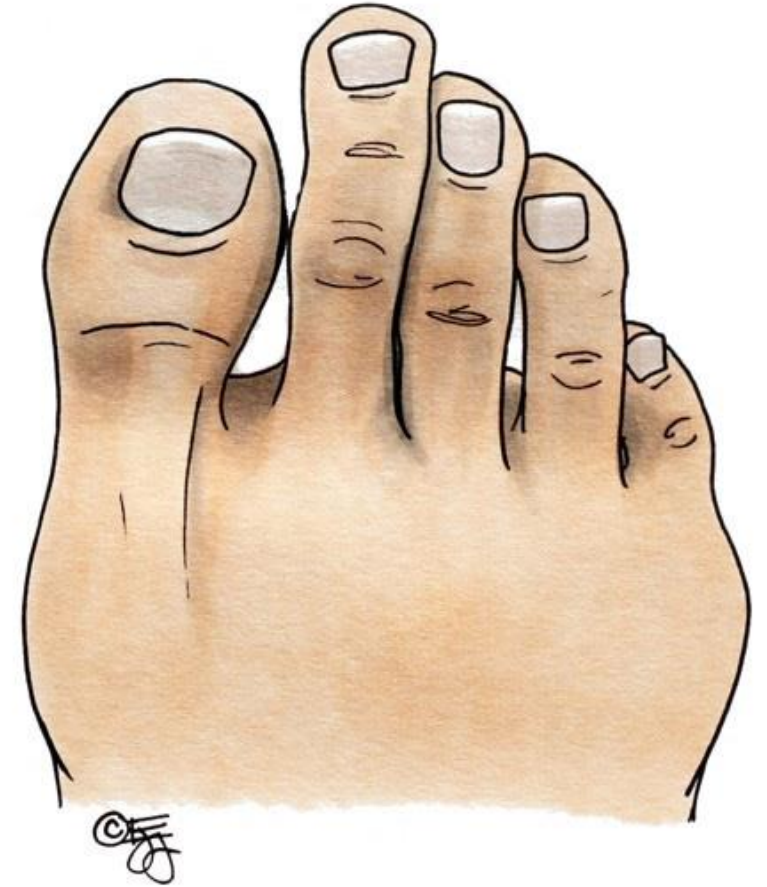


Additional Foot Pathologies

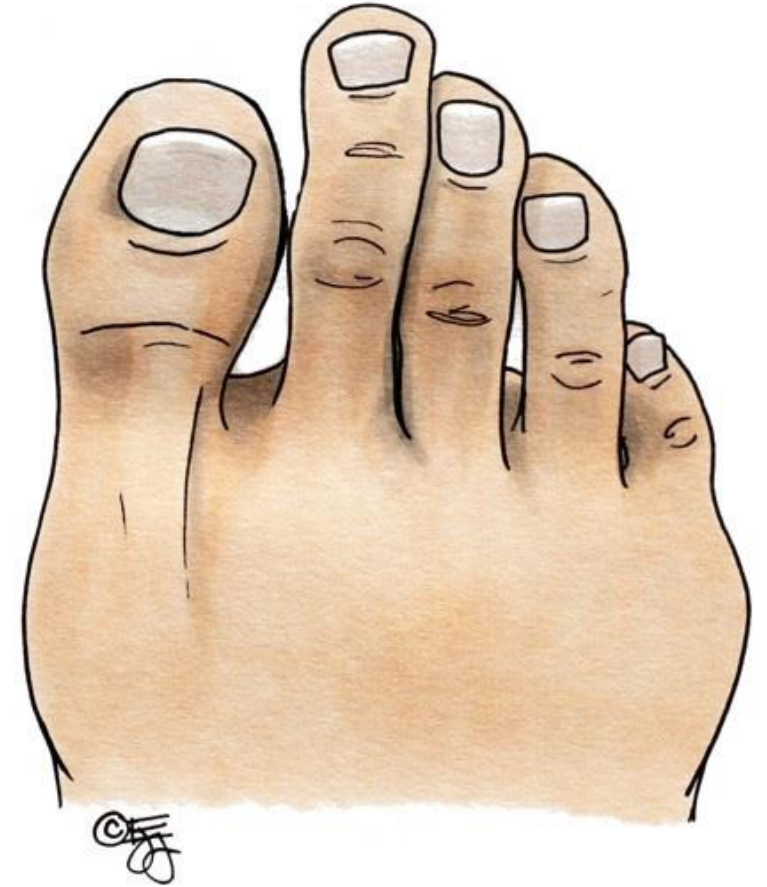
Morton's Toe

- Also called a “Greek foot” or “Royal toe”
- Generally considered more of a foot type rather than a pathology.
- The name derives from American orthopedic surgeon Dudley Joy Morton, MD, who originally described it as part of his so-called “Morton's Triad”: a congenital short first metatarsal bone, a hypermobile first metatarsal segment, and calluses under the second and third metatarsals.



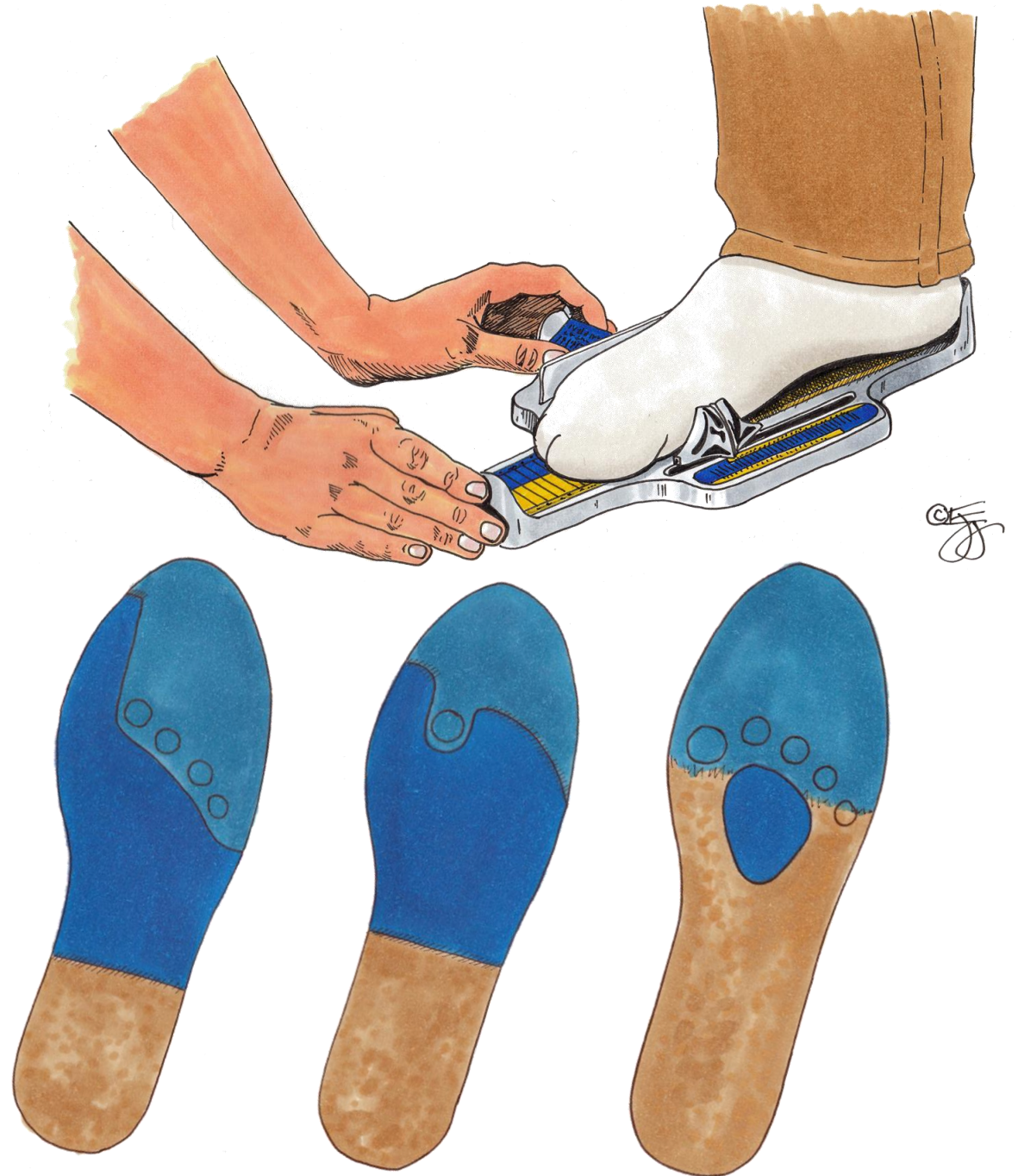
Morton's Toe

- Although the obvious presentation is a “long” second toe, it is actually a type of brachymetatarsia where the first metatarsal is short.
- *Brachymetatarsia* is a condition in which the metatarsal physis closes prematurely yielding a pathologically shortened metatarsal length. It can affect any of the five metatarsal bones of the foot and it could be bilateral.



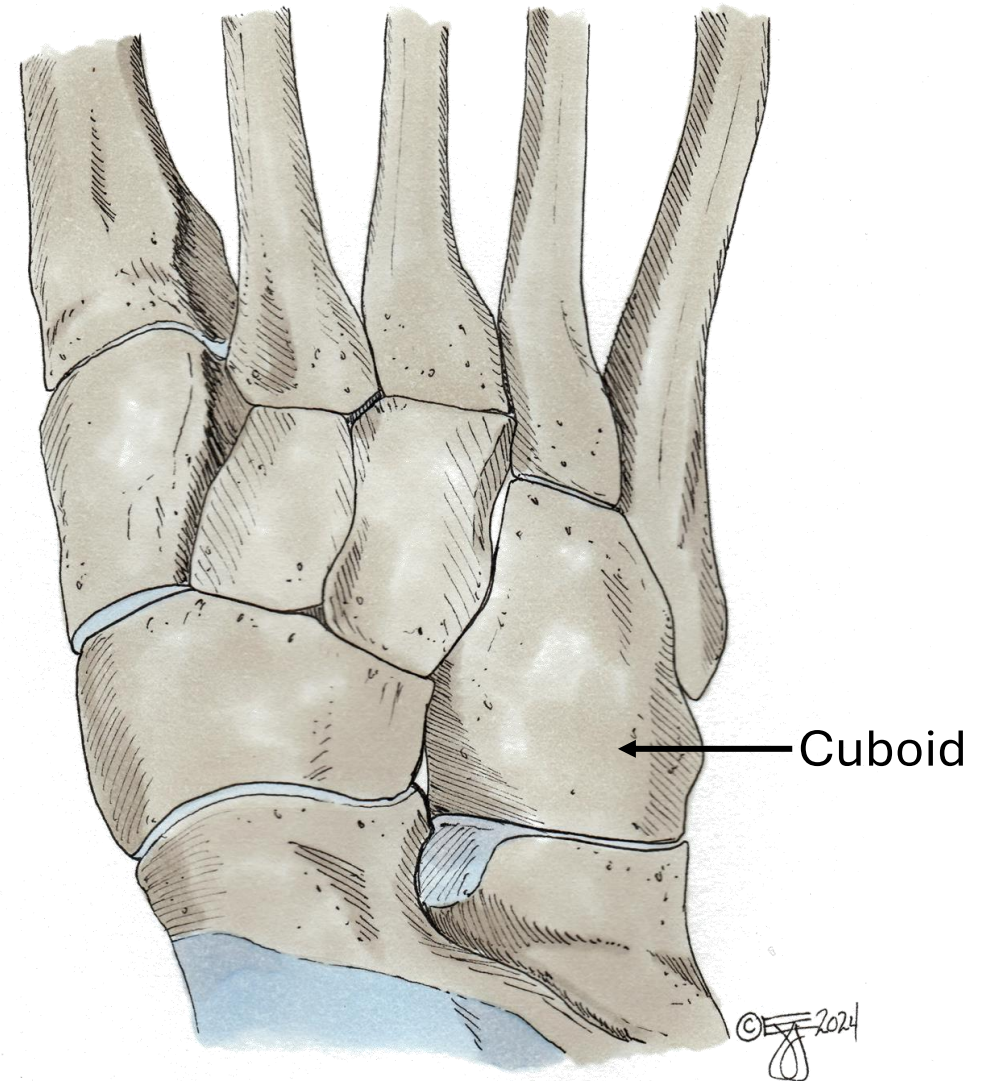
Morton's Toe

- When fitting shoes, always measure to the end of the longest toe.
- When checking shoe fit, verify length according to the second toe if the patient has a Morton's toe.
- Patient may experience excess pressure and pain under the 2nd (and sometimes 3rd) metatarsal heads.
- Pedorthic interventions:
 - Foot orthoses to offload the 2nd MTH. Loading of the 1st MTH may also be considered with the intention to normalize weightbearing pressures across all five MTHs.
 - Rocker soles, or at least, a good quality walking or running shoe with a factory rocker sole built in.



Cuboid Syndrome

- Cuboid syndrome is an articular pathology wherein the cuboid is out of normal congruity with the five bones with which it articulates (calcaneus, navicular, 4th and 5th MT bases and the lateral cuneiform).
- Left uncorrected, this subluxed cuboid can lead to:
 - Midfoot arthritis
 - Peroneus longus tendinitis
 - Compensated gait patterns



Cuboid Syndrome

- Cuboid syndrome (a.k.a. *dropped cuboid*) is a common condition that is often misdiagnosed and, therefore, mistreated.
- It is common in people who have suffered severe and/or multiple inversion ankle sprains. The sudden tension of peroneus longus tendon during the inversion episode causes the cuboid to pop out of position.
- Repeated inversion injuries accelerate wear and tear of the joint capsule and ligaments surrounding the cuboid, increasing the frequency of episodic cuboid subluxation.

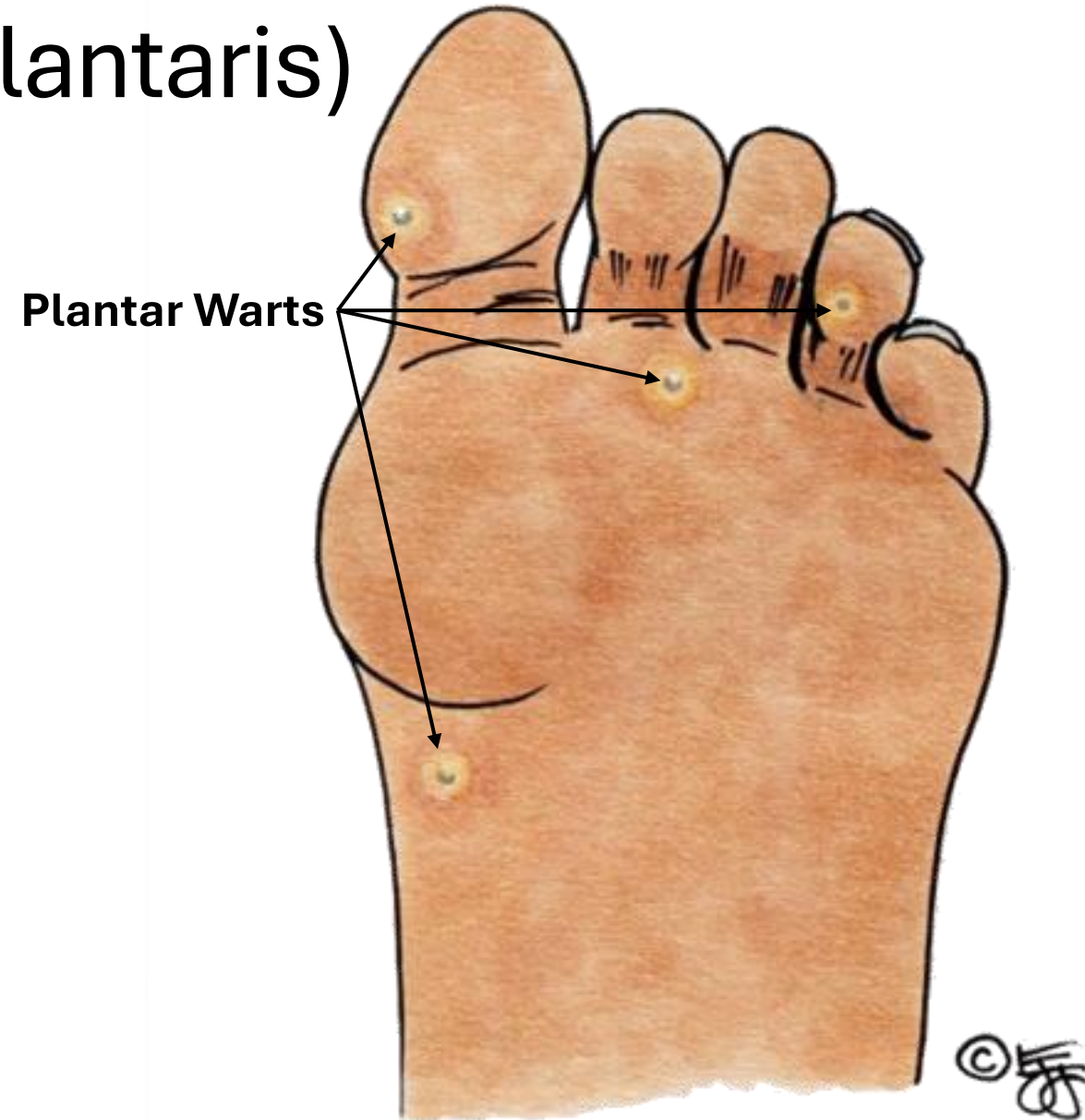
Cuboid Syndrome

- Patients will describe point tenderness and/or bony ache.
- There may be swelling, bruising or erythema around the area.
- Pedorthic intervention:
 - Footwear: Stable with good hindfoot support. So-called “motion control” shoes should be avoided.
 - Shoe modifications: Lateral wedge and/or flare may be useful in chronic cases.
 - Foot orthoses: Corrective functional or total contact foot orthoses to relieve stress and strain on cuboid joint capsule. Not much evidence to suggest that FOs will prevent cuboid syndrome, however custom foot orthoses with soft cuboid padding and lateral hindfoot posting can be effective in treating an episode.
 - SCFO: Arizona Mezzo®-style SCFO +/- incorporated cuboid pad.



Plantar Warts (Verruca Plantaris)

- Small growths that appear on the plantar surface of the foot. Caused by a virus (human papillomavirus-HPV)
- **Causes**
 - Tiny cuts and abrasions
 - Walking barefoot on contaminated surfaces
- **Preventions/Treatments**
 - Changing socks/shoes regularly
 - Footwear in communal shower, locker rooms, etc.
 - Medications and surgery



Plantar Warts

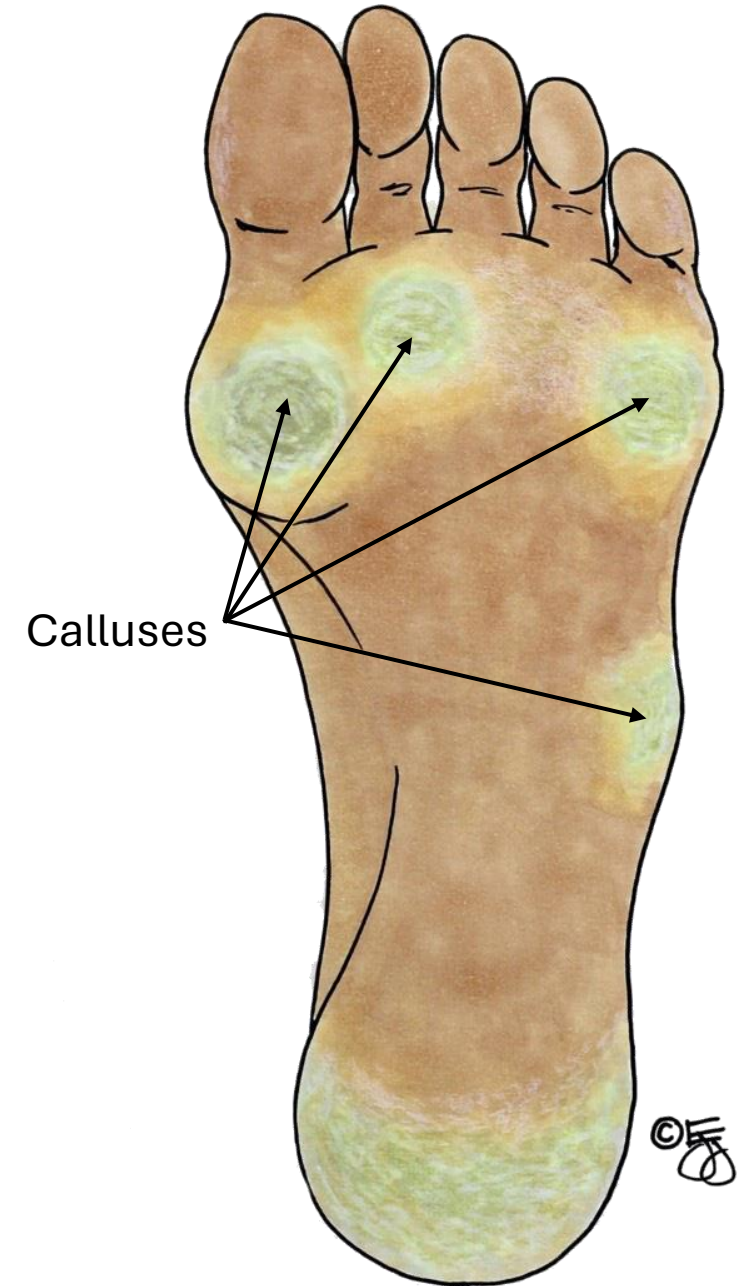
- Plantar warts are sometimes misdiagnosed as intractable plantar keratosis (IPK) and referred to a podiatrist for a foot orthosis to offload the “IPK”.
- While warts can be painful (and offloading certainly helps the pain) the foot orthosis will do nothing to actually resolve the problem.
- Plantar warts often go away on their own after one to two years, after the immune system fights off the virus. However, because plantar warts can spread, cause pain and make one feel self-conscious, the physician may recommend treatment.

Plantar Warts

- Treatment:
 - Cryotherapy: The dermatologist applies extreme cold to freeze and destroy the plantar wart. Liquid nitrogen or argon gas is used to create the severe cold.
 - Immunotherapy: Immunotherapy helps the immune system fight HPV. This process involves a topical chemical, such as diphencyprone which causes a mild allergic reaction that makes the plantar wart go away.
 - Laser treatment: A laser light is used to heat and destroy the tiny blood vessels inside the plantar wart. The treatment cuts off the blood supply, which kills the plantar wart.
 - Electrocautery: An electric current is used to burn the planter warts off.
 - Topical medicine: Usually a liquid medicine that contains the chemical cantharidin. A blister forms under the plantar wart that cuts off the blood supply. The dermatologist then removes the dead plantar wart about a week later.
 - Surgery: In some cases, it may be necessary for the physician to surgically remove the wart. This is typically done in the office with local anesthesia.

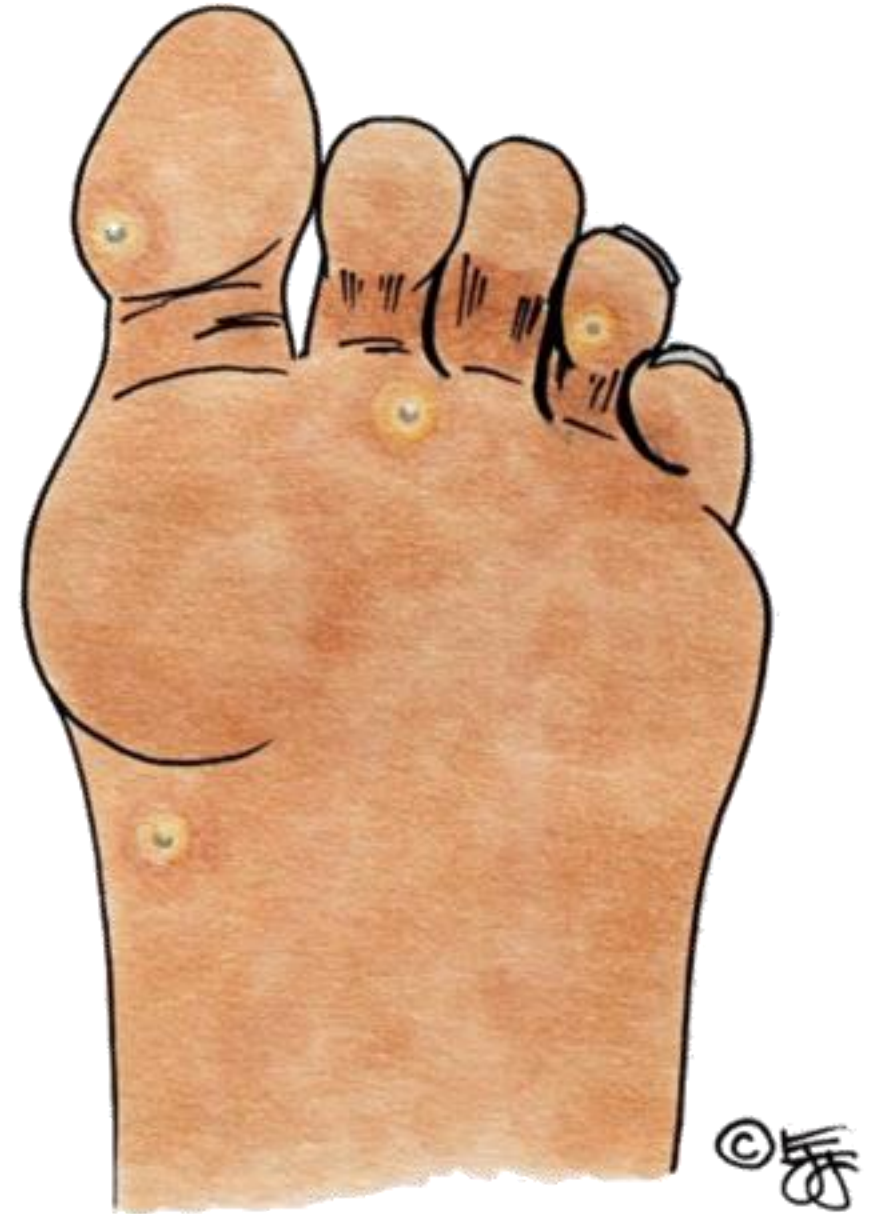
Plantar Warts

- How to tell a wart from a callus:
 - Calluses form under areas of particularly high plantar pressures; warts can develop anywhere. (Warts are more painful when they do develop under areas of high pressure.)
 - Warts often have a well-defined center; calluses do not.
 - Warts often have black “pinpoints” in them (which are small, clotted blood vessels called “wart seeds”); calluses do not.
 - The patterns of ridges and furrows in the skin continue uninterrupted through a callus (as the callus is just skin thickened by layers of keratin); in the case of a wart, the lines will deviate to bypass the wart – like the lines in a plank of wood will deviate to go around a knot in the wood.



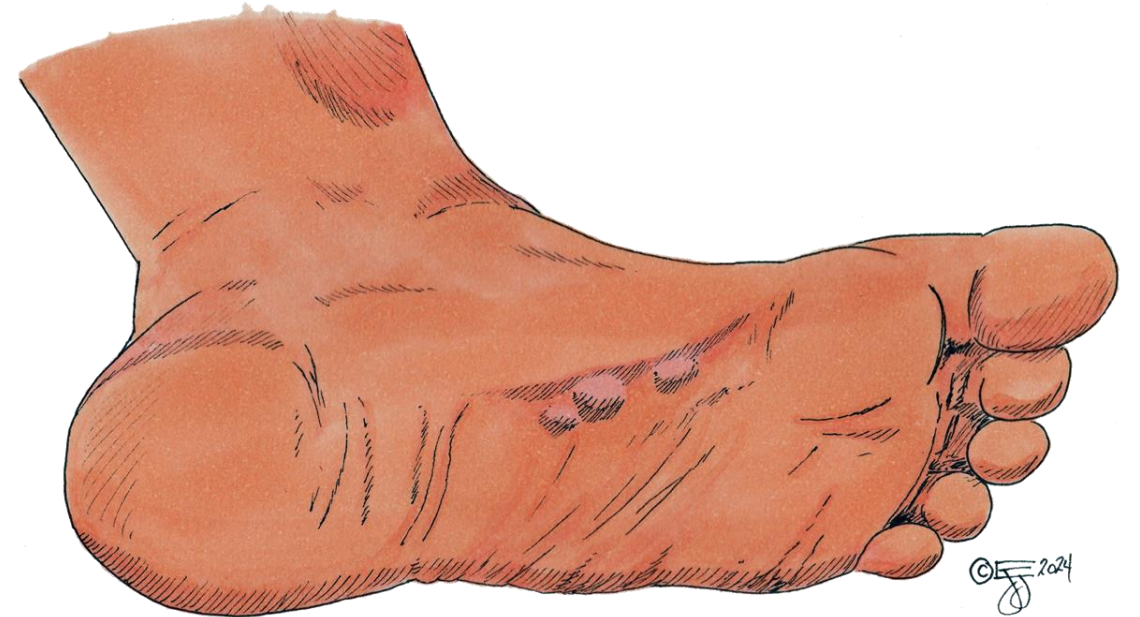
Plantar Warts

- Plantar warts are very common.
- Approximately 10% of people have plantar warts.
- 10%-20% of children and teenagers have plantar warts.
- Plantar warts *are* contagious!
- The best course of action is a referral to a dermatologist for treatment and/or removal.
- To avoid recurrence, the pedorthist should strongly encourage the patient to replace their shoes and inserts as the virus may still be present even after they've had the warts treated.



Plantar Fibromatosis

- Plantar fibromatosis (a.k.a. Ledderhose disease) is a benign fibroblastic, connective tissue proliferative disorder of the plantar fascia.
- It belongs to a family of similar diseases (Peyronies and Dupuytren's) first described in 1610 by Plater.
- George Ledderhose, a German physician, initially described the disease in 1897 following his observation of fifty cases. Ledderhose disease is diagnosed by identifying *nodules within the central or medial bands of the plantar fascia* of the foot.
- Onset is slow, and patients usually present after the disease becomes locally aggressive, causing pain and swelling in the medial non-weight bearing plantar surface of the feet.

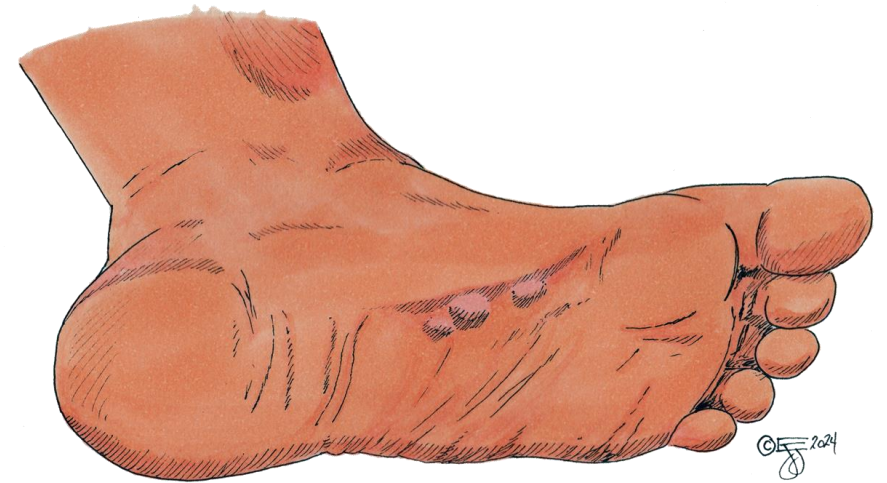


Plantar Fibromatosis

- Hyperproliferative fibrous tissue disorder resulting in the formation of nodules (fibromas) along the plantar fascia.
- Plantar fibromatosis can be locally aggressive, and often results in pain – especially with weightbearing pressure, functional disability, and decreased quality of life.
- Diagnosis is primarily clinical.
- Conservative treatment options:
 - Steroid injections
 - Verapamil
 - Radiation therapy
 - Extracorporeal shock wave therapy
 - Tamoxifen
 - Collagenase.
 - When conservative measures fail, surgical removal of fibromas and adjacent plantar fascia can be done, but recurrence is very common and can even be more aggressive.

Plantar Fibromatosis

- Pedorthic intervention:
 - Footwear: Properly fitted in-depth shoes to accommodate custom foot orthosis
 - Foot orthoses: Custom total contact foot orthosis with soft, cushioned topmost layer. Trough-like cutout/depression under location of nodules. The trough shape is necessary to avoid edge-effect pain since the nodules, as part of the plantar fascia, travel forward and back during the gait cycle.
 - Shoe modifications: Extended steel shank to reduce dorsiflexion at the toes and subsequent exposure of the plantar fascia. Rocker soles to replace motion lost to ESS.
- Note – Although the correct FO can relieve pain (and may even lead to the nodule shrinking some as inflammation dissipates), it won't permanently resolve the underlying problem. If the FOs, work as intended, the patient will likely need to continue FO use indefinitely.



Piezogenic Pedal Papules

- Piezogenic papules are typically asymptomatic but can occasionally be painful.
- Small papular herniations of subcutaneous tissue and adipose on the heel that occur only upon standing or with the application of pressure.
- They present with firm, yellowish to skin-colored papules that protrude from the lateral, posterior, or medial aspects of the heel and become more prominent in full weight bearing position and, by definition, resolve when the patient removes weight.
- Typically, lesions are painless, occur bilaterally, and do not require treatment.
- Incidence may be as high as 76%.



Piezogenic Pedal Papules

- Pathophysiology:
 - The specific etiology is unknown. However, the mechanism of pressure from standing or applying pressure to the heel induces herniation of fat into connective tissue in the dermis of the heels is easily replicated. One hypothesis is that elevated pressures may induce small tears in the plantar fascia, thereby creating a defect for herniation of the deep subcutaneous fat.
 - In cases associated with collagen disorder, such as Ehlers-Danlos syndrome, a structural abnormality of the connective tissue has been suspected but not proven.
- Pedorthic intervention:
 - If the case of painful Piezogenic heel papules, modification to the counter of the shoe may be necessary. A custom foot orthosis made of lower density materials like EVA and having a very deep heel cup could be used to provide some cushioning between the foot and the shoe.

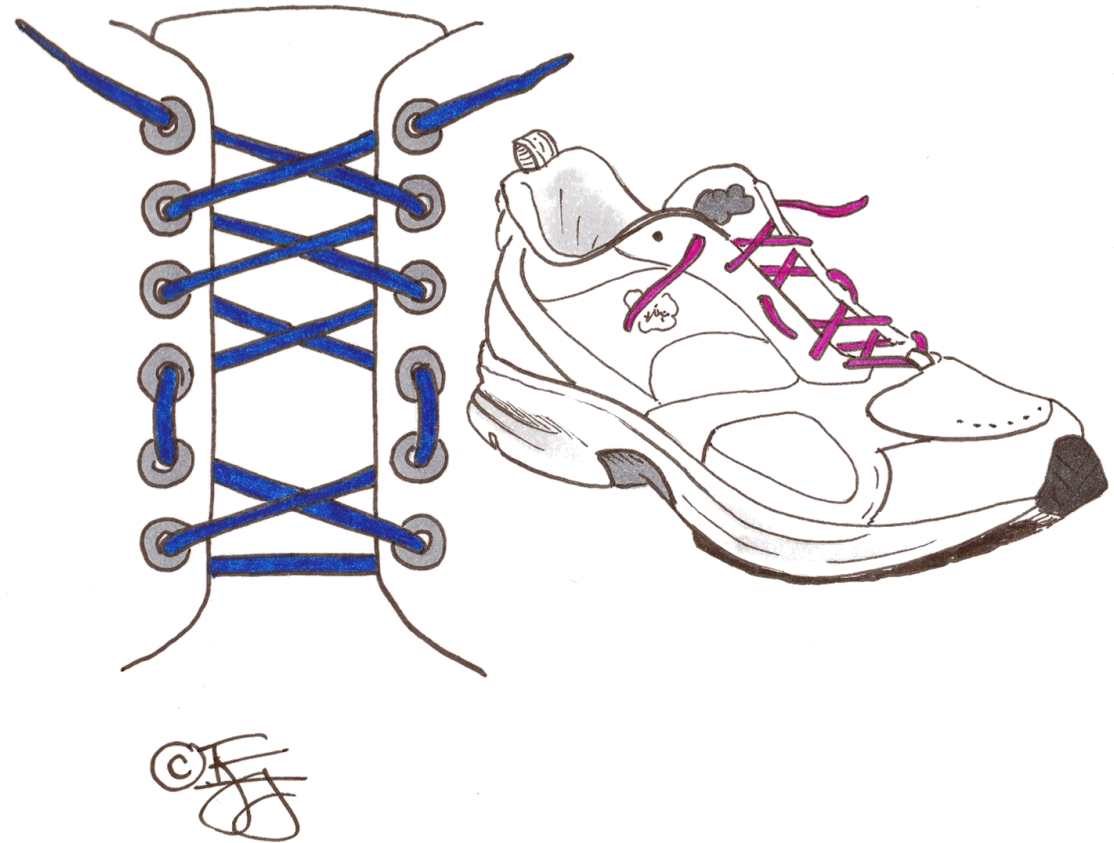
Ganglion

- Ganglions are fluid-filled cysts that can form anywhere on the foot, but most commonly from on the ankle or the dorsum of the foot.
- They tend to be slow-growing and can change in size, enlarging or shrinking.
- Ganglions, by nature, are not typically symptomatic but can become painful if a shoe is creating pressure or the ganglion itself is creating pressure on a nerve.



Ganglion Cyst

- Gap-lacing, skip-lacing is the best option.
- Tongue pads could exacerbate the pain.
- Depending on location, the upper of the shoe may need to be modified with a bubble patch.
- Stretching the shoe with a ball-and-ring stretcher over the affected area may be effective, as well.



Condition: Edema

An abnormal accumulation of fluid trapped beneath the skin. It is very commonly found in the lower extremities.

Causes

- Medications
- Liver or kidney disease
- Heart failure
- Venous insufficiencies
- Pregnancy

Treatments

- Medications
- Elevation of feet/legs
- Compression hosiery



Edema

- From a pedorthic perspective, chronic and/or fluctuating edema can be a difficult challenge.
- If a patient presents with edema, the pedorthist should inquire as to how long it's been present, whether it fluctuates (and to what extremes), if the cause is known, what has been tried to alleviate or control it to date.
- As LE edema can be a sign of a larger and more concerning systemic condition, if the patient has not yet seen their physician for the edema, the pedorthist should encourage them to seek a medical opinion/treatment.

Edema

- Edema makes it difficult to get an accurate foot measurement and can make shoe fitting frustrating for the pedorthist and the patient alike.
- Fluctuating edema makes it hard – if not impossible - to know whether the foam impression, plaster cast or scan of the foot for a foot orthosis is an accurate representation of how the foot will look when the patient comes back for the delivery appointment.
- The same is true – just on a more expensive level – when it comes to molding for custom shoes, a SCFO or an AFO.



Edema...what to do?

- Hold off on measuring/molding until swelling is resolved or, at least, stabilized.
- Consider stocking/providing compression stockings in your practice.
- Select footwear that is maximally adjustable/accommodating to fluctuating edema.
- Have patience and manage expectations.



Condition: Gangrene

A serious condition where a loss of blood supply causes body tissue to die.

Causes

- Diabetes
- PAD
- Atherosclerosis
- Smoking
- Trauma or frostbite

Treatments

- Debridement
- Surgery
- Maggot therapy
- Oxygen therapy
- There is no real podiatric intervention...other than, **“Go see your doctor immediately!”**



Fibromyalgia

- Fibromyalgia is a condition characterized by chronic, widespread musculoskeletal pain.
- Fatigue, cognitive disturbance, psychiatric and multiple somatic symptoms often accompany the disorder.
- Fibromyalgia has an unknown etiology and uncertain pathophysiology.
- There is no evidence of tissue inflammation despite symptoms of soft tissue pain.
- Fibromyalgia is a pain regulation disorder, as suggested by ongoing research, and often classifies as a form of central sensitization syndrome. Fibromyalgia is considered to be a neurosensory disorder where the individual is not able to process pain in the brain.

Fibromyalgia

- Fibromyalgia is more common in women compared to men, with the prevalence of fibromyalgia in the United States at 6.4% (7.7% in women and 4.9% in men).
- Incidence increases with age.
- Between the ages of 20 to 55 years, the cause of generalized musculoskeletal pain in most women is fibromyalgia. The prevalence in adolescents has been found to be similar to those in adults in many studies.
- Amongst the patients referred to a tertiary care pain clinic, more than 40% met the criteria for fibromyalgia.
- The risk for fibromyalgia is higher if one has an existing rheumatic disease.

Fibromyalgia

- Pathophysiology
 - In fibromyalgia, there appears to be a problem with the processing of pain in the brain. Patients often become hypersensitive to the perception of pain. The constant hypervigilance of pain is also associated with numerous psychological issues. Abnormalities noted in fibromyalgia include:
 - Elevated levels of the excitatory neurotransmitters like glutamate and substance P
 - Diminished levels of serotonin and norepinephrine in the descending anti-nociceptive pathways in the spinal cord
 - Prolonged enhancement of pain sensations
 - Dysregulation of dopamine
 - Alteration in the activity of brain endogenous opioids.
 - Fibromyalgia is more common in women than men because of the following:
 1. Higher levels of anxiety
 2. Use of maladaptive coping methods
 3. Altered behavior in response to pain
 4. Higher levels of depression

Fibromyalgia

- Symptoms:
 - Widespread musculoskeletal pain – The chief complaint of a patient with fibromyalgia is widespread musculoskeletal pain, which is bilateral and involves both the upper and lower parts of the body. The pain may be localized initially, commonly in the neck and shoulders. The predominant description of the pain is muscle pain, but the patients may also complain of joint pain.
 - Fatigue – The other cardinal symptom of fibromyalgia is fatigue. Especially when waking up from sleep, but it is also in the mid-afternoon. Minor activities may aggravate the pain and fatigue, though inactivity for a prolonged period also increases the symptoms. There is stiffness on waking up in the morning. Patients complain of sleeping lightly with frequent awakenings during the early morning. They feel unrefreshed in the morning, even if they sleep 8 to 10 hours.
 - Cognitive disturbances – Often referenced as "fibro fog,"; patients have difficulty with attention and doing tasks that require rapid changes in thought.
 - Other symptoms - 30%-50% of patients have anxiety and/or depression at the time of diagnosis. More than 50% of the patients have headaches, which include migraines and tension types. Patients often complain of paresthesias, particularly in both arms and legs. A detailed neurologic evaluation is usually unremarkable. Among gastrointestinal syndromes, IBS commonly correlates with fibromyalgia. Gastroesophageal reflux disease (GERD) occurs more commonly in patients with fibromyalgia compared to the general population. Patients may complain of dry eyes, dyspnea, dysphagia, and palpitations.

Fibromyalgia

- Pedorthic intervention:
 - While there is no specific pedorthic intervention for fibromyalgia, understand that the condition may complicate the pedorthic treatment process, as well as the patient's response to pedorthic intervention.
 - The best approach is to focus as best you can on the foot-related condition for which the patient was initially referred to you.
 - Very broadly speaking, patients with fibromyalgia may be more comfortable in softer, more accommodating foot orthoses and shoes with cushioned, shock-absorbing soles as opposed to rigid, corrective devices.
 - Pedorthic treatment should be *progressive* rather than *aggressive*.

The End