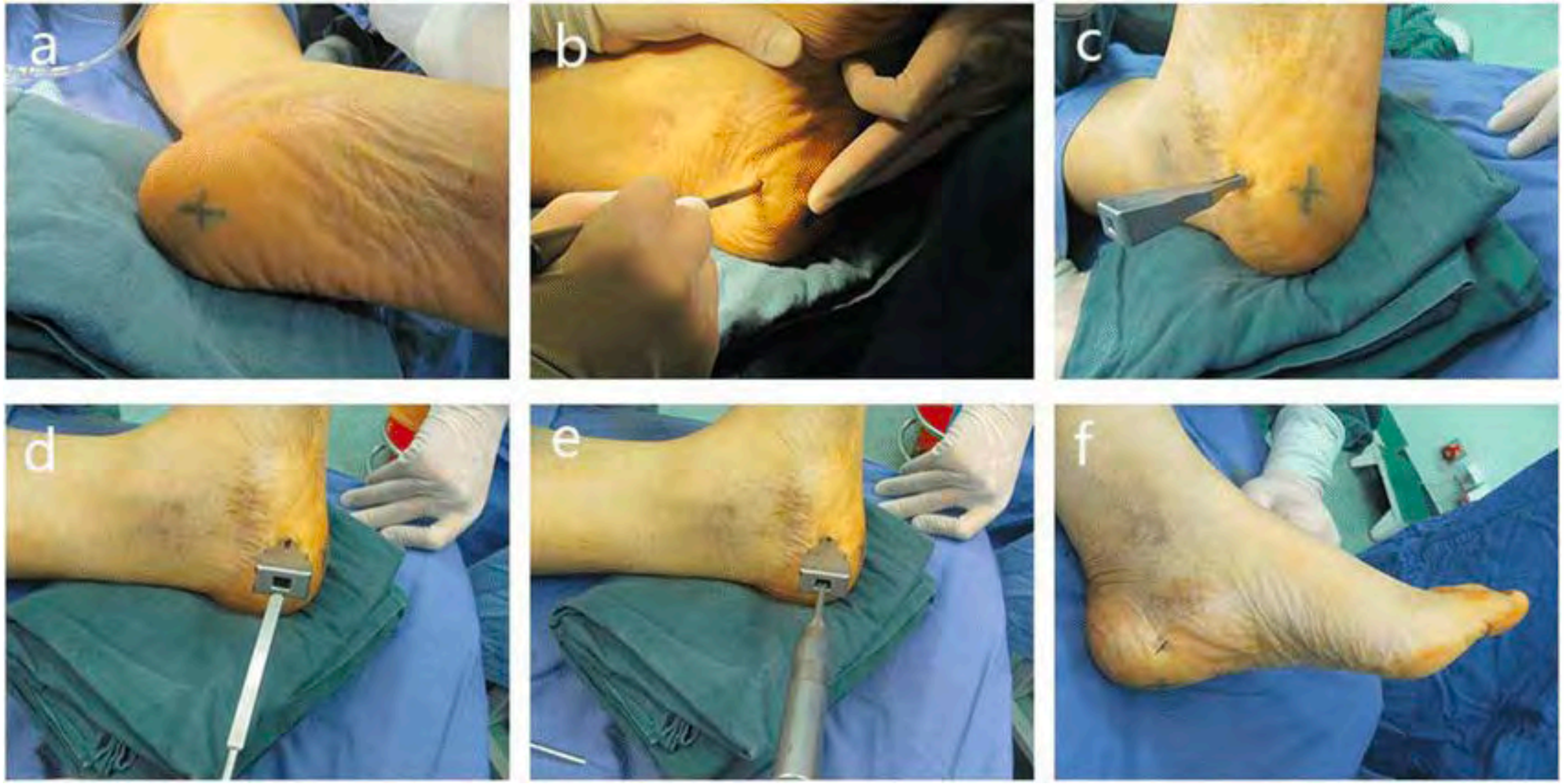
Physiotherapy modalities

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

Elastic Taping

FOOT LEVELERS

Endoscopic Plantar Fascial Release



FOOT LEVELERS

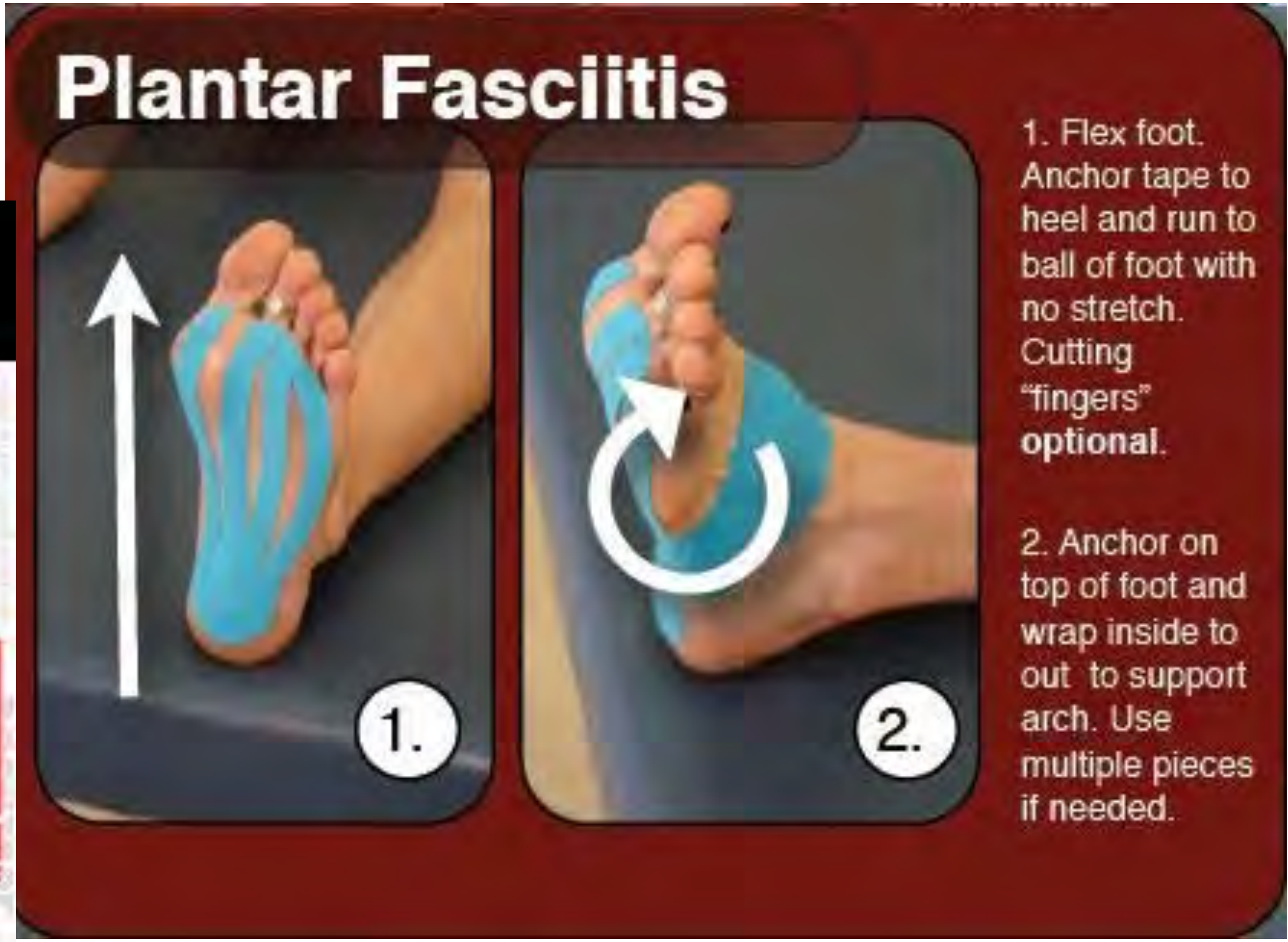

CUTTING EDGE
LASER TECHNOLOGIES
painaway
LASER
battery
treatment
mode
Start
Stop
ACTIV PRO
ACTIV PRO
POWERED BY
MULTI RADIANCE
Multi Radiance
Super Pulsed Lasers
LEVELERS

Plantar Fasciitis: Support

Stabilizing Orthotics

Shoe types

Elastic Tape



FOOT LEVELERS

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

FOOT LEVELERS


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

FOOT LEVELERS


TOTAL BODY REHAB
Tri-FLEX
Low-Tech Rehab

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

FOOT LEVELERS

Theraciser Concepts

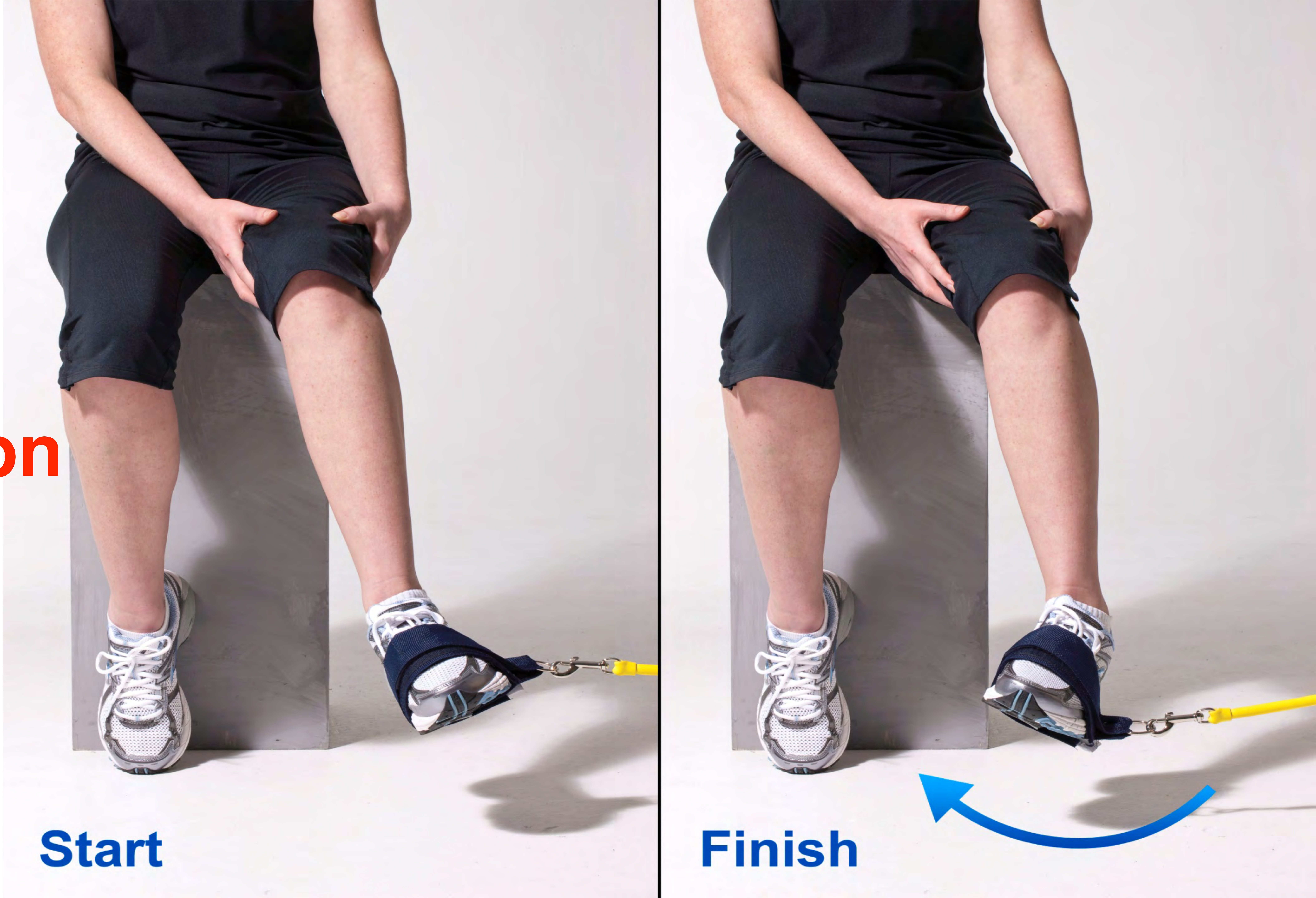
- Wide variability of speeds from very fast motion to very slow, sustained contractions.

- Resistance provided by the tubing can easily be very light to very heavy (depending on color).

FOOT LEVELERS

Eversion

Inversion



Dorsiflexion

FOOT LEVELERS

Plantarflexion

FOOT LEVELERS

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

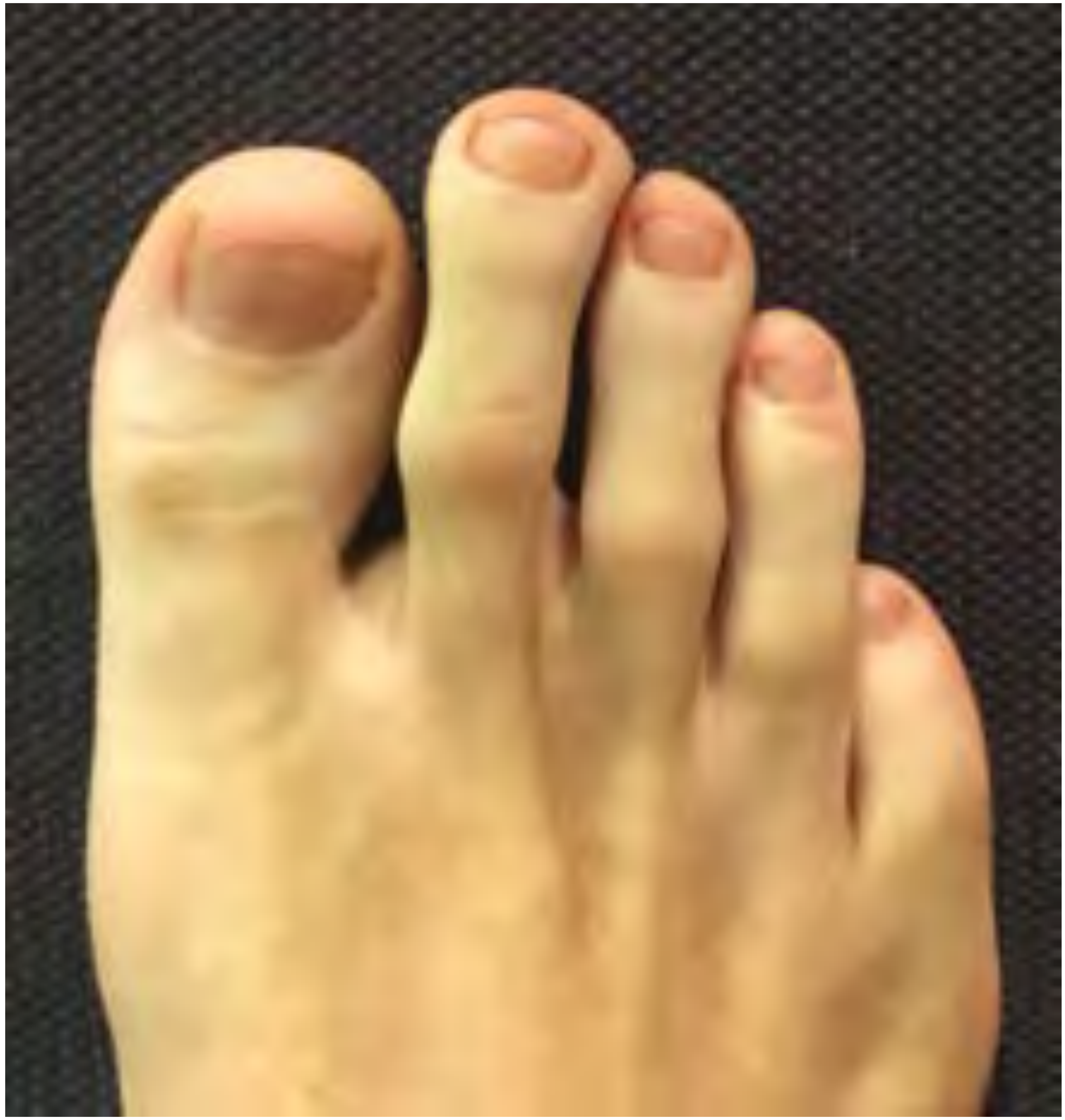
Phase	*Range of Motion*	*Speed of Contraction*	*How Long Each Exercise Motion*
I	short	slow	2 min. daily
II	short	fast	to fatigue daily
III	full	slow	to fatigue every other day
IV	full	fast	to fatigue every other day

After each exercise session use ice. 2 wks per phase

FOOT LEVELERS

Morton’s Toe/Foot

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



FOOT LEVELERS

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.

FOOT LEVELERS

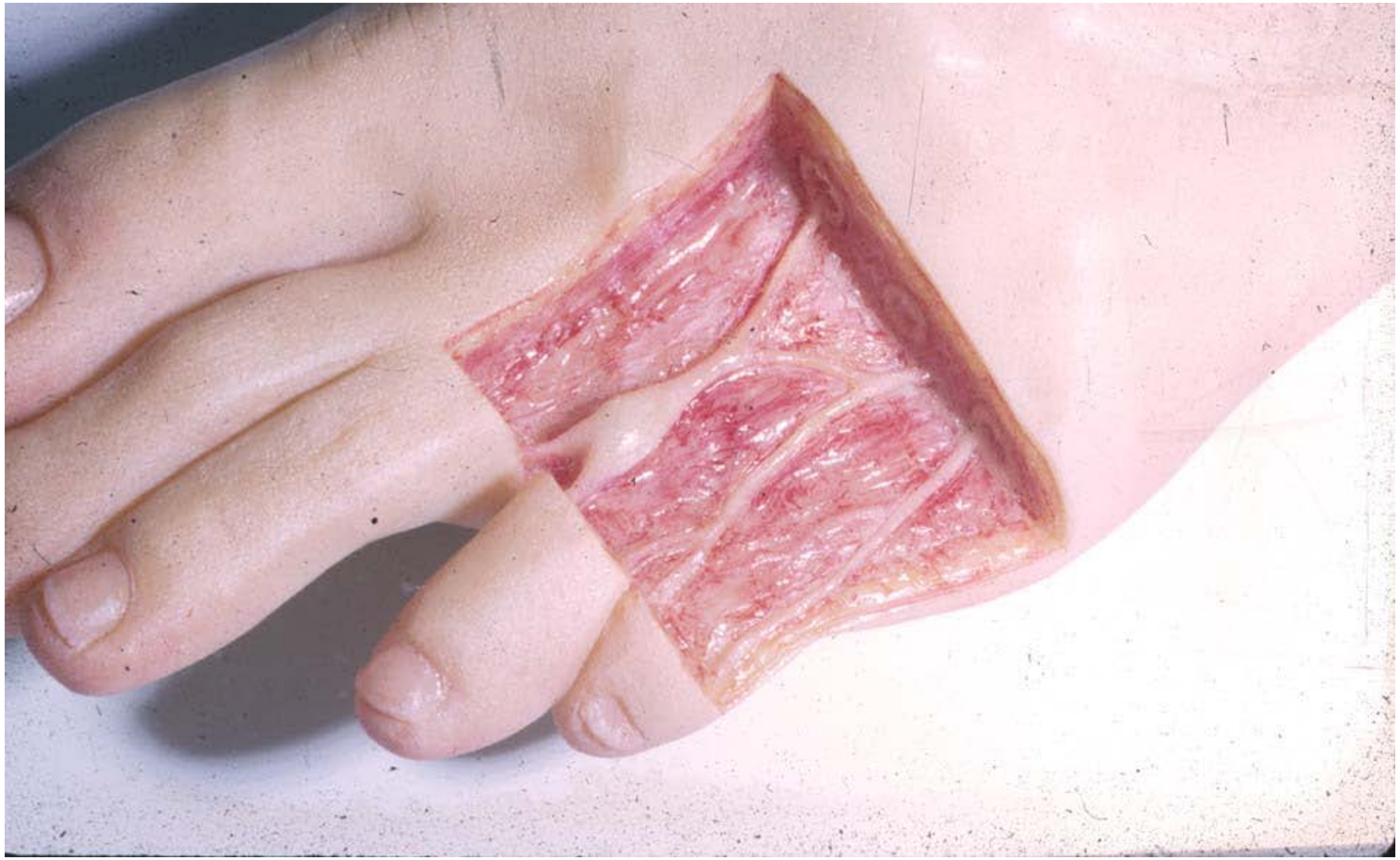
Morton's Toe/Foot

- 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.

FOOT LEVELERS

Morton's Neuroma

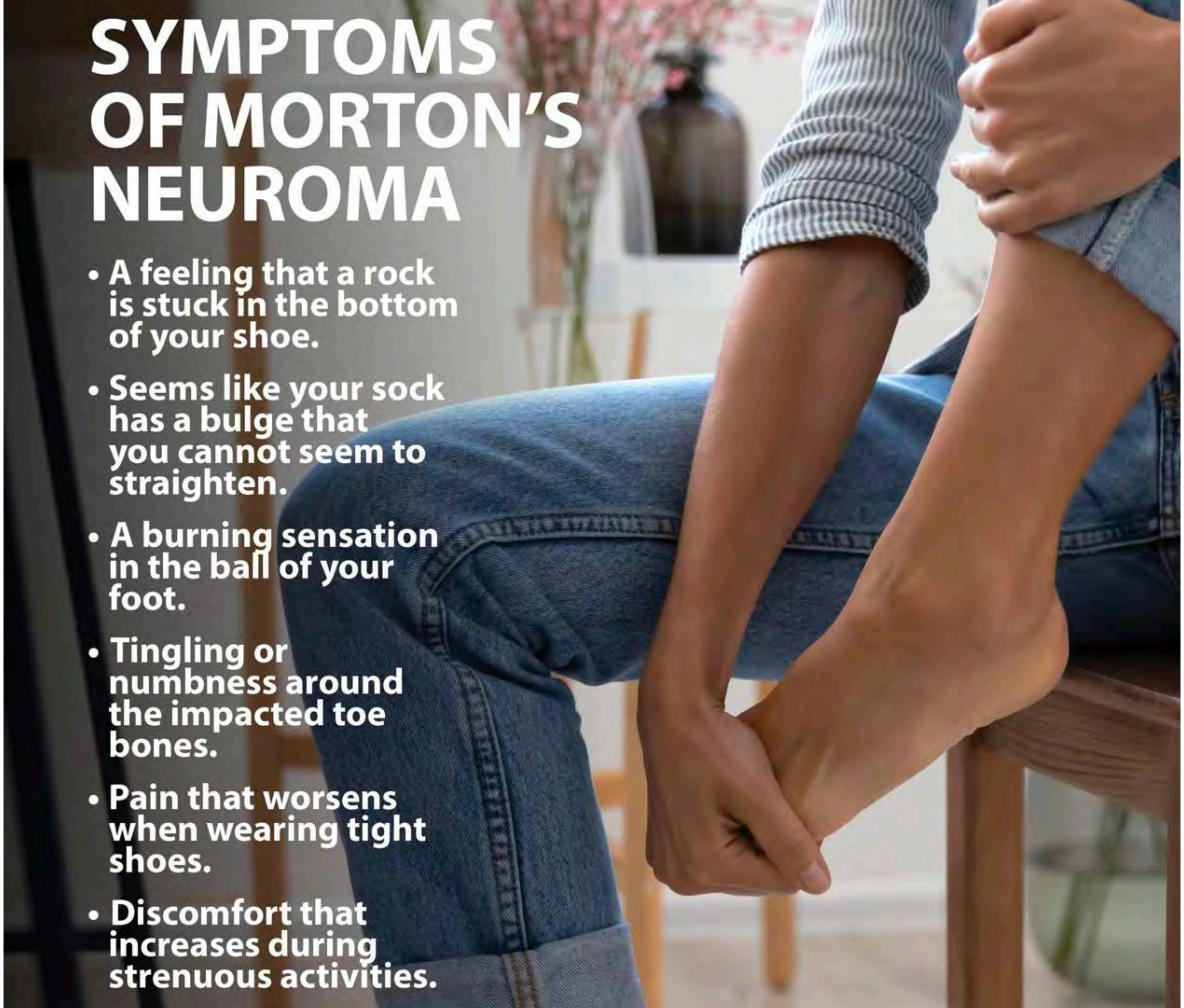
- Neuralgic radiating pain on plantar surface of foot.
- Located between the 3rd and 4th MT's.



Morton's Neuroma: Etiology

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

FOOT LEVELERS



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.

FOOT LEVELERS

Morton's Neuroma: Treatment

Physiotherapy modalities

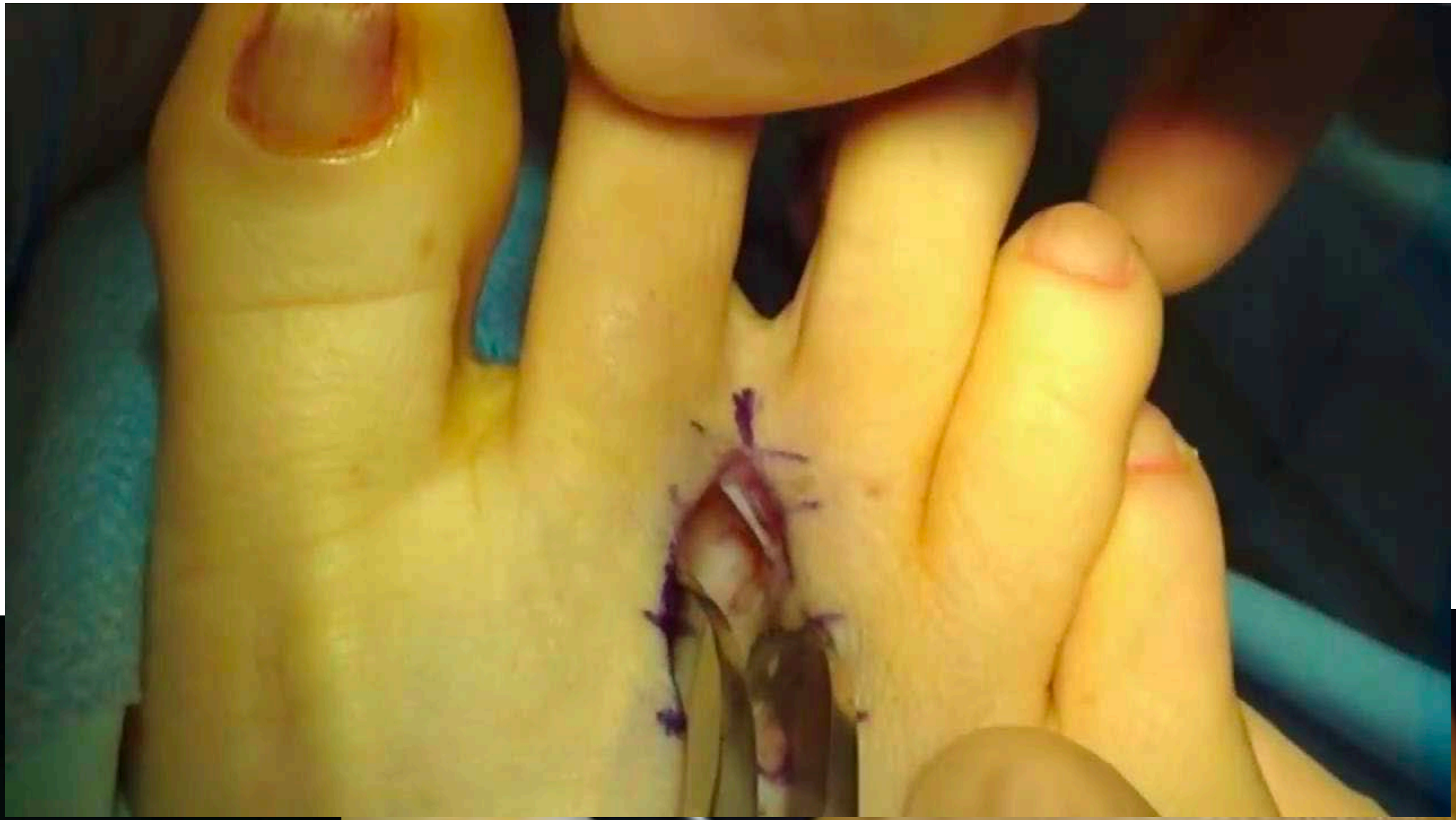
Adjustments: Basic Foot (MT's, toes)

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

FOOT LEVELERS

SEVER'S DISEASE

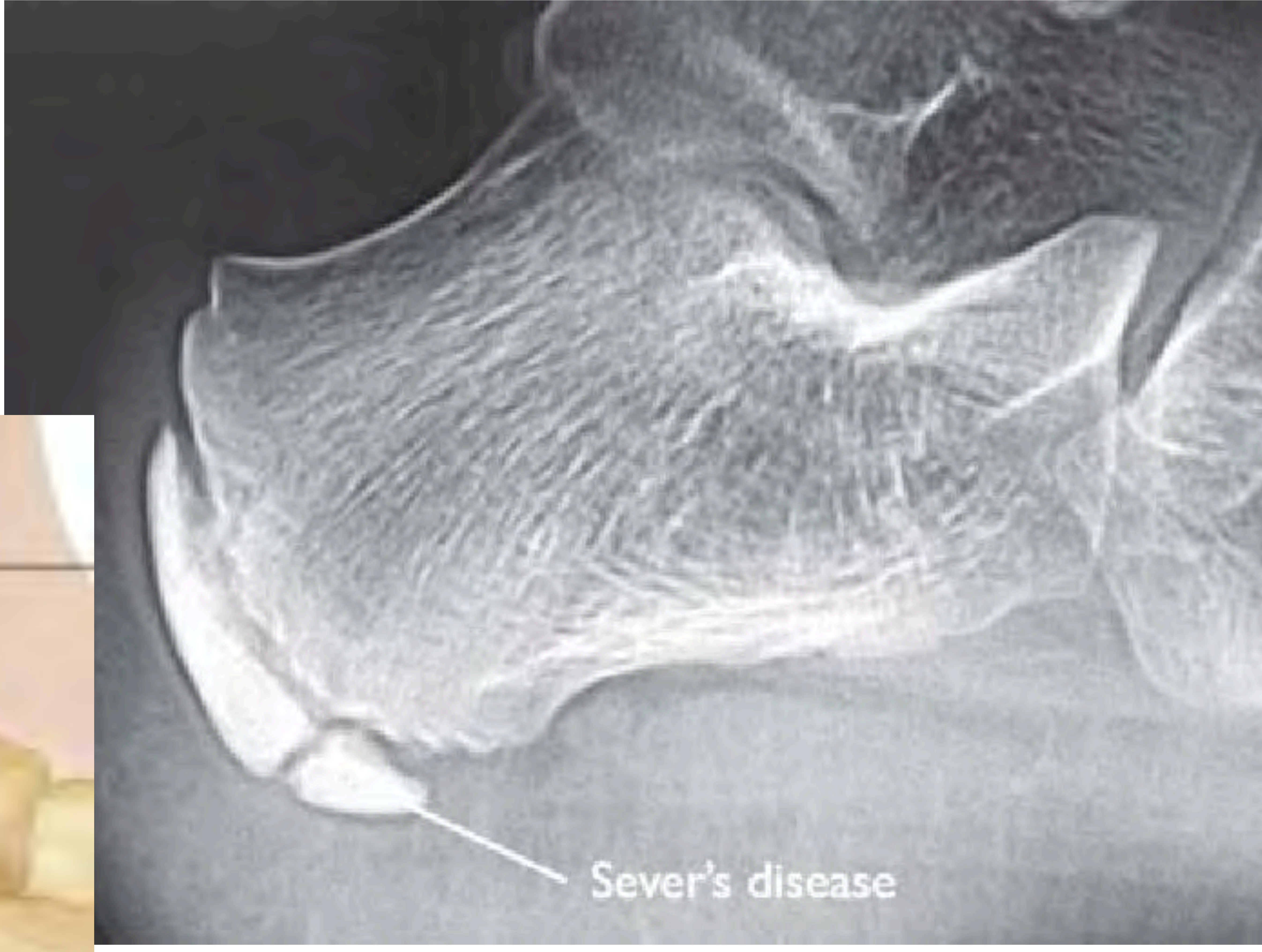
"Calcaneal Apophysitis"

- 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.

FOOT LEVELERS

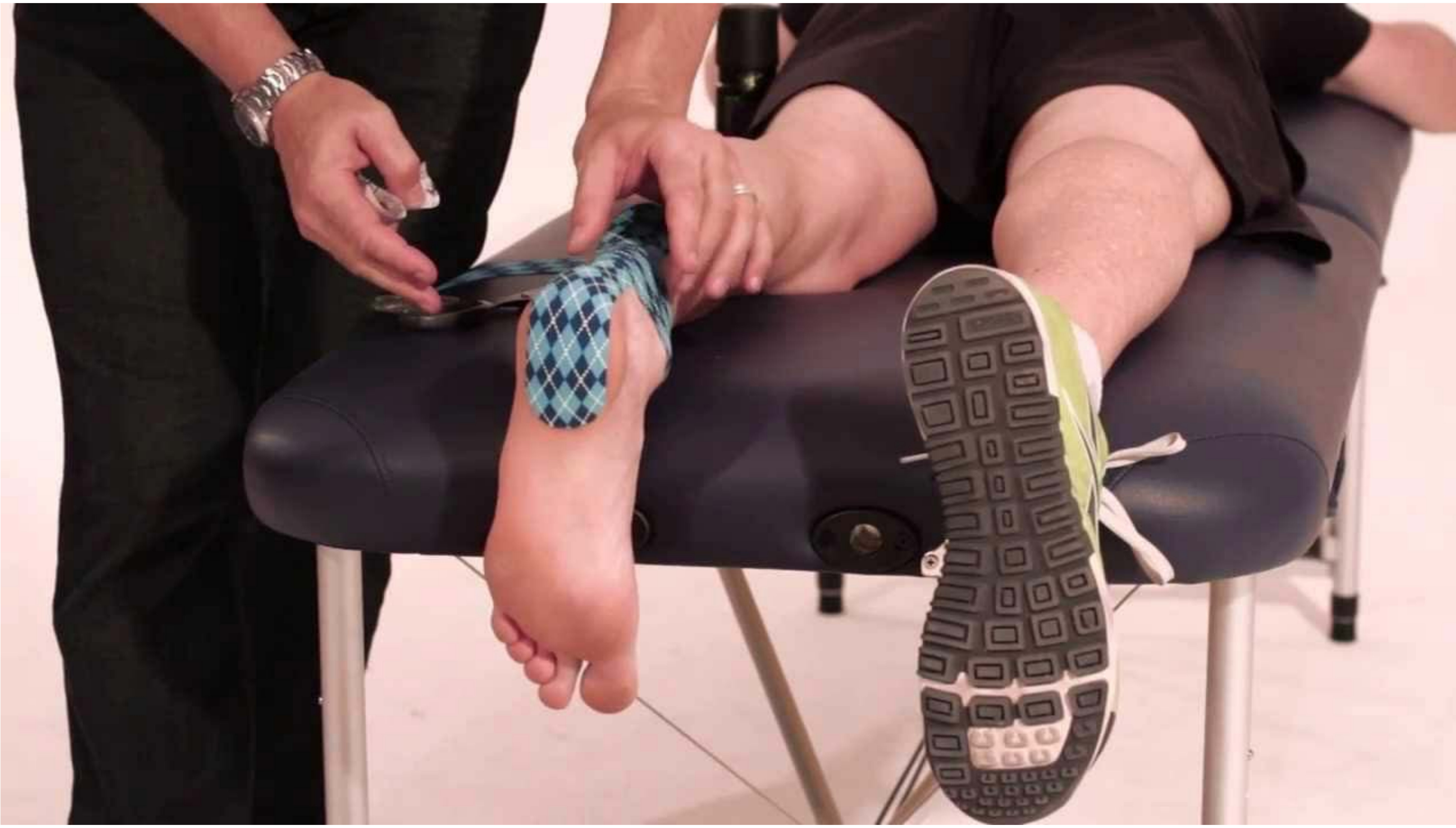
Sever's Disease

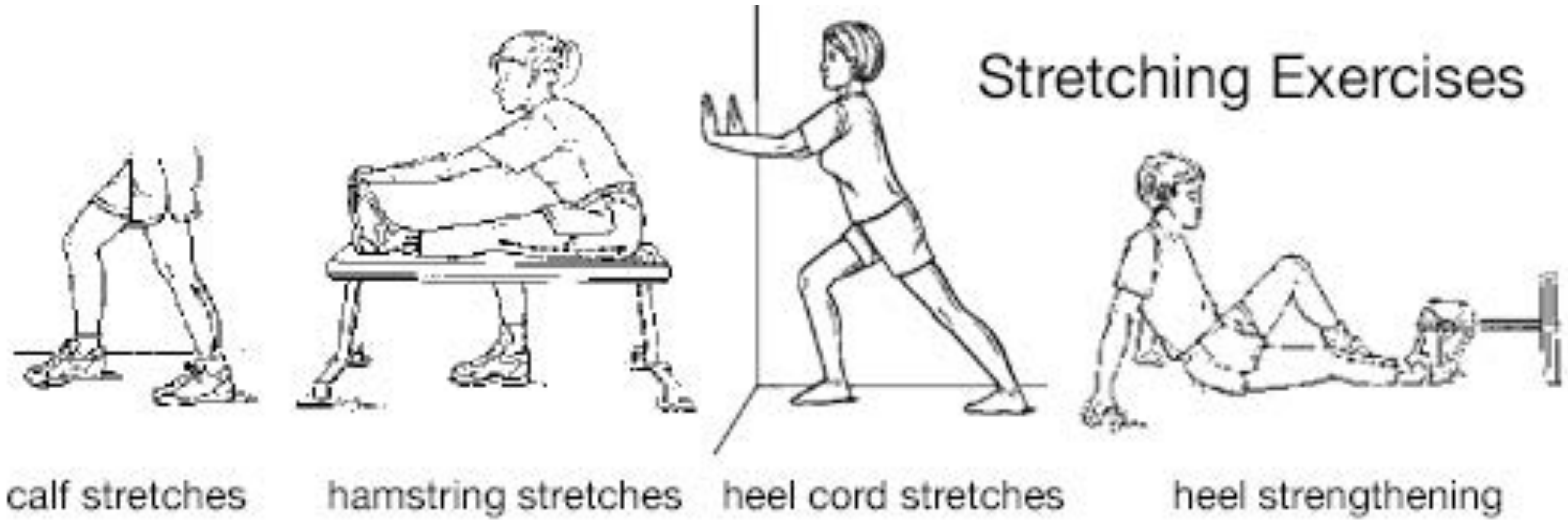


FOOT LEVELERS

Sever’s Disease: TX

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





FOOT LEVELERS

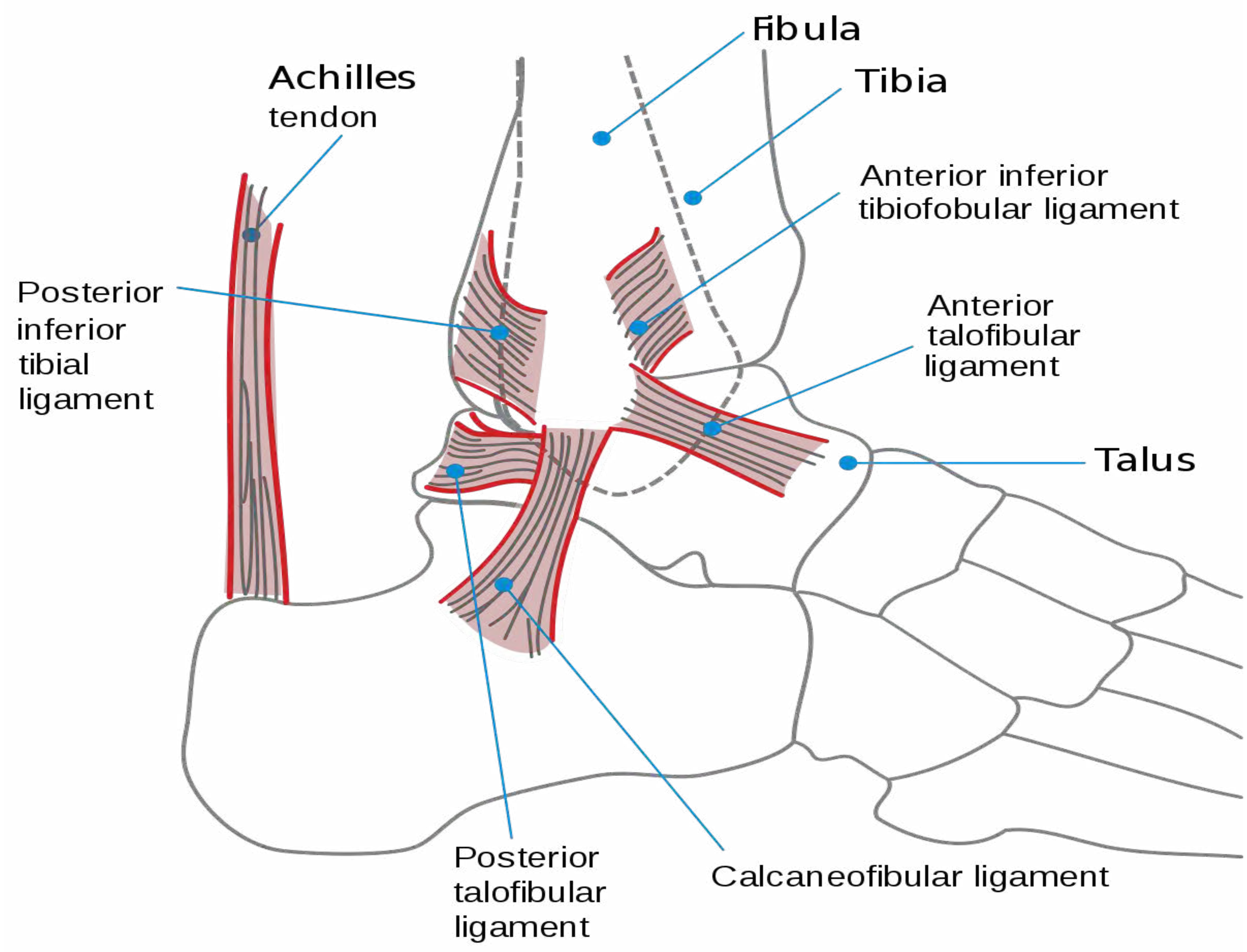
Sever's Disease: Taping

FOOT LEVELERS

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

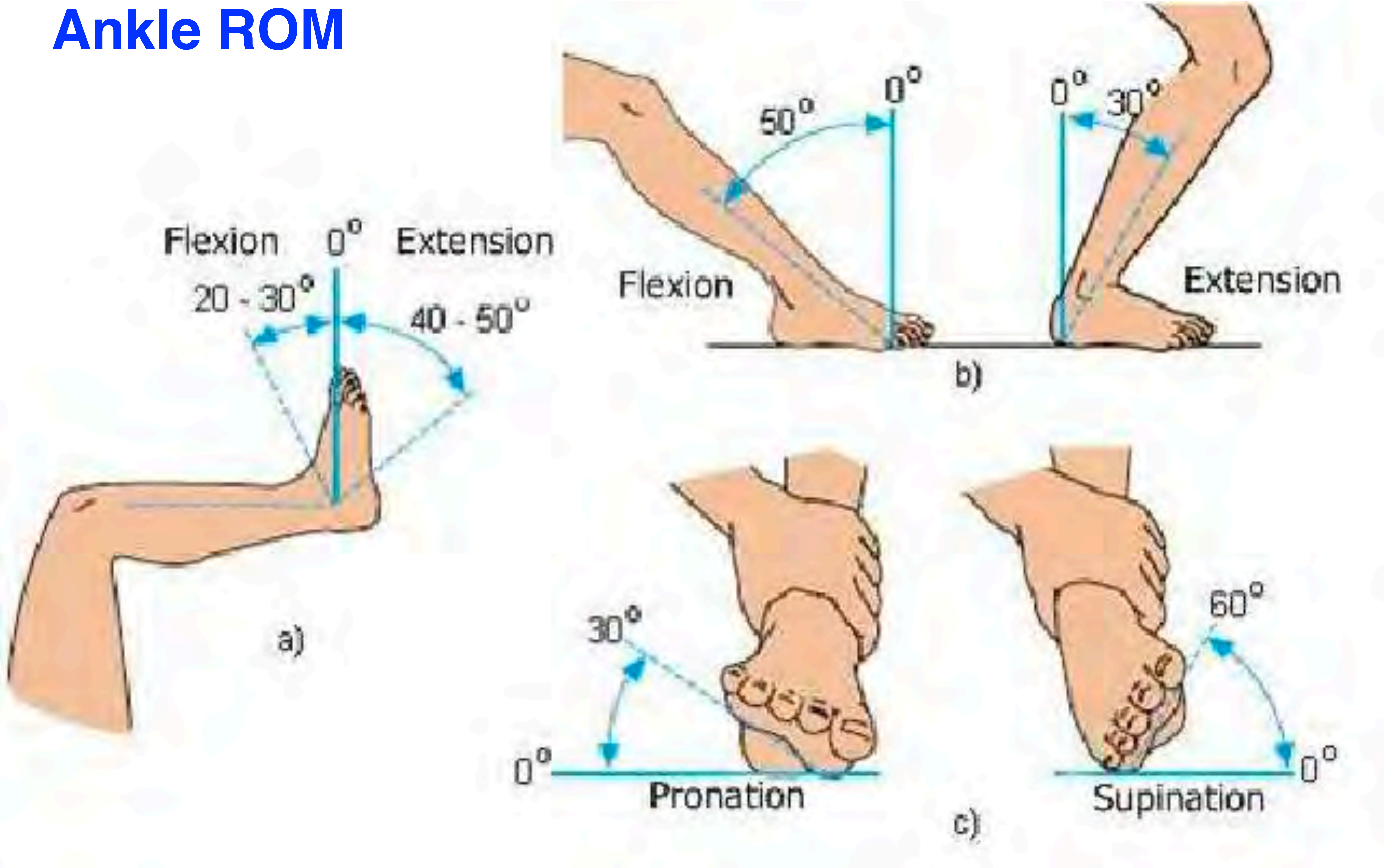
Lateral Ankle



FOOT LEVELERS

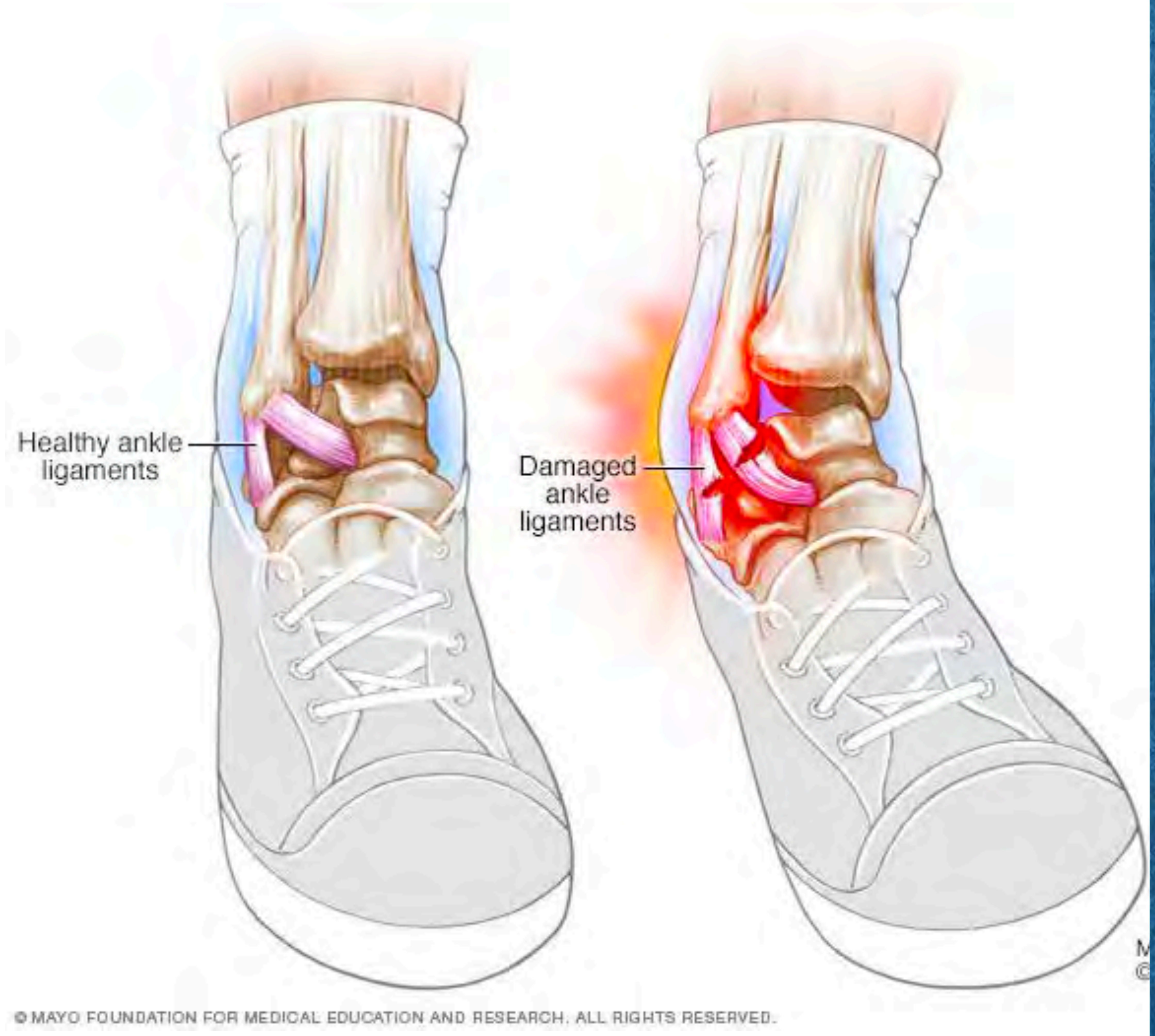
Medial Ankle

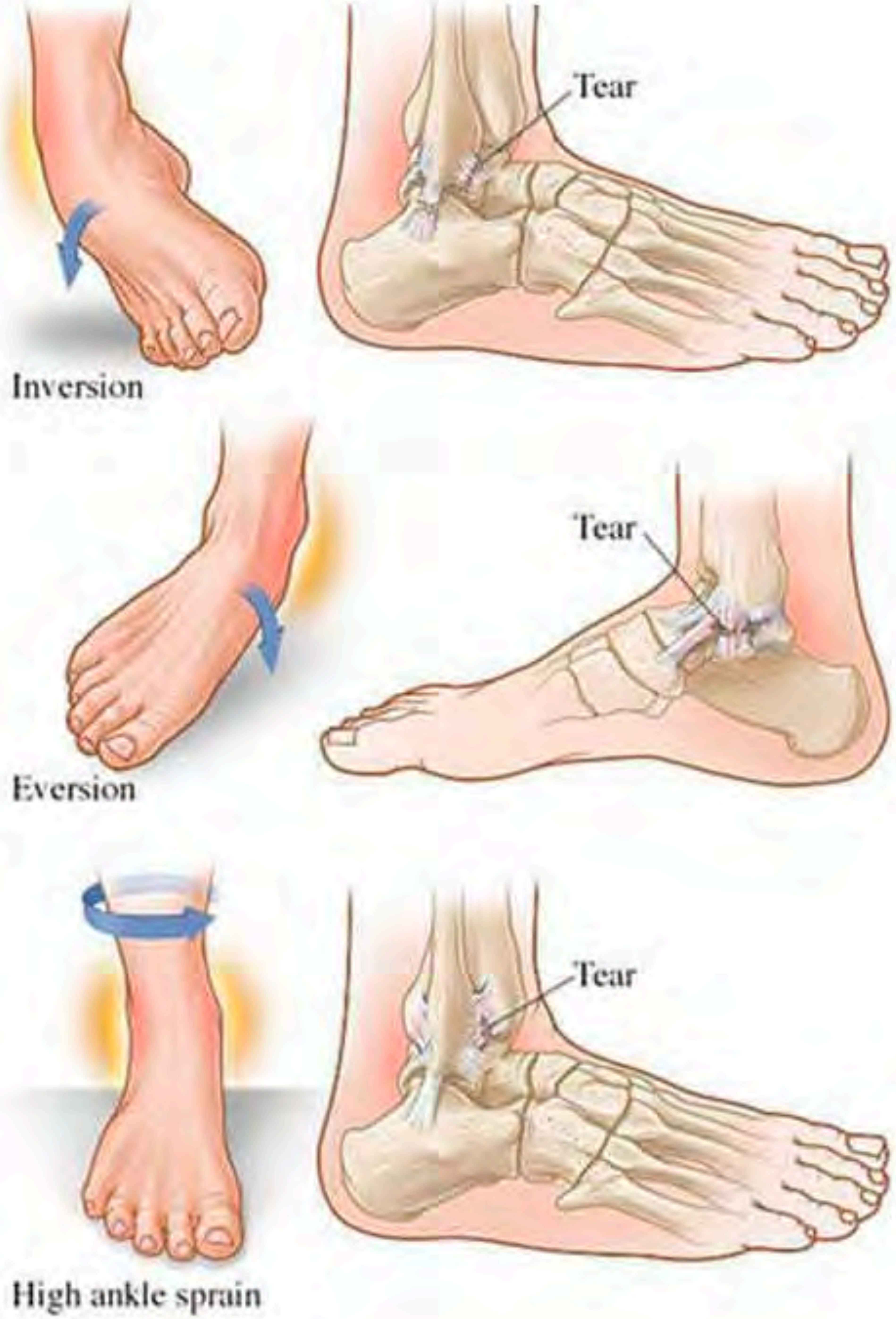
Ankle ROM



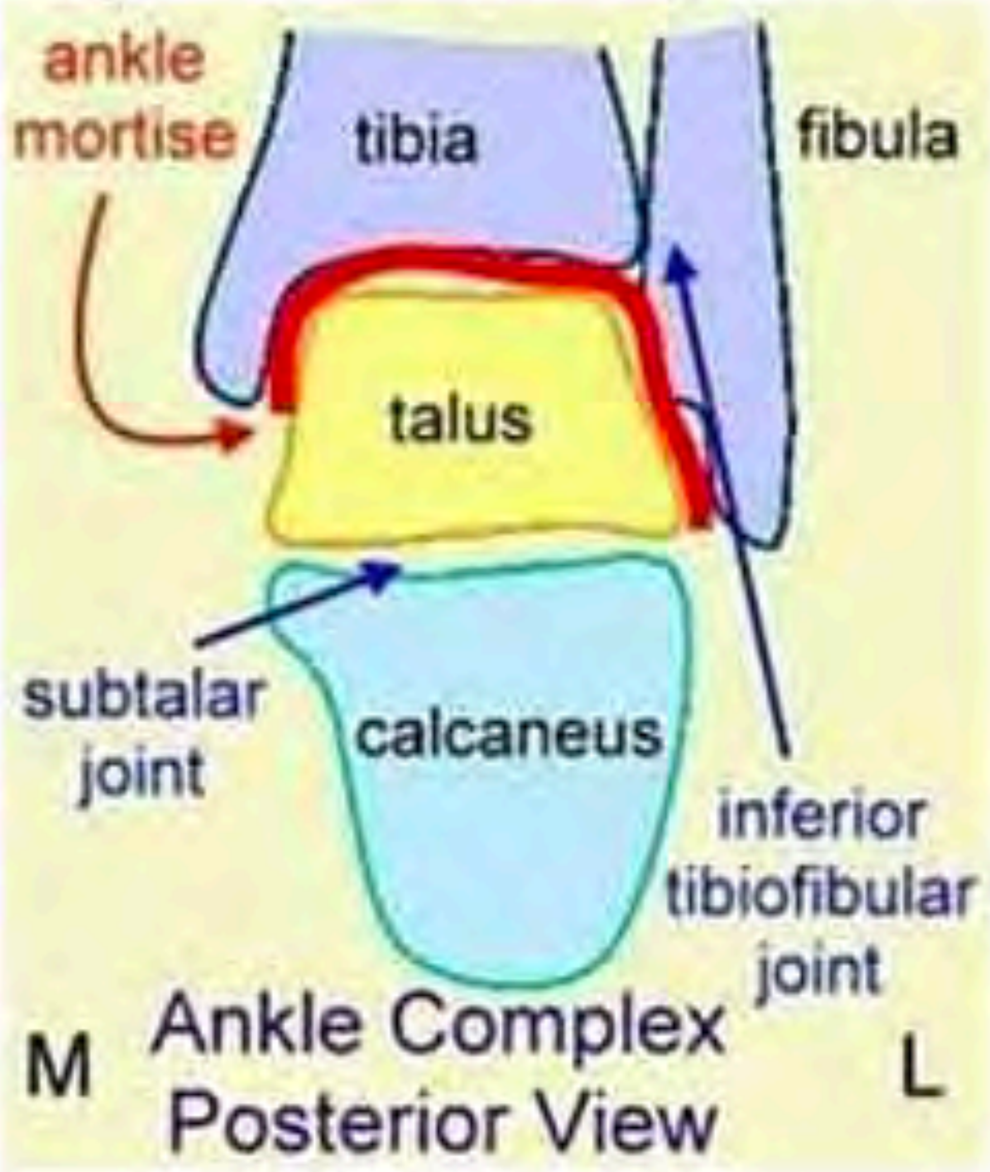
FOOT LEVELERS

Sprained Ankle

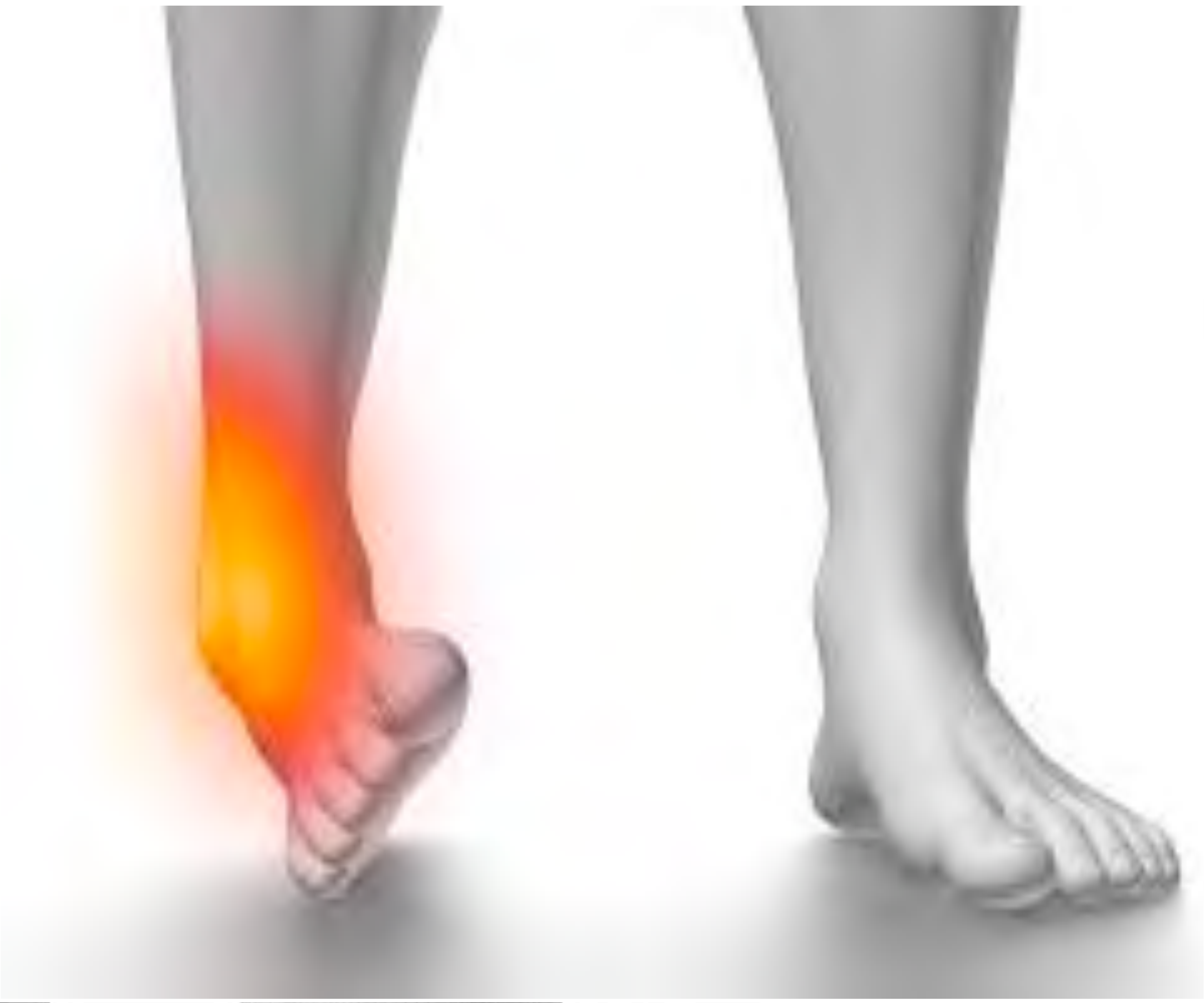


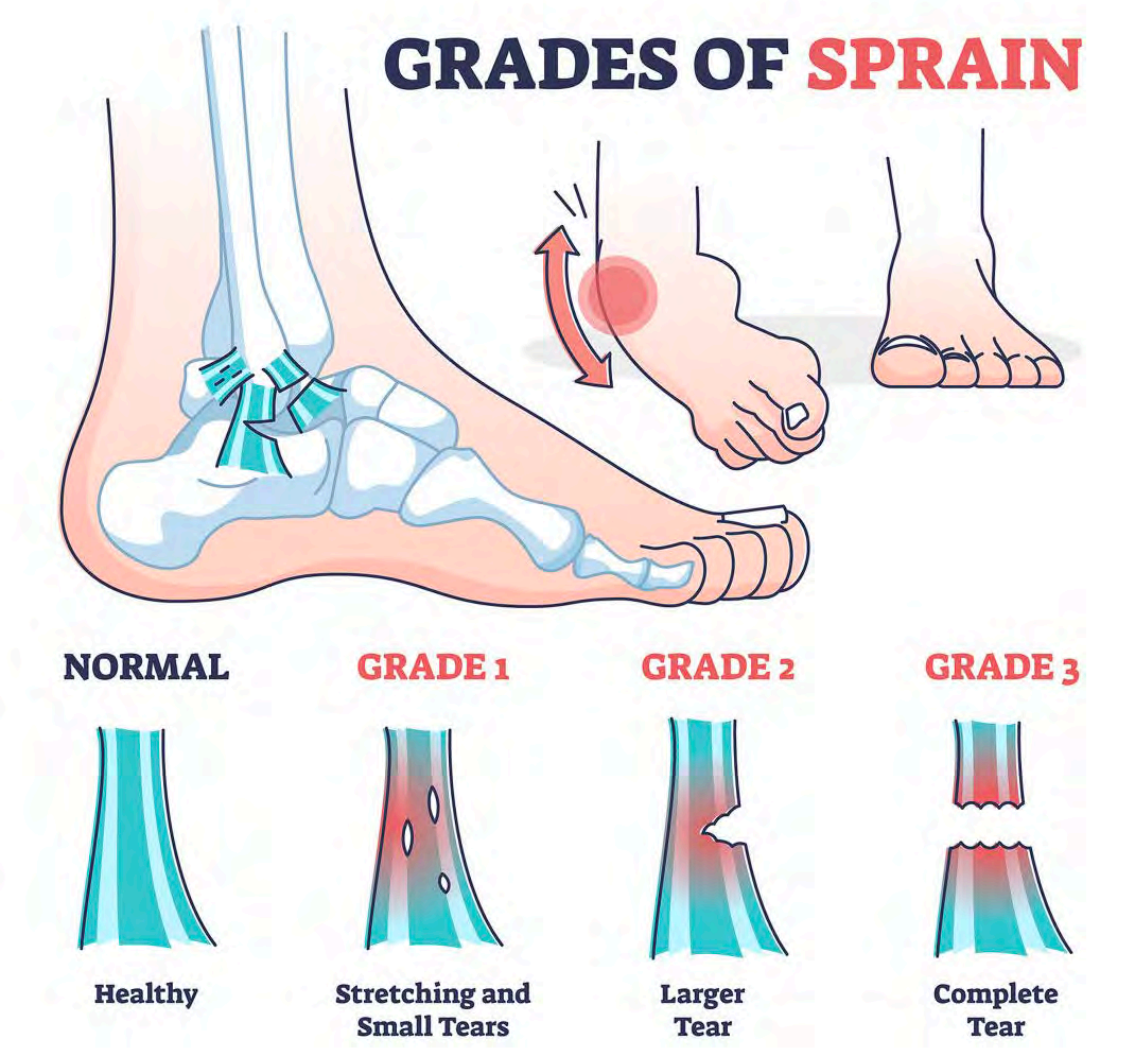


- **Inversion**
  - Anterior Talofibular
  - Calcaneofibular
  - Posterior Talofibular
- **Eversion**
  - Deltoid Ligament
- **Syndesmotic**
  - High ankle sprain



T LEVELERS

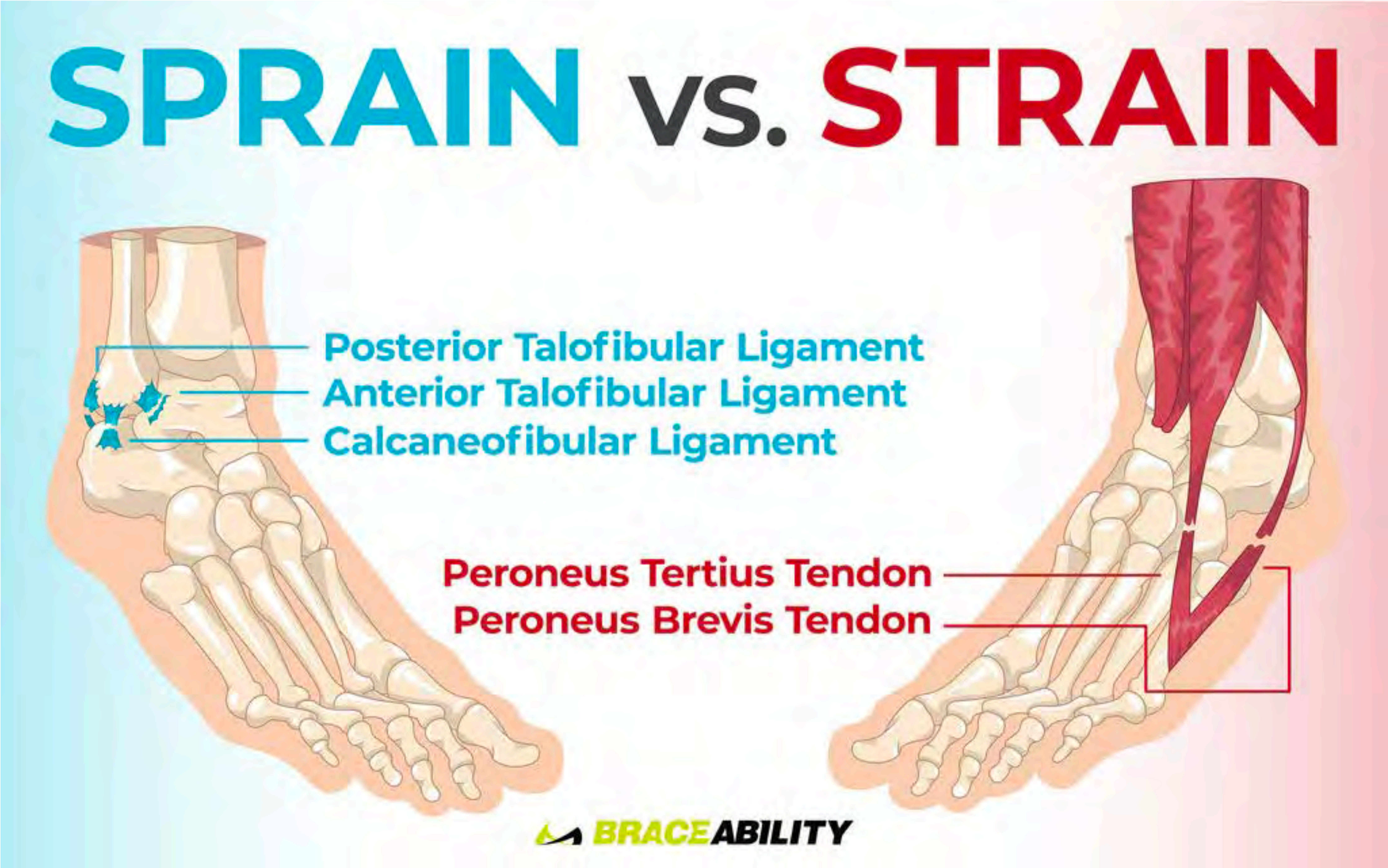



GRADES OF SPRAIN
NORMAL
GRADE 1
GRADE 2
GRADE 3
Healthy
Stretching and Small Tears
Larger Tear
Complete Tear

Sprained Ankle

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

FOOT LEVELERS



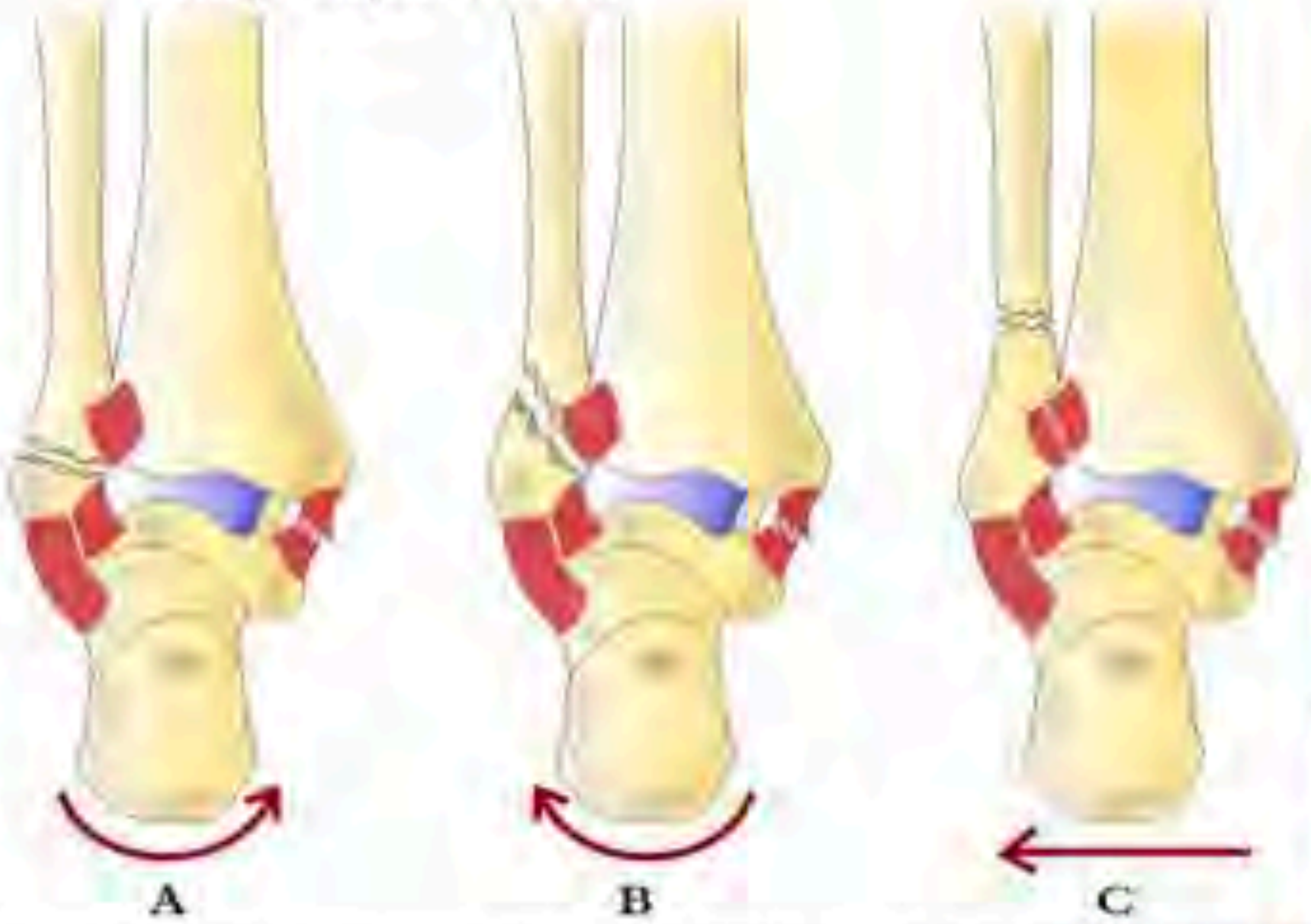
FOOT LEVELERS

Classification

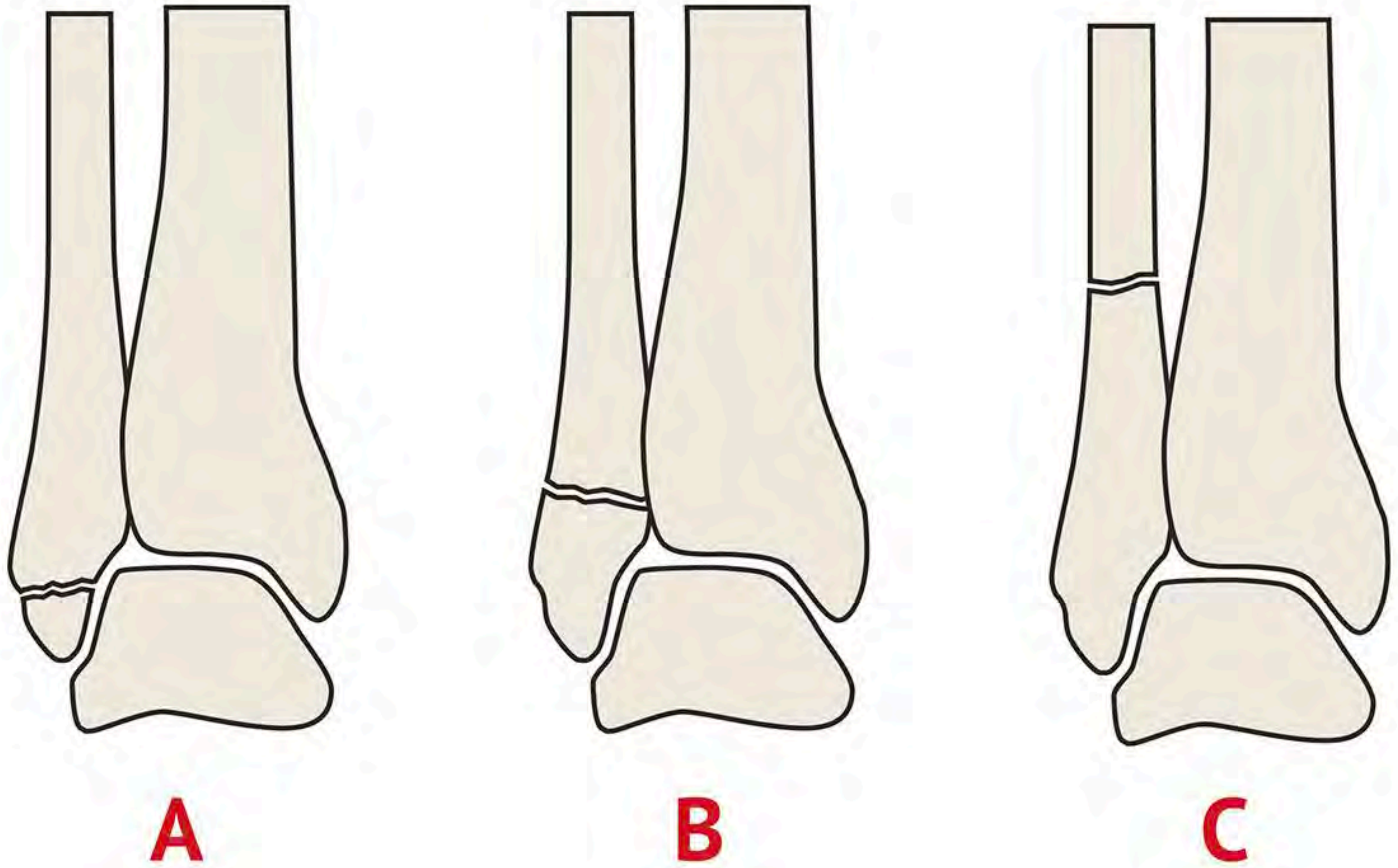
Weber A
- Fracture inferior to syndesmosis
- Syndesmosis intact
- Medial malleolus may be fractured
- Usually stable
- Reduction and cast
- ORIF occasionally needed

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



Weber Fracture Classifications:



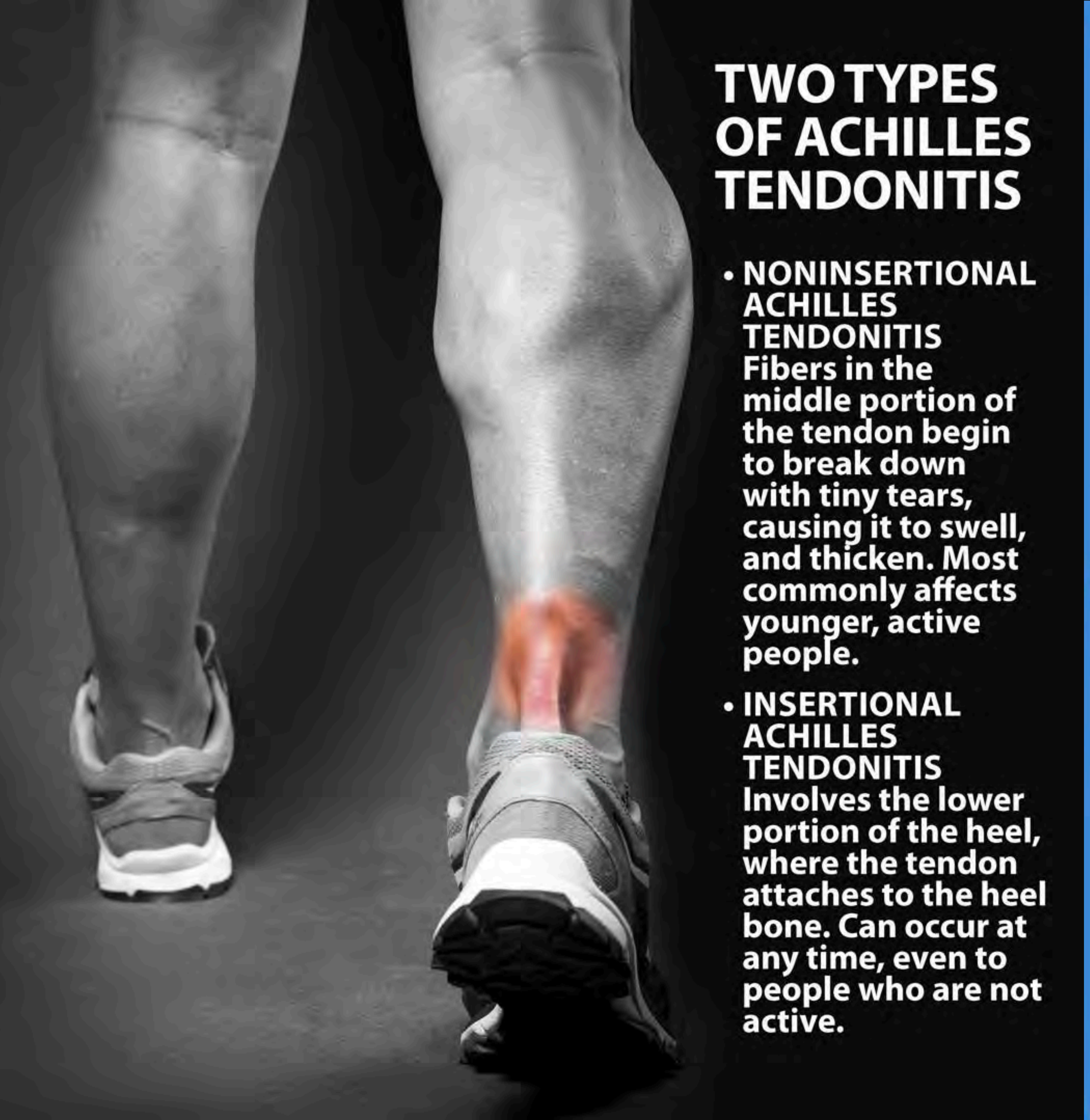
Sprained Ankle: Tx

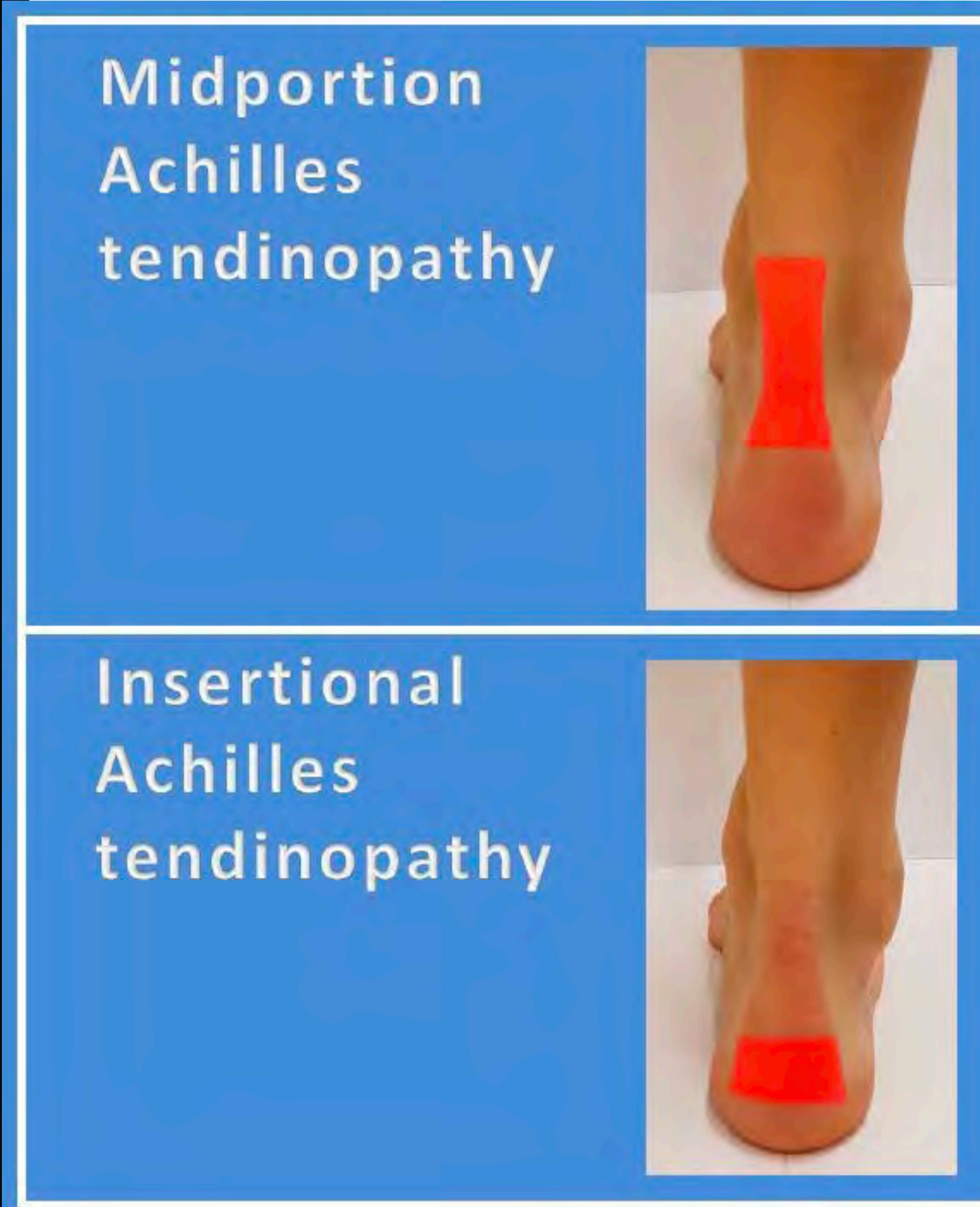
- Physiotherapy modalities
- Adjust foot/ankle
- Elastic Tape
- Stabilizing Orthotics


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.

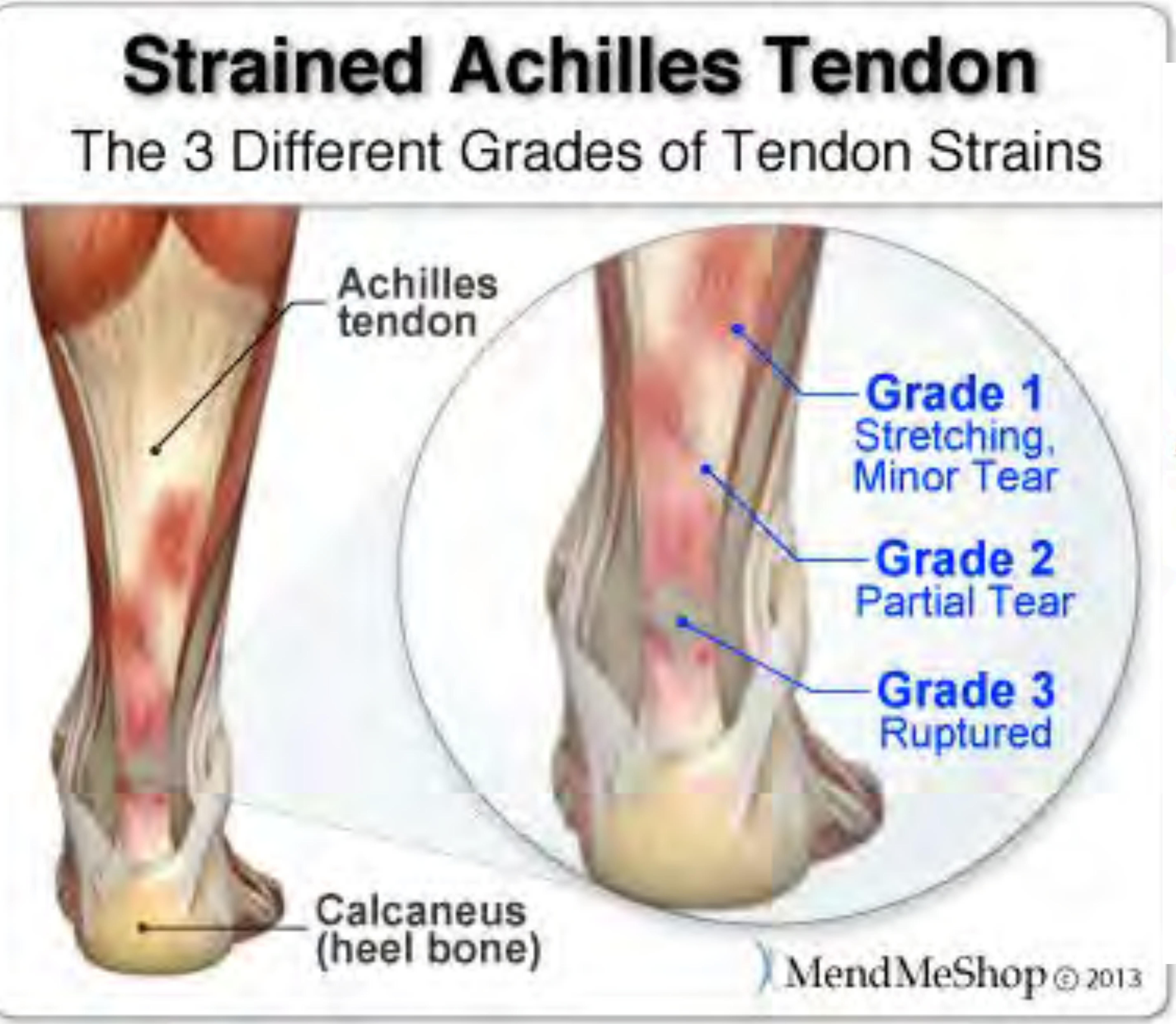

Midportion Achilles tendinopathy
Insertional Achilles tendinopathy

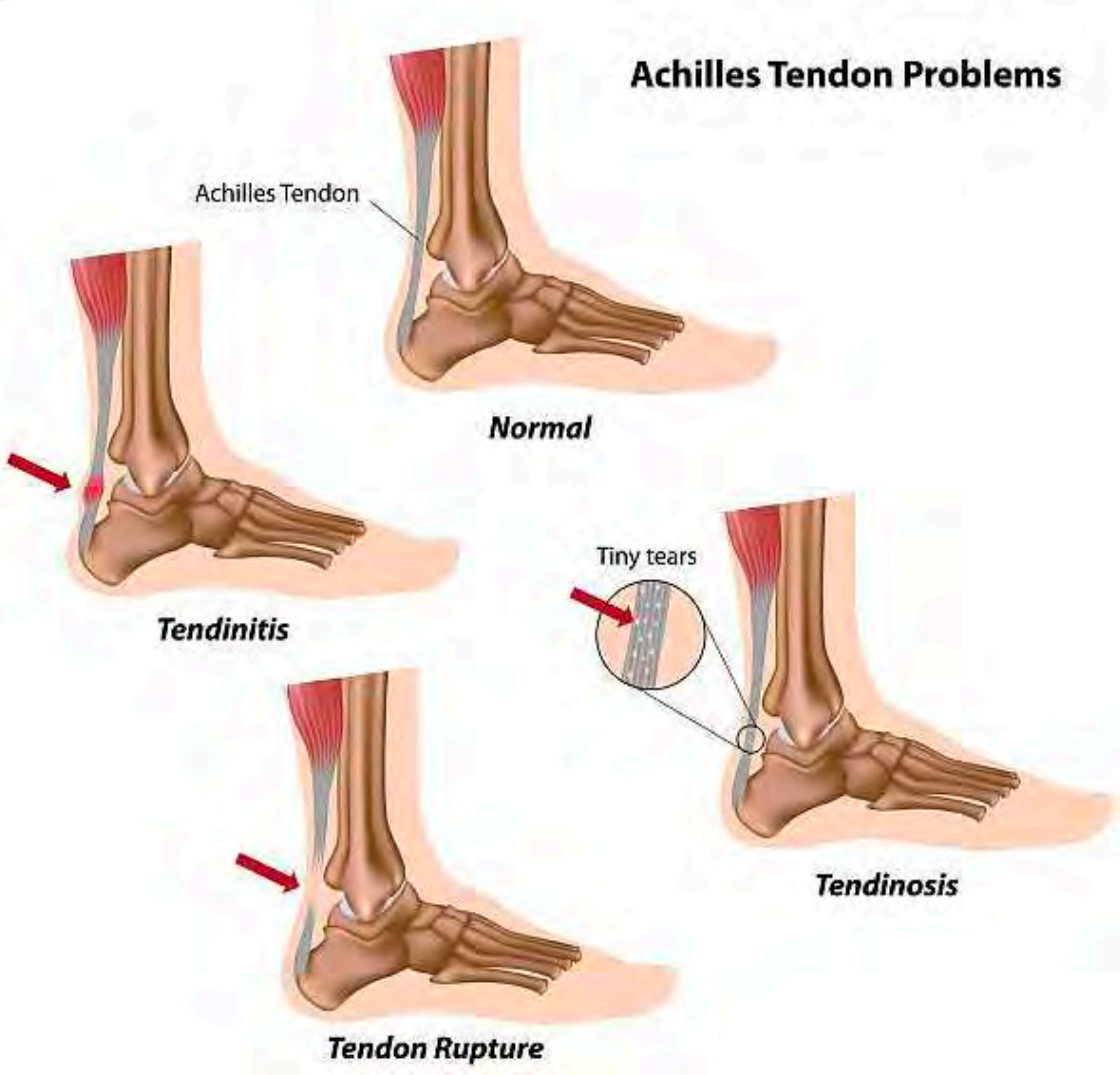
FOOT LEVELERS

Achilles Tendonitis: Etiology

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

FOOT LEVELERS

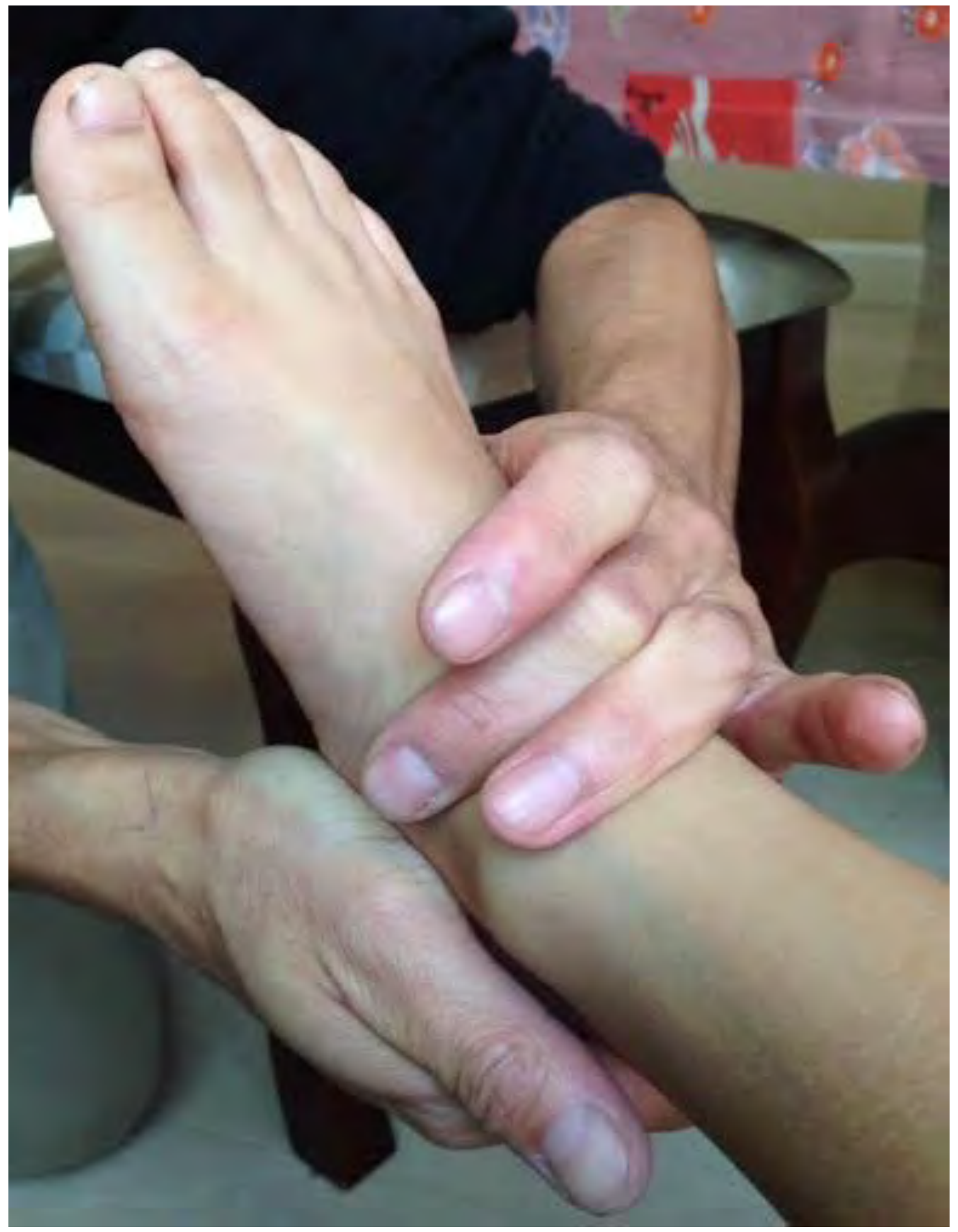




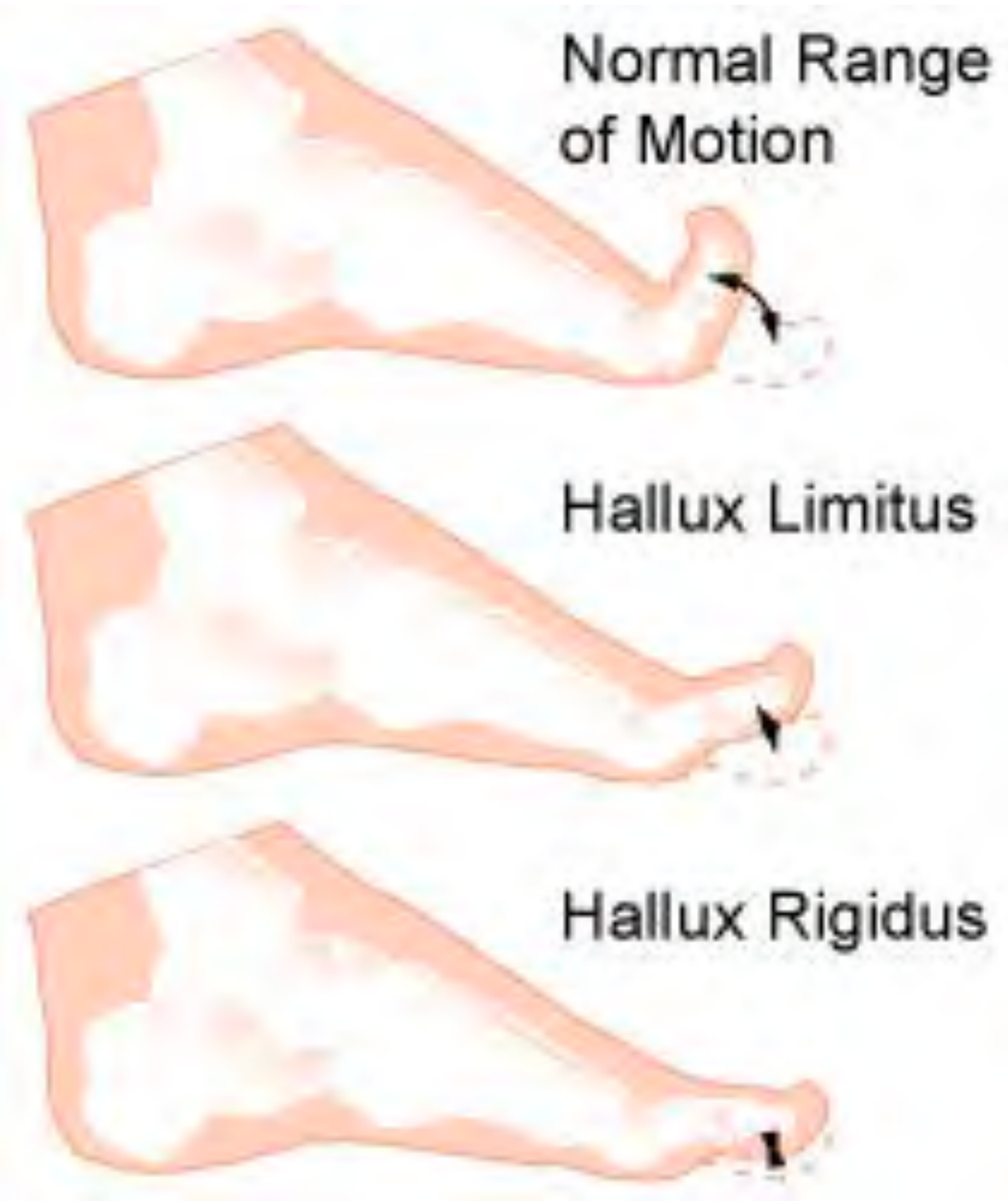
FOOT LEVELERS

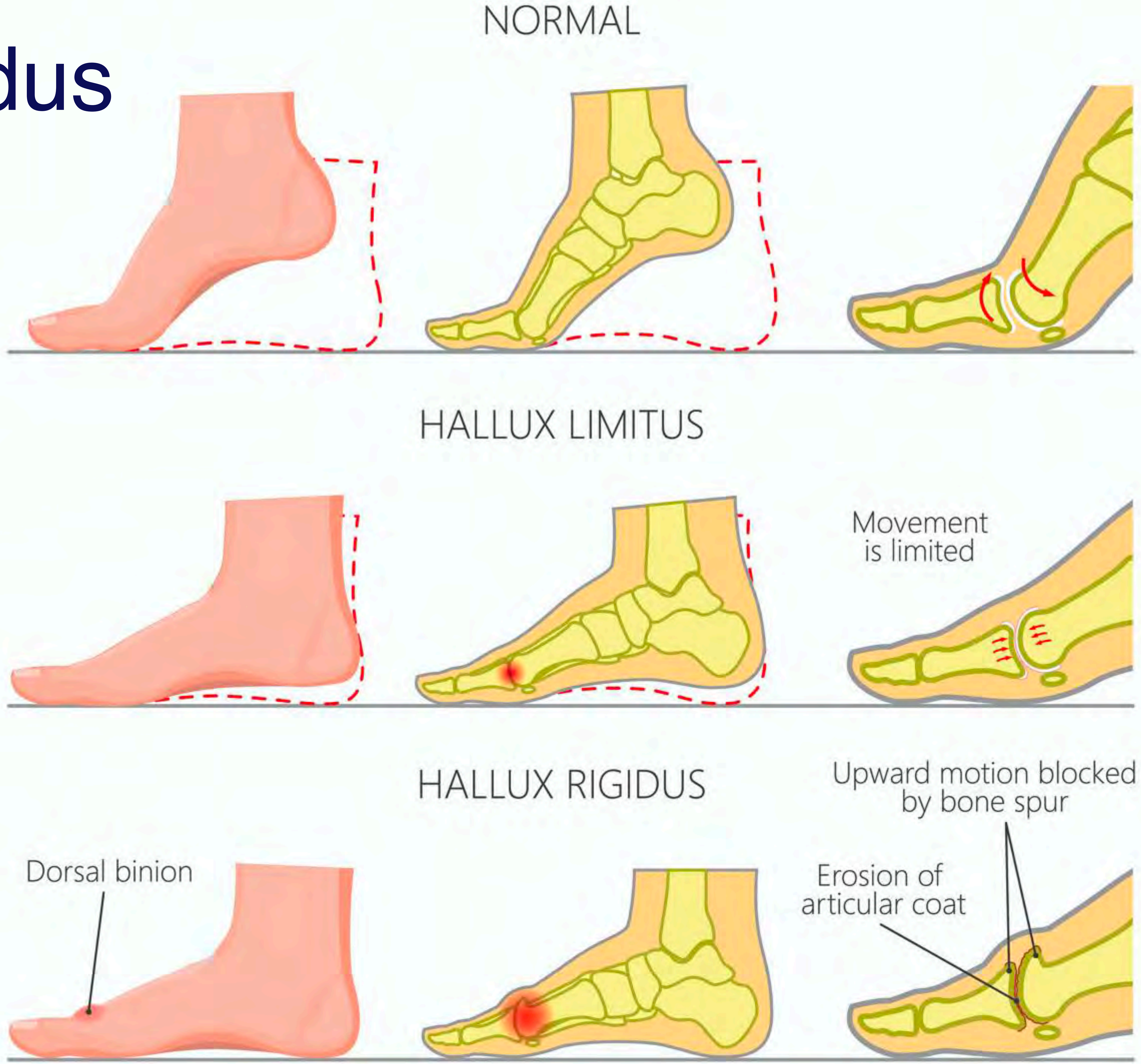
Achilles Tendonitis: Tx

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



Hallux Limitus/Rigidus





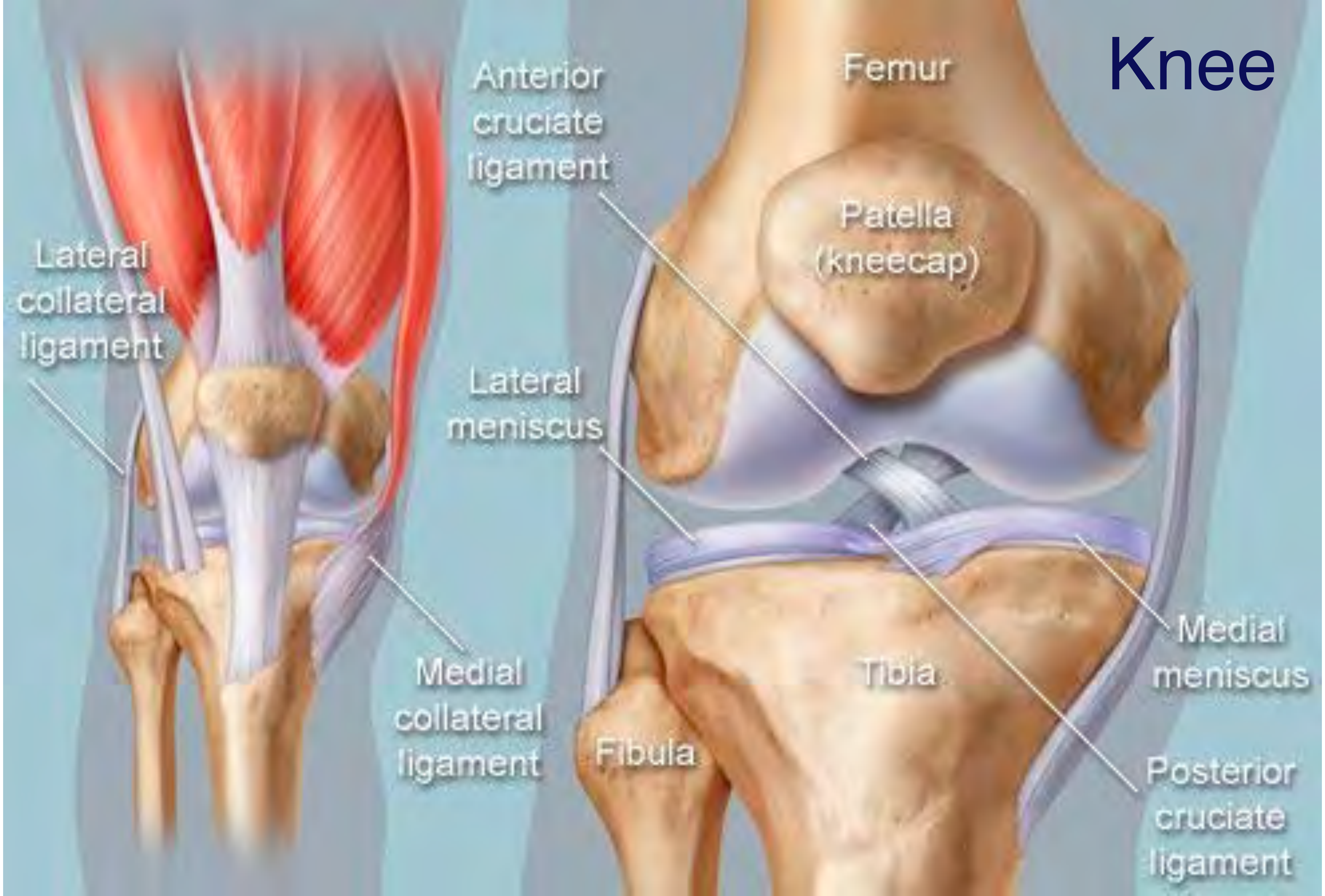
FOOT LEVELERS

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.

FOOT LEVELERS

Knee



FOOT LEVELERS

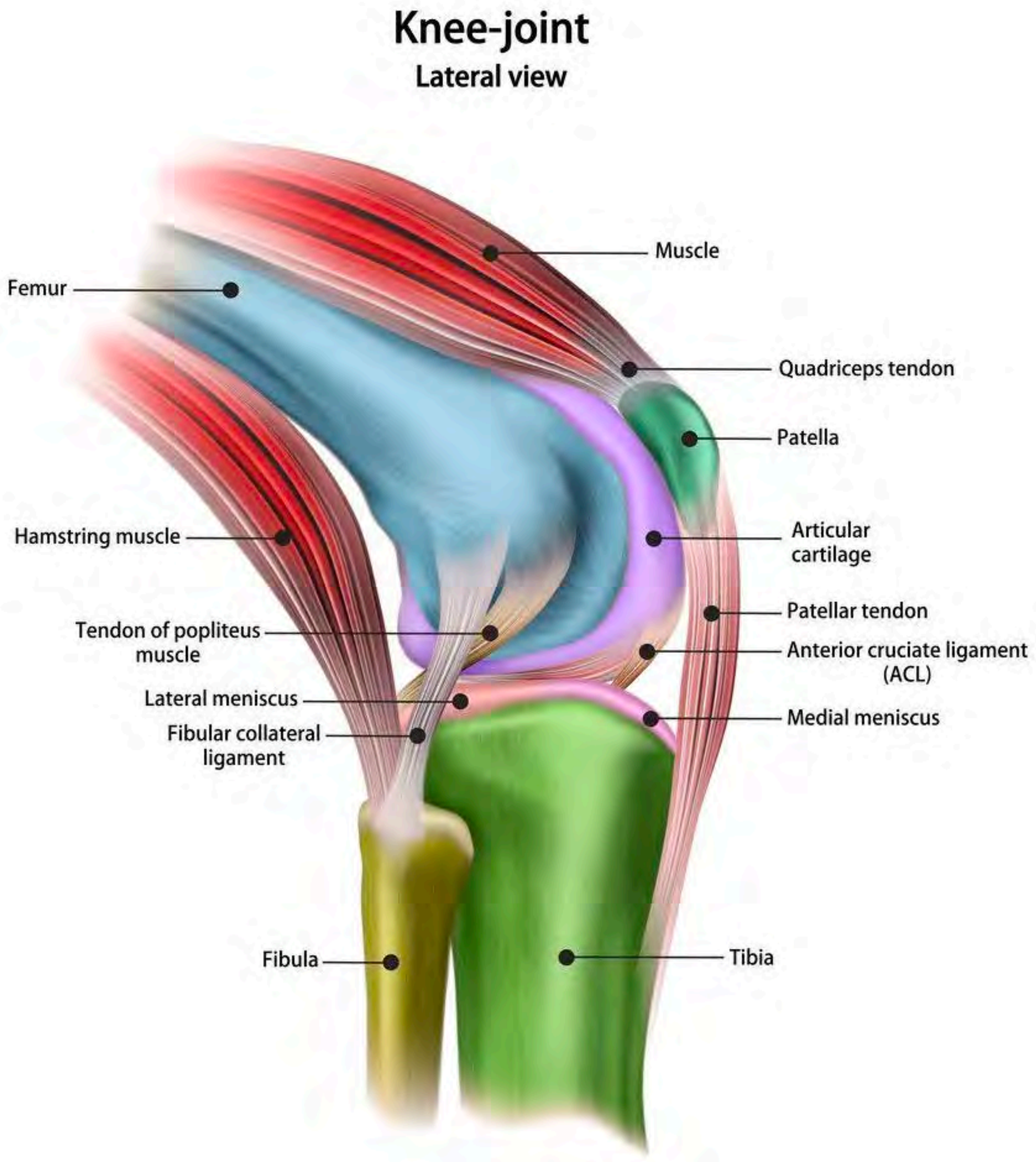
Joints of the Knee

One joint is between the femur and tibia **(tibiofemoral joint)**.

One is between the femur and patella **(patellofemoral joint)**.

Modified hinge joint allows flexion/ extension and slight internal/ external rotation.

At birth, the patella is formed from cartilage, which ossifies ages 3-5.




Femur
(thighbone)
The lateral collateral ligament (LCL) runs on the outside of your knee. It limits sideways motion.
Articular cartilage lines the bones, cushioning your joint.
Patella
(kneecap)
The anterior cruciate ligament (ACL) connects the femur to the tibia in the center of your knee. It limits rotation and the forward motion of the tibia.
The medial collateral ligament (MCL) runs down the inside of your knee joint. It connects the femur to the tibia and limits the sideways motion of your knee.
The meniscus is cartilage that absorbs shock in your joint.
The posterior cruciate ligament (PCL) also connects the femur and tibia. It limits backward motion of the tibia.
Tibia
(shinbone)
FOOT LEVELERS

Knee Movements

- **Flexion** : these muscles produce flexion :
  Biceps femoris , Semitendinosus , Semimembranosus , Gracilis, Sartorius , Popliteus .

~ Flexion is limited by the contact of the back of the leg with the thigh .

- **Extension** : by the Quadriceps femoris .

~ Extension is limited by the tension of all the ligaments of the joint .

- **Medial Rotation** : by the Sartorius , Gracilis , Semtendinosus .

- **Lateral Rotation** : by the Biceps femoris .

Screw Home Mechanism

- The **extended knee** is in **locked position**
  - **<u>medial rotation of the femur</u>** results in **a twisting and tightening of all the major ligaments of the joint**
  - The knee becomes **a mechanically rigid structure**
  - The cartilaginous **menisci are compressed like rubber cushions between the femoral and tibial condyles**

Knee

(tibiofemoral joint)

Flexion

Lateral rotation of flexed knee
(right knee)

Extension

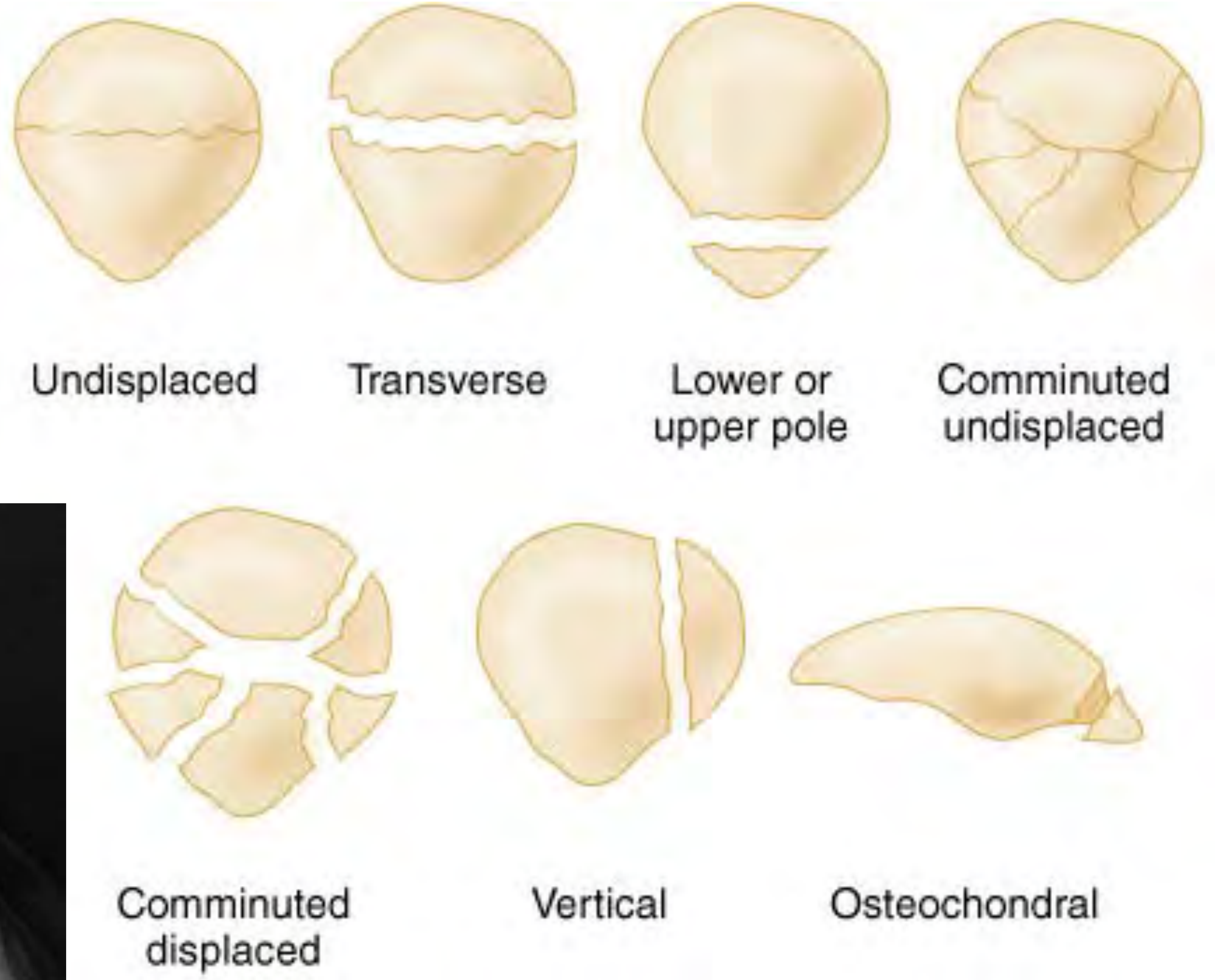
Medial rotation of flexed knee
(right knee)

COMMON KNEE CONDITIONS:

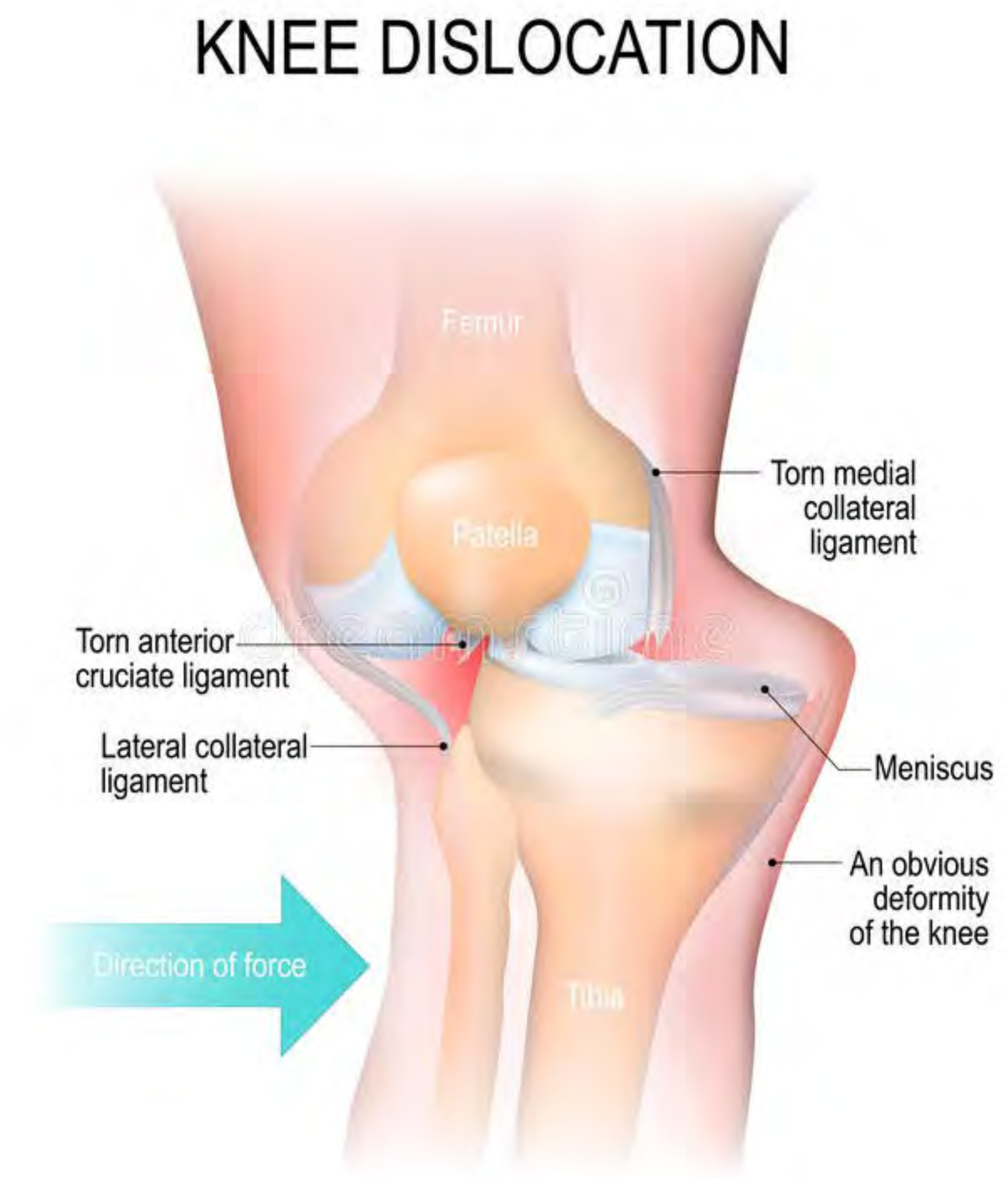
- Fracture (Patella most common)
- Dislocation
- ACL Injuries
- PCL Injuries
- Collateral Ligament Injuries
- Meniscal Tears
- Tendon Tears

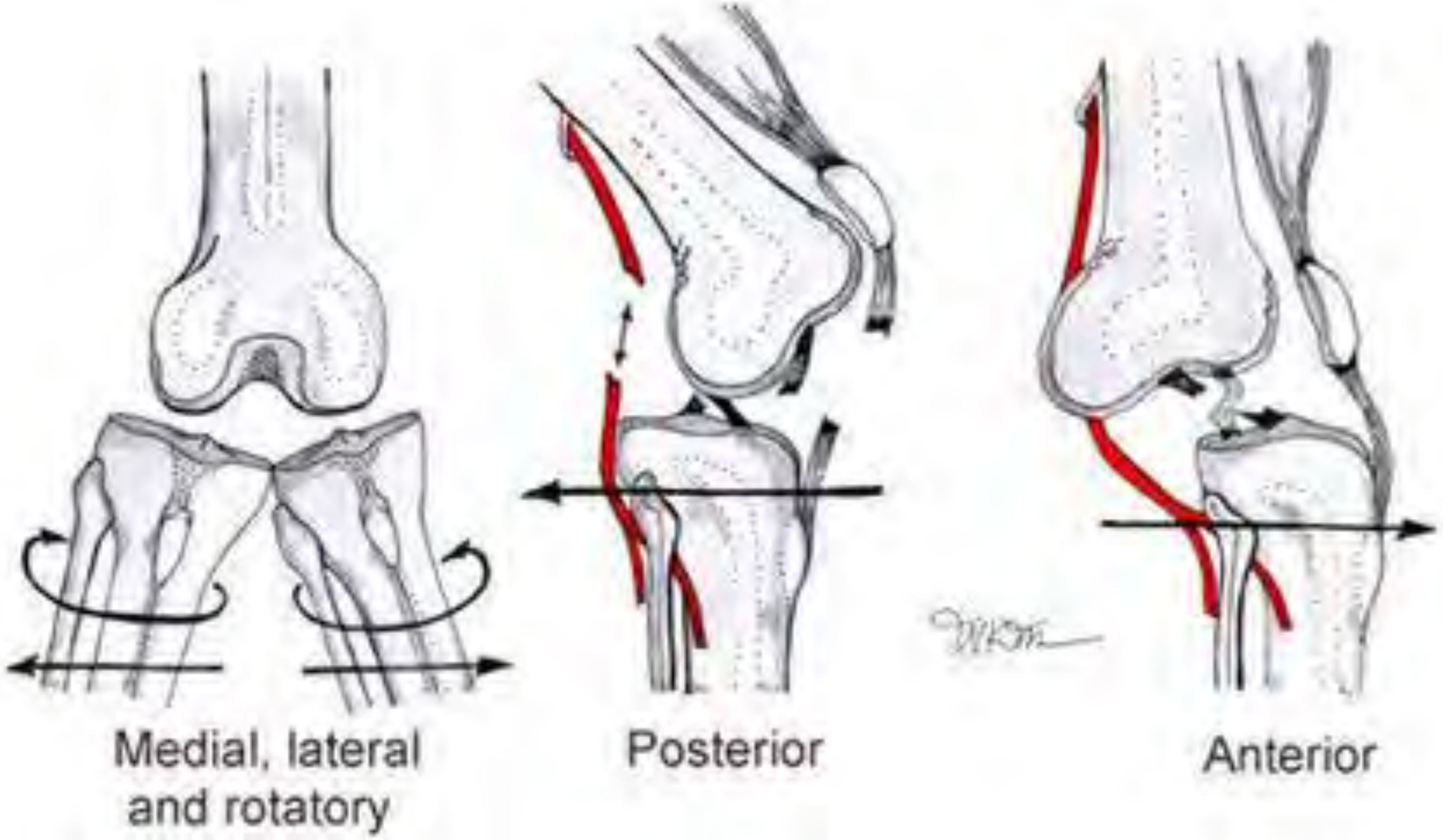
FOOT LEVELERS

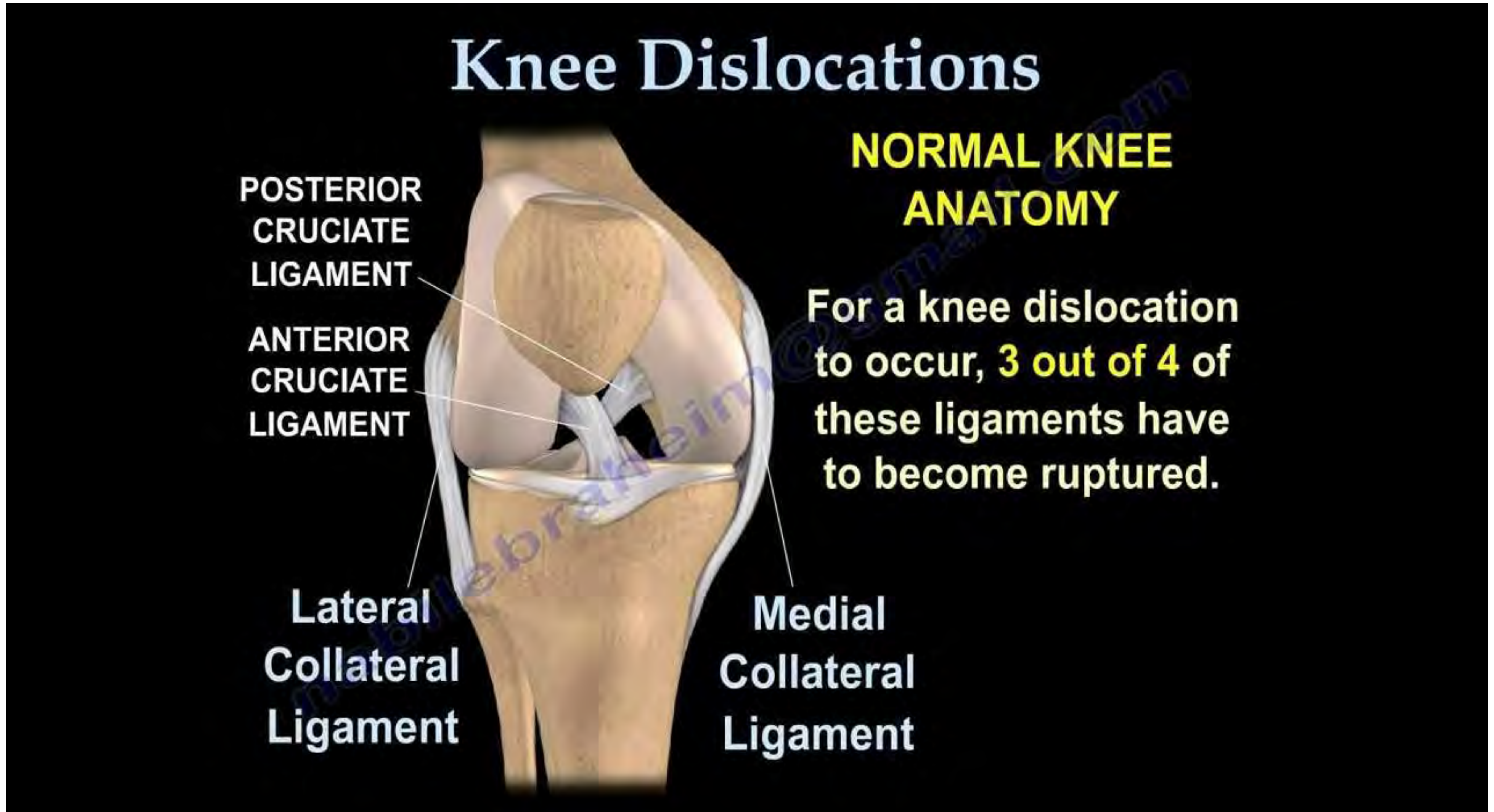
Patellar Fractures



Patellar Fx Surgery


KNEE DISLOCATION
Femur
Patella
Torn medial collateral ligament
Torn anterior cruciate ligament
Lateral collateral ligament
Meniscus
An obvious deformity of the knee
Direction of force
Tibia

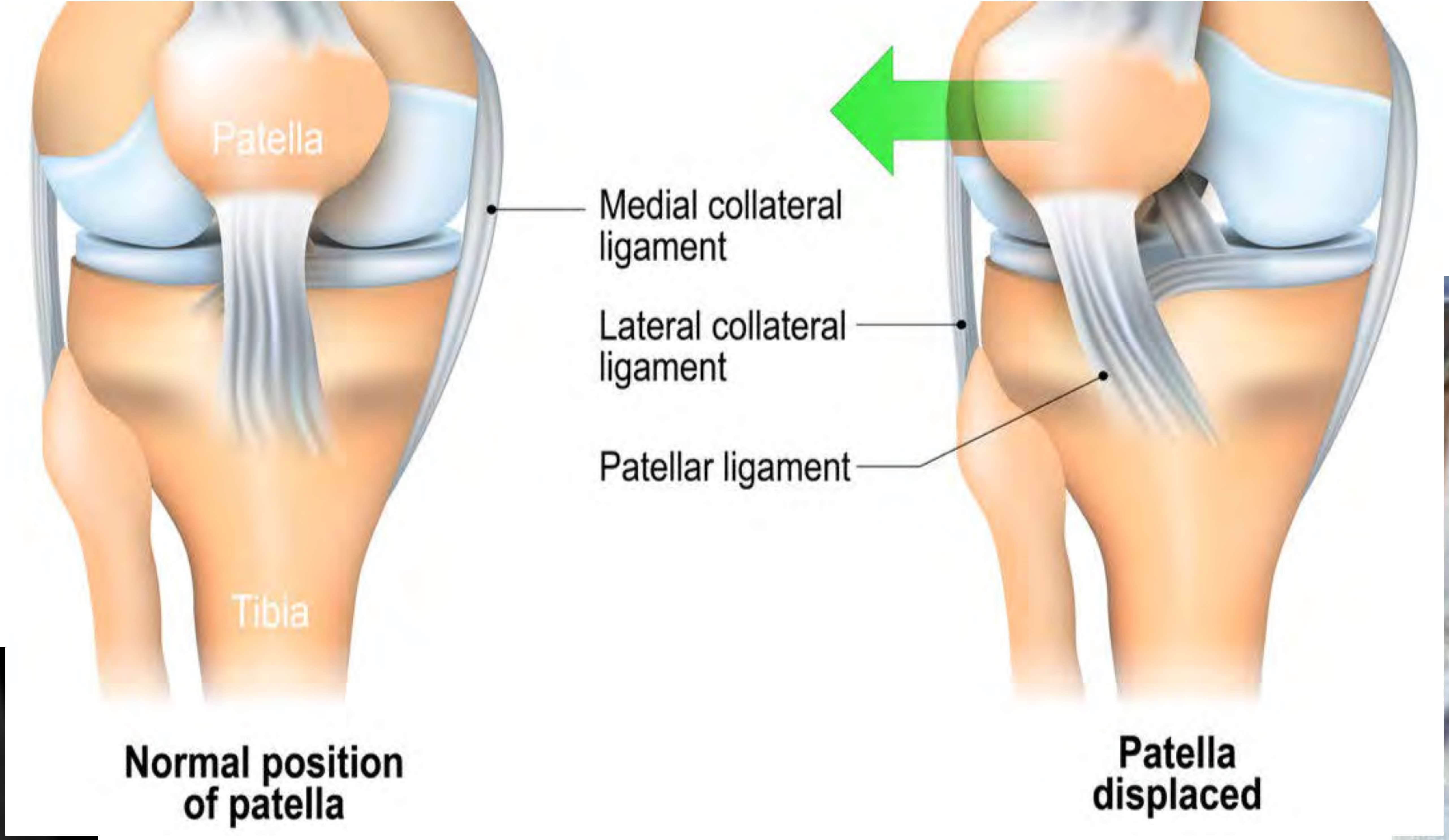

Medial, lateral and rotatory
Posterior
Anterior

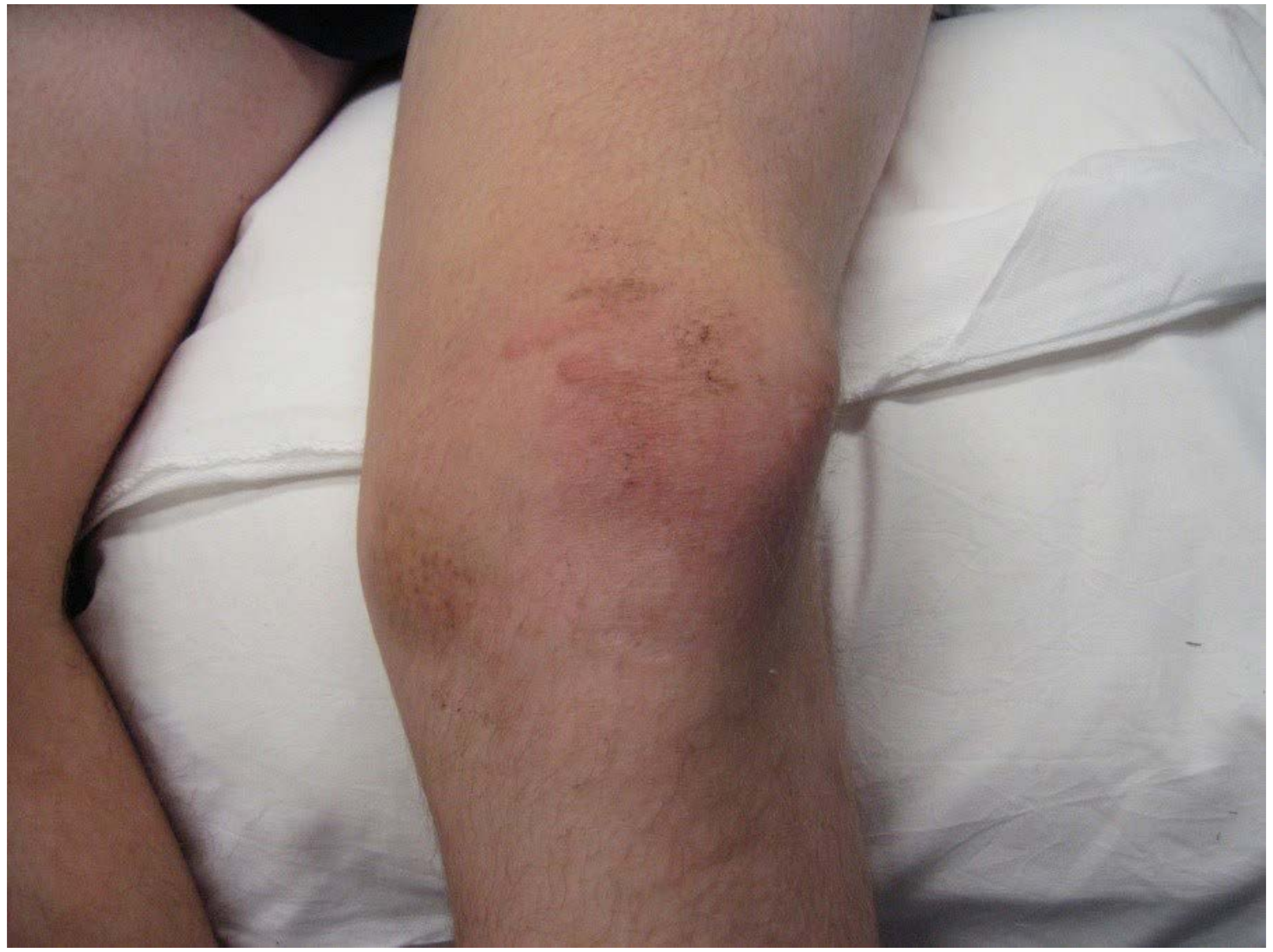

Knee Dislocations
NORMAL KNEE ANATOMY
POSTERIOR CRUCIATE LIGAMENT
ANTERIOR CRUCIATE LIGAMENT
For a knee dislocation to occur, 3 out of 4 of these ligaments have to become ruptured.
Lateral Collateral Ligament
Medial Collateral Ligament

Knee Dislocation

• FIGURE A6-2 Anterior Dislocation of the Knee
This rare injury poses a significant threat to blood vessels and nerves that transverse the knee. Immediate reduction is

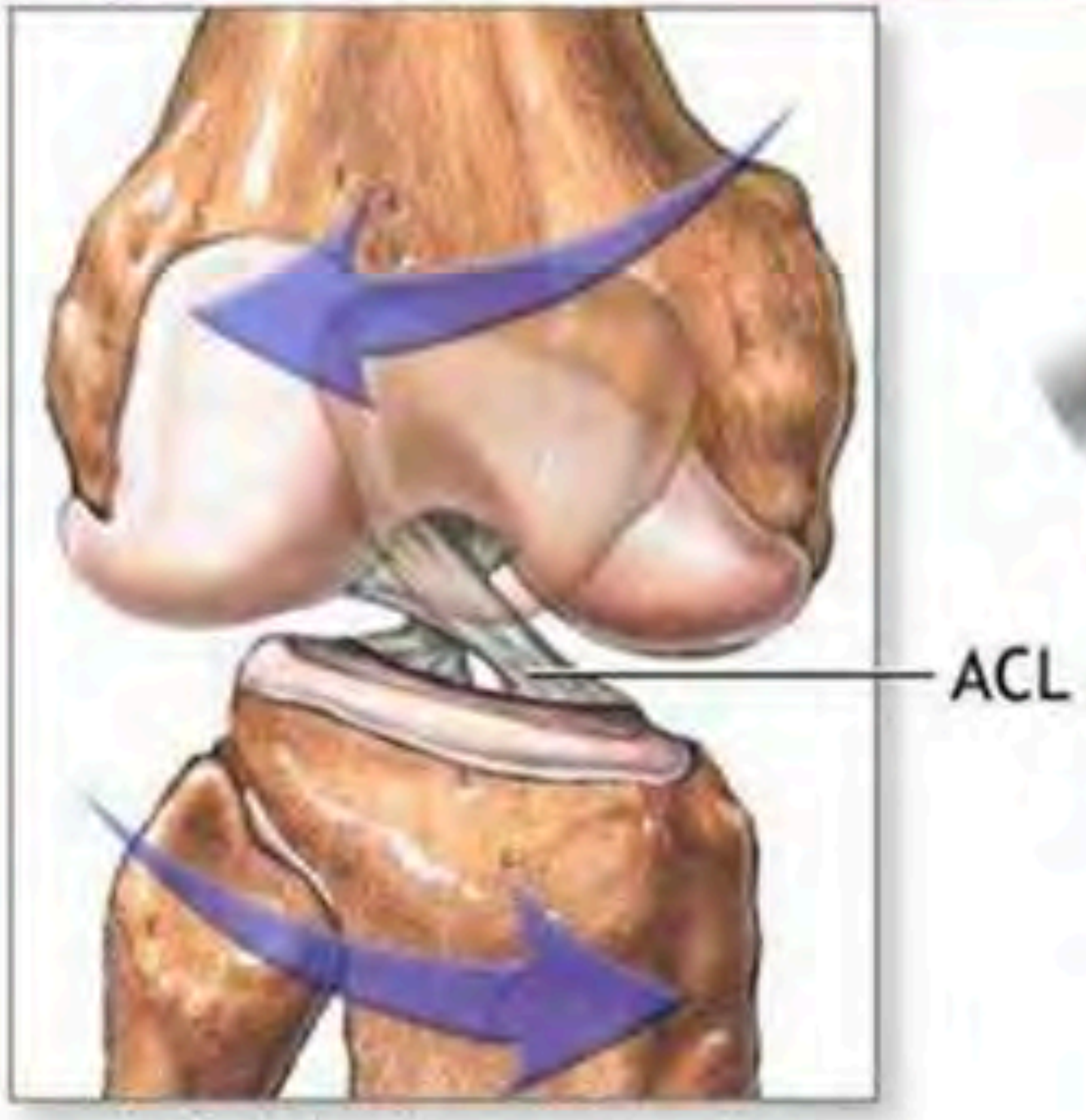
PATELLAR DISLOCATION



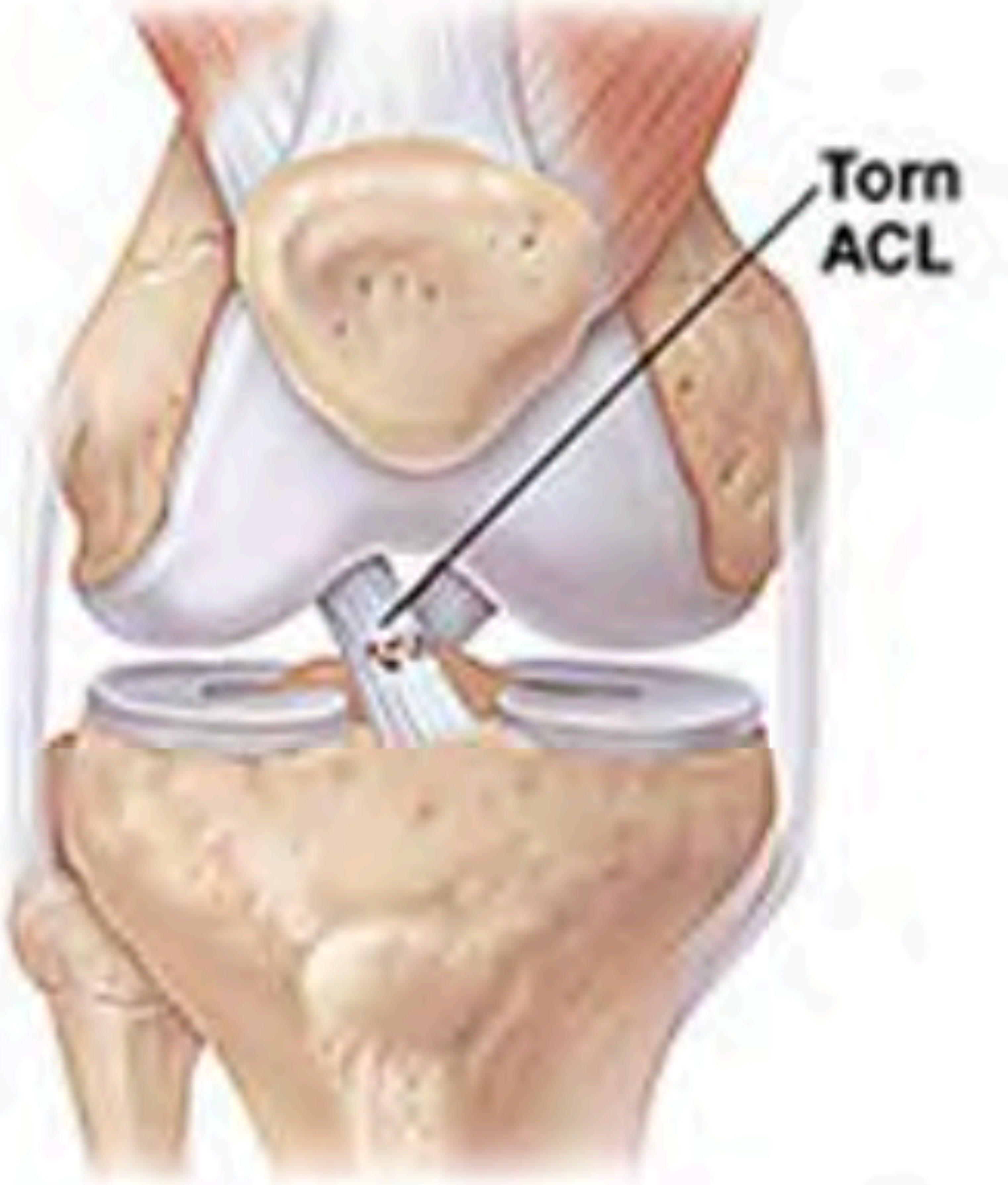


FOOT LEVELERS

Torn ACL

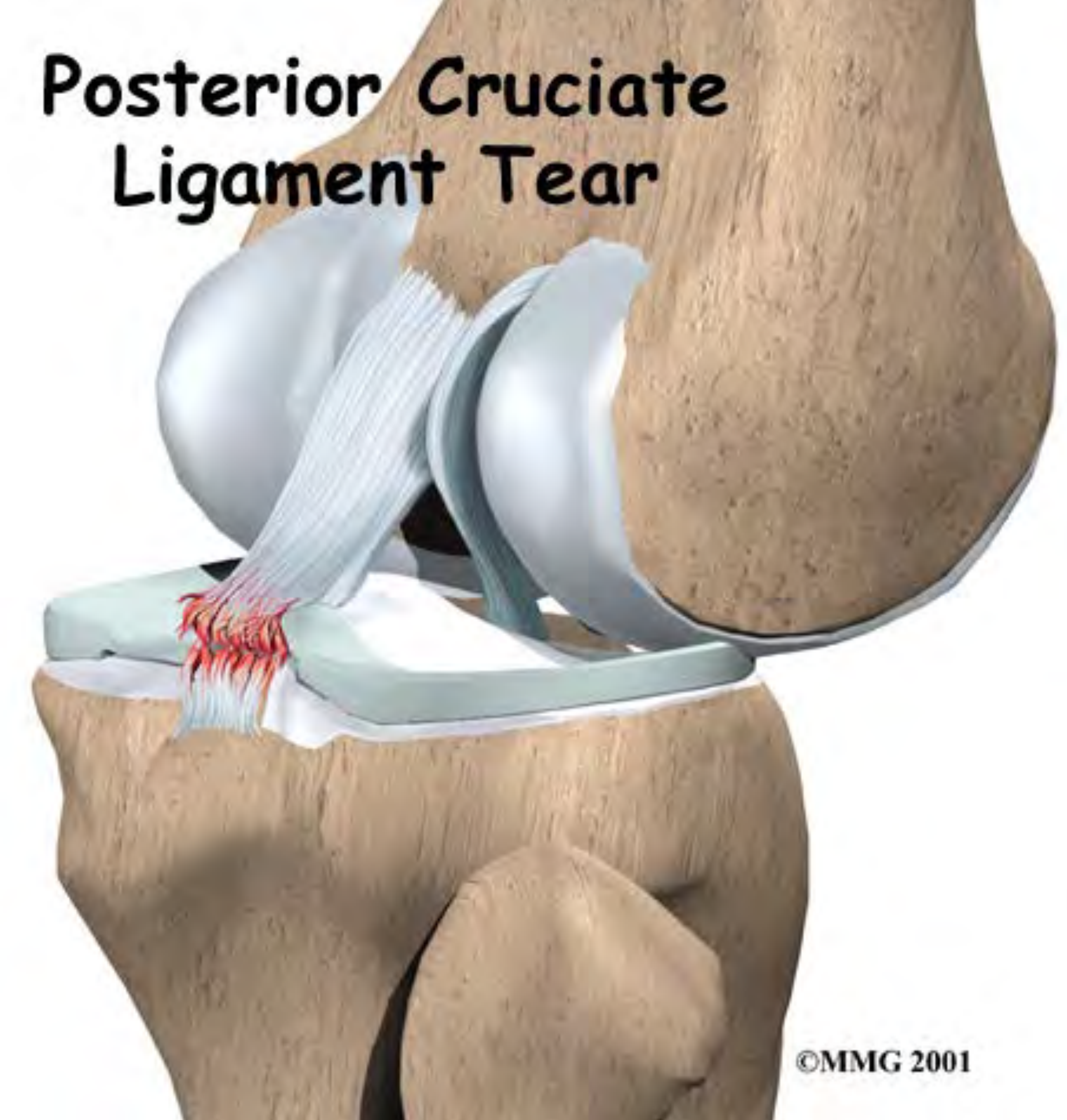


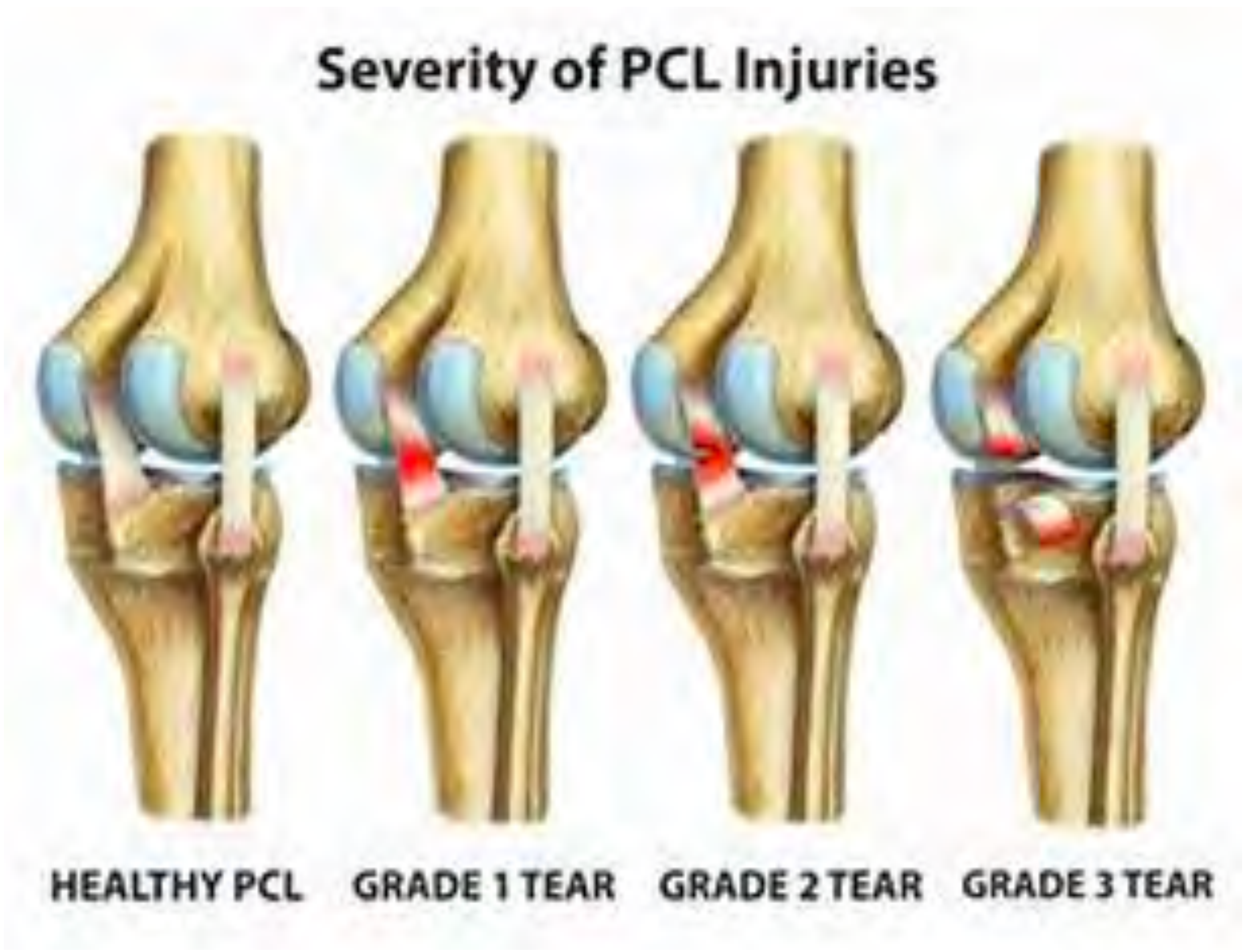
ACL injuries occur when bones of the leg twist in opposite directions under full body weight



- The injury may occur with or without contact. Women have an increased risk of **ACL** injury because of differences in anatomy, muscle mass, and training. **Symptoms** of **ACL tear** include hearing a loud pop as the ligament **tears**, pain, knee swelling, and difficulty walking

Posterior Cruciate Ligament Tear

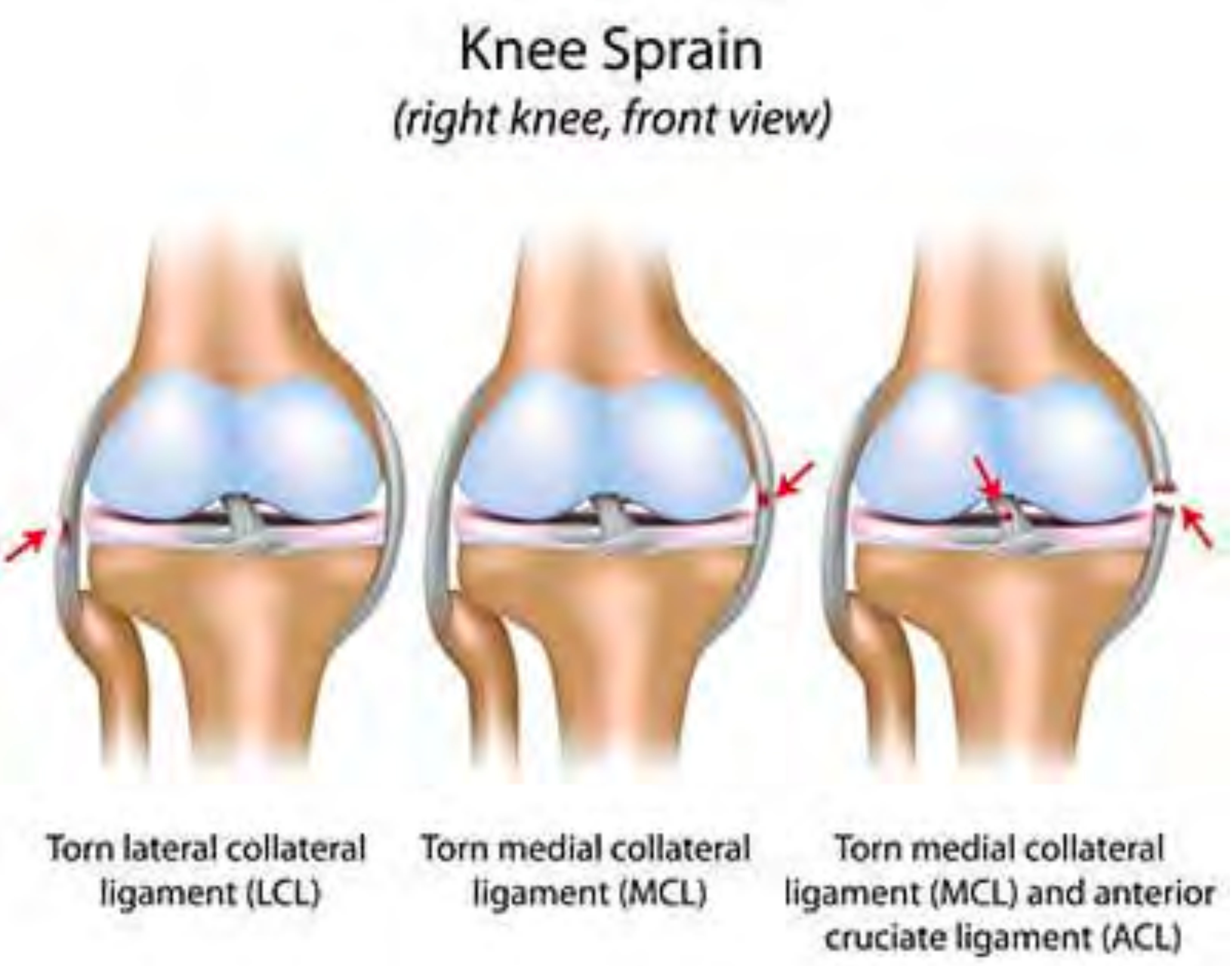


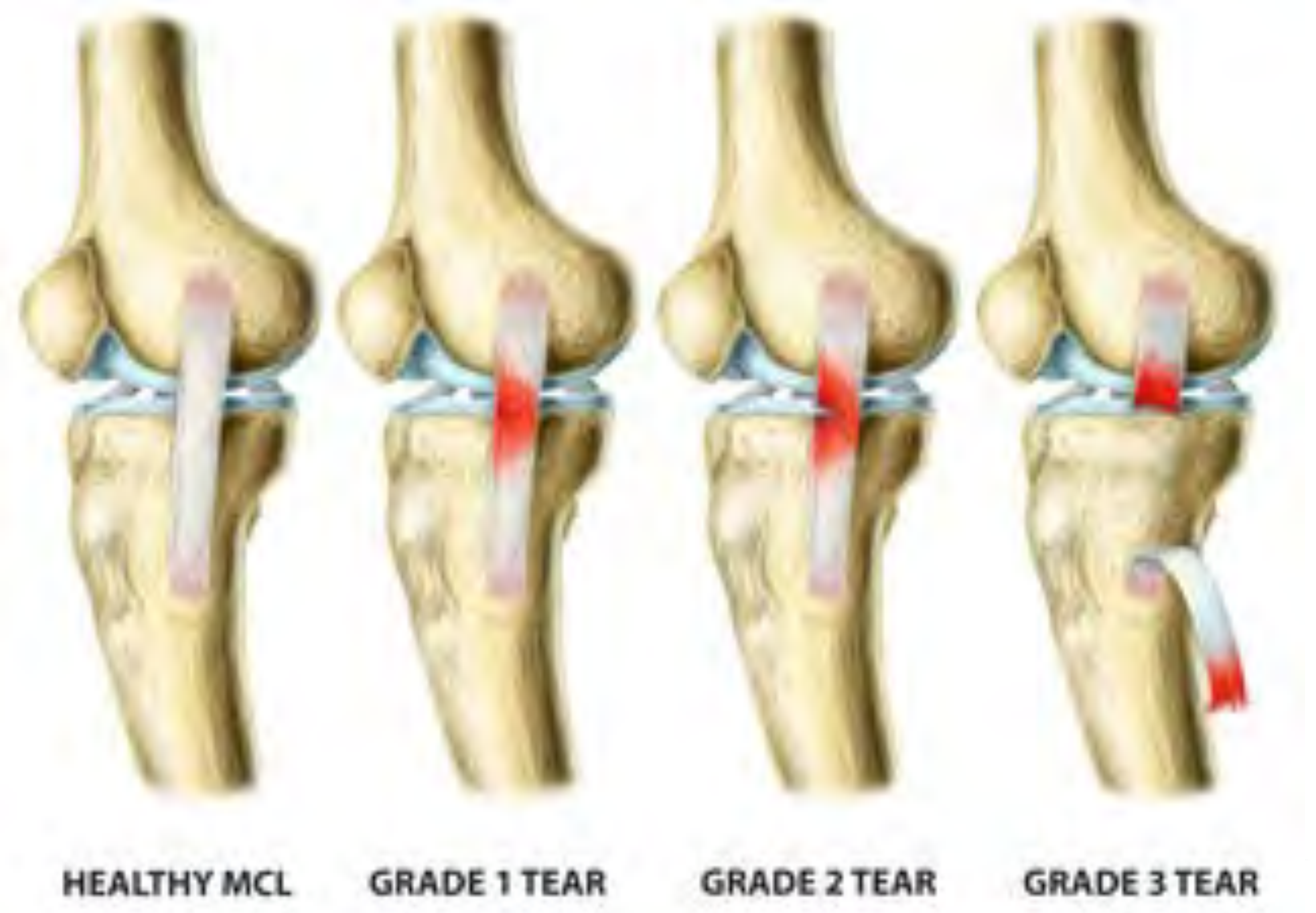


FOOT LEVELERS

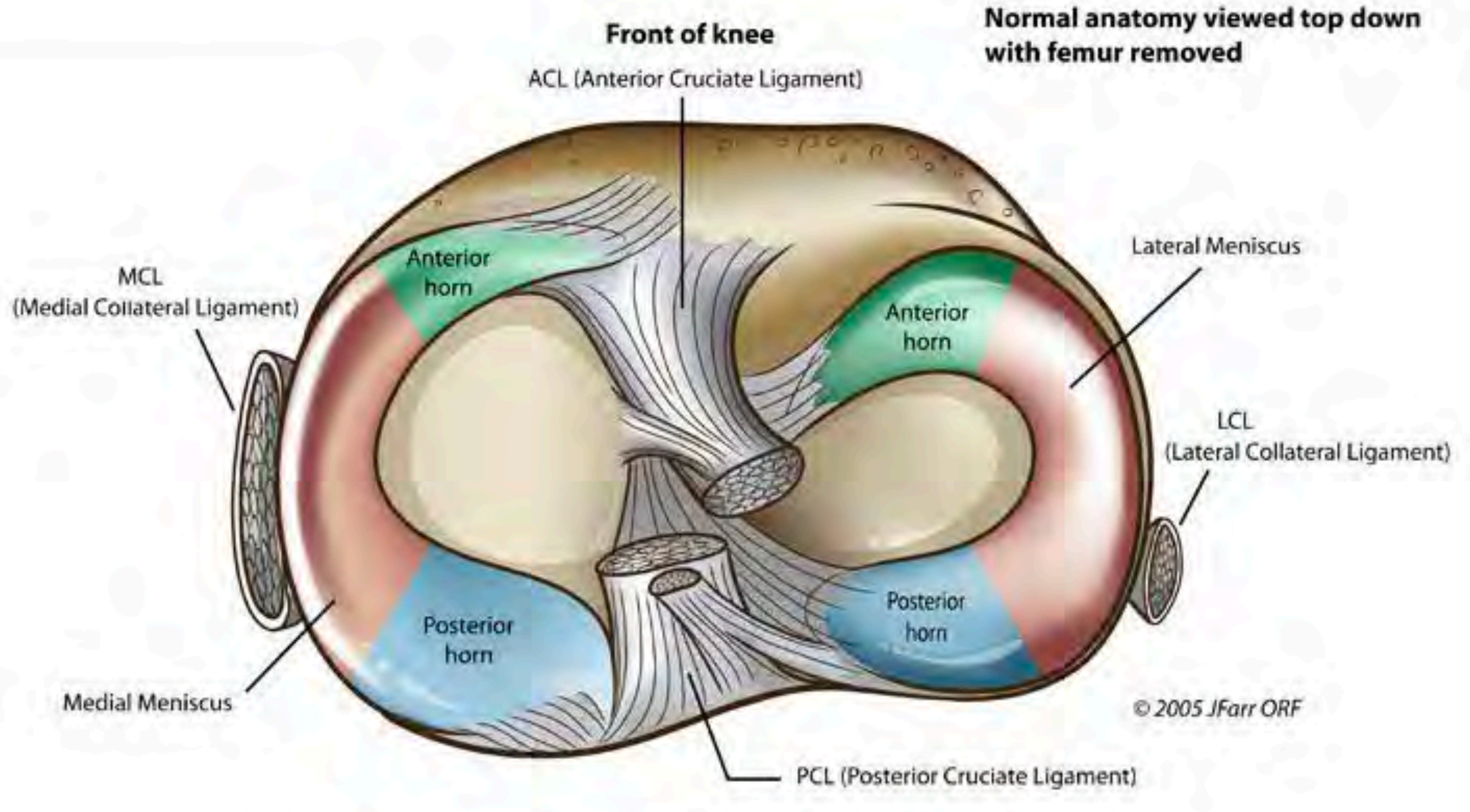

TEAR OF THE POSTERIOR CRUCIATE LIGAMENT (PCL)
BACK VIEW OF STRAIGHT KNEE
The PCL is intact
Partial tear of the PCL
Complete tear of the PCL
Femur
Posterior cruciate ligament
Anterior cruciate ligament
Fibula
Medial collateral ligament
Lateral collateral ligament
Tibia
Femur
Fibula
Tibia
Femur
Fibula
Tibia

Collateral Ligament Tears





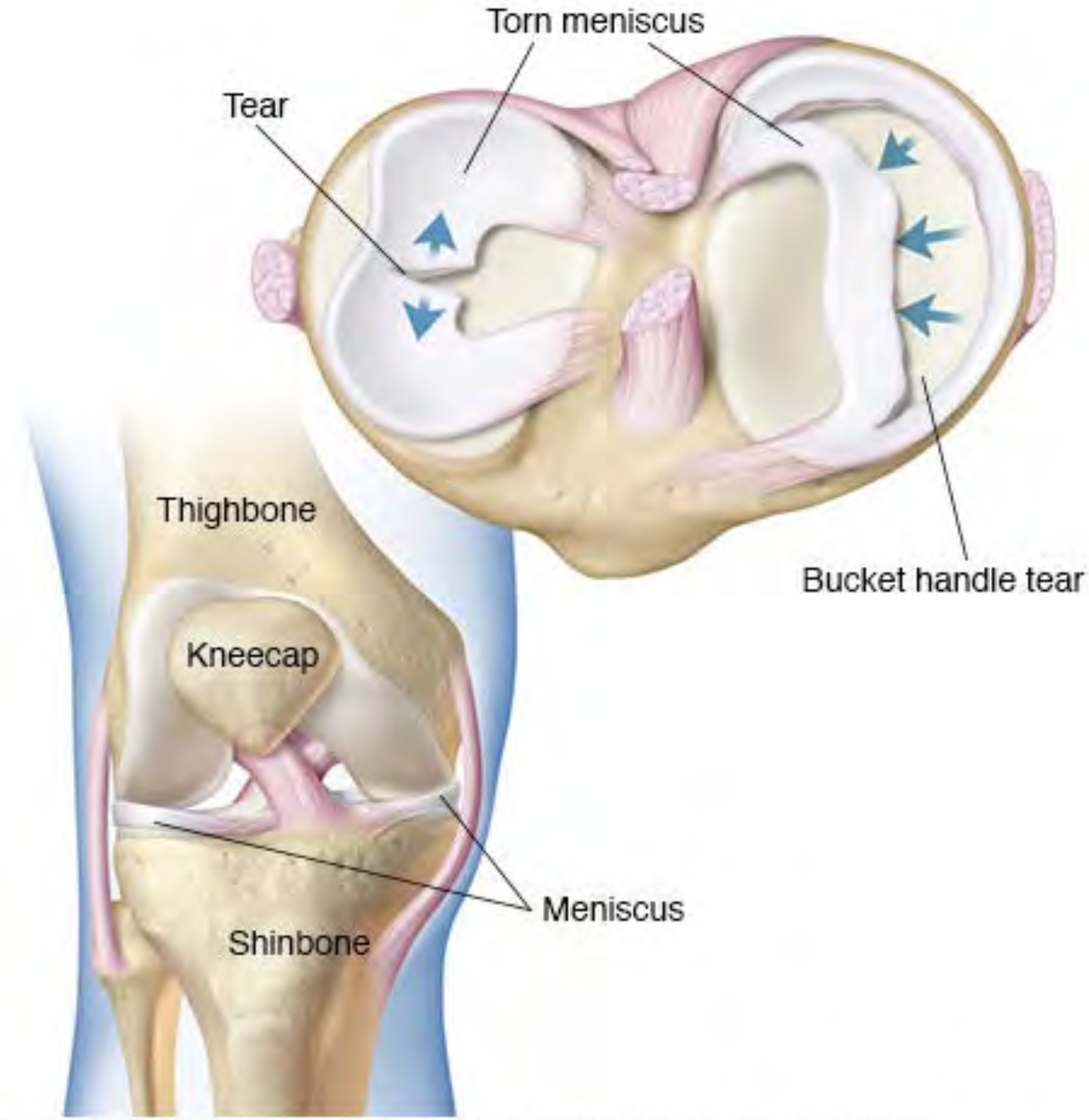
Meniscus:



* Primary function is to transmit loads and reduce stress on the tibiofemoral joint.

* 98% of people with with ACL insufficiency will have a meniscal injury.
* Injuries are found more commonly in people age 20<.
* Non contact forces are the most frequent MOI.

FOOT LEVELERS



Meniscus Injuries:

* Non-contact forces are the most frequent mechanism of injury

* Patients over 40 can get “acute” symptoms with no active MOI.

* In acute meniscal injuries, swelling occurs 6-24 hours later.

FOOT LEVELERS

Prevalence of Meniscal Lesion

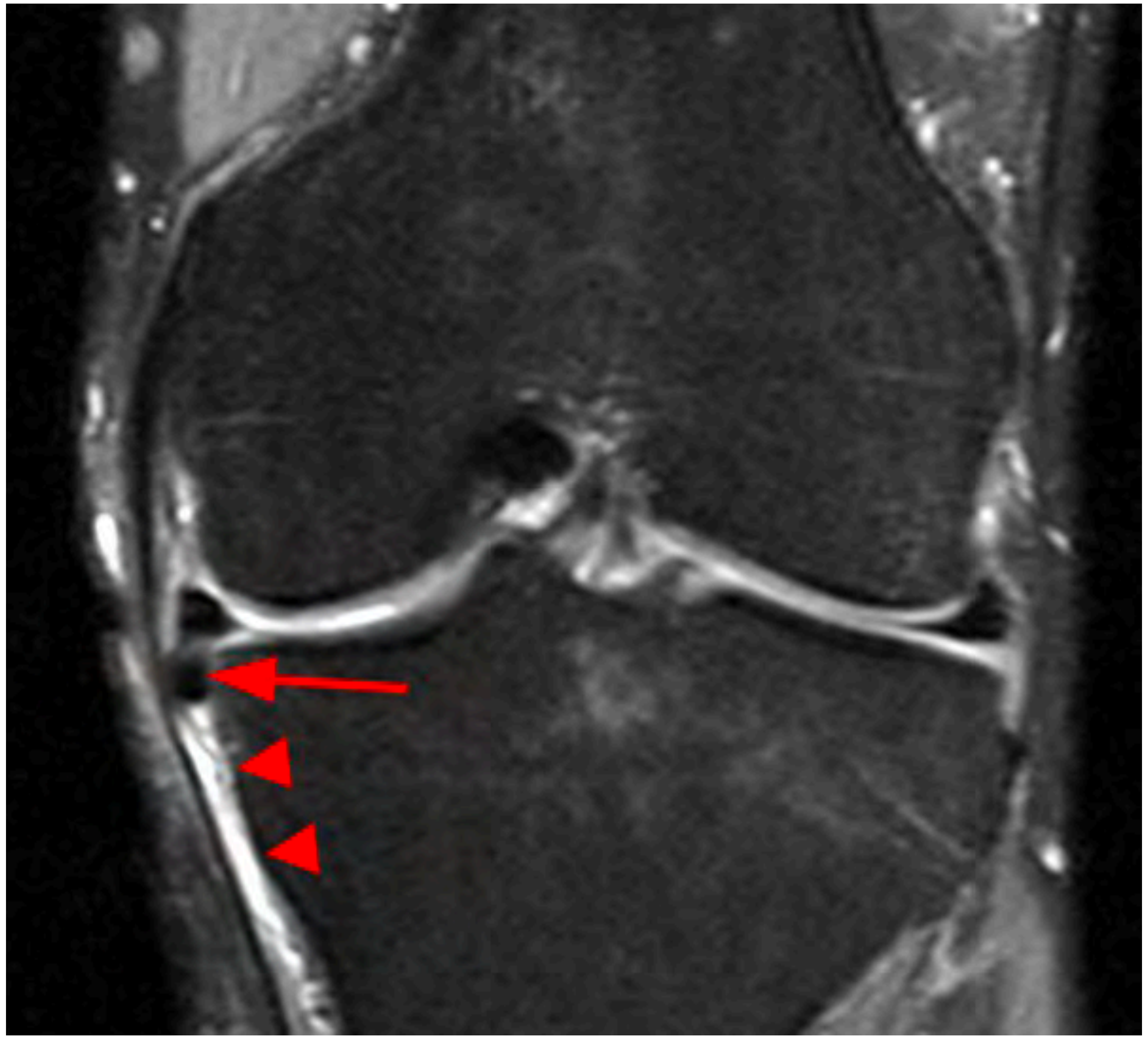
Age of Patient	Prevalence
50-59	25%
60-69	35%
70-79	45%
Patients with OA	75-95 %

* Melissa McDonald, DC, CCSP, Northwestern University of Health Sciences
*

FOOT LEVELERS

Meniscal Injury S & S's:

* General knee pain
* Insidious swelling
* Locking of knee
* Joint line tenderness



Displaced meniscal flap tears are when a fragment of torn meniscus displaces into the recess between the proximal tibia and the adjacent knee capsule and soft tissues.

It commonly occurs after a defined traumatic incident (such as a twisting injury), but may also occur with no clear traumatic mechanism.

Displaced tears have a higher likelihood of needing surgery. Patients report that their knee gets "weak" or "gives way" all of a sudden.

FOOT LEVELERS

Orthopedic Testing:

- Joint line tenderness palpated with knee flexed at 45-90 degrees.
- Knee pain with squatting (hyper flexion)

McMurray Test

For Meniscus Pathology

Flex and extend the knee

- In tibial IR - biases lateral meniscus
- In tibial ER - biased medial meniscus

Positive Test: Pain or audible click

- Sensitivity, 55%
  - Medial meniscus, 50%
  - Lateral meniscus, 21%
- Specificity, 77%
  - Medial meniscus, 77%
  - Lateral meniscus, 94%

Logerstedt DS, Scalzitti DA, Bennell KL, et al. Knee Pain and Mobility Impairments: Meniscal and Articular Cartilage Lesions Revision 2018. J Orthop Sports Phys Ther. 2018

Thessaly Test

For Meniscus Pathology

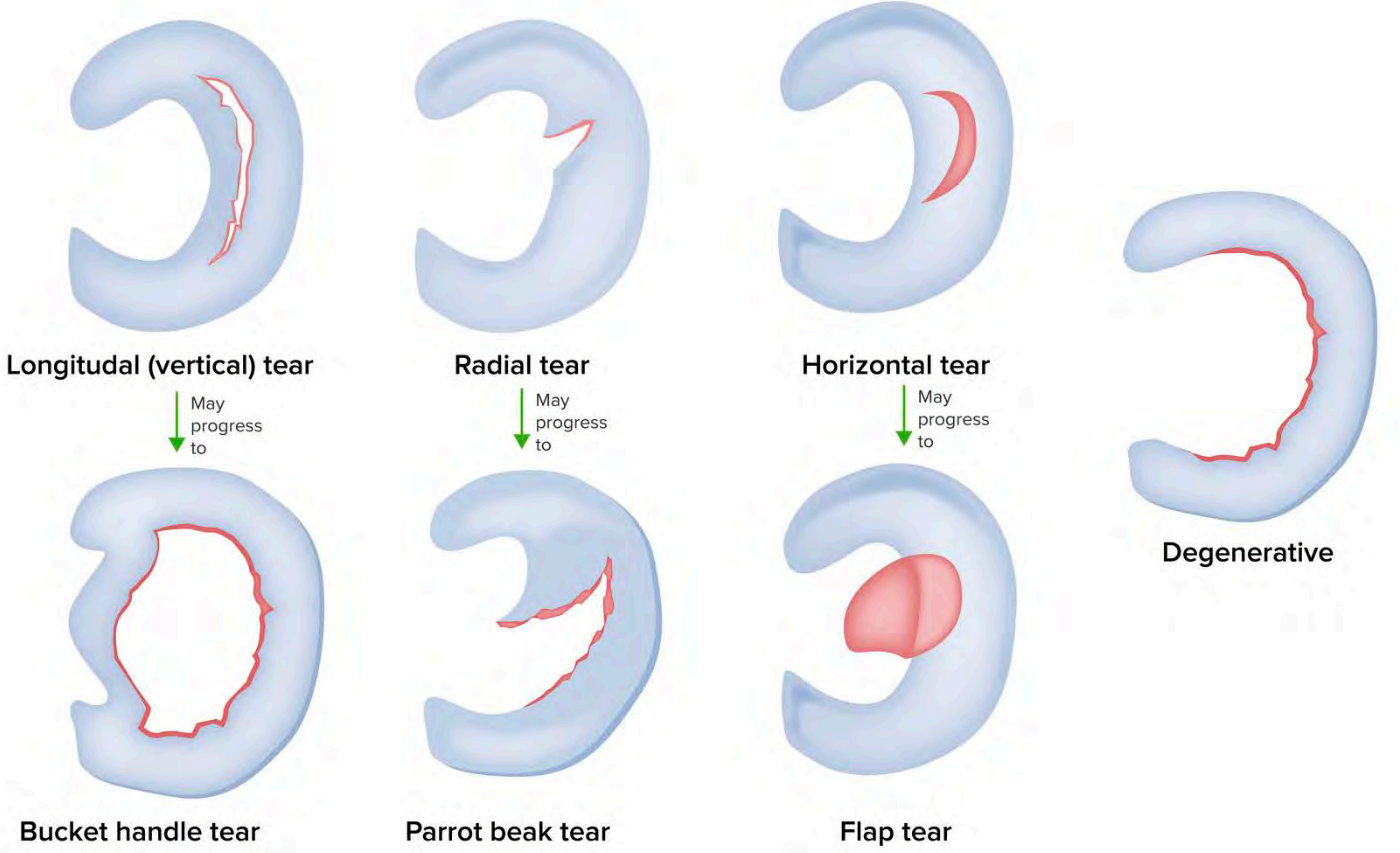
In single leg balance and 20 degrees knee flexion

- Rotate medially
- Rotate laterally

Positive Test: Discomfort or sense of locking / catching in knee over medial or lateral joint line

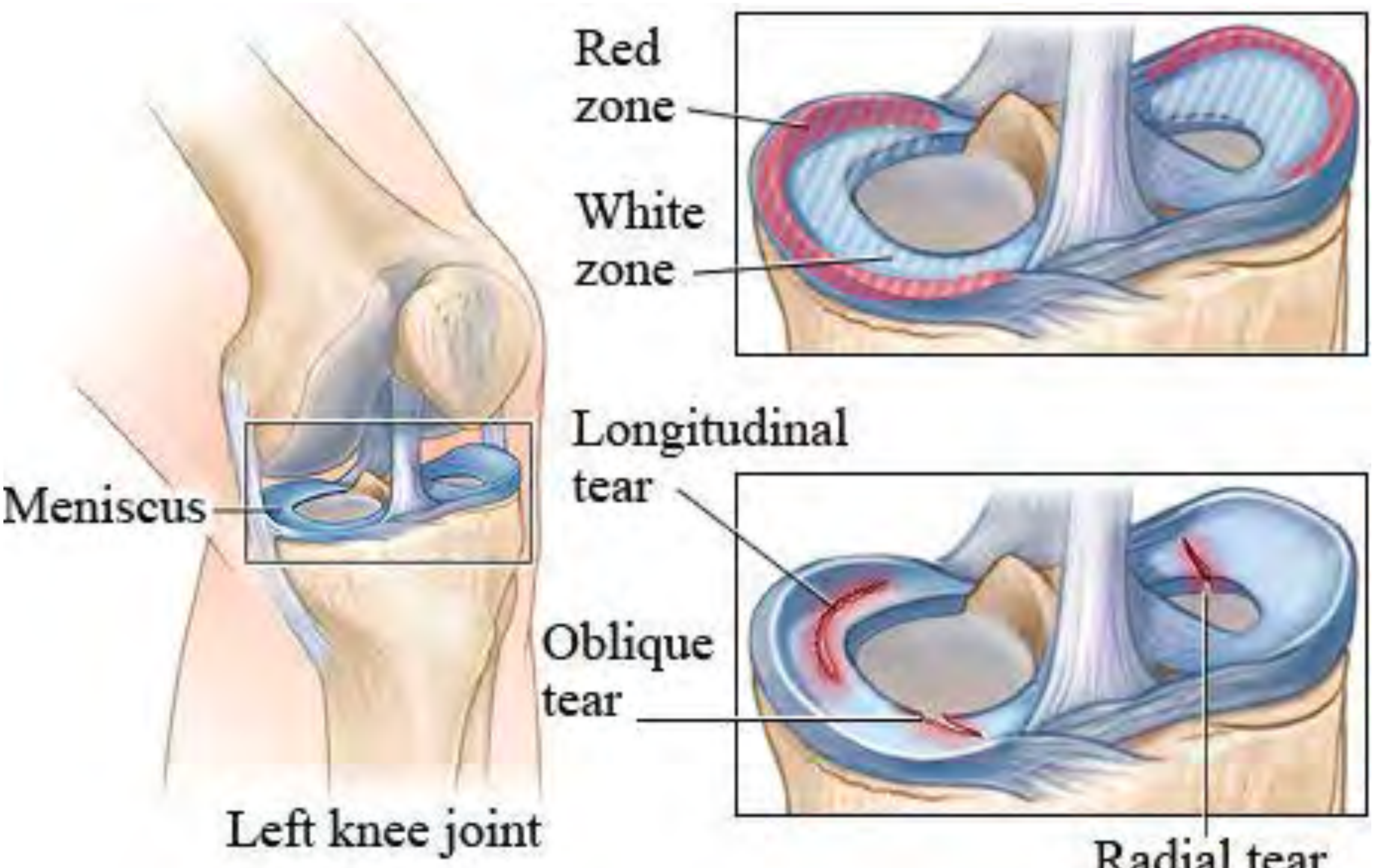
- Sensitivity, 76%
  - Medial meniscus, 83%
  - Lateral meniscus, 68%
- Specificity, 77%
  - Medial meniscus, 76%
  - Lateral meniscus, 97%

Logerstedt DS, Scalzitti DA, Bennell KL, et al. Knee Pain and Mobility Impairments: Meniscal and Articular Cartilage Lesions Revision 2018. J Orthop Sports Phys Ther. 2018



FOOT LEVELERS

Meniscus Injuries



FOOT LEVELERS

Surgery vs Rehab

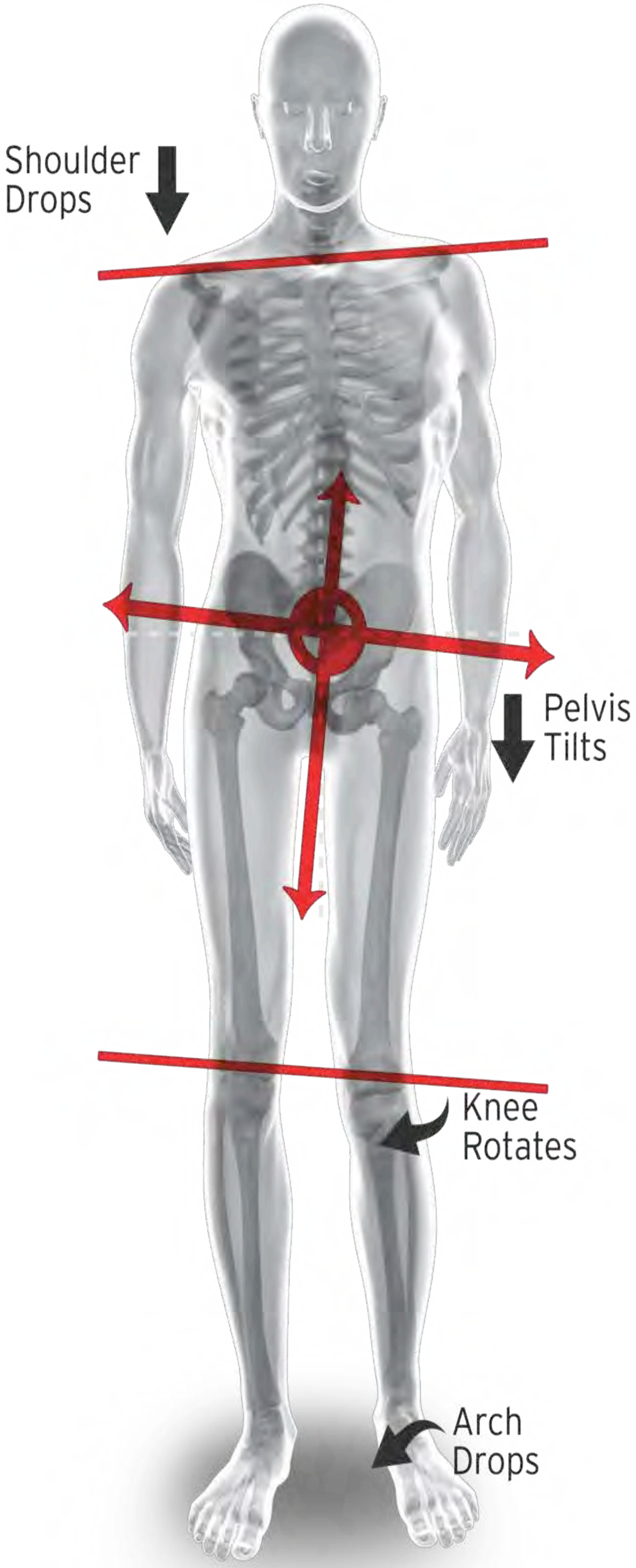
Non-Surgical Success	Indicates Surgery
Symptoms develop over 24-48 hours following injury	Severe twisting injury, athlete is unable to continue playing
Minimal injury or no recall of specific injury	Locked knee or severely restricted ROM
Able to weight-bare	Positive McMurray test (palpable clunk)
Minimal swelling	Pain on McMurray's test with minimal knee flexion
Full ROM with pain only at end range	Presence of ACL tear
Pain on McMurray's test only in the inner range of flexion	Little improvement of clinical features after 3-6 weeks of non-surgical treatment
Previous History of rapid recovery from similar injury	
Early degenerative changes on plain radiographs	

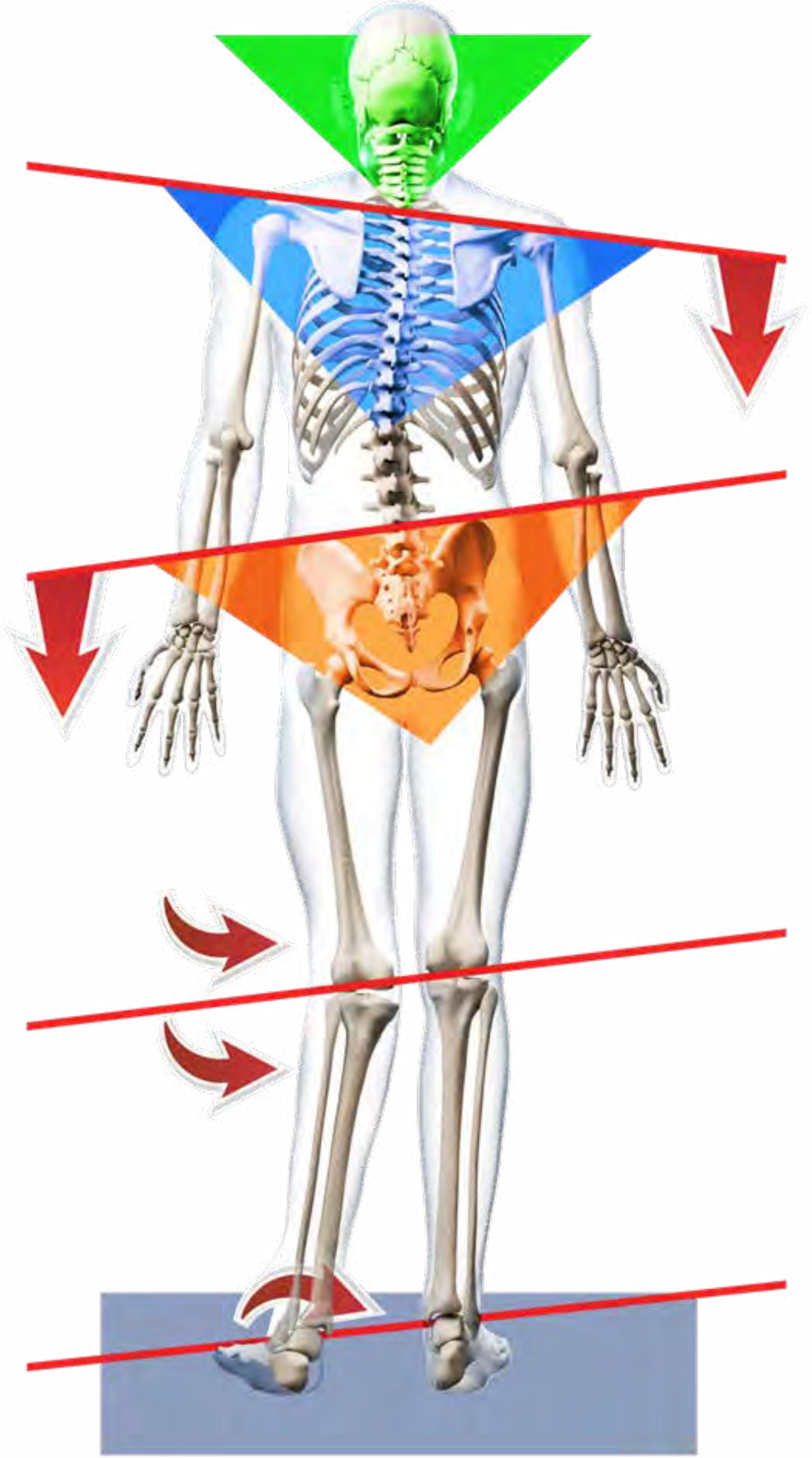
* Melissa McDonald, DC, CCSP, Northwestern University of Health Sciences

FOOT LEVELERS

Remember Over Pronation Pattern! (99% of patients)

- Feet excessively pronate/flatten
- Ankles turn in/drop
- tibia/femur internally over-rotate
- Medial knee stress due to torsion and compression of the tibia, femur bones.

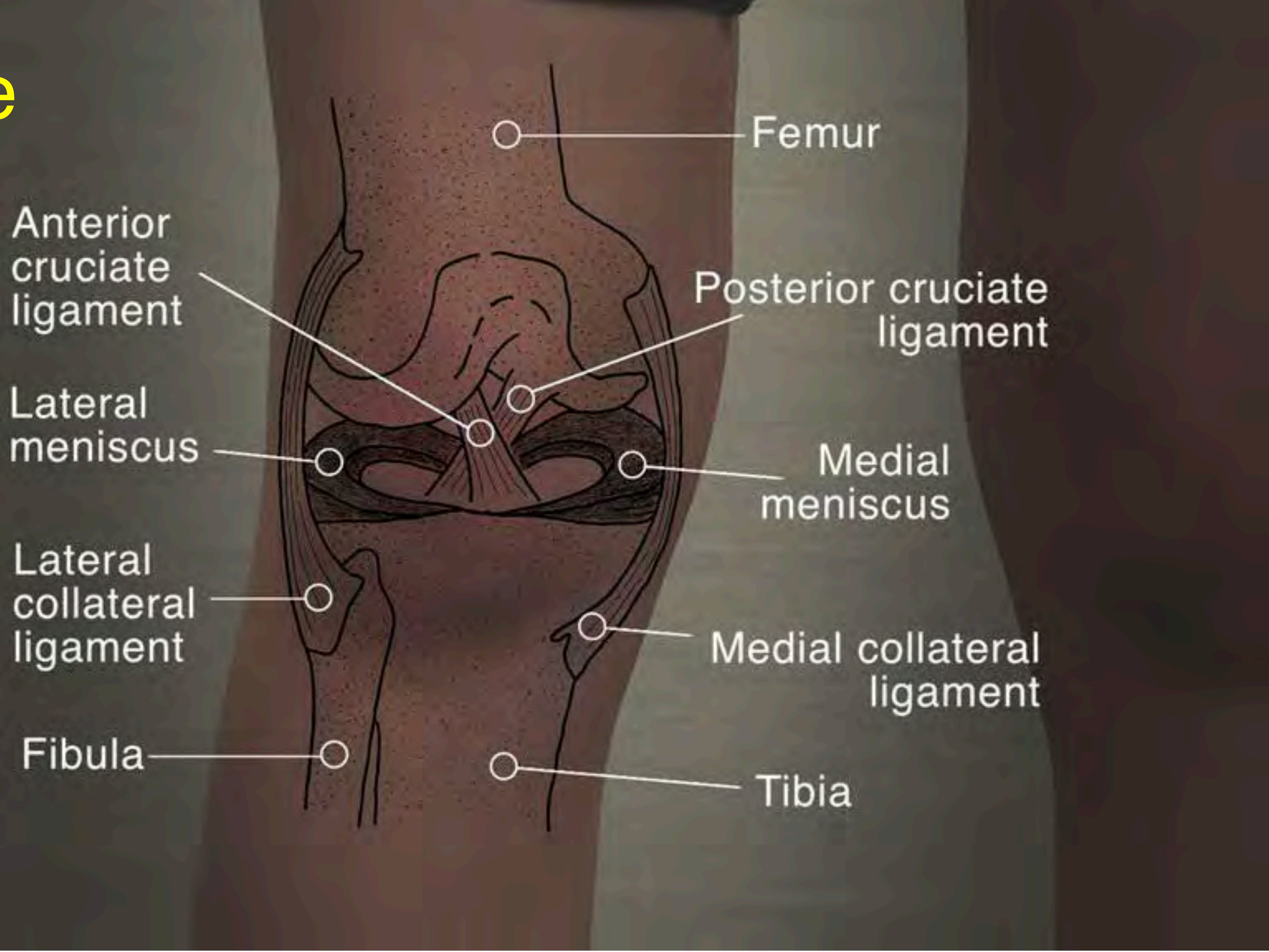




FOOT LEVELERS


Partner Up!

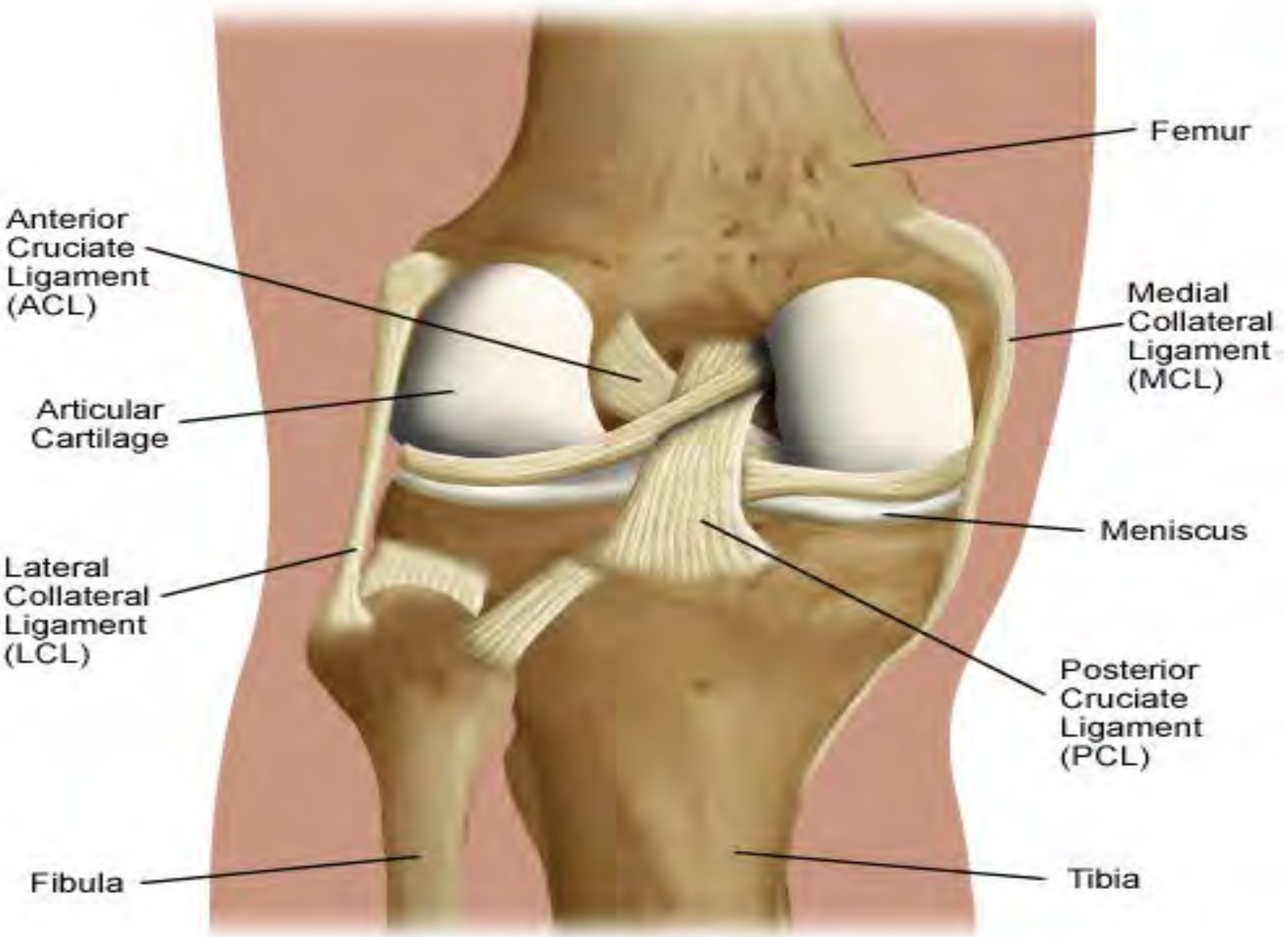
Right Knee



Femur
Anterior cruciate ligament
Posterior cruciate ligament
Lateral meniscus
Medial meniscus
Lateral collateral ligament
Medial collateral ligament
Fibula
Tibia

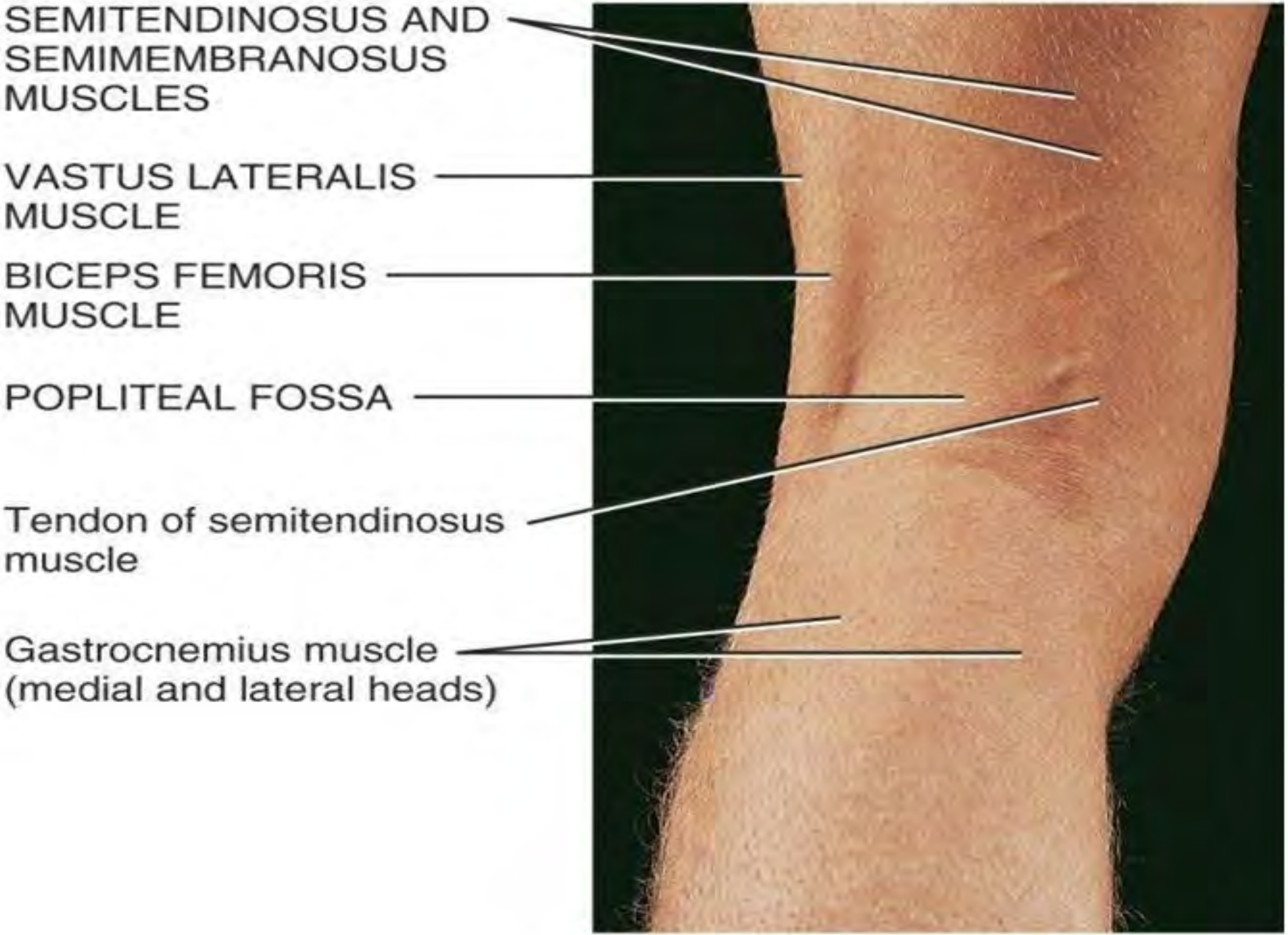

Right knee clinical anatomy
Quadriceps
Patella
Lateral Joint Line
Petellar Tendon
Fibular Side (actual bony prominence not visible)
Medial Joint Line
Anterior Tibial Tuberosity
Tibia

Knee Joint Ligaments



Left Knee From Behind

FOOT LEVELERS


SEMITENDINOSUS AND SEMIMEMBRANOSUS MUSCLES
VASTUS LATERALIS MUSCLE
BICEPS FEMORIS MUSCLE
POPLITEAL FOSSA
Tendon of semitendinosus muscle
Gastrocnemius muscle (medial and lateral heads)

Knee Misalignments

- Tibia internal (medial) or external (lateral)
- Tibia Posterior
- Patella medial/inferior or lateral
- Fibular head posterior/ superior


Internal/External tibia
PALMER

Internal/external rotated tibia

- <u>CP:</u> thumb web contact w/ both hands stabilizing femur and tibia. Cushion under knee.
- <u>Drop table:</u> similar to manual.
- <u>Spring loaded instrument:</u>

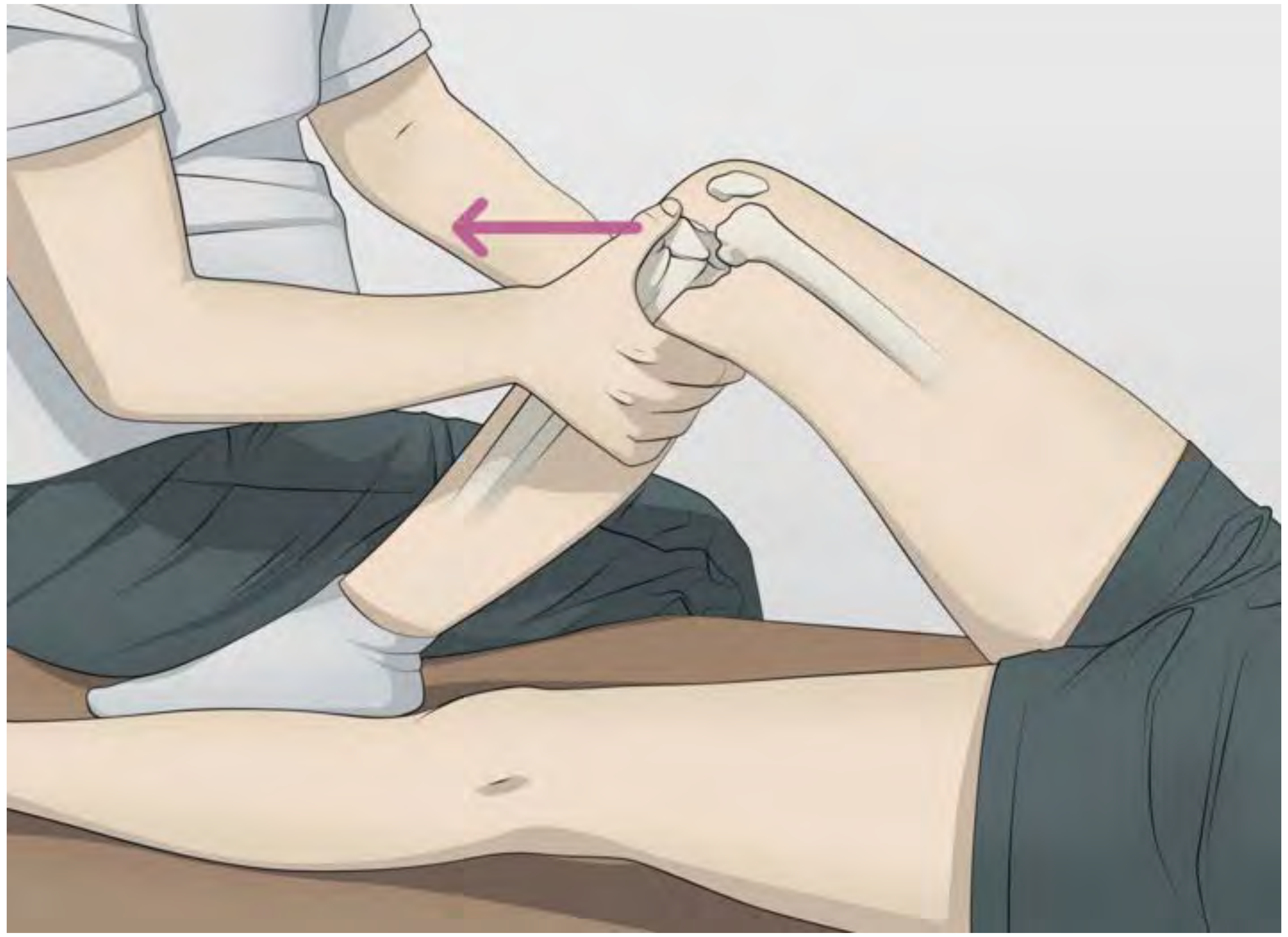
FOOT LEVELERS

Internal/External Rotated Tibia

FOOT LEVELERS

Posterior Tibia

- Supine: knee bent, interlaced fingers, slight forward tug on tibia.
- Prone: knee bent, knife edge or thumb web contact
- Drop table: same as supine or prone
- Spring loaded instrument



Fibular Head

- Anterior Fibula
- Posterior/Inferior Fibula
- Manual, Drop table, Spring loaded instrument

Medial, Inferior Patella

CP: supine with knee bent, thumb web

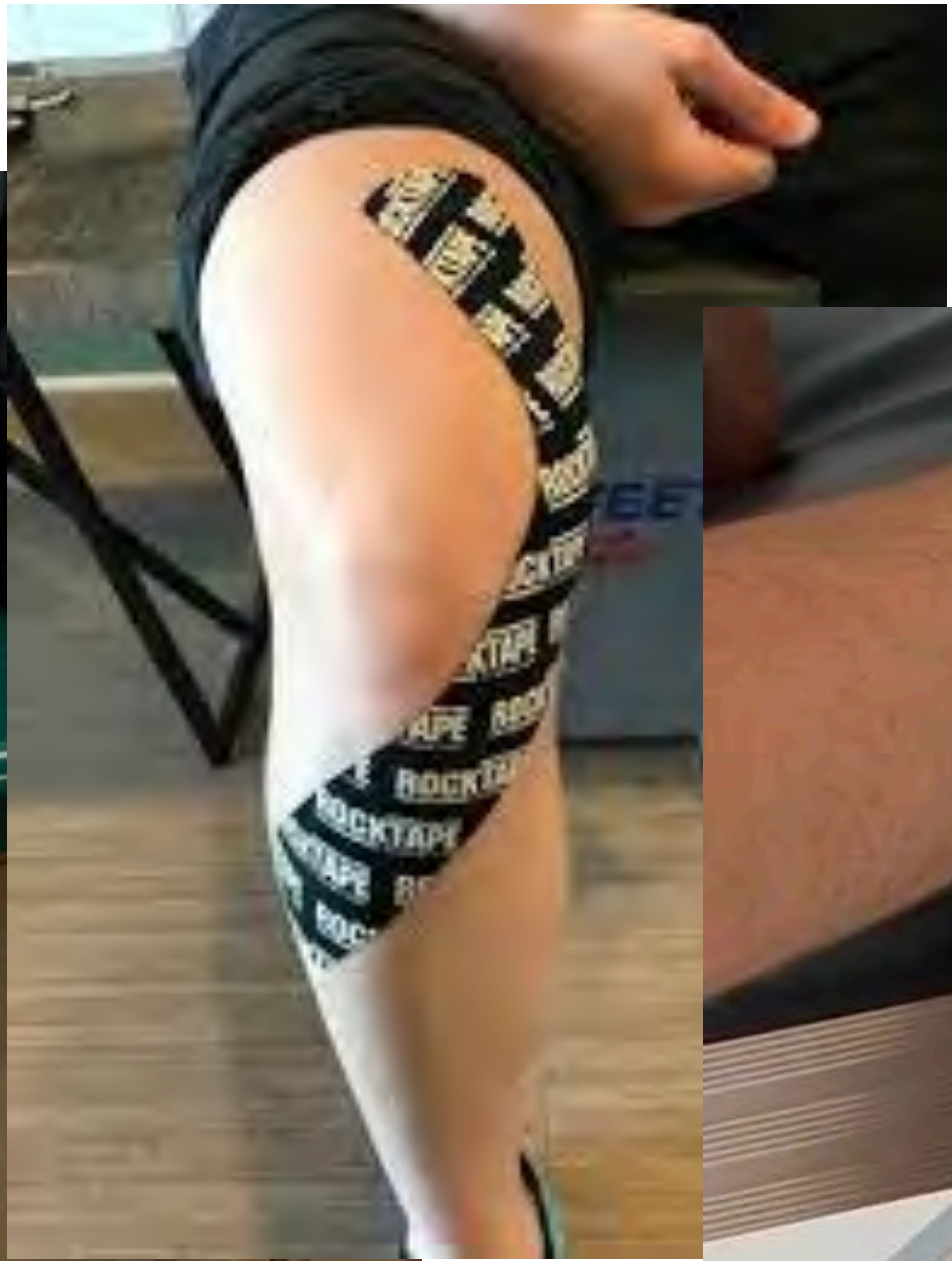
Drop table: pillow under knee

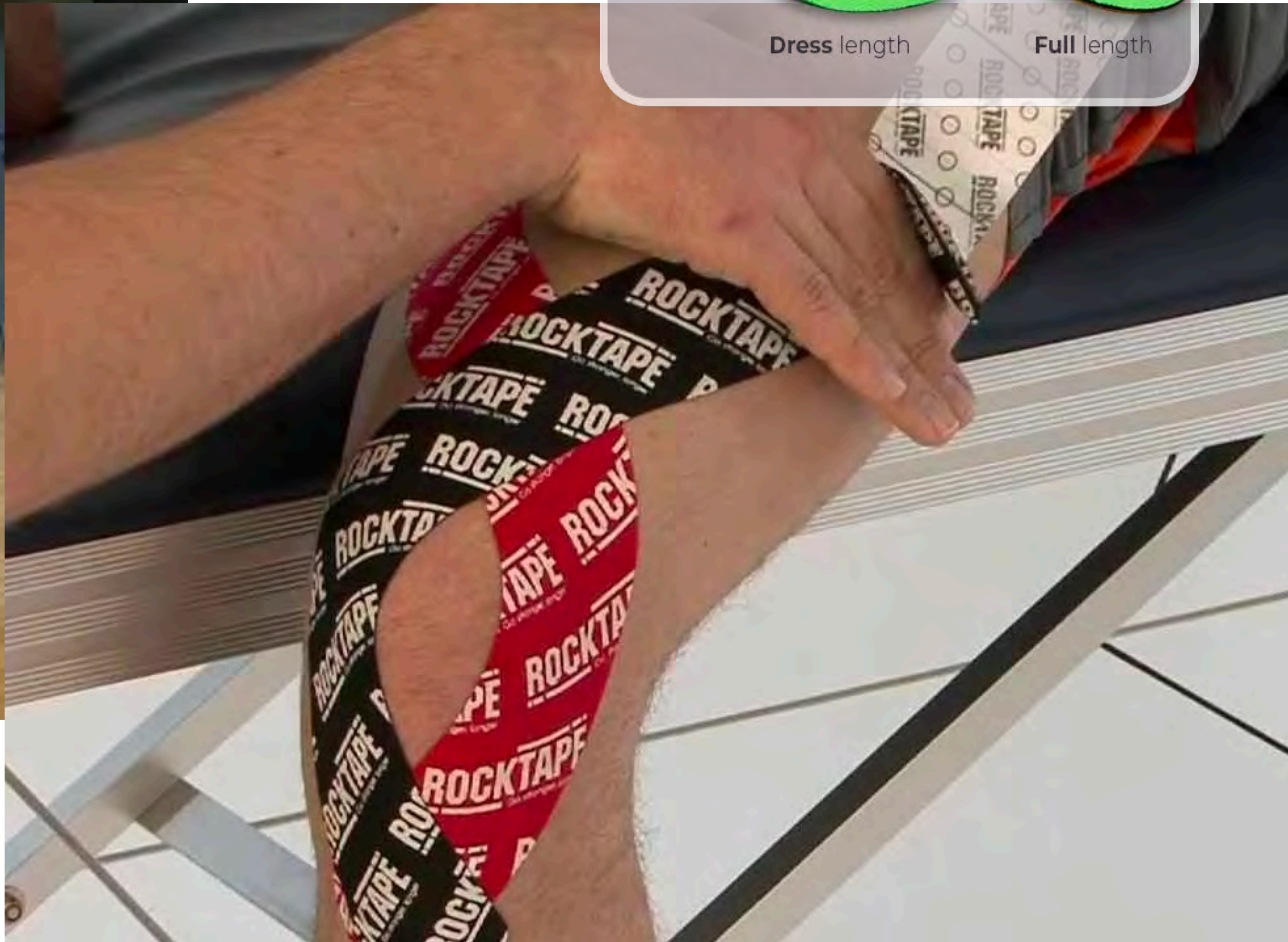
Spring loaded instrument:

FOOT LEVELERS

Prone knee Adjustments

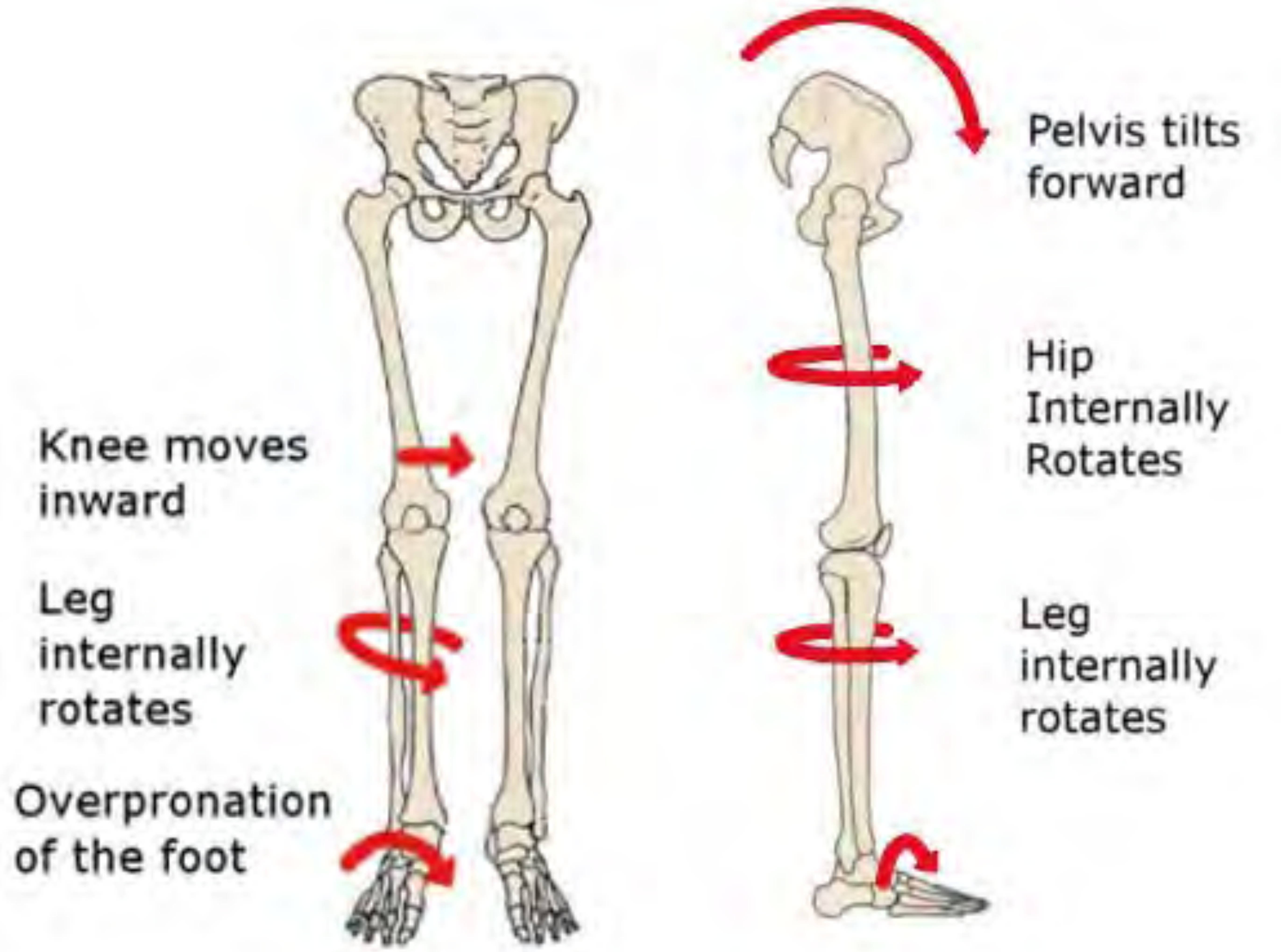
Knee Support





Pronation and Knee injury

Excessive Pronation causes internal tibial rotation, patellar tracking problems, (chondromalacia patella) and medial knee stress.

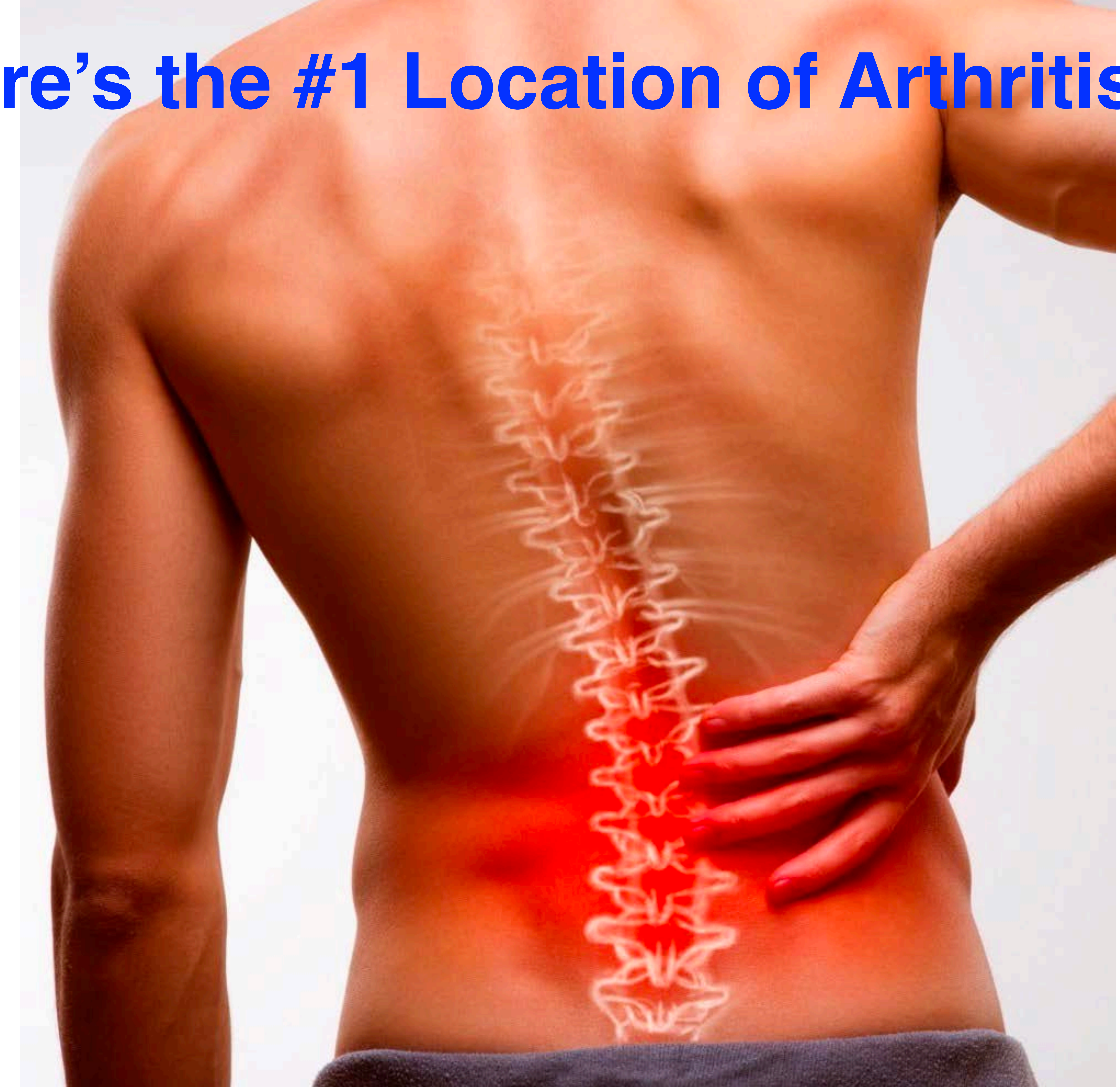


- ACL
- Medial Meniscus
- Medial Collateral ligament
- Medial Knee DJD

FOOT LEVELERS

FOOT LEVELERS

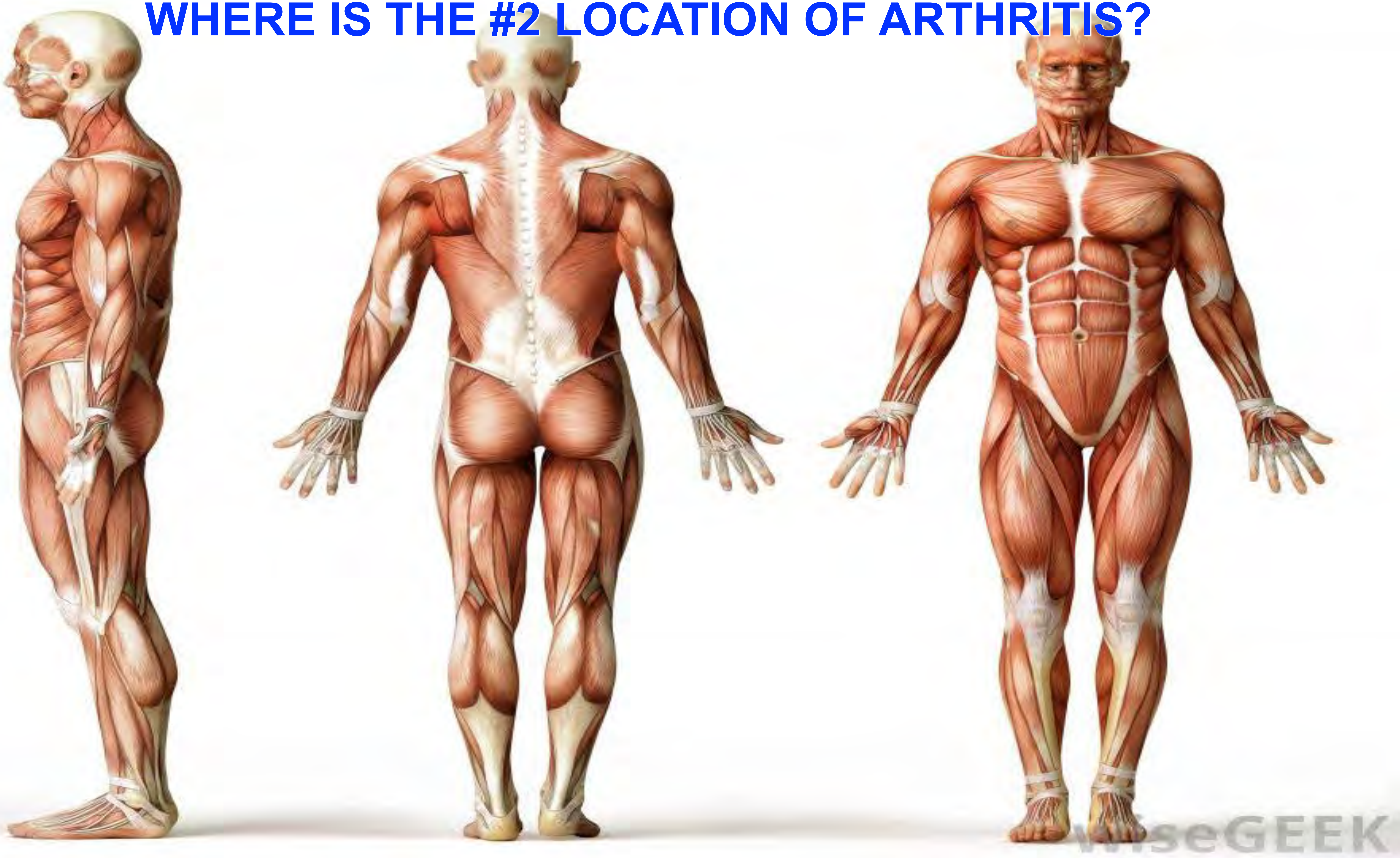
Where's the #1 Location of Arthritis?



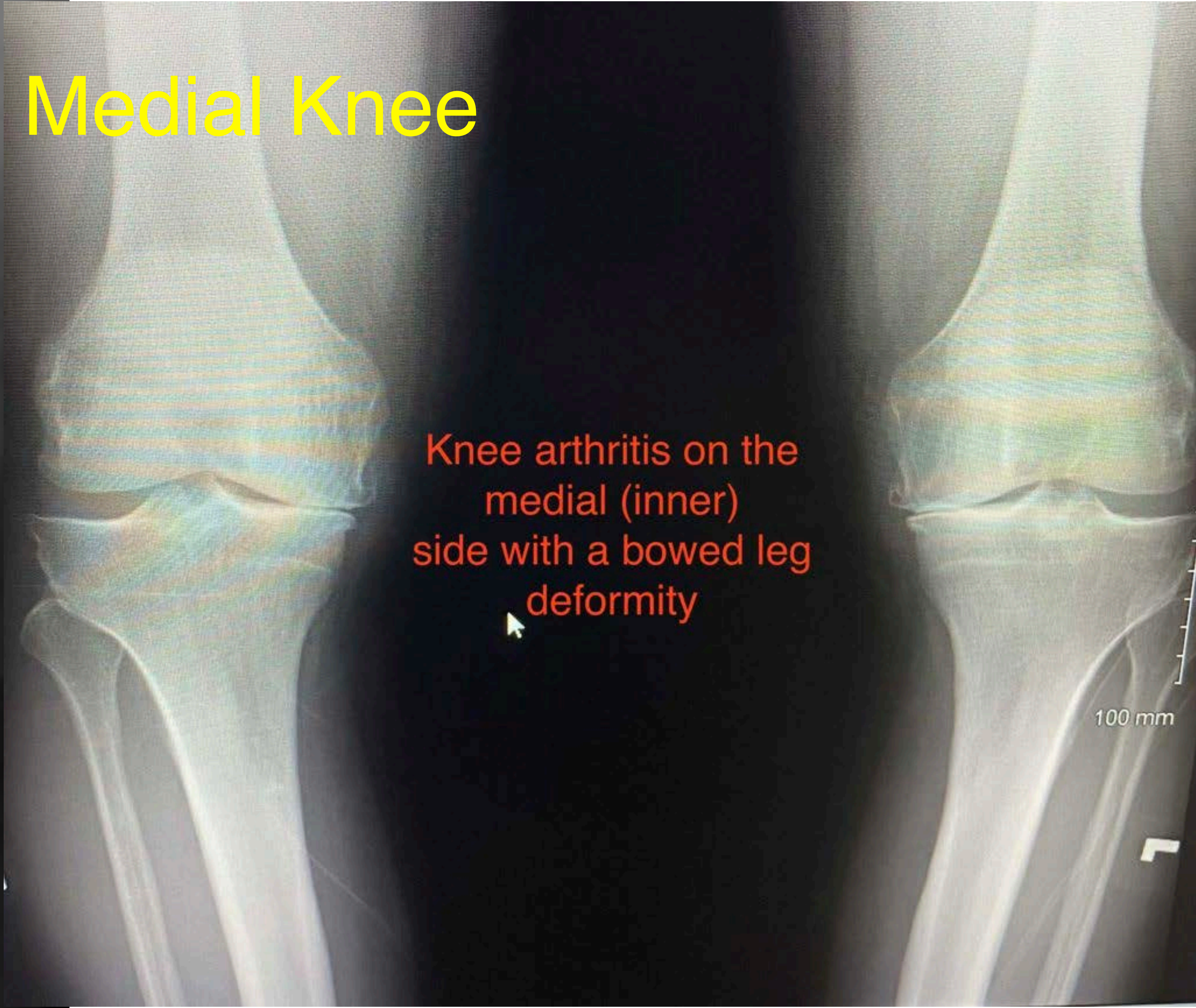
FOOT LEVELERS

Figure 5. Standing plain x-rays actually revealed the most significant loss of disc height at L5-S1 with sclerotic endplates and posterior bone spur formation at L5-S1.

WHERE IS THE #2 LOCATION OF ARTHRITIS?



The Medial Knee



Check the feet!

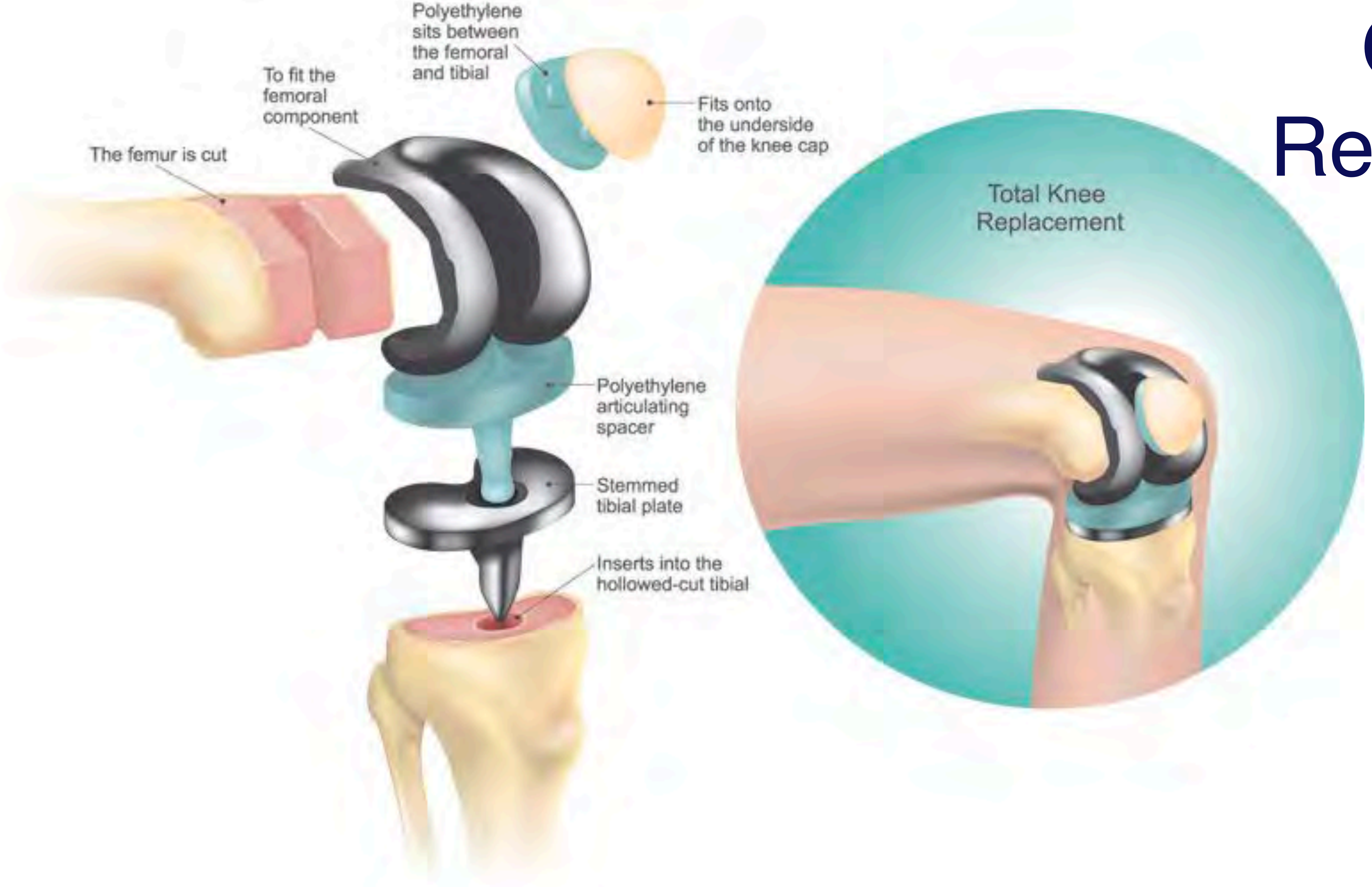
We can reduce knee and hip replacement surgeries!

We can reduce the number of sports injuries in adults and children

FOOT LEVELERS

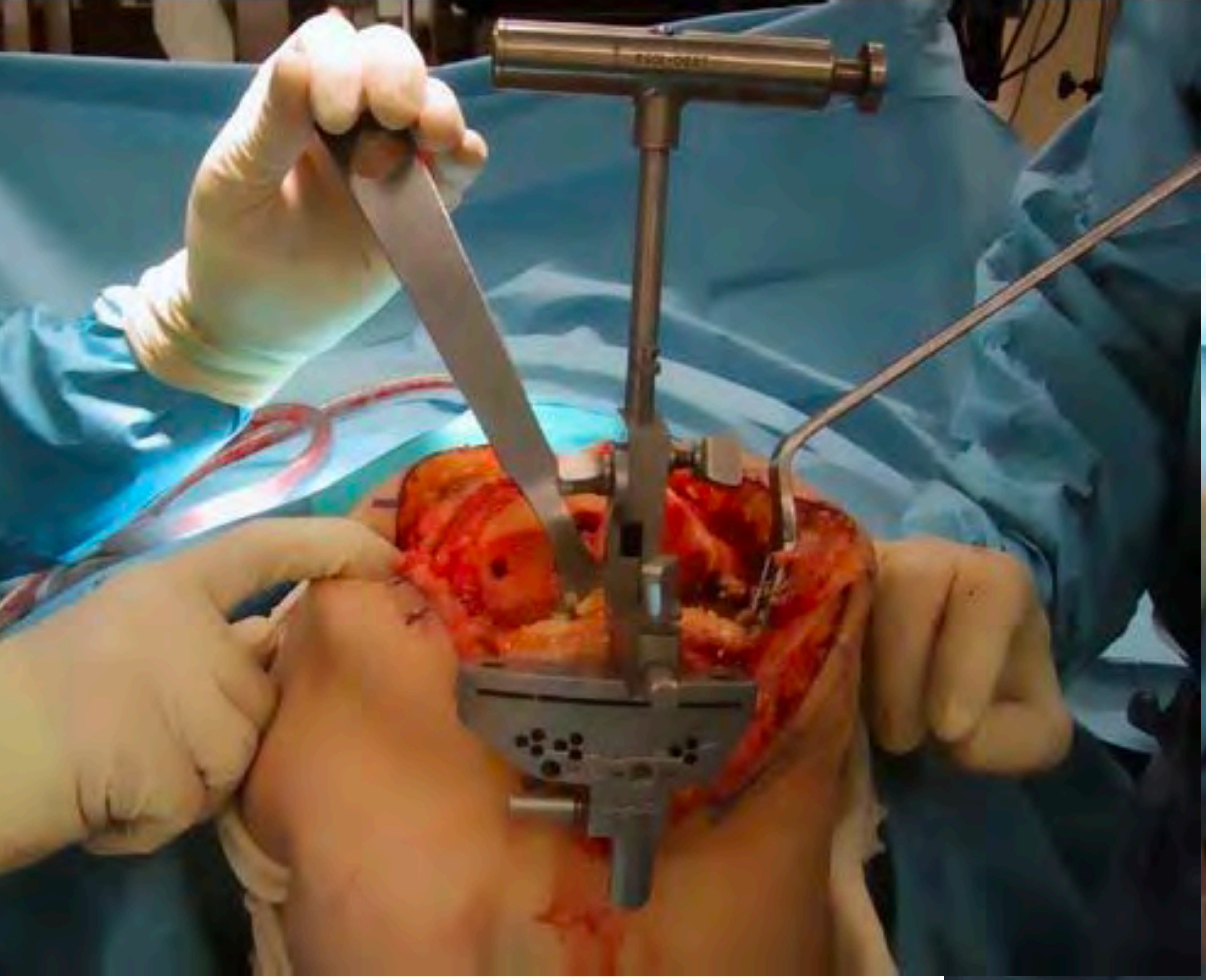
FOOT LEVELERS

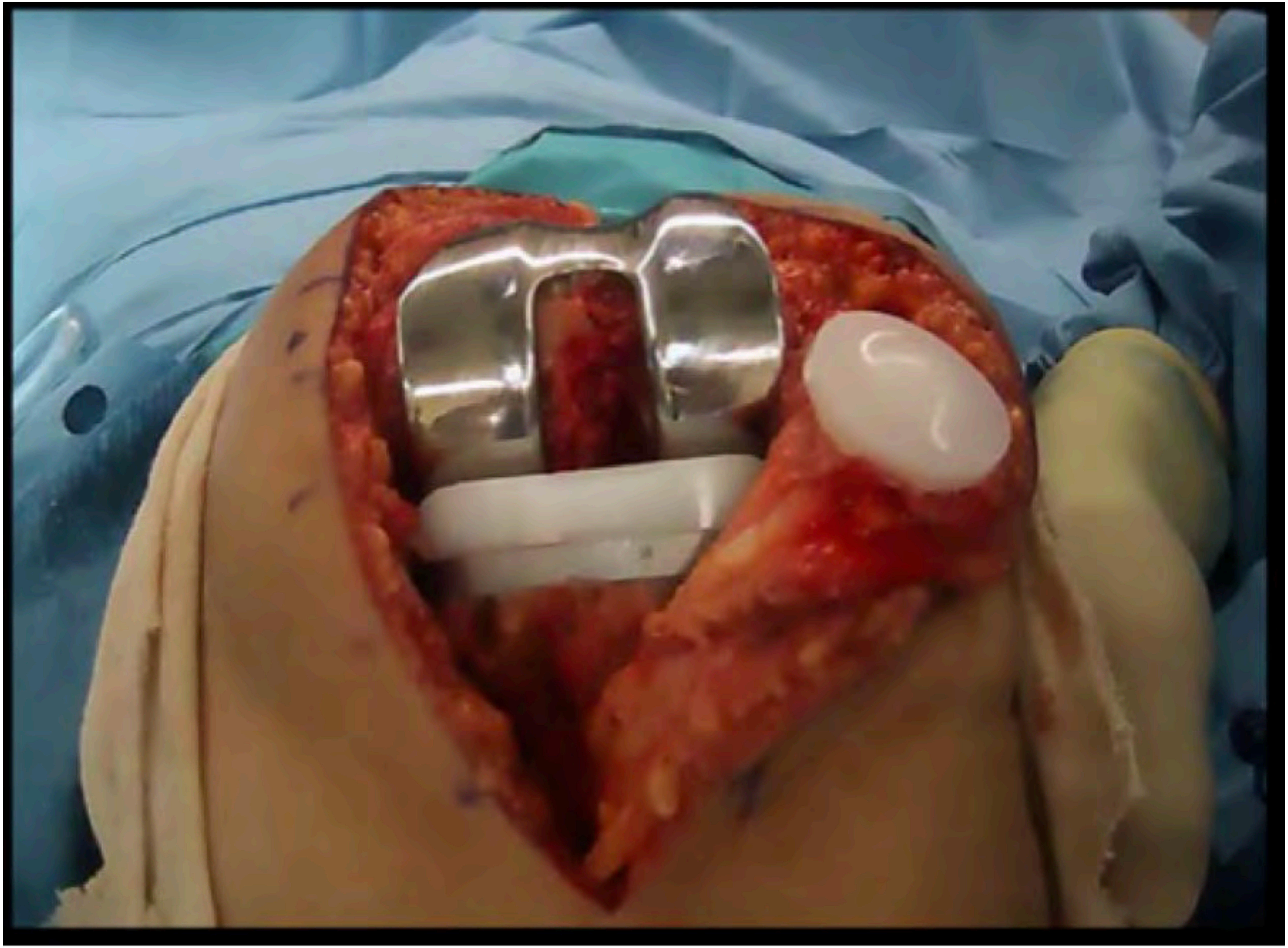
Components Of Knee Replacement Surgery



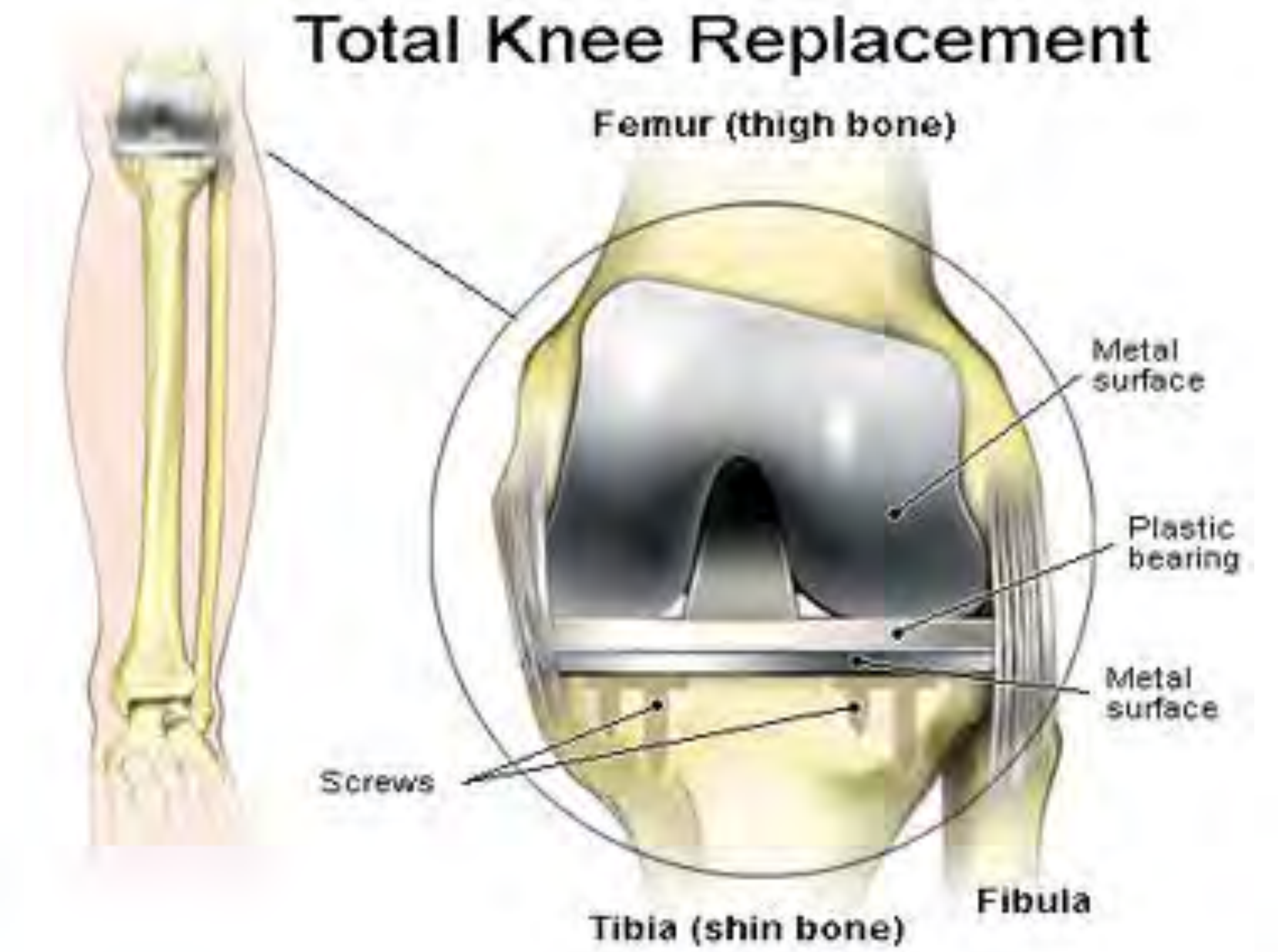
FOOT LEVELERS

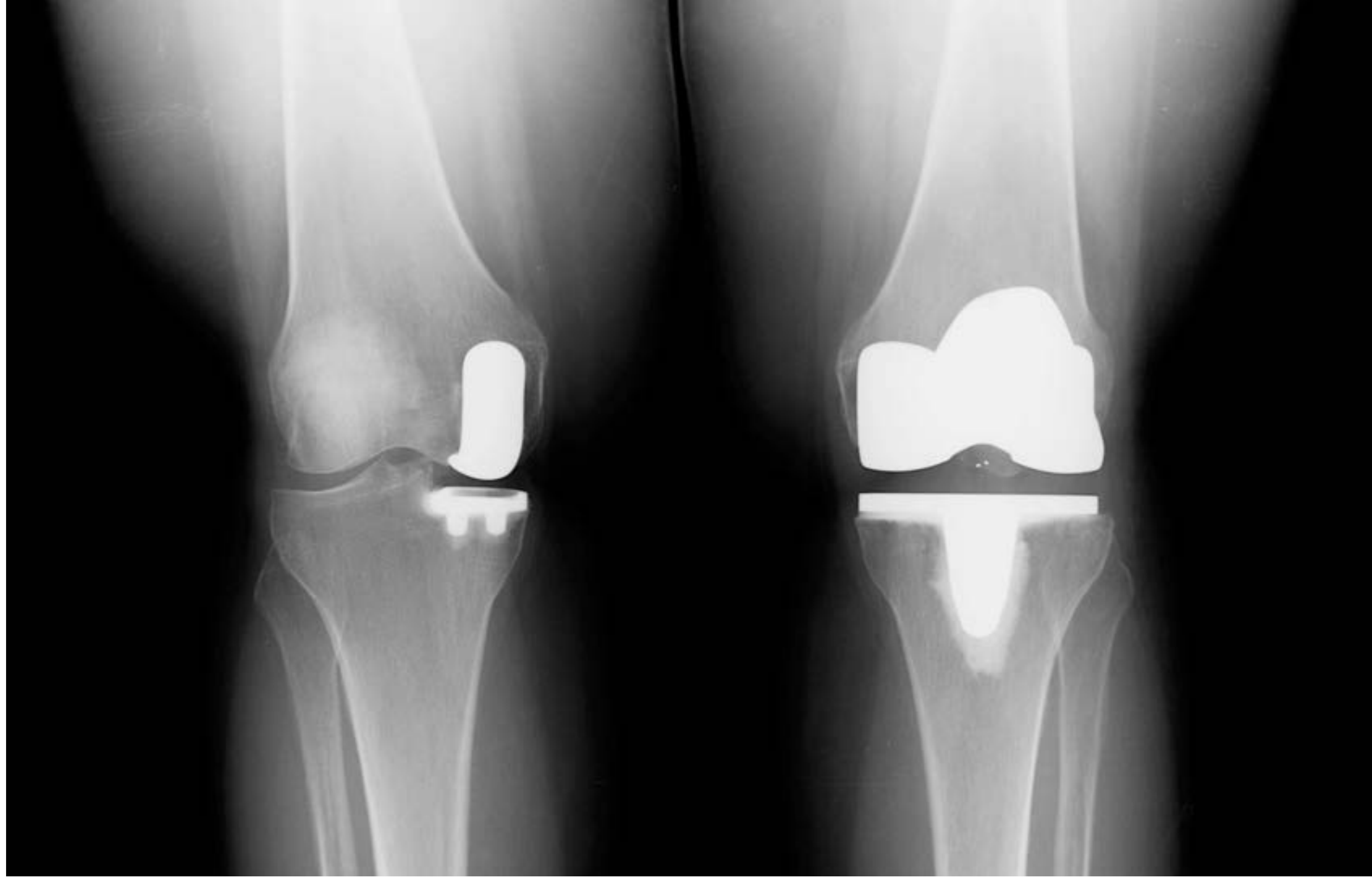
Knee Replacement



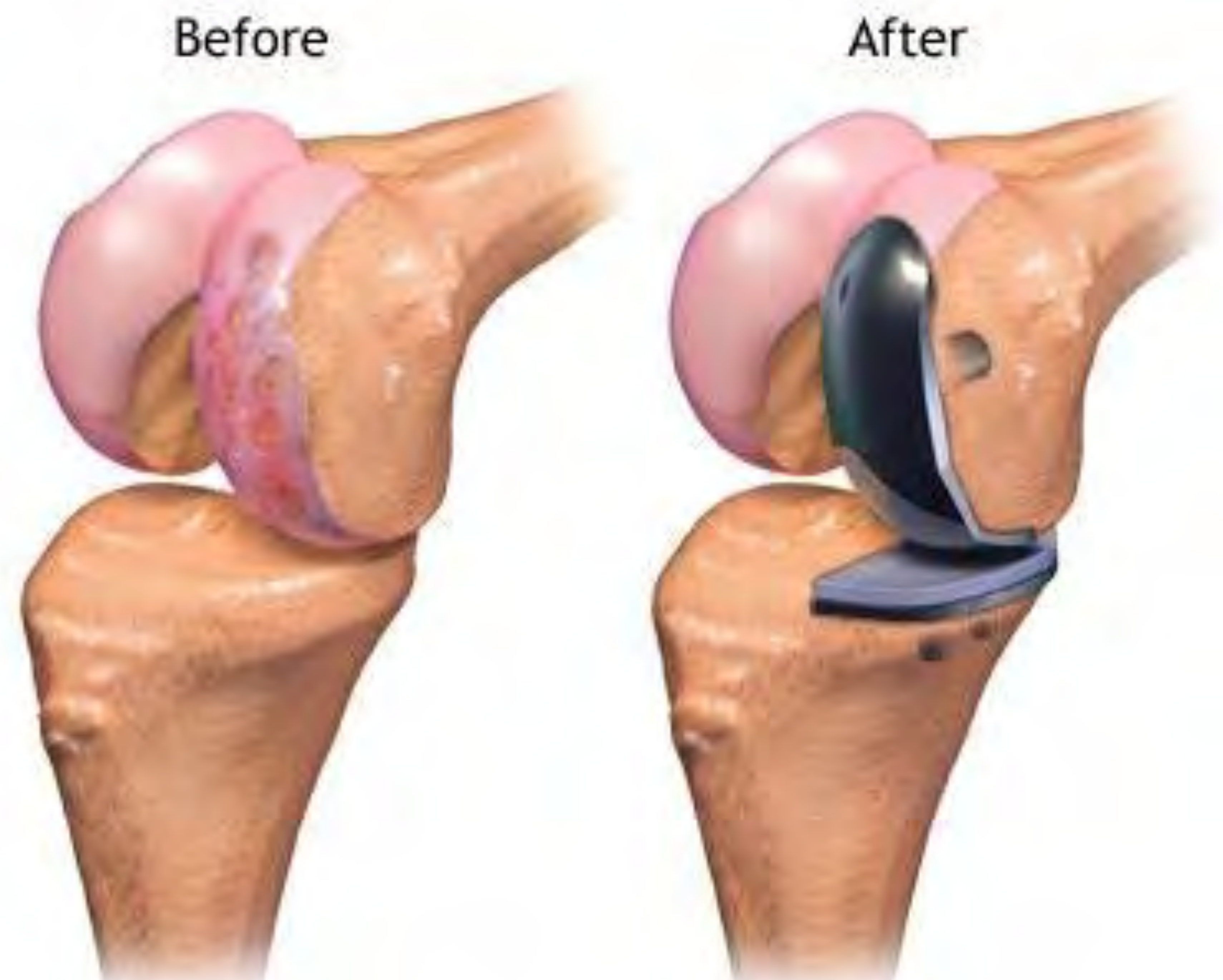


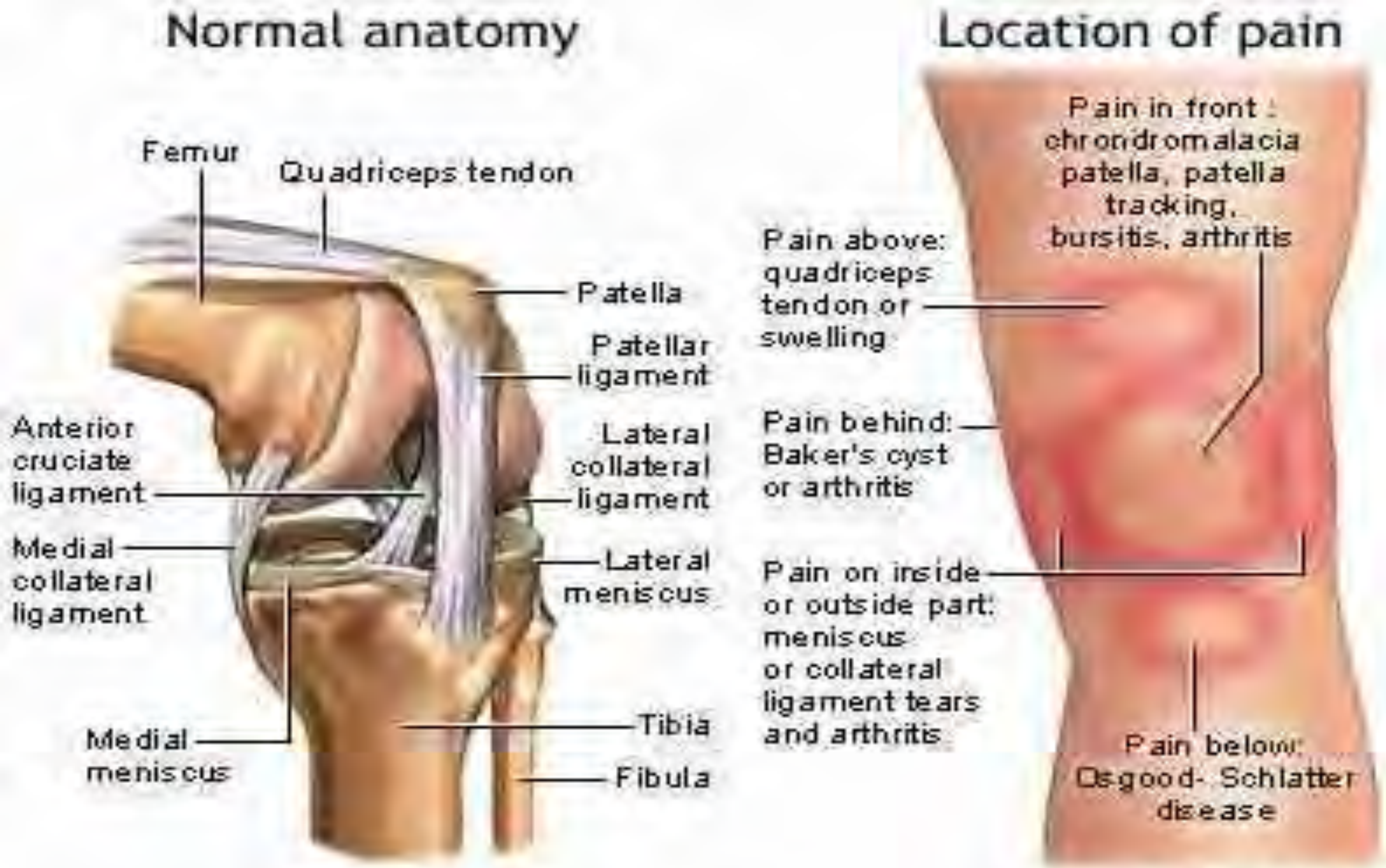
FOOT LEVELERS


Total Knee Replacement
Femur (thigh bone)
Metal surface
Plastic bearing
Metal surface
Screws
Fibula
Tibia (shin bone)

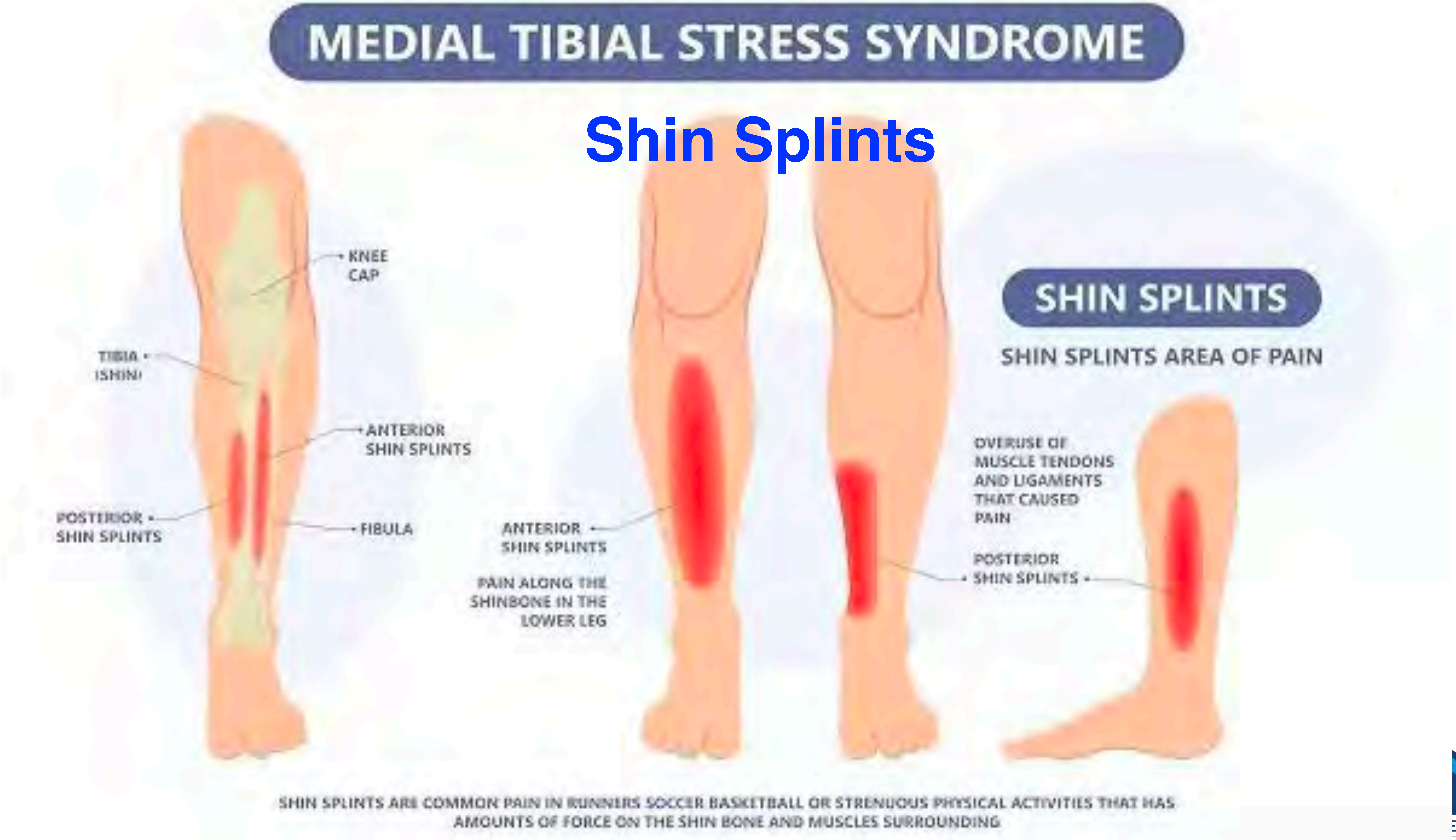



Femoral Component
Tibial Components:
plastic spacer
metal plate
Diseased joint
Bones cut and shaped
Implants in place

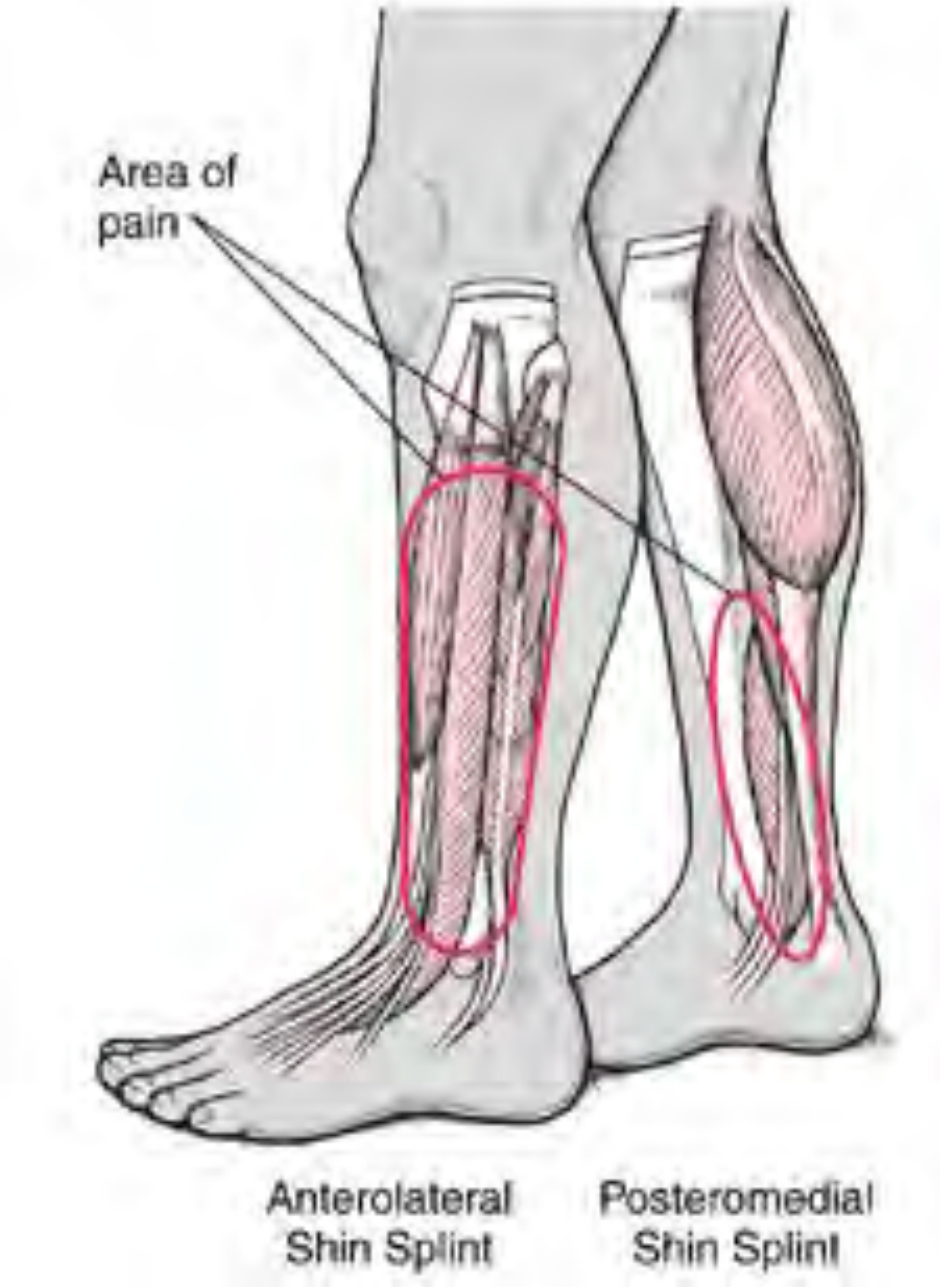

Before
After


Normal anatomy
Location of pain
Femur
Quadriceps tendon
Patella
Patellar ligament
Anterior cruciate ligament
Lateral collateral ligament
Medial collateral ligament
Lateral meniscus
Medial meniscus
Tibia
Fibula
Pain in front : chrondromalacia patella, patella tracking, bursitis, arthritis
Pain above: quadriceps tendon or swelling
Pain behind: Baker's cyst or arthritis
Pain on inside or outside part: meniscus or collateral ligament tears and arthritis
Pain below: Osgood- Schlatter disease

Shin Splints

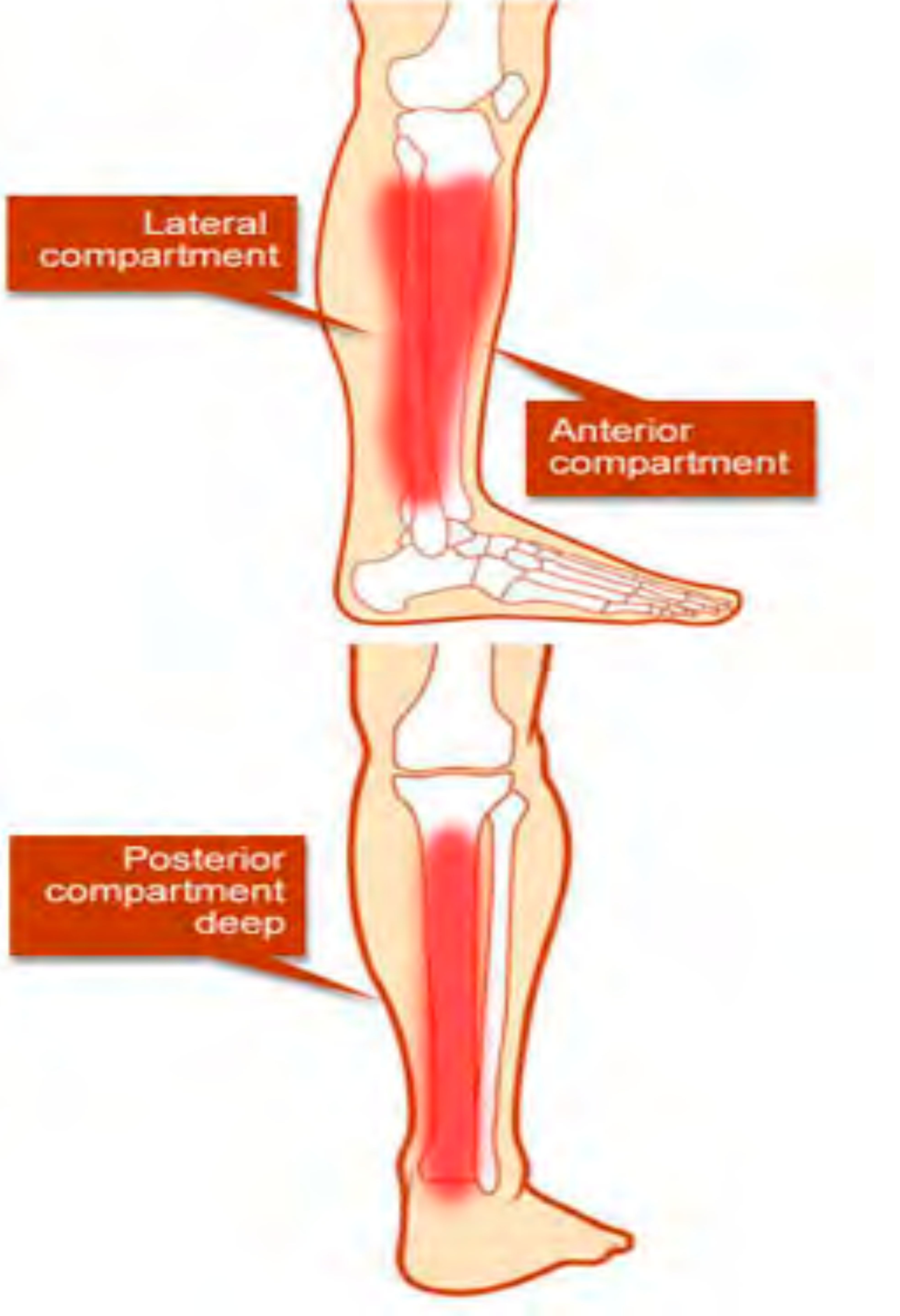


Shin Splints



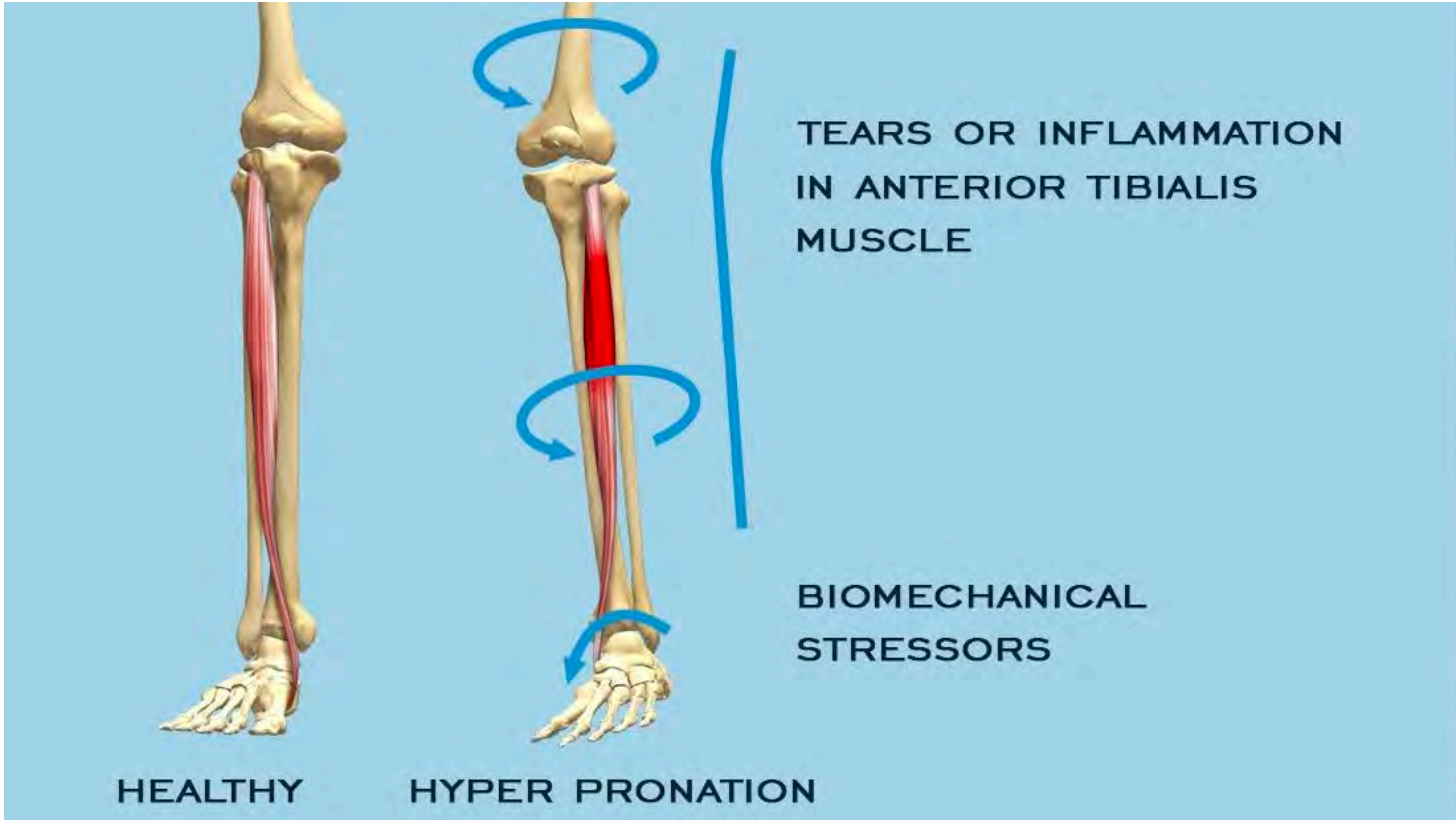
Shin Splints: Etiology

- Overuse injury
- Inflammatory process that affects muscle, tendon and bone.
- Bone resorption
- Stress fracture
- Anyone engaged in WB activity can get th



Role of Excessive Pronation:

Eversion, dorsiflexion, abduction and inward leg rotation increase stretch and decelerate contraction of shin muscles.



SHIN SPLINTS – GAIT CYCLE

Anterior Shin Splints: Anterior Tibialis muscle.
Active during heel strike, toe off, swing phase

Posterior Shin Splints: Posterior Tibialis muscle
Active just after heel strike to just prior to heel lift.

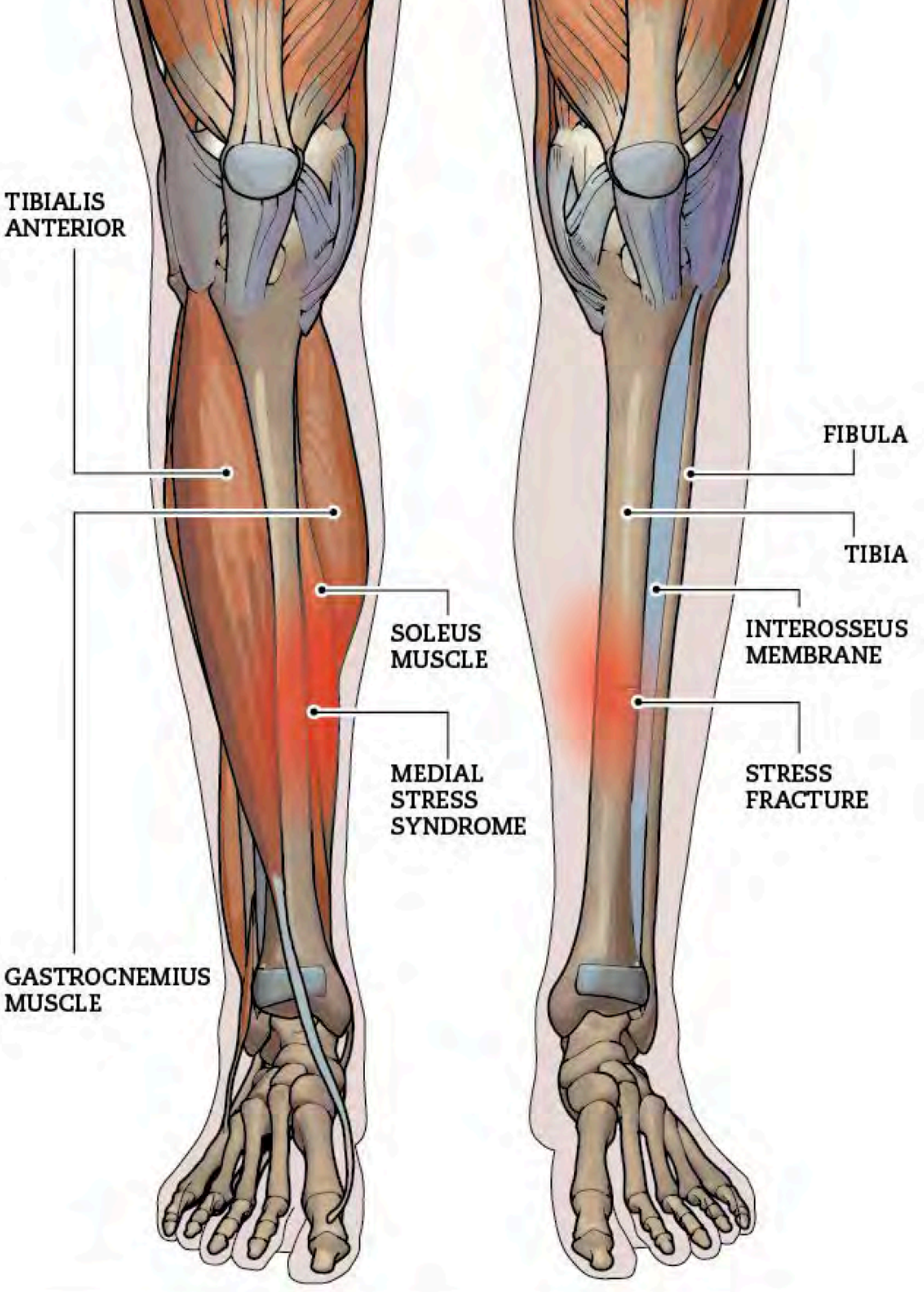
OT LEVELERS

SHIN SPLINTS: S&Ss

1. Hx. of change in recent activity
2. Gradual onset of pain that worsens
3. Deep, achy, throbbing
4. Location

SHIN SPLINTS: TX

- Physiotherapy modalities
- Adjust: talus, calcaneus, navicular, rest of the foot



SHIN SPLINTS: TX

Support:

Stabilizing Orthotics

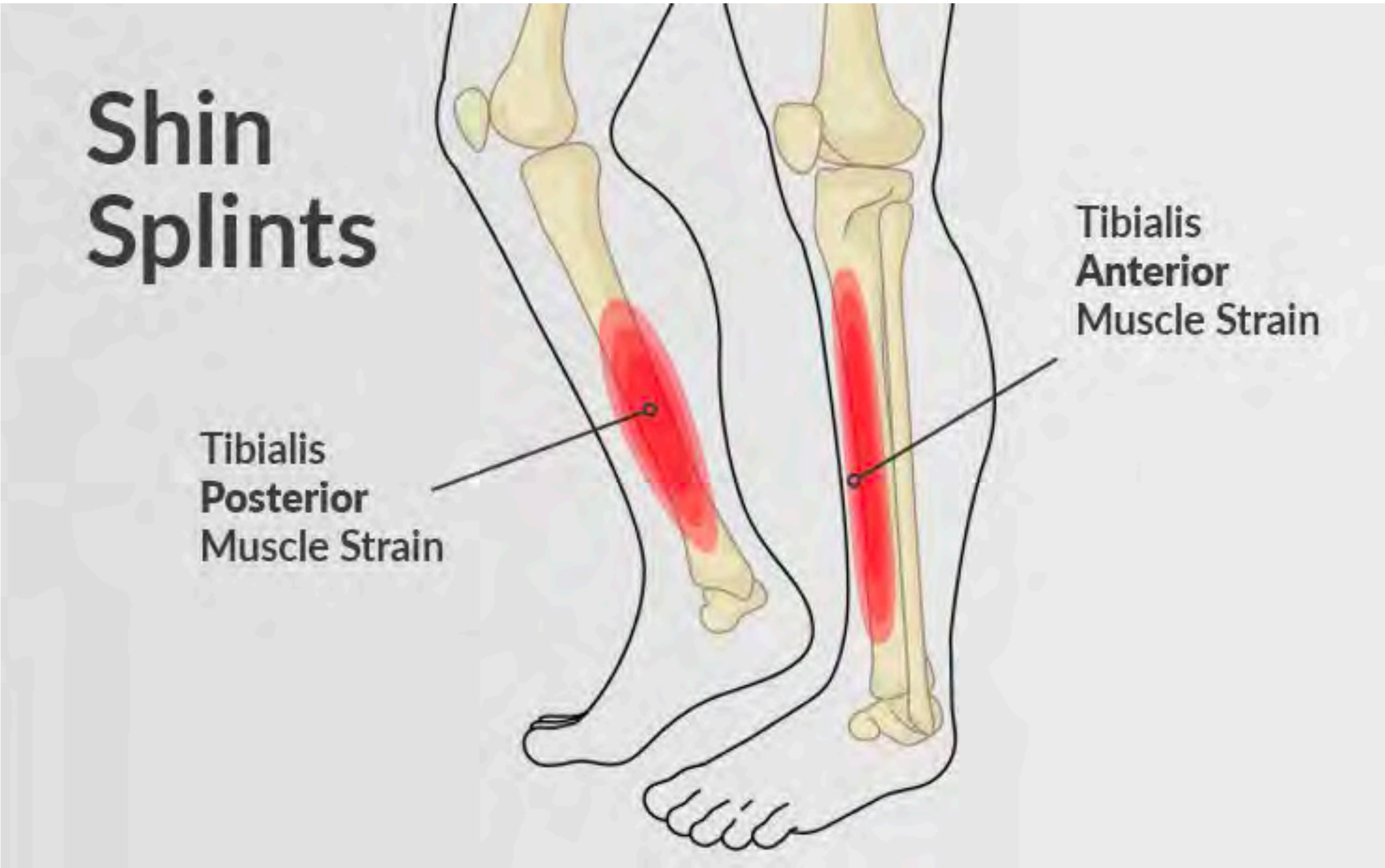
Elastic Taping

Types of shoes

Activities

FOOT LEVELERS

RESEARCH: SPORTS MEDICINE



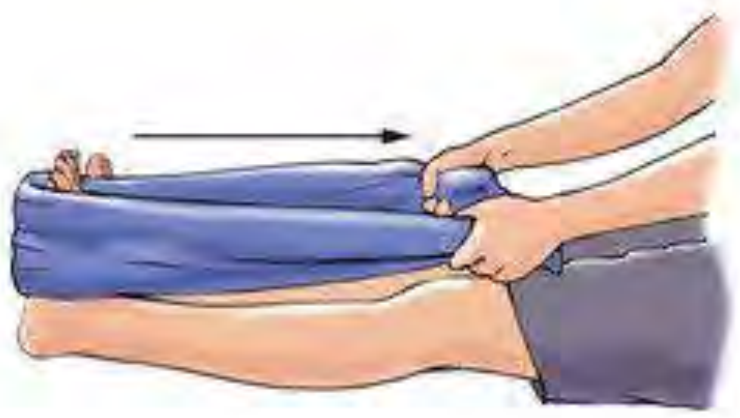
- High correlation between shin splints and excessive pronation

DaLacerada F: *A study of the anatomical factors involved in Shin Splints,* J Orthopaedic and Sports Phys Therapy, 1980; (2) 55-59

Austin W: *Shin splints with underlying posterior tibial tendinitis: A case report,* J Sports Chiro Rehab 1996; 10 (4) 163-168.

FOOT LEVELERS

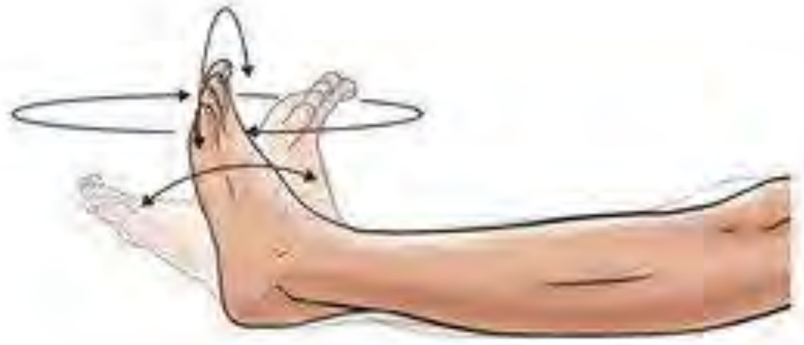
Shin Pain (Shin Splints) Rehabilitation Exercises

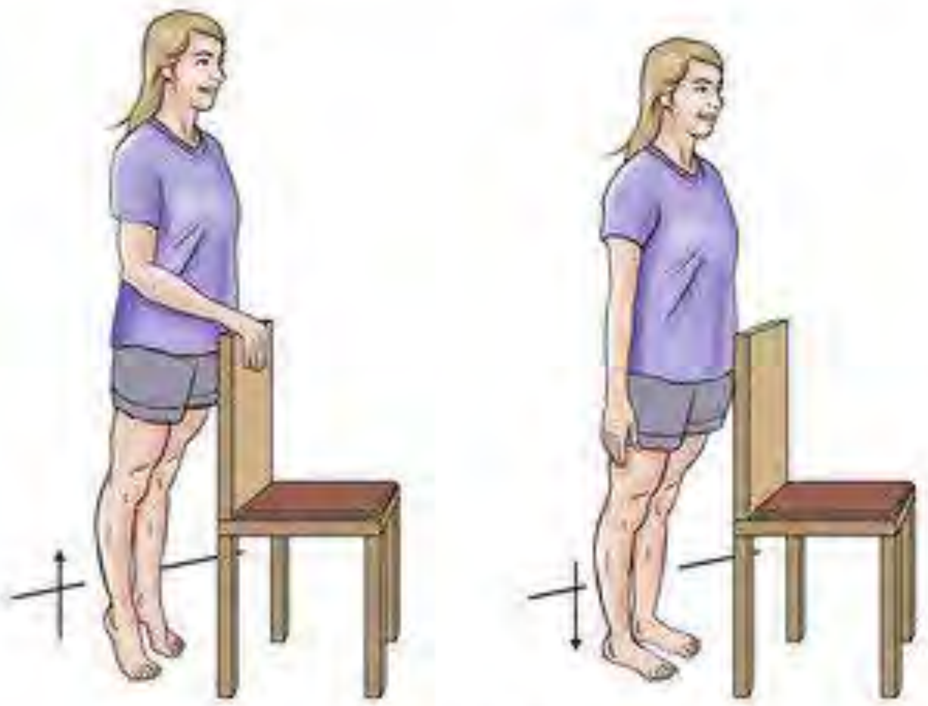

Towel stretch


Standing calf stretch


Anterior compartment stretch

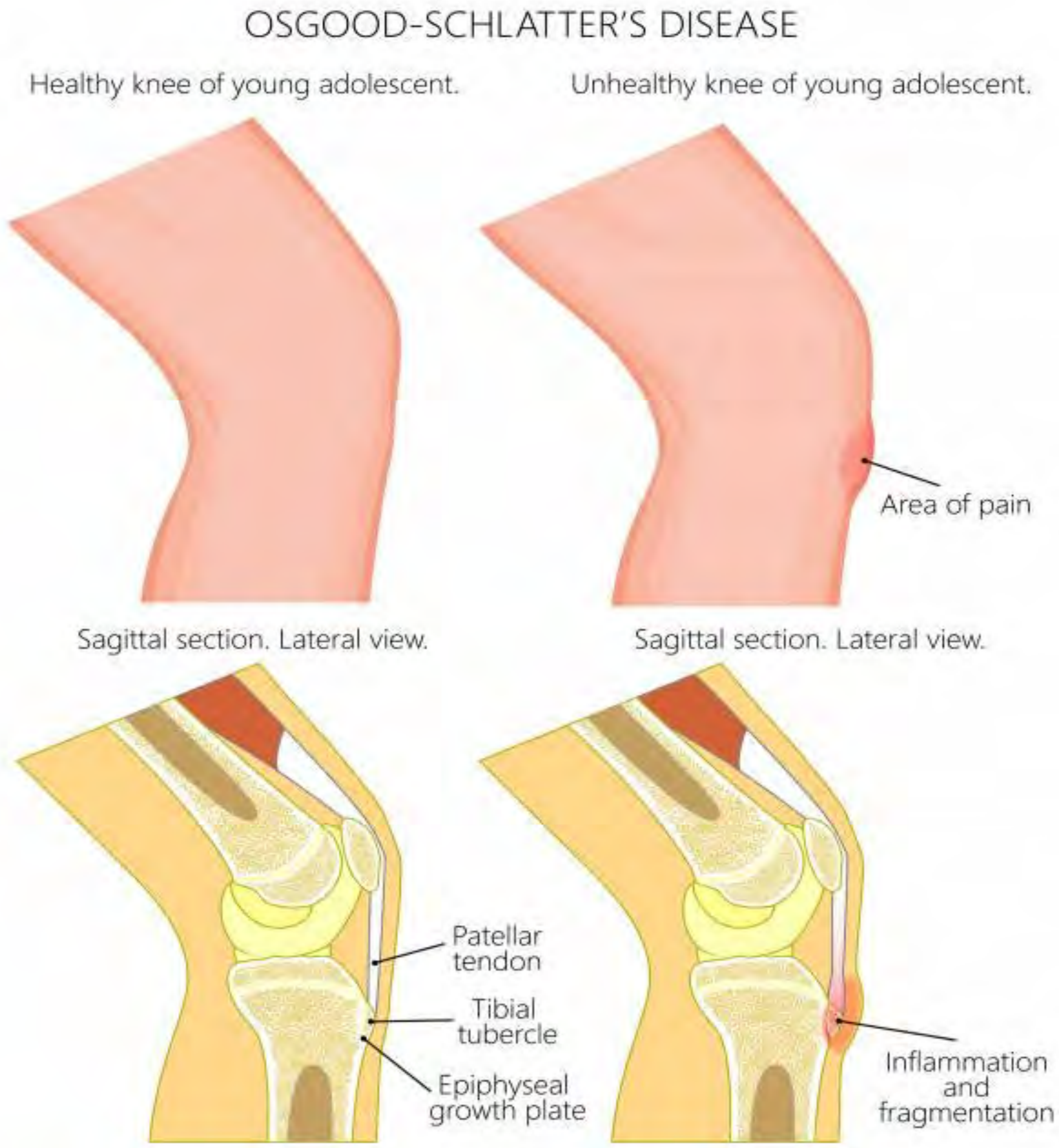

Resisted ankle dorsiflexion


Ankle range of motion


Heel raise

Shin Splints: Rehabilitation

- "Basic 4" foot/ankle series
  - Towel scrunch exercises
  - Golf/tennis ball exercises



Osgood Schlatter

Development of an avulsion fracture at the tibial tubercle

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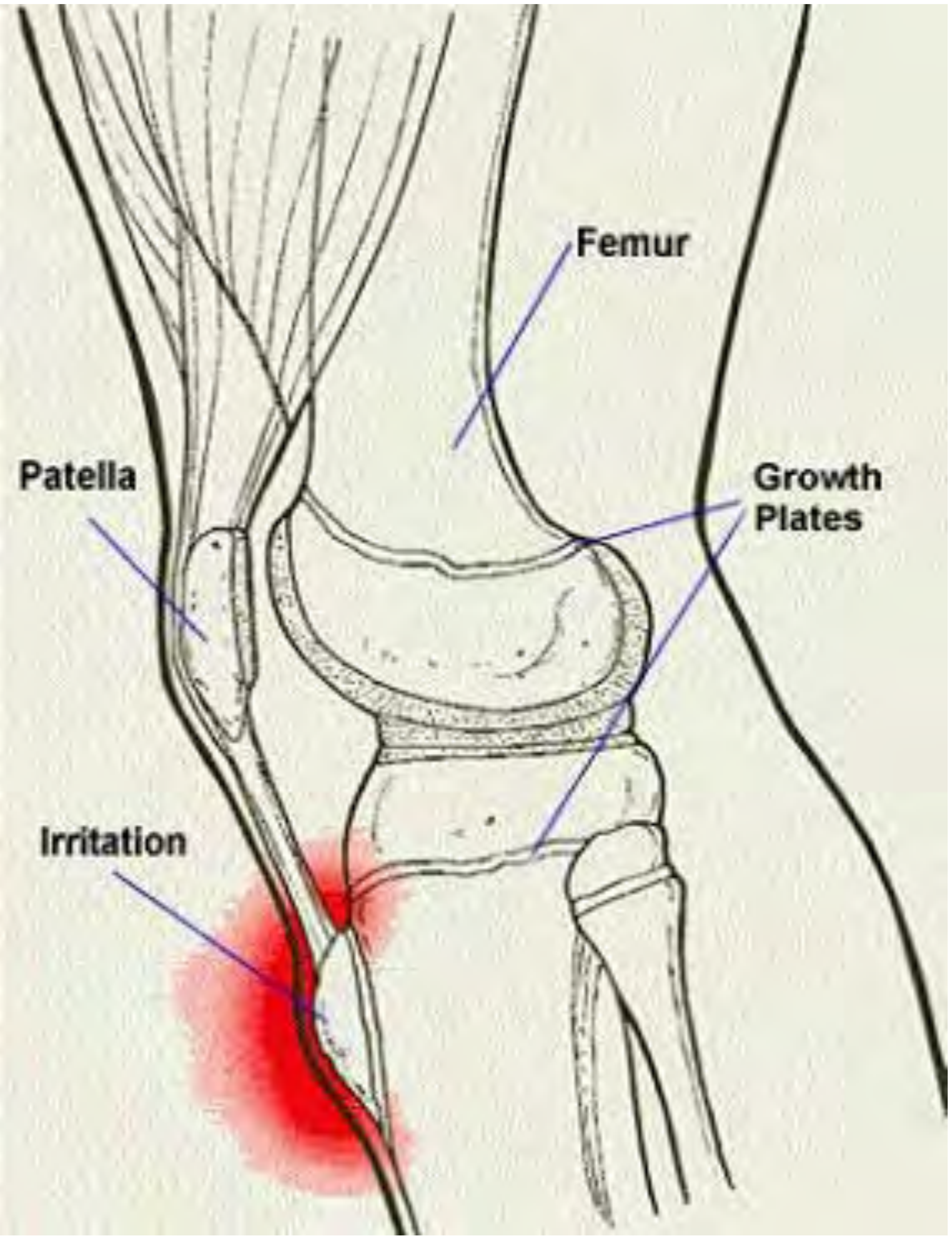


OSGOOD SCHLATTER: ETIOLOGY

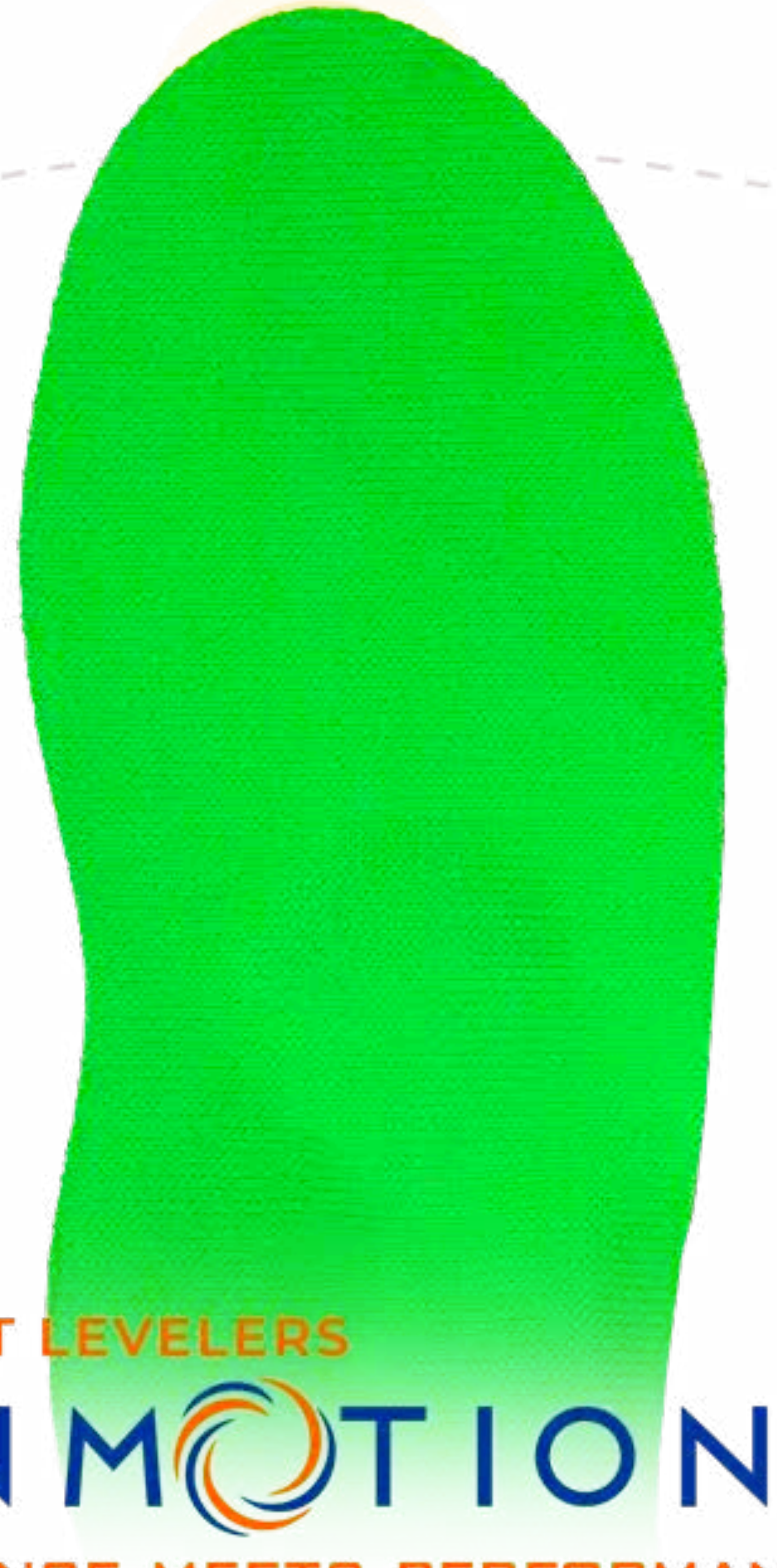
Forceful contraction of quadriceps femoris tendon onto immature tibial tubercle.

Children in rapid growth period are predisposed.

OSGOOD SCHLATTER: S & S

1. Pain, tenderness at tibial tuberosity
2. Swelling may or may not be present
3. Climbing stairs, running, kneeling
4. Possibly enlarged tibial tuberosity

OSGOOD SCHLATTER: TX



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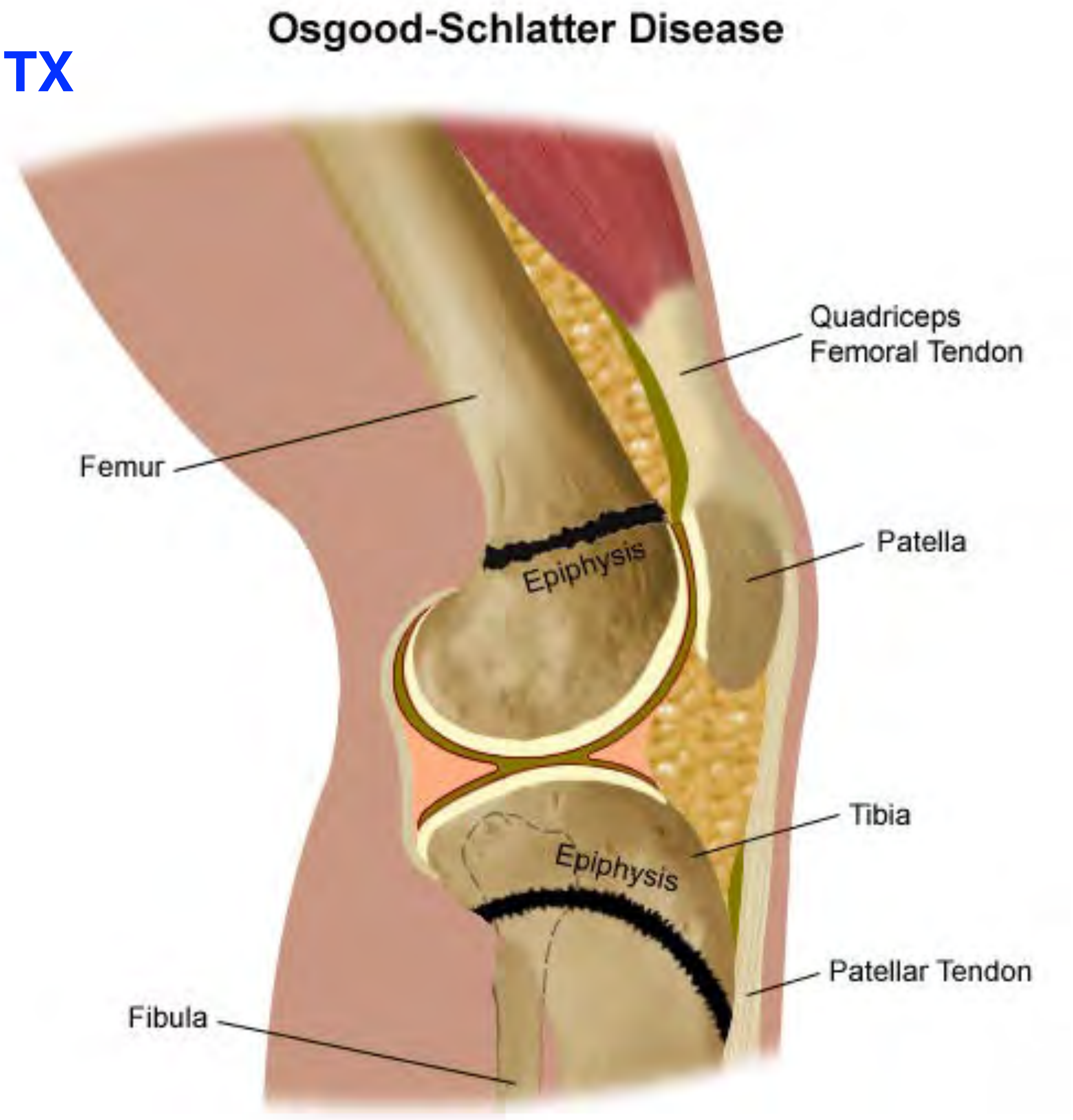
OSGOOD SCHLATTER: TX

Physiotherapy modalities:

<u>A</u>djust:

Tibia, Patella, Femur

OSGOOD SCHLATTER: TX



Rehabiltiation:

Knee Series with the Theraciser

FOOT LEVELERS

Start

Flexion

Finish

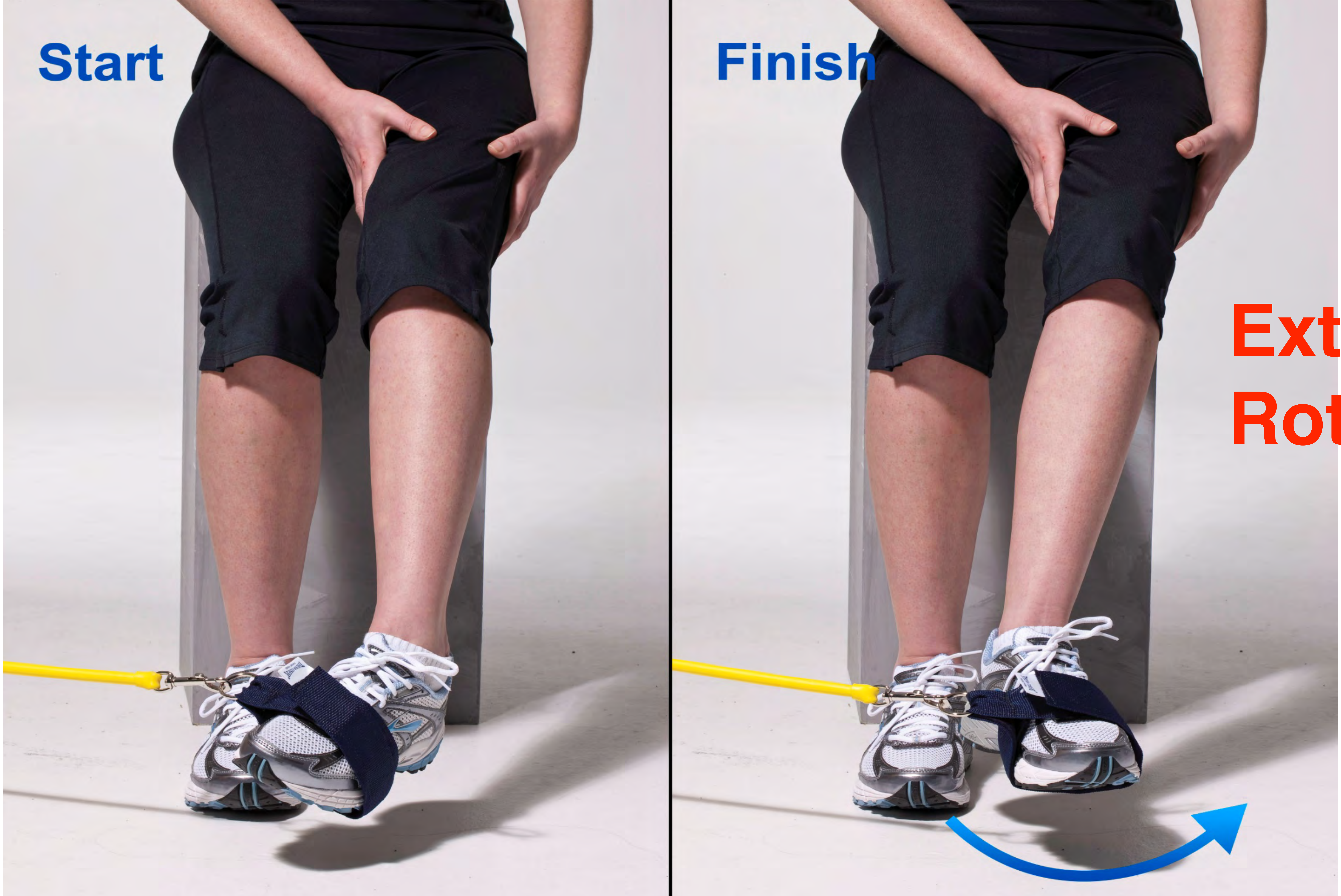
FOOT LEVELERS

Start

Finish

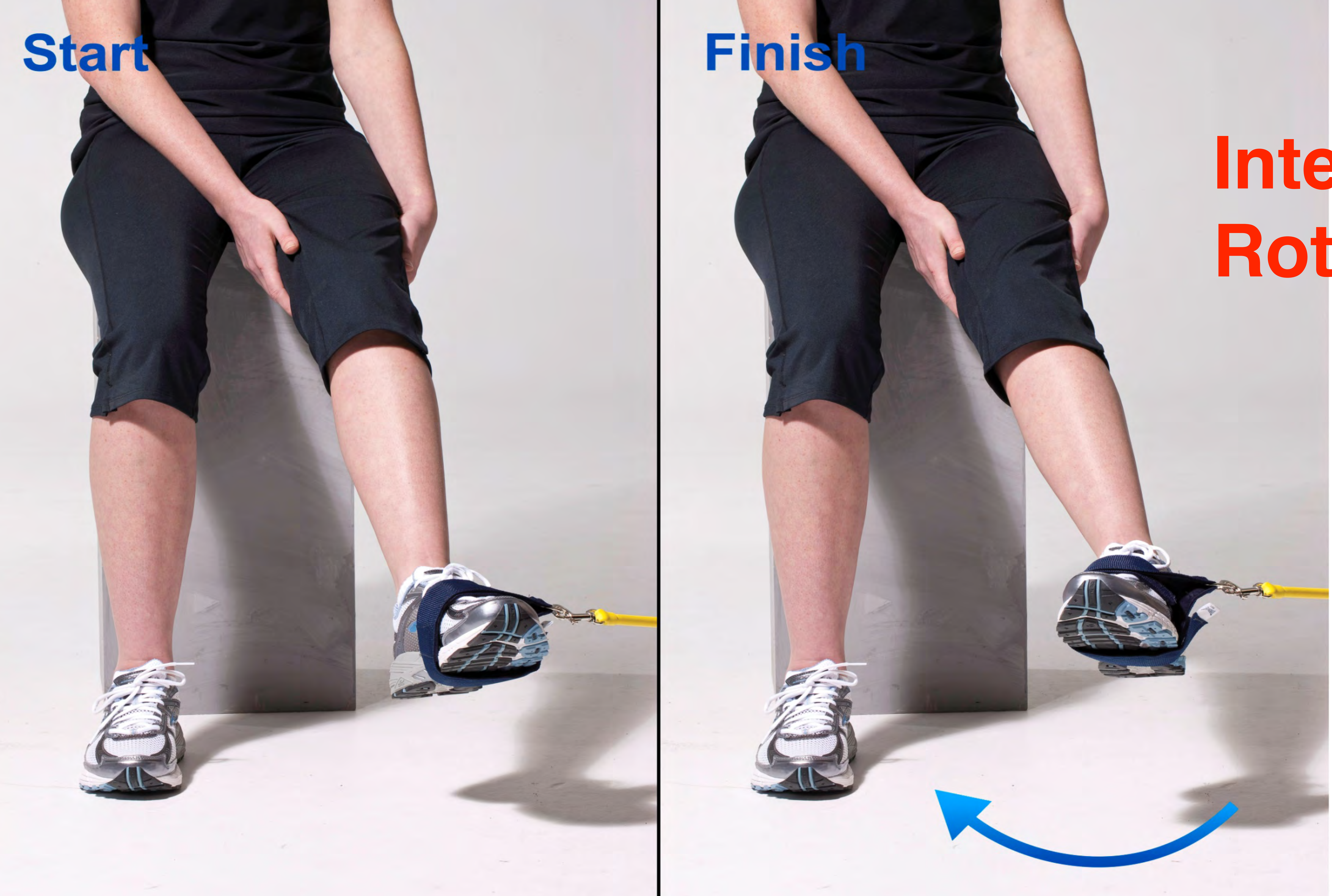
Extension

FOOT LEVELERS



External Rotation

FOOT LEVELERS



Internal Rotation

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