

Foot and ankle injuries related to dance

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 - Diplomate Podiatric Sports Medicine
 - Diplomate Lower Extremity Medicine
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DISCLOSURES

- I have no relevant financial disclosures or conflict of interest with the material in this presentation

FOOT FACTS

- 26 Bones (one quarter of the 206 bones in the average human body are found in the feet)
- 33 Joints
- 107 Ligaments
- 19 Muscles



Dance related injuries of the foot and ankle

- Ankle impingement
 - Posterior: Achilles tendinitis/rupture
 - Os trigonum impingement
 - Anterior: Extensor tendinitis/shin splints
- Ankle sprains
- Plantar fasciitis
- Sesamoiditis
- Severs disease
- Trigger toe/FHL tendinitis



ACHILLES TENDINITIS

- Two types
- Noninsertional. Fibers in the central portion of the tendon have begun to break down with small tears.
- Insertional. Involves the lower portion of the heel, where the tendon attaches to the calcaneus.



ACHILLES TENDINITIS



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Achilles tendinitis

- SYMPTOMS:
- Pain and stiffness along achilles tendon
- Swelling along pathway of tendon
- Palpable pain
- Palpable inflammation



Achilles tendinitis

- TESTS
 - Clinical examination
 - X rays (more to rule out other possible diagnosis)
 - MRI



Achilles tendinitis

- TREATMENT
- Rest
- Ice
- NSAIDS
- Stretching
- Physical therapy
- Cortisone injections
- Proper shoes/orthotics



Achilles tendon rupture

- Patient often feels a “pop” in posterior heel.
- Unable to walk or bear weight upon leg (not always).
- Clinically, positive Thompson test (calf squeeze, negative response of foot in dorsiflexion)
- Clinically, palpable gap is felt. Rupture usually occurs about 6cm proximal to the calcaneal attachment, the area of poor blood flow



Achilles tendon rupture

- Factors that may increase risk of rupture:
 - Age...peak age for rupture is between 30 and 40 years of age.
 - Sex...men are five times more likely to suffer a rupture.
 - Activities...sports involving running, jumping, and sudden starts and stops.
 - Steroid injections...medications like Kenalog can temporarily weaken a tendon.
 - Certain antibiotics...Fluoroquinolone antibiotics, such as ciprofloxacin (Cipro) or levofloxacin (Levaquin), can increase risk of rupture.
 - Obesity...more strain on tendon.



Achilles tendon rupture

- Surgical correction
- Ruptures with a gap of greater than 2.5cm often require surgical correction.
- Surgical correction often speeds up healing time, and research shows that these patients have lesser chance of recurrence. Avulsion ruptures (tendon avulsed off calcaneus) must be corrected surgically.
- Patients who choose non surgical options can and often do heel to the point of returning to full activities...however, longer recovery period (achilles boot for a minimum of six to eight weeks, followed by lengthy period of physical therapy sessions.



Ankle impingement/posterior

- Os trigonum impingement
- Only one in five people develop an os trigonum, and it forms between the ages of 7 and 11 (girls typically earlier than boys)
- It forms behind the talus, and develops as the talus develops. It is held in place with a thick fibrous band of tissue attached to the posterior talus.





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Os trigonum impingement

- Treatment
- Early stages, x ray findings followed by rest, ice, NSAIDS, PT
- Later stages and more severe, an MRI is needed, and depending results, either long term immobilization (four to six weeks), or possible surgical removal of bone.



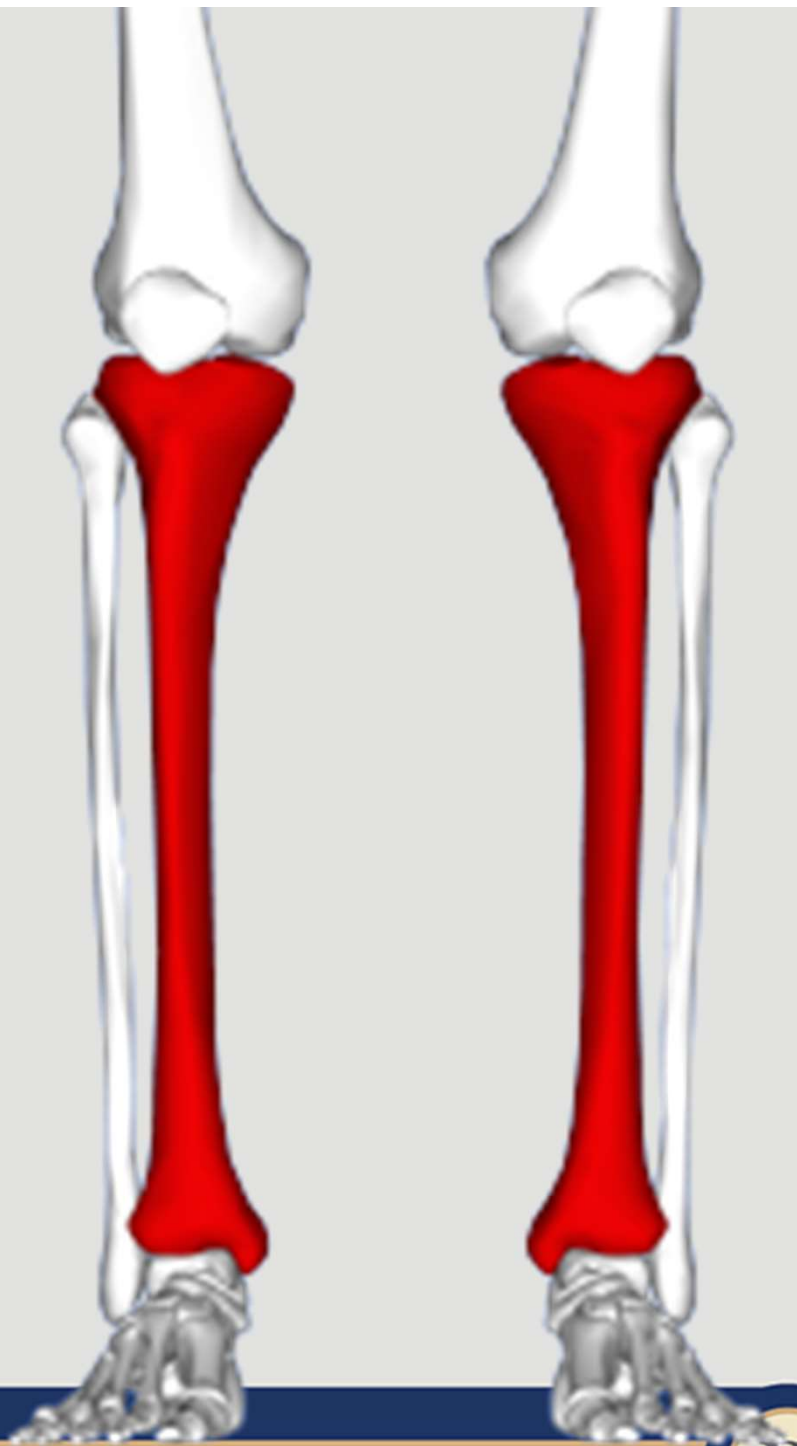
Ankle impingement/anterior

- Extensor tendinitis/shin splints
- Also commonly referred to as Medial tibial stress syndrome.
- Typically pain is associated with the anterior shin area, but can radiate to the anterior ankle as well as the dorsal aspect of the foot.



Shin Splints

- Treatment
- X rays to rule out stress fracture, and in severe cases with negative x ray findings, an MRI is necessary.
- Rest, ice, compression, NSAIDS, and PT.
- Biomechanical gait examination. Many people who develop shin splints will walk and stand with pes planus and pronation due to their overall flexibility (dancers). While this pronation can not necessarily be treated during their activities, we can supplement other shoe gear with arch supports to alleviate stress upon the extensor tendon apparatus.



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LATERAL ANKLE INJURIES

- The most common sports injury.
- 10%-15% of sport-related injuries.
- 7%-10% of all ER visits.
- 28,000 ankle sprains occur daily in the US
- 80%-85% of ankle sprains occur to the lateral ligaments.
- 1% to 18% of all ankle sprains involve injury to the syndesmosis as well as the medial ankle ligaments.

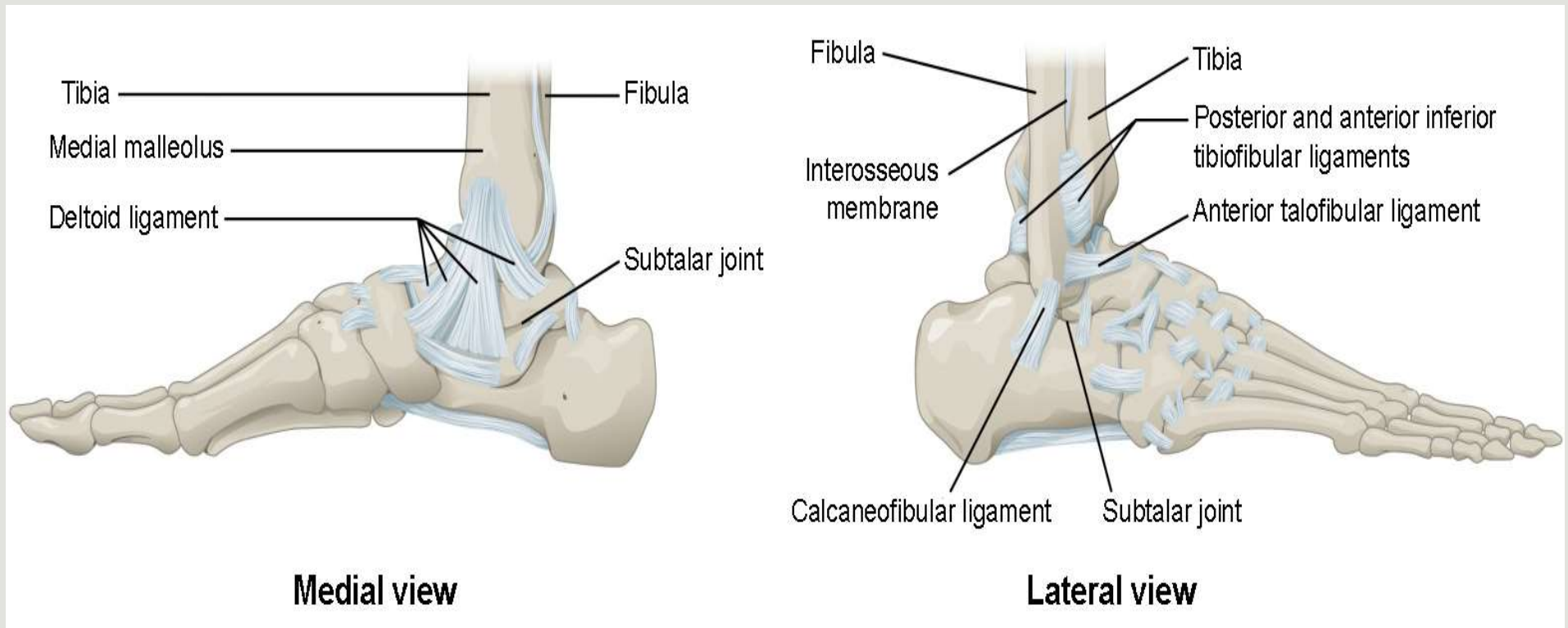


LATERAL ANKLE INJURIES

- An inversion injury where the foot is usually plantarflexed at the time of the injury.
- Supination injury
- Supination/plantar flexion is the weakest position of the ankle.

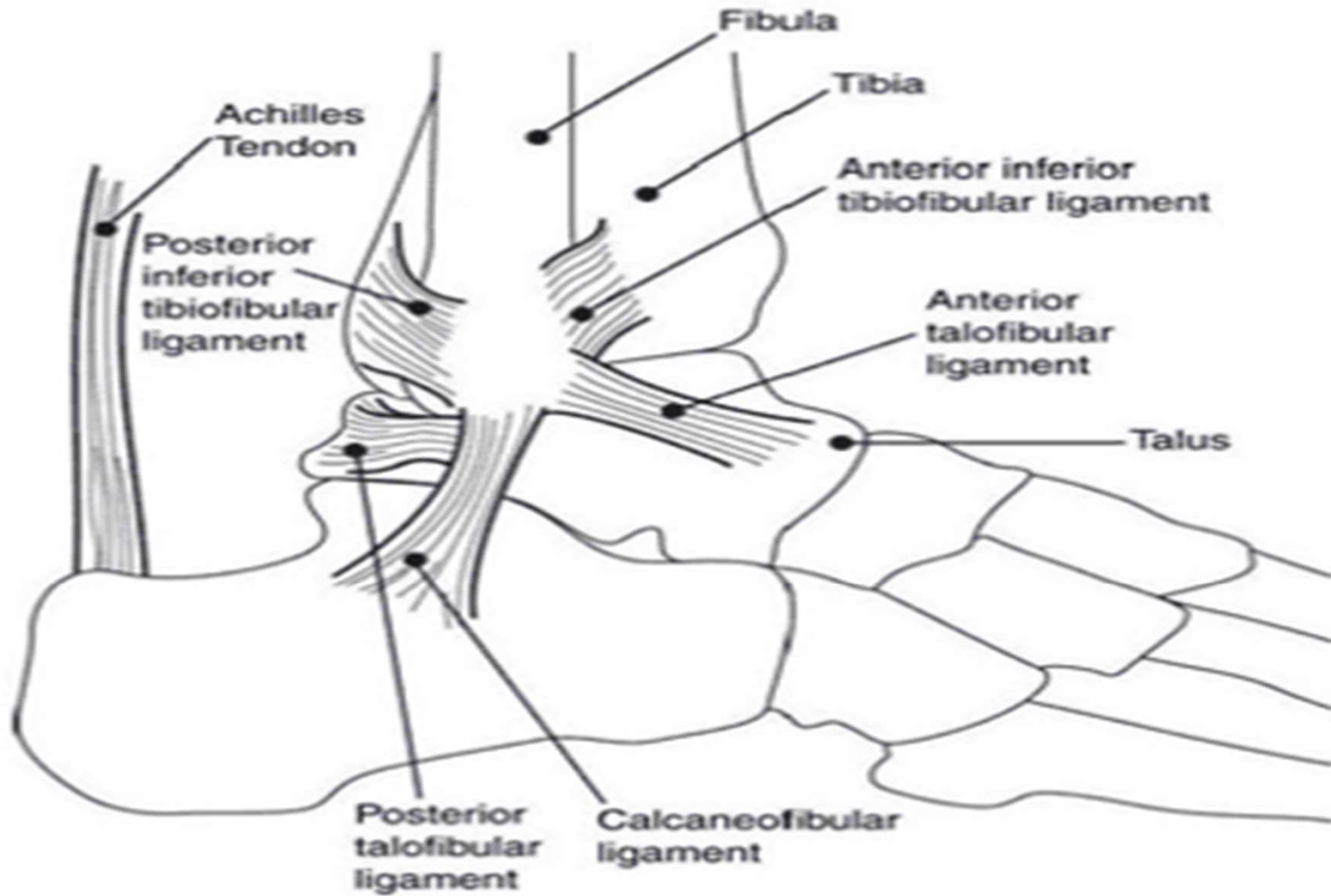


ANATOMY OF THE ANKLE



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Lateral View of the Ankle



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Anatomy of the lateral ankle

- Anterior talofibular ligament (ATFL) is a small thickening of the tibiotalar capsule. When the foot is in plantar flexion, the ligament courses parallel to the axis of the leg. Because most lateral ankle sprains occur when the foot is in plantar flexion, this ligament is most frequently injured in inversion sprains, and found to be ruptured in 65% of cases.
- Calcaneofibular ligament (CFL) and Posterior talofibular ligament (PTFL) which are injured far less frequently, ATFL and CFL injuries were found approximately 20% of the time, and injuries to the PTFL were found in only the most severe of lateral ankle injuries



Grading lateral ankle injuries

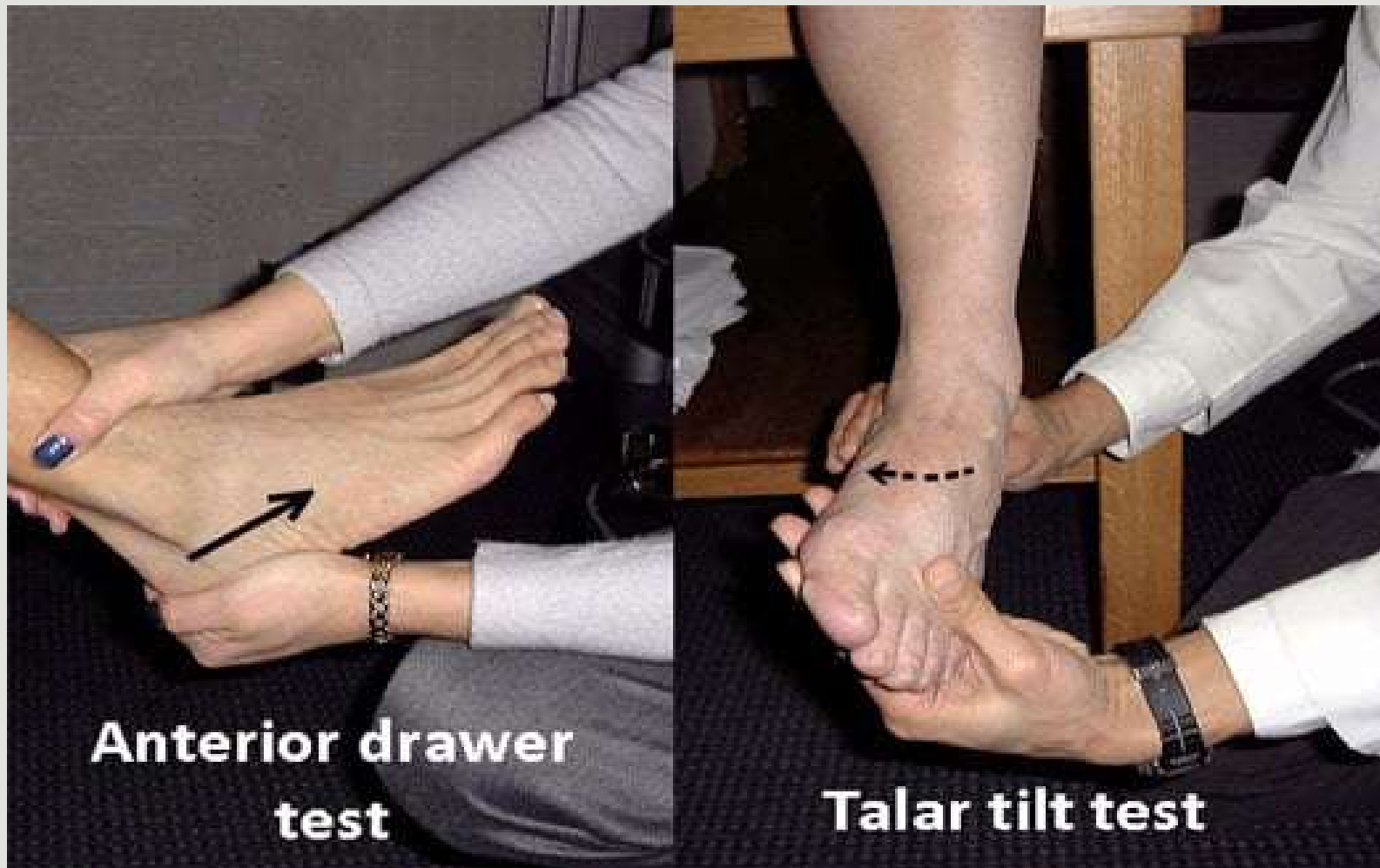
- Grade one (mild). Involves little swelling and tenderness, minimal or no functional loss, and no mechanical joint instability.
- Grade two (moderate). Has moderate pain and swelling, and tenderness over the involved structures, some joint motion is lost, and joint instability is mild to moderate.
- Grade three (severe). Complete ligament rupture with marked swelling, hemorrhage, and tenderness. Function is lost, and joint motion and instability are markedly abnormal



LATERAL ANKLE SPRAINS

- Clinical stability tests for ligamentous disruption are best performed between 4 and 7 days after the injury to allow pain and swelling to diminish.
- Anterior drawer test.
- Talar tilt test





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Treating lateral ankle sprains

- X rays
- RICE rest, ice, compression, elevation
- Ankle brace. Game day, Air cast
- Cam walker
- Weight bearing versus non weight bearing
- Physical therapy
- Preventing long term lateral ankle instability



Plantar Fasciitis

- Pain of the plantar foot in the area of the heel or arch, with or without pain of achilles tendon.
- No history of trauma, often patient speaks of a slow and insidious onset of pain
- “Post static dyskinesia”patient speaks of pain when first standing after periods of non weight bearing.
- No obvious signs of swelling or erythema.



Plantar Fasciitis

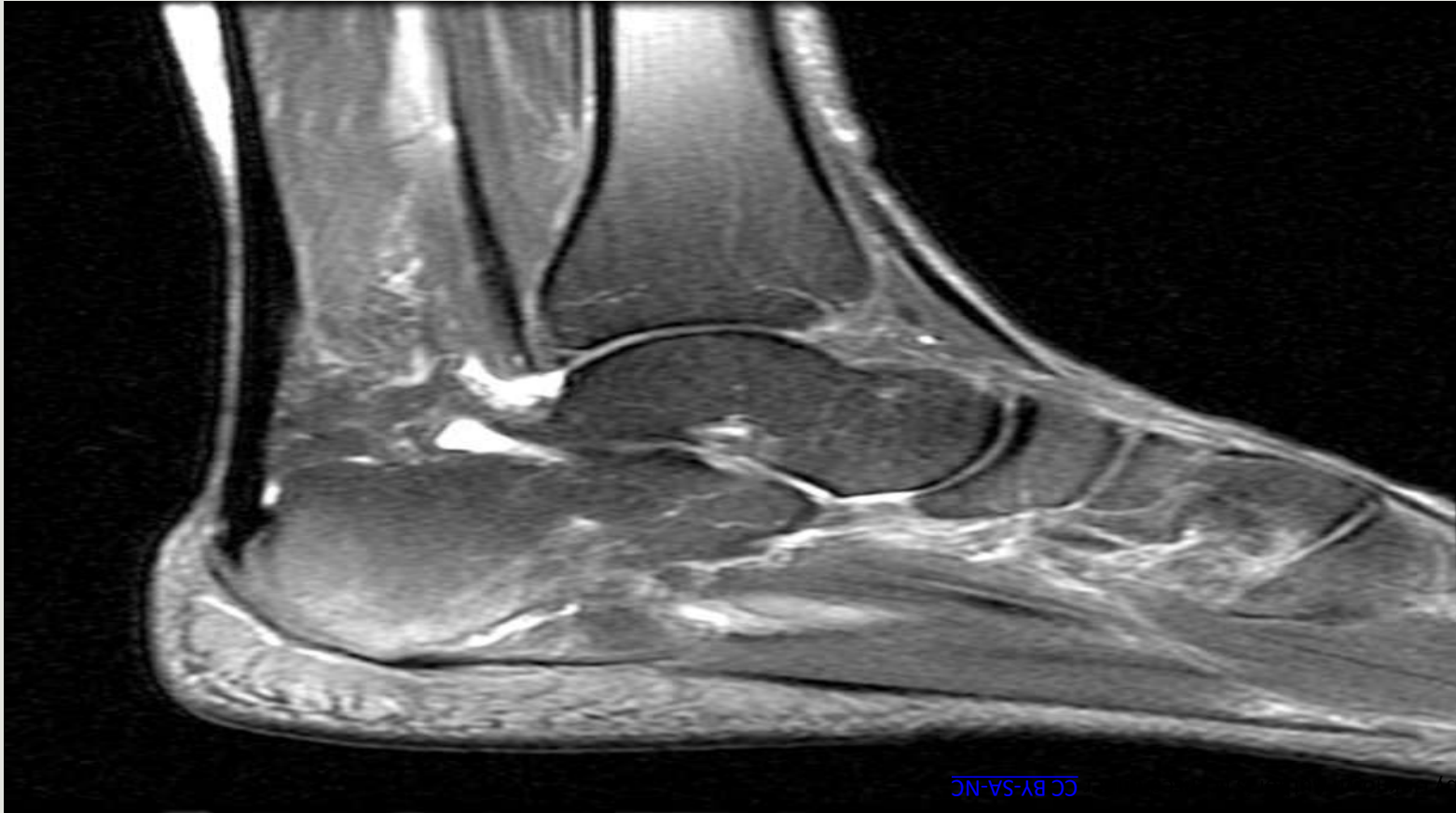
- Risks
- Age...Typically between the ages of 30, and 40 years of age.
- Activities...barefoot activities (martial arts) will increase stress upon the plantar foot.
- Overpronation
- Limb length discrepancy
- Tightness and weakness in the gastric/soleus complex.



PLANTAR FASCIITIS



PLANTAR FASCIA



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Plantar Fasciitis

- Tests
- X rays. More to rule out other diagnosis. Often the discovery of a plantar calcaneal spur is found of lateral views. Should not change treatment.
- Clinical examination. Pain with dorsiflexion of foot upon the ankle in the area of the origin of the plantar fascia upon the calcaneus. Pain with direct palpation. No palpable spur, or gap will be found.



Plantar Fasciitis

- Treatment
 - Stretching
 - Physical therapy (Iontophoresis, low voltage galvanic current stimulation unit to drive topical steroids into soft tissue.)
 - Orthotics/Proper shoe gear
 - NSAIDS
 - Steroid injections
 - Ice versus heat
 - Heel cups, night splints
 - Surgery.



SESAMOIDITIS

- Tibial and Fibular sesamoids:
- Located within the FHL tendon as part of the plantar plate beneath the first MPJ.
- Act like pulleys to provide a smooth surface over which the tendons slide, increasing the ability of the tendons to transmit muscle forces.
- Also assist with weightbearing forces.

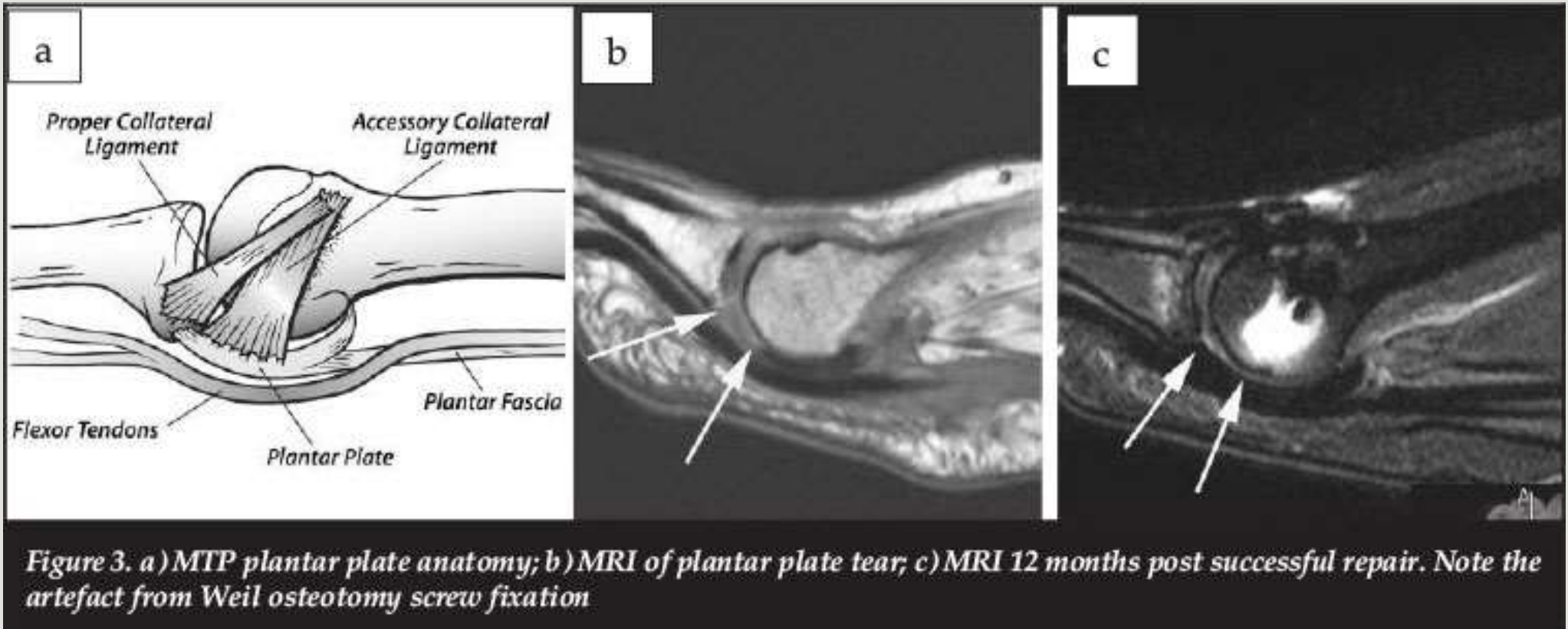


SESAMOIDITIS

- The FHL tendon becomes inflamed (tendinitis), but due to the presence of the sesamoids, it is referred to sesamoiditis.
- Symptoms are:
 - Pain of plantar aspect of first MPJ.
 - Swelling and sometimes bruising
 - Difficulty with dorsiflexion of hallux



SESAMOIDITIS



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Sesamoid and bipartate sesamoid



SESAMOIDITIS

- Treatment:
- X rays. A sesamoid can be fractured (differentiate from a bipartite sesamoid)
- Ice, rest, stop activities related to cause
- NSAIDS
- Orthotics...1st, to offload forefoot, 2nd, a gait analysis by an expert to determine if biomechanics had anything to do with the start of the sesamoiditis (severe pes cavus or severe pes planus).
- Steroid injections???

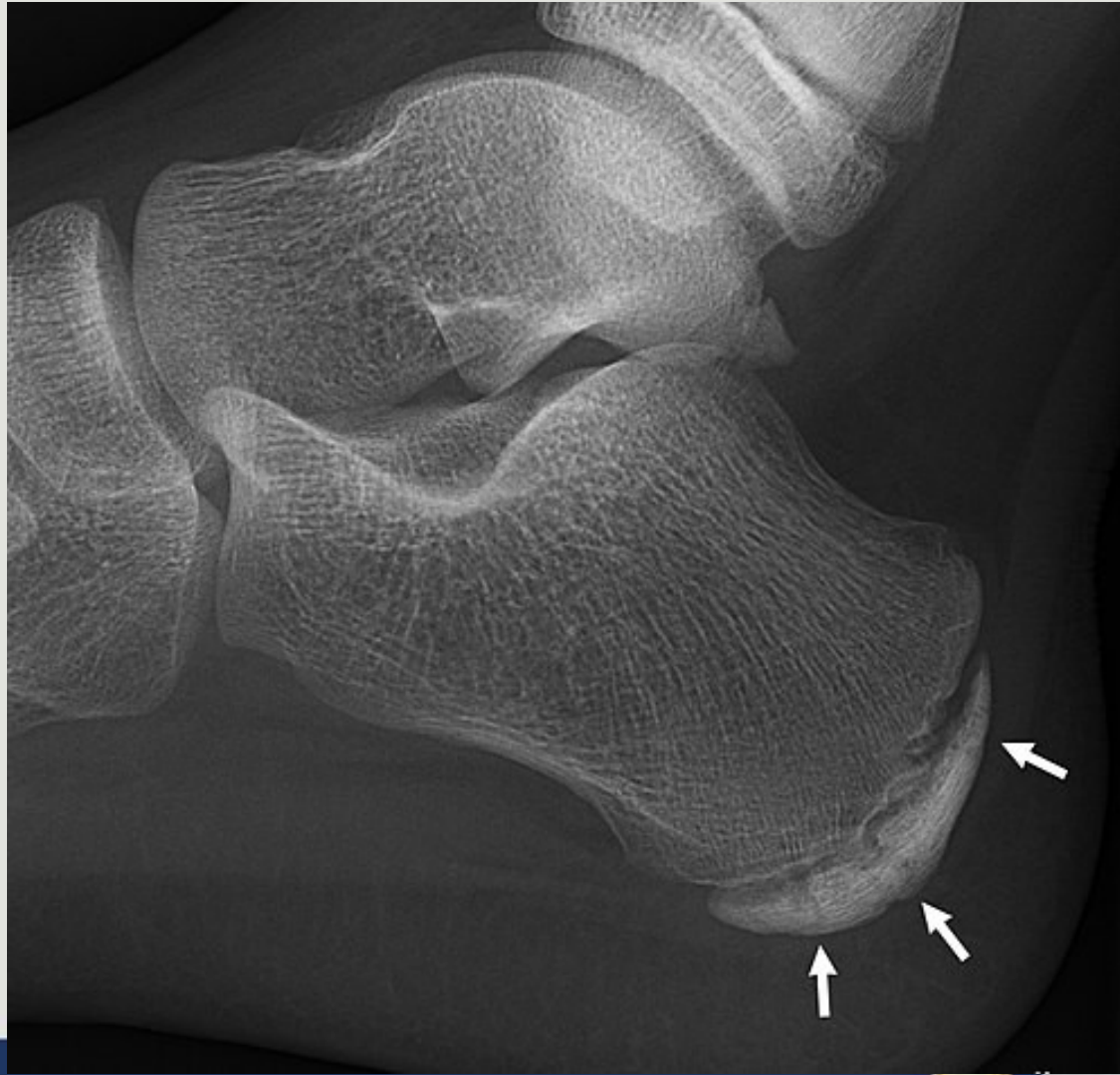


SEVER'S DISEASE (SYNDROME)

- Also known as calcaneal apophysitis. It is pain of the posterior calcaneal growth plate.
- Pain is usually very specific, the child will point to the posterior, plantar aspect of their heel. (It will sometimes radiate up into the achilles)
- Girls ages 7-13
- Boys ages 10-15



SEVERS DISEASE



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SEVER'S

Symptoms

- Often accompany a child's growth spurt.
- Sports that require intense running.
- Direct impact to posterior heel.
 - Barefoot activities, or playing on surfaces like artificial turf, both of which increase the pressures on the child's foot.



SEVER'S

- Treatment:
- X-rays, rule out fracture, also to see if the growth plate is still open.
- Ice, rest, temporarily stop activities.
- Stretching is most important (night splint). I often advise going to Physical therapy to allow an expert to assist in the child's care.
- Orthotic...if the child severely pronates, they will need orthotic control.
- Gel heel cup if the orthotic is not necessary.
- Proper shoe gear.
- Specialty Sever's ankle supports ??
- NSAIDS, if appropriate



SEVER'S

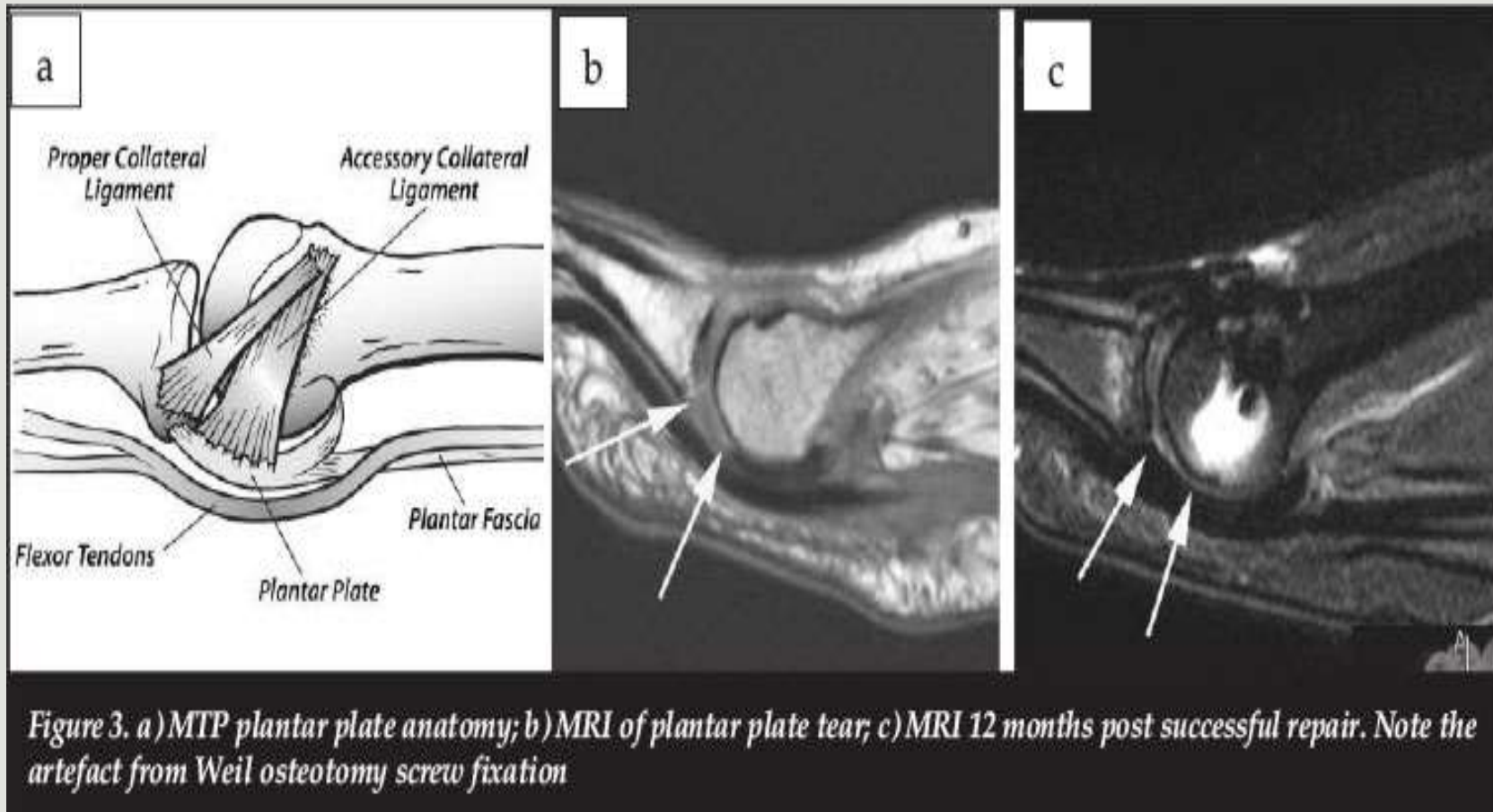
- Chronic, unresponsive sever's pain:
- Cam walker with heel lifts
- Fiberglass cast non weight bearing
- Complete shut down from all physical activities for at least 4-6 weeks.



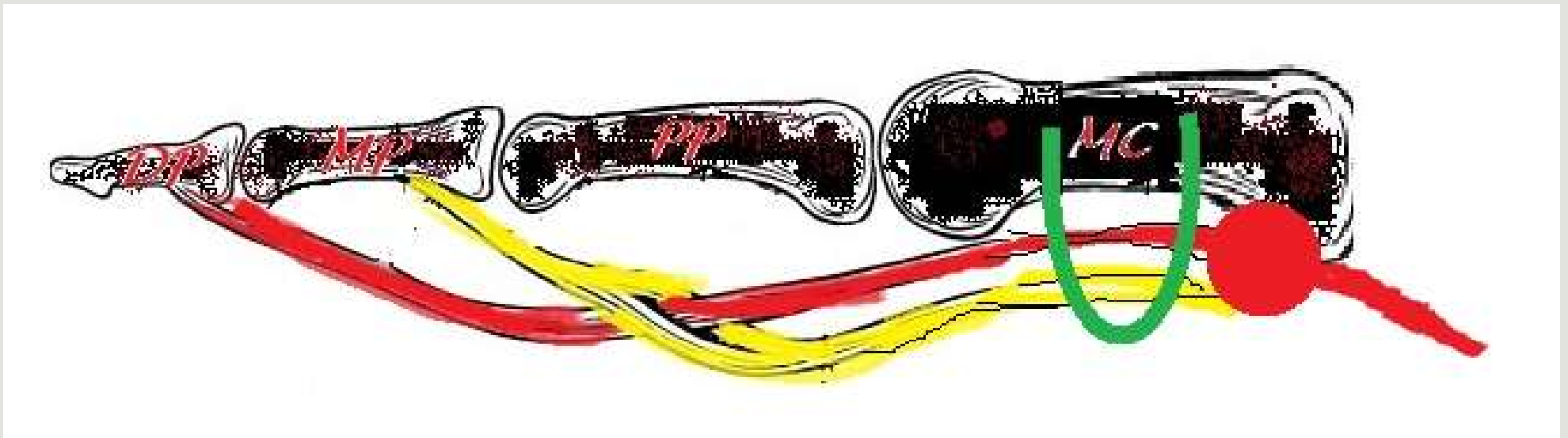
Trigger toe/FHL tendinitis

- Hallux becomes permanently flexed at IPJ.
- Three types: Flexible
 - Semi flexible
 - Rigid
- Ballet dancers from standing en pointe placing tremendous force upon the distal hallux





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Trigger toe/FHL tendinitis

- Treatment
- For the less severe, Flexible or Semi flexible, treatment includes rest, ice, NSAIDS, and PT.
- For more severe, Rigid, and MRI is needed to ascertain the damage to the FHL tendon, and likely surgical intervention to follow.







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Martial arts injuries of the foot and ankle

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Martial arts injuries of the foot and ankle

- Achilles tendinitis
- Achilles tendon rupture
- Ankle sprains
- Fractures
- Plantar fasciitis
- Sesamoiditis
- Severs disease



FOOT FRACTURES

- Management (most fractures take between five and eight weeks to repair)
- Depending on the location of the fracture, and the nature (non displaced versus displaced) treatments options include;
 - casting
 - cam walker
 - post op shoe
 - graphite plate



Martial arts injuries of the foot and ankle

- TaeKwon Do: Given its official name by its creator, General Choi of Korea, on 4/11/1955
- Grandmaster Suk Jun Kim, 9th degree black belt, and member of General Choi's demonstration team, student, and creative advisor to General Choi, now President of TaeKwon Do International.
- Grandmaster Mark Nathanson, 8th degree black belt, highest ranking student of Grandmaster Kim, and only student to start with Grandmaster Kim as a white belt and reach the level of 8th degree.



FOOT FRACTURES

- Most common are metatarsal shaft fractures.
- Fracture of toes is second most common.
- Jones fracture of the base of the fifth metatarsal, often associated with lateral ankle sprains.
- Signs and symptoms range from pain, swelling, ecchymosis (not initially), swelling.
- Deformity of the foot is often absent.



FOOT FRACTURES

- The ability to walk, stand, or run is never a good indicator of the severity of the injury.
- When in doubt, always seek an x ray to rule out any type of fracture.





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FOOT FACTS

- The average person takes between 3000 and 4000 steps per day (1.5-2 miles per day).
- 2000 steps per mile
- 30 minute brisk walk has 3000 steps.



FOOT FACTS

- Every pound of fat is comprised of approximately 3500 calories.
- In order to lose one pound per week, an individual would need to take 10,000 steps per day (5 miles), which would burn 500 calories per day.



FOOT FACTS

- **RUNNING VERSUS WALKING**
- Running places 3 ½ times your body weight upon your feet.
- The average 150 pound person places 525 pounds upon each foot with each stride during running.



FOOT PROBLEMS

- Bunions
- Hammertoes
- Diabetes and related foot problems
- Fractures
- Gout
- Plantar fasciitis (heel spurs)
- Arthritis
- Fungal nails
- Foot and ankle tendinitis
- Ankle sprains
- Athlete's foot
- Plantar warts



NORTH JERSEY OFFICES

- Paramus
- Montvale
- Rutherford

Non Op Physicians

- Chris Cherian, MD Sports Med.
- Mark Nathanson, DPM Foot and ankle.

REGIONAL UPDATES

- Dr Cherian and Dr Nathanson visiting medical offices on a weekly basis, along with holding zoom calls/lectures to local groups, PT offices on selected topics.
- We recently represented Rothman at the Snow Bowl at Met Life stadium. A flag football event organized to raise money for the Special Olympics.
- Currently working out the details in creating a one day seminar given to physical therapists on the topics of treating martial arts and dance injuries. A project coordinating Rothman Orthopaedics with Professional Physical Therapy.

REGIONAL UPDATE

- STAFFING ISSUES
 - CA
 - Both Dr Cherian and myself have one CA assigned to us full time. No other employee is dedicated to our team.
- ORTHOTICS
 - Currently we have three offices, and only one orthotics person.
 - NEED: At a minimum we need two more orthotic staff so that each office is fully functional, and at least one or two MA's dedicated to non op so as to allow normal flow of patients.