

Overpronation & Underpronation

Two commonly seen conditions in the feet are overpronation and underpronation (or supination).

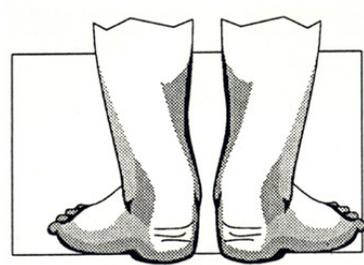
OVERPRONATION

Overpronation is a condition in which the foot rolls excessively down and inward. The arch may elongate and collapse (or 'fall') and the heel will lean inward. Overpronation should not be confused with pronation.

Pronation is a normal motion of the foot during weight bearing and allows the foot to absorb shock as it contacts the ground.

Common conditions seen with overpronation:

- Heel pain or plantar fasciitis
- Achilles tendonopathy
- Hallus Valgus and/or bunions
- Patellofemoral pain syndrome
- Iliotibial band pain syndrome
- Low back pain
- Shin splints
- Stress fractures in the foot or lower leg

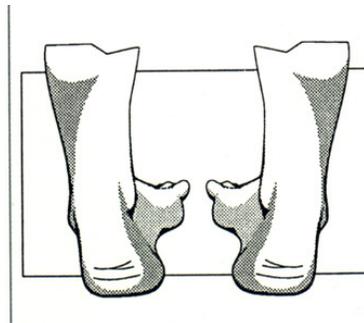


UNDERPRONATION

Underpronation is a condition commonly referred to as supination. An underpronated foot structure may have an abnormally high arch or instep that has very little flexibility when standing. The heel often leans outward, putting more weight on the outer edge of the foot. Callousing is common under the knuckle of the baby toe because of the weight on the outside of the foot.

Common Conditions see with underpronation:

- Heel pain or plantar fasciitis
- Achilles tendonopathy
- Metatarsalgia
- Iliotibial band syndrome
- Lateral ankle sprains
- Stress fractures in the foot and lower leg
- Medial tibial stress syndrome



PEDORTHIC POINTERS FOR PATIENTS

Overpronation and underpronation describe general foot movements. These terms do not necessarily describe a medical problem with a foot. For example, you can overpronate and not have any problems or symptoms at all. It is important to have your foot structure and symptoms adequately assessed by your prescribing physician and a qualified practitioner such as a Canadian Certified Pedorthist. Once the underlying conditions and mechanical faults are assessed, an appropriate treatment plan including possible orthotic and footwear recommendations can be made.

Adequate footwear can often help with conditions related to flat feet and high arches. Canadian Certified Pedorthists recommend selecting shoes featuring:

Heel counters that make the heel of the shoe stronger to help resist/reduce excessive rearfoot motions, appropriate midsole density, and wide base of support through the midfoot.

If you are experiencing foot pain or discomfort, you should consult your physician for a proper diagnosis and an appropriate treatment plan. Your doctor may refer you to a Canadian Certified Pedorthist for pedorthic management services including orthopaedic footwear, shoe selection guidance and orthotics.

Forefoot Pain

Metatarsalgia

Metatarsalgia is a term used to describe a group of forefoot conditions that cause pain, burning or discomfort under the ball of the foot or in the metatarsal bones. Each foot has five metatarsal bones that run from the arch of your foot to your toe joints.

SYMPTOMS

- Pain and/or burning sensation in the ball of your foot when standing, walking or running - which improves upon resting
- Sharp or shooting pain in your toes, and
- Numbness or tingling in your toes.



CAUSES

- Intense activities
- Foot trauma
- Certain foot types such as high arches
- Foot deformities
- Arthritis
- Fat pad deterioration (a thinning of the protective fat pads that cushion the balls of the foot)
- Bunions
- Excessive weight
- Improper fitting footwear

COMMON FOREFOOT CONDITIONS

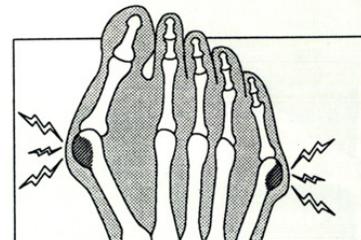
Examples of common types of painful forefoot conditions include:

Bunion / Bunionette

A bunion is a bony enlargement or bump located on the side of the big toe joint. This area is often irritated and made more painful by tight fitting shoes causing pressure and friction on the area. A bunionette is an enlargement of the baby toe joint.

Symptoms:

- The bunion or bunionette will often be red, swollen and painful
- Often a bunion may also have a corresponding shift of the big toe toward the smaller toes. This is called hallux valgus. The 2nd toe may rest over the big toe.



Hallux Valgus Deformity

This is a shift of the big toe toward the smaller toes. It is often improperly identified as a bunion, but frequently co-exists with a bunion.

Symptoms:

- Not always symptomatic, but pain is often present with forced movement of the big toe joint
- The 2nd toe often overrides the big toe (called crossover toe deformity) as the big toe shifts under the 2nd toe

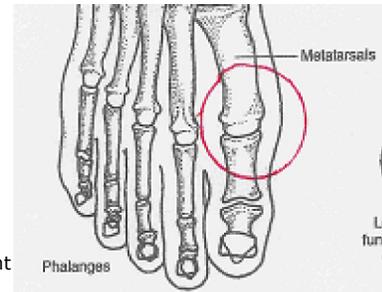
Hallux Limitus (HL) / Hallux Rigidus (HR)

Hallux limitus is limited or reduced motion in the big toe joint possibly due to bony changes in the joint.

Hallux rigidus occurs when the big toe joint motion ceases to occur as arthritic changes have caused pronounced degeneration of the joint.

Symptoms:

- General enlargement of the big toe joint that is tender along the top of the joint line
- Pain is aggravated with increased weight-bearing activity
- A bony prominence on top of the big toe joint (called an osteophyte) may be seen on examination
- Pain during walking, especially as the foot pushes off



Morton's Neuroma (interdigital neuroma)

A Morton's Neuroma develops in response to irritation, pressure or injury to one of the nerves that lead to the toes. A neuroma is most often found between the 3rd and 4th toes but can also occur between the 2nd and 3rd

Symptoms:

- Pain, tingling, burning, and/or numbness is reported beginning at the ball of the foot and often radiating into the toes
- Tenderness is found in the web space between the toes and there may be a palpable click when squeezing the metatarsals (long bones of the forefoot) together.



LESS COMMON FOREFOOT CONDITIONS

Metatarsal Phalangeal Joint Capsulitis

This refers to a local inflammation under the metatarsal head (ball of the foot) sometimes due to degeneration of the ligaments that stabilize the metatarsal head.

Metatarsal Stress Fractures (march fractures)

A Stress fracture is a small break in the bone caused by repetitive stress.

Freiberg's Disease

This condition occurs from a lack of blood supply (avascular), which results in permanent damage to the bone tissue at the 2nd metatarsal head. The avascularity leads to eventual collapse and deformity of the metatarsal head.

PEDORTHIC TREATMENT

- Foot and lower limb exam
- Custom-made foot orthotic or over-the-counter device
- Recommendation of appropriate and proper-fitting footwear
- Modification of Footwear

If you are experiencing foot pain or discomfort, you should consult your physician for a proper diagnosis and an appropriate treatment plan. Your doctor may refer you to a Canadian Certified Pedorthist for pedorthic management including orthopaedic footwear, shoe selection guidance and orthotics.

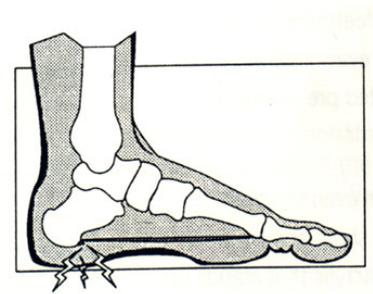
Heel Pain

Plantar Fasciitis

CAUSES

Causes of possible heel conditions:

- Poor foot mechanics
- Being overweight
- Low activity levels
- Improper footwear
- Aging
- Unfavourable ground conditions



COMMON HEEL CONDITIONS

Plantar Fasciitis

One of the most common heel problems seen by Canadian Certified Pedorthists, plantar fasciitis is the inflammation and irritation of the plantar fascia (a thick fibrous tissue that extends from the heel to the toes and supports the arch). Poor foot posture or excessive ankle motion during walking can strain the plantar fascia resulting in small tears and increased tension where the fascia attaches to the calcaneus (heel).

Symptoms:

- Pain and swelling (inflammation) at the beginning of the arch or bottom of the heel
- Often the pain is worse with the first few steps when getting out of bed or after sitting

Calcaneal Stress Fracture

Calcaneal stress fracture of the heel is usually a result of some sort of trauma but can also result from increased activity done improperly.

Symptoms:

- Total avoidance of weight-bearing will be seen in an individual with a stress fracture of the calcaneus (heel).

Retrocalcaneal Bursitis (Achilles bursitis)

Retrocalcaneal bursitis is the inflammation of the bursa (balloon-like lubricating sack) that lies between the Achilles tendon and the back of the heel bone (calcaneus).

Symptoms:

- Tenderness is found at the back of the heel just above where the Achilles tendon attaches
- Swelling of the bursa produces symmetric widening of the heel where the Achilles tendon attaches to the calcaneus (heel)
- Pain increases with passive dorsiflexion (bending the foot towards the front of the leg) of the ankle or with standing on toes

Achilles Tendonopathy

Achilles tendonopathy is an injury to the Achilles tendon just above the heel on the back of the leg. This condition may be due to abnormal or excessive strain on the tendon from poor shock absorption or excessive foot pronation.

Symptoms:

- Pain, swelling, and possible nodule formation along the Achilles tendon or where it is attached to the back of the calcaneus (heel)
- Stiffness may be present after sitting or resting

PEDORTHIC TREATMENT MAY INCLUDE:

- Custom-made foot orthotic or over-the-counter device
- Recommendation of appropriate and proper-fitting footwear
- Modification of footwear

Toe Pain

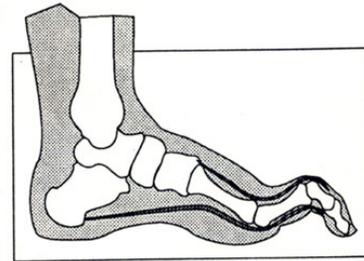
Hammer Toes

TOE CONDITIONS

Conditions of the lesser toes can be caused by internal or external factors. Lesser toes refer to all of the toes (2nd, 3rd, 4th and 5th) except for the big toe.

CAUSES

- Improper and/or ill-fitting footwear
- Neuromuscular factors
- Peripheral neuropathy caused by diabetes or leprosy
- Rheumatoid or psoriatic arthritis
- Trauma
- Muscle imbalance



TYPES OF LESSER TOE CONDITIONS AND SYMPTOMS INCLUDE:

- *Claw Toe Deformity* – deformity where both the 1st and 2nd joints within the toes are permanently flexed. Pain in the ball of the foot and painful corns may occur on the top of flexed joints or underneath the tip of the toe
- *Hammer Toe Deformity* – deformity where only the 1st toe joint is flexed. An irritation or corn is often seen on the top of the joint, or under the tip of the toe
- *Mallet Toe Deformity* – deformity where the last joint in the affected toe is flexed. Pain and/or a corn may develop over the top of this joint and possibly under the tip of the toe

PEDORTHIC TREATMENT MAY INCLUDE:

- Foot and lower limb exam
- Custom-made foot orthotic or over-the-counter device
- Modification of footwear
- Recommendation of appropriate and proper fitting-footwear
- Toe spacers or padding

PEDORTHIC POINTERS FOR PATIENTS

To alleviate the pain caused by lesser toe deformities, Canadian Certified Pedorthists recommend selecting footwear with:

- Wide, deep, square toe box to allow proper room for toes and alleviate pressure
- Toe box without stitching to avoid irritation
- Rocker soled shoes (where toe part curves up from the ground) to decrease stress and pressure on the ball of the foot
- Where required, Canadian Certified Pedorthists will also spot stretch areas where the shoe rubs to minimize discomfort and potential irritation
- A custom-made foot orthotic can be created to reduce pain and pressure on specific areas such as the ball of the foot
- Padding can also be used to protect painful corns and calluses.

If you are experiencing foot pain or discomfort, you should consult your physician for a proper diagnosis and an appropriate treatment plan. Your doctor may refer you to a Canadian Certified Pedorthist for pedorthic management including orthopaedic footwear, shoe selection guidance and orthotics.