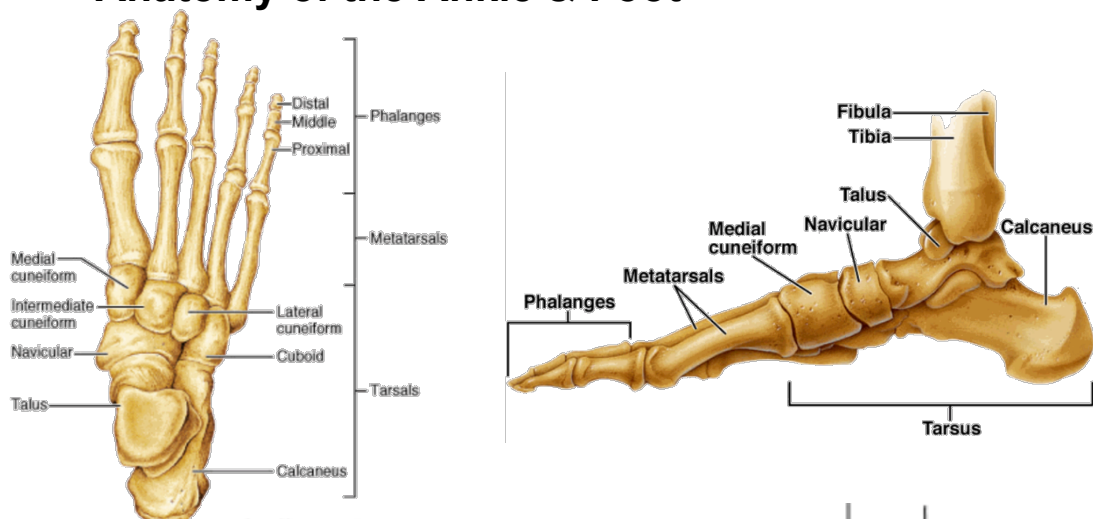


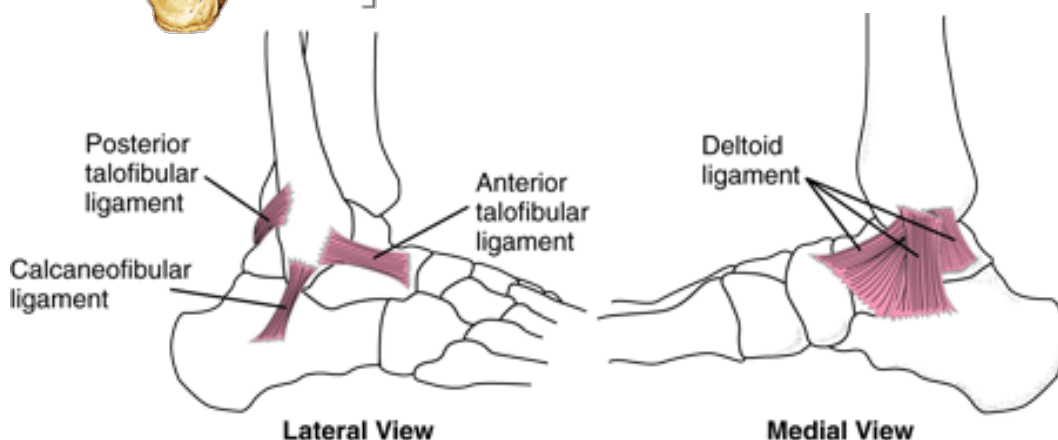
Common Ankle & Foot Injuries in Dancers

Anatomy of the Ankle & Foot

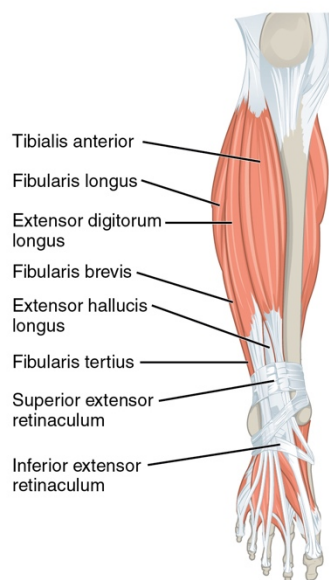
Bones



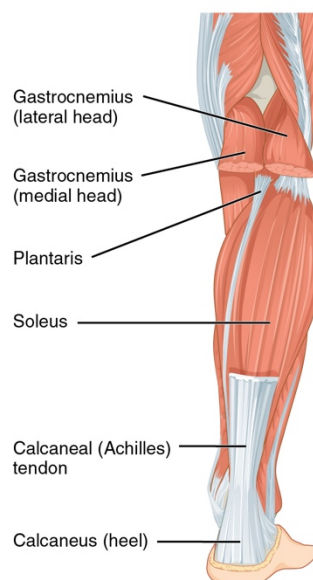
Ligaments



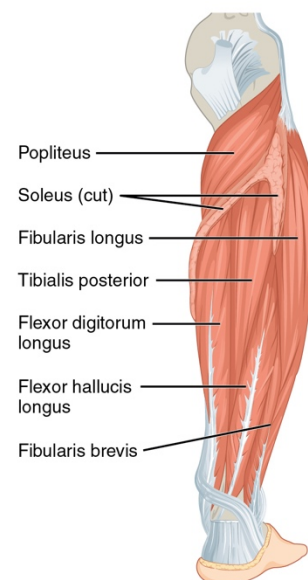
Muscles



Superficial muscles of the right lower leg (anterior view)



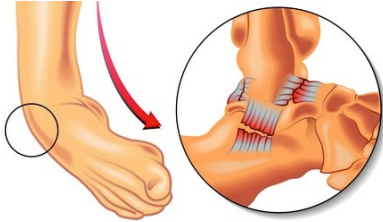
Superficial muscles of the right lower leg (posterior view)



Deep muscles of the right lower leg (posterior view)

Ankle Sprains

- Most commonly affects the anterior talo-fibular ligament, ATFL.
- Usually caused by an inversion injury (combined with rotation).

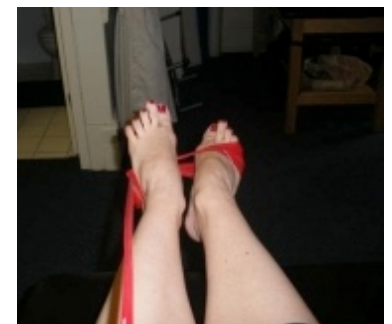


- In dancers, it often occurs during improper landing of a leap, or falling out of pointe.
- Commonly becomes a chronic problem if left untreated.

What puts me at risk?

- High arches
- Stiffness of big toe joint (hallux rigidus)
- Tight Achilles tendon
- Weak calf muscles
- Weak feet (intrinsic muscles)
- Weak peroneal muscles
- Lack of control of the turn-out
- Hypermobility syndrome
- Ballet dancers, dancing in pointe shoes

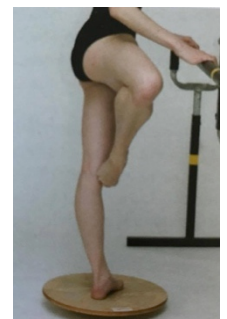
Level of Sprain	Description
Grade 1: Mild	-Microscopic tearing -Some pain and swelling -Symptoms usually subside in a few days with a rest, elevation and short periods of icing. Do not run or jog during this time.
Grade 2: Moderate-Severe	-Partially torn ligament -Pain, swelling, bruising -Walking painful and may need walking aid.
Grade 3: Severe	-Completely torn ligament -Considerable pain, swelling, bruising, and instability, or giving way may be experienced. -Weight-bearing difficult, and may require walking aid.



Injury Prevention Exercises

- 2x 60 second holds, calf stretching daily on stair (to stretch Achilles tendon & gastrocnemius/soleus muscles)
- 3x10 repetitions, ankle eversion resistance exercises (to strengthen fibularis muscles)
- 3x10 repetitions of relevé in 1st, 2nd, 4th and 5th positions (to strengthen calf muscles)
- 2x 60 second holds, calf stretching daily on stair (to stretch Achilles tendon & gastrocnemius/soleus muscles)
- 3x 2 minute holds, balance board at the barre
- 2x 60 second holds on both feet, big toe stretching (to decrease stiffness)
- KT taping for ankle instability (to help with control):

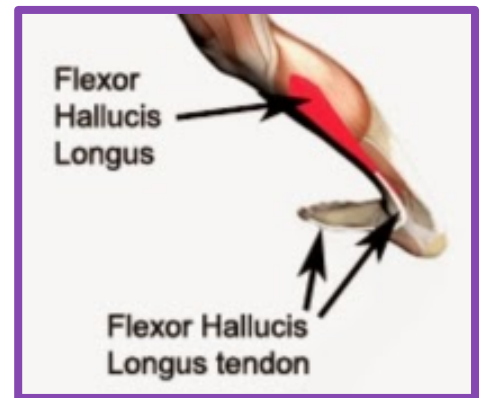
<https://www.youtube.com/watch?v=-ySkXxXCybg>



Treatment: *Refer back to Basic Principles of Injury & First Aid Handout: RICE

Flexor Hallucis Longus (FHL) Tendinopathy

- Caused by irritation or inflammation to the tendon.
- The FHL helps you rise up onto your toes, bending your big toe, and helping to maintain the arch of your foot.
- Symptoms include: pain in the inside of your ankle that travels down to your big toe, or in some cases pain only on the ball of your foot, stiffness when waking up, hearing or feeling a clicking, or swelling on the inside of the ankle.
- Usually an overuse injury caused by incorrect weight-bearing on the foot, and in dancers excess pressure on the tendon in relevé.

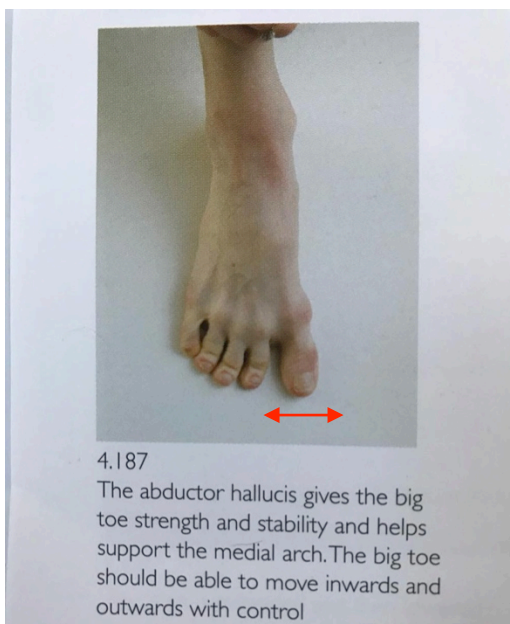
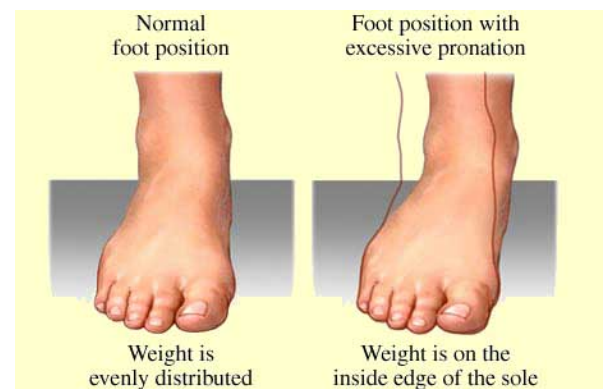


What puts me at risk?

- Low arches (excessive pronation)
- Insufficient hip turn-out
- Tendency to sickle the foot when pointed
- Having a short big toe
- Poor ankle strength

Treatment

- Ice over any areas of swelling, ultrasound
- Calf self-massaging/foam roller
- Improving Hip turn-out with daily stretching
- 3x10 daily Abductor Hallucis strengthening



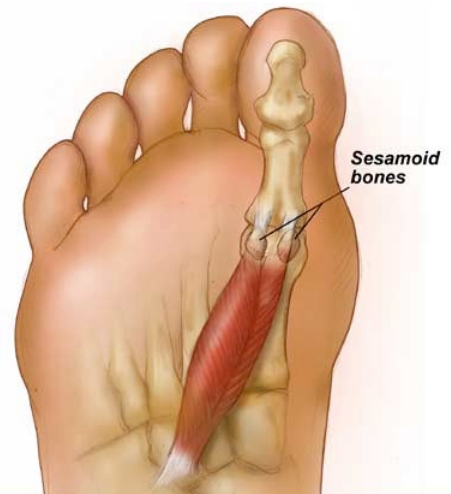
- 3x10 towel scrunches *Refer to basic principles of Injury & First Aid Handout (Strengthening of the foot intrinsics)
- Placing marbles from one surface into a cup (Strengthening of the foot intrinsics)



- Alternatively, a toe spacer worn between the 1st and 2nd toes to help compensate for weakness.

Sesamoid Injuries

- 2 small (bean-sized) bones at the base of the big toe
- Common pathologies include: fractures, stress fracture, ganglion cysts between the sesamoid bones, chondromalacia (damage to cartilage).
- Dancers will often compensate by putting more pressure on the outside of the foot (supination) when going into relevé due to pain at the 1st metatarsal phalangeal (MTP) pain.
- Usually due to a direct trauma, in dancers after a poor landing, on a hard surface.



What puts me at risk?

- Weak big toe
- Poorly fitting footwear

Treatment

- Ice to the swollen area
- Modification of footwear, use of orthotics (sesamoid pad) to add support during increased weight-bearing



Available at: Walmart

PediFix Sesamoid Relief Sleeve Large \$14.40

<https://www.walmart.com/ip/PediFix-Sesamoid-Relief-Sleeve-Large-Left/104561546>

Available at: Amazon

Performance Foot Dancer/Sesamoid Pad -1/8 inch Purple Gel Reusable \$9.77

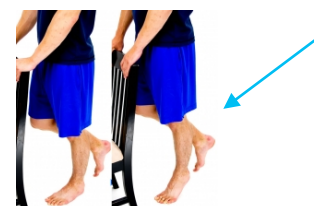
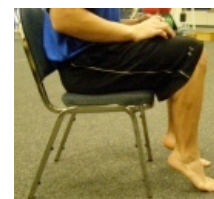
<https://www.amazon.com/PerformanceFoot-Dancer-Sesamoid-Purple-Reusable/dp/B008MB09XM>

Available at: Myfootshop.com

Dancer's Pads Premium Felt \$9.45 or Reusable Gel Dancer's Pads \$12.30

<https://www.myfootshop.com/article/sesamoiditis>

- Strengthening & Stretching
Toe flexion & extension 3x10 with 5 second holds during extension to promote stretch.
- Do smaller motions to start, working up to bigger motions
- Stop if you are experiencing pain
- Heel Raises
-First begin exercise seated in chair 2x15
-Progress to standing on both legs 2x15
-Progress to standing on the affected leg 2x15



Achilles Tendinopathy

Excessive supination →

- The Achilles tendon is the thickest tendon of the human body connecting the muscle bellies of the gastrocnemius and soleus muscles.
- The Achilles tendon is not surrounded by a covering, therefore inflammation to the tendon may cause small tearing to the tendon itself, larger partial tears, or a degeneration.



What puts me at **risk**?

Excessive pronation →

- Excessive pronation or supination positioning of the foot
- Inability to get into high relevé position (more strain placed on Achilles tendon in low relevé)
- Overuse causing fatigue or weakness of the gastrocnemius, hamstrings, quadriceps, gluteals or any combination of these muscle groups.
- Swayback
- Knee hyperextension
- Dancing with your weight shifted too far back
- Curling of the toes in tendu
- Pointing your toes with a sickled foot
- Failing to get your heels down to the ground in demi plié position



Treatment

- Trigger point release, foam rolling, and massage techniques to the calf
- 2x60 second holds daily stretching of the gastrocnemius muscle
- 2x60 second holds daily stretching of the soleus muscle

-Emphasize eccentric exercise (just the heel lowering down phase) on the affected leg to strengthen the calf musculature as it lengthens

Gastrocnemius stretch
Back leg straight



Soleus stretch
Back knee bent



Plantar Fasciitis

- The plantar fascia (PF) is a tough band of tissue on the bottom of the foot, running from the ball of the foot and attaching to the bottom of the heel.
- Most commonly inflammation of the tissue occurs due to overuse, however it can be due to an acute strain. Check for trigger points in the calf and foot, as these refer to the PF
- Potential for bone spurring to occur.
- Pain is usually of gradual onset, can be throbbing or constant, and occurs when weight-bearing on the foot. Tenderness is most often localized to the bottom of the heel, and usually first occurs in the morning when getting out of bed.

What puts me at **risk**?

- Excessive pronation of the foot
- Weak foot intrinsic muscles
- High or low arches
- Dancing in high heels for prolonged periods



Treatment

- Can be very slow to heal!
- Studies show 90% chance of healing in 9 months regardless of treatment
- Initial stages: rest, ice, foot intrinsic exercises shown on previous pages & *Refer to Basic Principles of Injury & First Aid Handout
- Taping techniques to the bottom of the foot

*Refer back to KT Taping & Ankle Instability Handout: Plantar Fasciitis Taping Technique

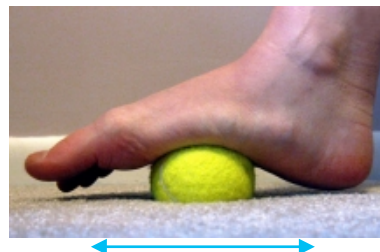
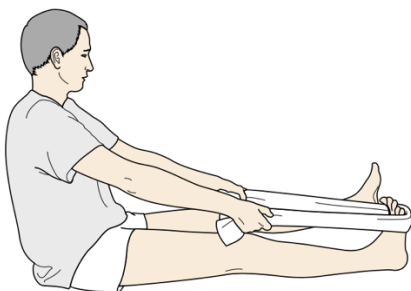


- 2x60 second holds daily stretching of the gastrocnemius
- 2x60 second holds daily stretching of the soleus muscle

(Pictures shown on the page above)

- Daily dynamic stretching of the plantar fascia

-Rolling the tennis ball back and forth underneath the arch
-Perform for a few minutes per day



- 2x60 seconds Achilles tendon and plantar fascia towel stretch daily

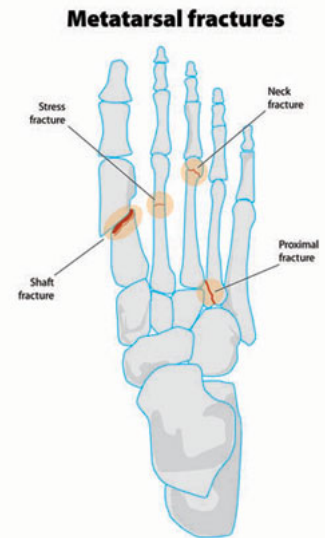
Metatarsal Stress Fractures & 5th Metatarsal Fracture

“March or Dancer’s Stress Fracture:”

- Is a fracture in the middle of the second or third metatarsal bone of the forefoot. This injury usually occurs in ballet dancers at the base of the second metatarsal. Pain is usually in the middle of the mid-foot.
- Dancers can usually return to weight-bearing activities about 6 weeks from the time of diagnosis.

5th Metatarsal Fracture:

- The 5th metatarsal is a small bone on the outside of the forefoot below the ankle.
- This is a common area of injury caused by abrupt twisting of the foot, when coming down from a leap incorrectly, or falling out of relevé and rolling the ankle.
- Dancer may feel a pop, have immediate pain, discoloration, and swelling in the area.



What puts me at risk?

- Having a longer 2nd or 3rd toe compared to the big toe
- Weak foot intrinsic muscles
- Dancing on solid wood floors or concrete surfaces
- A lot of pointe work or jumps required in choreography
- Decreased forefoot strength or shoe support
- Stiff big toe (Hallux rigidus)
- Failing to hold proper turnout
- Dancing with your weight shifted too far behind



Treatment

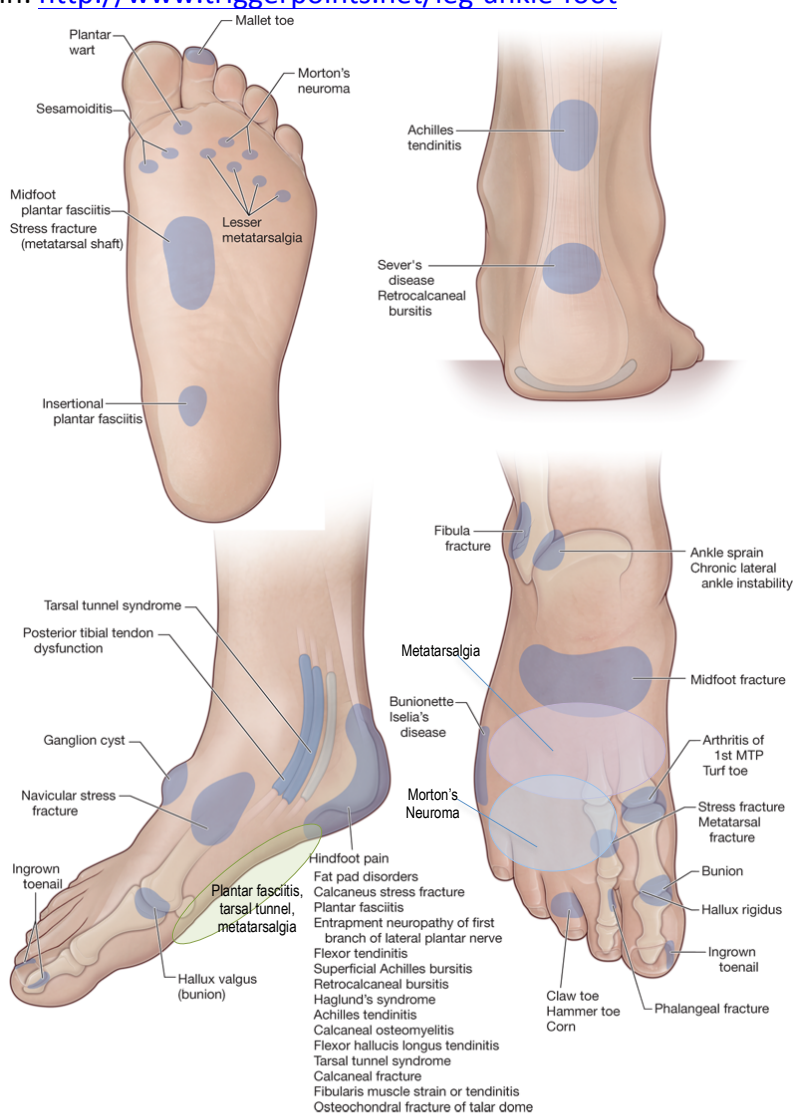
*Refer back to Basic Principles of Injury & First Aid Handout: RICE treatment, & Ottawa Foot & Ankle Rules on whether to see the doctor

- **If diagnosed with 5th Metatarsal Fracture:** Firm shoes & crutches will usually be a standard form of treatment. Dancers can usually return to full activity within 2 months from the time of the injury
- Stress Fracture: Rest time is required for fracture to unite
- Early exercises include:
 - Ankle ROM all directions
 - Toe ROM: Toe flexion & extension 3x10 with 5 second holds
 - Towel scrunches or marble exercises (to strengthen foot intrinsics)
 - Toe spreading with 5 second holds (to strengthen foot intrinsics)



Additional resources

- The Foot Pain Identifier web site can help you figure out what is causing your pain:
<http://www.foot.com/site/foot-pain-identifier>
- Triggerpoints.net - A web site with information about trigger points that cause lower leg, ankle and foot pain: <http://www.triggerpoints.net/leg-ankle-foot>



Source: Mark Dutton: Introduction to Physical Therapy and Patient Skills
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Picture modified from
Dutton, Introduction to
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Resources used in this handout:

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