



PHYSICIANS' GUIDE TO PEDORTHIC MANAGEMENT

Specialized treatment for foot and lower
limb pain and dysfunction

Canadian Certified Pedorthists are foot orthotic and
orthopaedic footwear experts.

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PEDORTHIC
ASSOCIATION OF CANADA

About the Pedorthic Association of Canada

The Pedorthic Association of Canada (PAC) is a national, non-profit organization whose main mandate is to develop and promote the study, practice and knowledge of pedorthics in Canada. Over the last 15 years, the practice and profession of pedorthics has significantly grown in Canada under the guidance of the Association.

Established in 1990, the Pedorthic Association of Canada currently boasts an impressive membership of almost 650 members nationwide who are governed by a strict code of ethics through both the Association and the College of Pedorthics of Canada.

The Pedorthic Association of Canada is managed by a volunteer Board of Directors.

For information on becoming a member of the Pedorthic Association of Canada, please contact the office at 1-888-268-4404 or info@pedorthic.ca.

HOW CANADIAN CERTIFIED PEDORTHISTS CAN HELP YOUR PATIENTS

Pedorthists specialize in the treatment of pain and dysfunction of the foot and lower limb.

As one of the few healthcare professionals educated in the assessment, design, manufacturing, modification and fit of foot orthoses (orthotics) and footwear, certified members of the Pedorthic Association of Canada (PAC) are regularly called upon to make recommendations regarding appropriate footcare management.

A Canadian Certified Pedorthist assists in alleviating painful or debilitating conditions resulting from abnormalities or limited actions of the lower limb. Canadian Certified Pedorthists may assess for and create various types of foot orthotics to improve and assist in:

- Accommodations of foot deformities
- Realignment of anatomical structures
- Redistribution of external and internal forces
- Balance
- Control of biomechanical function
- Accommodation of circulatory concerns
- Improvement of the movement of limbs compromised as a result of an accident, congenital deformity, neural condition or disease

Pedorthic Services

To help patients deal with pain, discomfort and disabilities in the lower limbs, Canadian Certified Pedorthists provide a range of specialized services including:

PEDORTHIC ASSESSMENT - an assessment of lower limb bony alignment, movement pattern, general function of the foot and the interaction of the foot with the rest of the body. Typically a pedorthic assessment includes history taking, bony palpation, range of motion testing, gait analysis, and footwear consultation.

GAIT ANALYSIS - the observation of the lower extremity to determine deviations in alignment, movement pattern and symmetry. This may be done visually or through video recording.

CUSTOM FOOT ORTHOSES (ORTHOTICS) - foot appliances placed within shoes which are manufactured from three dimensional images of the foot and made from raw materials. Canadian Certified Pedorthists create custom foot orthoses to accommodate bony deformities and/or modify the movement pattern of the foot and lower limb.

CUSTOM-MADE FOOTWEAR - footwear that is manufactured from a three dimensional image of the foot and lower leg and made of raw materials. Canadian Certified Pedorthic Master Craftsmen (C Ped MC) specifically design unique custom-made footwear for individuals who need it. It is usually needed when mass-produced footwear will not fit due to deformity or will not suit the patient due to significant dysfunction.

FOOTWEAR MODIFICATION - the adaptation of mass-produced footwear to accommodate deformity and/or improve function of the foot and lower limb. Canadian Certified Pedorthists can make these modifications to shoes, boots and sandals.

OVER-THE-COUNTER (OTC) FOOTBED (INSOLE) - prefabricated commercial insoles that Canadian Certified Pedorthists can modify with the addition of posting, padding, or metatarsal support. It may also be further modified by the addition of specific top covers to address conditions such as diabetes, arthritis or significant callus build up.

OVER-THE-COUNTER (OTC) FITTING AIDS - the addition of over-the-counter or hand-made padding, cushioning or fillers designed to improve the fit of a client's footwear. Useful when there is a significant size discrepancy between feet or abnormally shaped anatomy not requiring custom-made footwear or footwear modifications.

THERAPEUTIC/ORTHOPAEDIC SHOES - the most frequently used footwear for pedorthic patients, these mass-produced shoes are sold by Canadian Certified Pedorthists in order to provide a stable base for an orthosis to sit on. Appropriate footwear is an important treatment modality and an orthosis is rendered less effective by placing it within inferior footwear. Therapeutic and orthopaedic shoes incorporate key features including removable sock liners, adjustable closures, sufficient torsional stability and heel stability. These shoes can be modified by Canadian Certified Pedorthists to improve the product for a specific client.

THERAPEUTIC ACCESSORIES - includes stockings, hosiery and specialty socks offered by Canadian Certified Pedorthists to complement treatment. Compression hosiery can prevent and control swelling and improve venous circulation. Proper socks made of non-absorbing materials, anti-pilling material and no elasticity in the legs help to reduce shearing and cushion areas that take repetitive trauma.

SPECIALTY FOOTWEAR - includes shoes, braces, post-op shoes and forefoot and rearfoot relief shoes. These items can be created or provided by a Canadian Certified Pedorthist to meet a patient's specific needs.

About the Pedorthic Profession

Canadian Certified Pedorthists are trained and tested in the assessment of lower limb biomechanics, the casting, manufacturing and dispensing of foot orthoses and the fitting and modifying of footwear.

THE COLLEGE OF PEDORTHICS OF CANADA

The College of Pedorthics of Canada (The College) is the certifying and regulatory body for the profession and it has established stringent standards of practice for certified members. Clinicians undergo rigorous written and practical testing processes and are required to comply with the Pedorthic Code of Ethics. A complaint and disciplinary process is readily available to consumers and stakeholders – for more information please visit www.cpedcs.ca.

THE COLLEGE TESTS AND CERTIFIES THREE LEVELS OF CERTIFIED PEDORTHISTS:

CERTIFIED PEDORTHIC MASTER CRAFTSMAN

A **C. Ped (MC)** is the highest level of certification available. A Master Craftsman has been certified as a C. Ped (C) and is also certified in the craft of custom shoe design and manufacturing.

CERTIFIED PEDORTHIC TECHNICIAN (CANADA)

The **C. Ped Tech (C)** is an individual trained in the practice of shoe fitting, footwear modifications and orthosis fabrication from files produced by healthcare professionals with the ability to assess, such as a C. Ped (C) or C. Ped MC. The C. Ped Tech (C) may perform duties of a clinical pedorthist under the direct supervision of a C. Ped (C) or C. Ped MC.

CERTIFIED PEDORTHIST (CANADA)

A **C. Ped (C)** is an individual who is trained in the biomechanical assessment of the lower limb, manufacturing, fitting and modification of foot orthoses and fitting and modifying footwear; all for the purposes of alleviating painful or debilitating conditions and providing assistance for abnormalities or limited actions of the lower limb.

THE PEDORTHIC JOURNEY

Patients often receive a recommendation from a physician or other health care professional to see a Canadian Certified Pedorthist in order to address a functional or pain issue that is aggravated by mechanics of the foot. For the most part, costs for pedorthic services are reimbursed by insurance companies – through their extended health benefits packages – third party groups and government or other agencies including (but not exclusive to) Non-Insured Health Benefits (NIHB) through Health Canada, Workplace Safety & Insurance Board (Ontario), Workman's Compensation Board (WCB), Social Services, the Department of Veteran Affairs and motor vehicle accident insurance claims. There may be other payers exclusive to each province.

Canadian Certified Pedorthists play a critical role in supporting the health and well being of Canadians. Accountability, ethics and standards of practice enforced by The College, along with education and training provided by PAC, ensure high standards of the pedorthic practice.

Frequently Asked Questions

WHAT MAKES A CANADIAN CERTIFIED PEDORTHIST DIFFERENT FROM OTHER HEALTHCARE PROFESSIONALS WHO PROVIDE ORTHOSES?

Canadian Certified Pedorthists are one of the few healthcare professionals educated in the assessment, design, fit, manufacture and modification of footwear and foot orthoses. A Canadian Certified Pedorthist has extensive training and experience dealing with the biomechanics of the foot and selecting appropriate footwear. In order to become a Canadian Certified Pedorthist, candidates have undergone a rigorous examination process testing their knowledge about biomechanics, disease, anatomy, orthosis fabrication and fitting as well as footwear function, design and modification. Canadian Certified Pedorthists work as part of the medical team, often with a referral from a prescribing healthcare provider in order to provide treatment. In addition to providing a gait analysis, a Canadian Certified Pedorthist is also trained to manufacture orthoses, modify footwear and recommend and fit appropriate footwear.

HOW ARE PATIENTS REFERRED TO CANADIAN CERTIFIED PEDORTHISTS?

Pedorthists are often referred by a prescribing healthcare provider such as a physician. This can be as simple as “Please Assess and Treat” or as complex as a full biomechanical assessment from the prescribing healthcare provider requesting a specific device, modification or manufacture of custom-made footwear. Following the pedorthic assessment, the Certified Canadian Pedorthist will indicate the underlying condition to the physician to enable the physician to make the appropriate diagnosis.

WHO PAYS FOR PEDORTHIC SERVICES?

Most insurance companies provide coverage through their extended health benefits packages, third party groups and government or other agencies including (but not exclusive to) Non-Insured Health Benefits (NIHB) through Health Canada, Workplace Safety & Insurance Board (Ontario), Workman’s Compensation Board (WCB), Social Services, the Department of Veteran Affairs and motor vehicle accident insurance claims. There may be other payers exclusive to each province. Canadian Certified Pedorthists are one of the few providers that meet all requirements of all extended medical coverages. Patients without insurance cover their own costs for pedorthic products and services.

WHY DO ORTHOTICS COST SO MUCH?

The cost of orthotics depends not only on the materials used, but also the time and expertise involved in designing and producing them. Custom orthotics are made by qualified and

certified professionals, like Canadian Certified Pedorthists, whose education includes four years of undergraduate studies, followed by a diploma program and/or additional training. In order to continue practising, pedorthists must maintain certification through the College of Pedorthists of Canada, which allows them to regularly build on their expertise and experience. Further, the cost of orthotics usually includes professional service fees and possible follow-up appointments and adjustment costs.

WHAT CAN I EXPECT FROM MY FIRST APPOINTMENT WITH A CANADIAN CERTIFIED PEDORTHIST? WHAT DO I NEED TO BRING WITH ME?

Your first appointment with a Canadian Certified Pedorthist will include:

- Reviewing your medical history
- A full biomechanical and gait analysis – which means they will watch you walk and/or run if you are a runner
- A hands on assessment of your lower limb joints
- A shoe consultation
- Advice on selecting proper footwear for your specific condition

As part of their initial consultations, Canadian Certified Pedorthists will review their full patient assessment, explain their findings and the best course of treatment, whether it is custom foot orthoses, over-the-counter products, footwear modifications or a change in footwear. They may also suggest other forms of treatment such as physiotherapy or massage therapy.

For a patient’s first appointment with a Canadian Certified Pedorthist, he should bring the shoes that he most frequently wears. Many Canadian Certified Pedorthists will request patients bring shorts or wear pants that they can roll up to their knees. Wearing skirts to consultations is not recommended.

HOW MANY TIMES WILL I NEED TO SEE A CANADIAN CERTIFIED PEDORTHIST?

Every patient is unique so there is no hard-and-fast rule for length of treatment. After the initial consultation, your Canadian Certified Pedorthist will be able to provide an estimated length and course of treatment. There will always be a separate appointment to fit the foot orthotics to the patient. Canadian Certified Pedorthists are able to adjust the orthotic to ensure proper function for the foot and the shoe.

For more information about pedorthics in Canada please visit www.pedorthic.ca.

To find a pedorthist, visit www.pedorthic.ca/find.

Guide to Foot Conditions

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Foot Types

& ASSOCIATED CONDITIONS

There are many shapes and sizes of feet. When examining feet, it is important to evaluate the patient's gait for a comprehensive understanding of how the foot moves during the gait cycle. In order to propel normally, feet need to have normal amounts of pronation and supination. Additionally, different foot types will affect an individual's gait, changing when certain movements occur and causing a number of different symptoms or conditions. Conditions and symptoms associated with the most typically identified foot types include:

PES PLANUS

Symptoms/Conditions

- Hallux valgus and/or bunions
- Heel pain
- Patellofemoral knee pain
- Low back pain
- Excessive pronation
- Stress fractures
- Shin splints

What is it?

Pes planus is a foot type commonly referred to as a "flat foot" because of its low medial longitudinal arch structure. It is a very common condition or deformity in which a larger than normal area of the plantar aspect of the foot is in contact with the ground. While generally this foot type is hypermobile, there are cases where the planus foot structure is rigid. Pes planus is often characterized by excessive pronation, a low medial longitudinal arch, calcaneal valgus and forefoot abduction in standing and forefoot varus in non-weight-bearing.

Pes planus and pes cavus describe general foot types. These terms do not necessarily describe a particular problem with a foot. For example, you can have a pes planus foot 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 orthoses and footwear recommendations can be made.

Pedorthic Treatment

Treatment for a pes planus foot depends on the specific condition or mechanical fault related to the planus foot. Since many conditions are characterized by excessive pronation, heel valgus in standing and forefoot varus in non-weight-bearing, a Canadian Certified Pedorthist can construct an orthosis to help.

Canadian Certified Pedorthists may use over-the-counter devices or may create functional, bio-mechanical custom-made orthoses to control the abnormal and potentially harmful motion of the subtalar and other joints of the foot. Using posting materials to reposition and control motion, the orthosis will control the abnormal motions by supporting the subtalar joint in a more neutral position, reducing compensatory motions that allow for abnormal pronation and encouraging a normal sequence of subtalar joint motion during gait.

PES CAVUS

Symptoms/Conditions

- Clawed toes
- Metatarsalgia
- Iliotibial band friction syndrome (lateral knee pain)
- Osteoarthritis of the midfoot
- Ankle sprains
- Difficulty finding shoes to fit high instep
- Stress fractures
- Shin splints

What is it?

Pes cavus is a foot type commonly referred to as a "high arch" because of its abnormally high medial longitudinal arch structure that does not flatten with weight-bearing. There is often a varus heel position when weight-bearing, a plantarflexed first ray, reduced pronation during the gait cycle and the foot may be in

an equinus position. Callusing is common under the 1st and 5th metatarsal heads. While standing, weight distribution in a pes cavus foot is predominantly under the heel and metatarsal heads, with limited to no weight distribution under the lateral border of the midfoot. Cavus feet can be flexible or inflexible/rigid; inflexible cavus feet tend to be more prone to injuries that result from poor shock absorption, while flexible cavus feet tend to be more prone to overuse injuries similar to a flexible planus foot.

Pedorthic Treatment

Treatment for a pes cavus foot depends on the specific condition or mechanical fault related to the cavus foot. Since many conditions of the cavus foot are characterized by restricted pronation, heel varus (or restricted eversion of the calcaneus) and forefoot valgus when non-weight-bearing, Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to help compensate for the specific mechanical fault identified. In decreasing the mechanical stressors to the affected tissues, healing can occur and pain can be reduced.

Canadian Certified Pedorthists may use over-the-counter devices or may create functional, biomechanical custom-made orthoses to accommodate and compensate for the reduced motion of the subtalar and other joints commonly seen in the cavus foot. Using posting materials, the orthosis can accommodate and control the abnormal motions of the foot by supporting the foot joints in a more neutral position, reducing compensatory motions, and encouraging a normal sequence of subtalar joint motion during gait. Use of appropriate materials can help aid in shock absorption that is often lacking in the cavus foot or the foot with reduced pronation capabilities.

PEDORTHIC POINTERS FOR PATIENTS

Adequate footwear can often help with conditions related to pes planus or pes cavus feet.

Canadian Certified Pedorthists recommend selecting shoes featuring:

- Heel counters that make the heel of the shoe stronger to help resist/reduce excessive rearfoot motions. The heel counter is the hard piece in the back of the shoe that helps control the foot's motion from side-to-side. You can quickly test the effectiveness of a shoe's heel counter by placing the shoe in the palm of your hand and putting your thumb in the mid-portion of the heel, trying to bend the back of the shoe. A heel counter that does not bend very much will provide superior motion control
- Wide base of support through the midfoot, to provide more support under a foot that is overpronated or collapsed inward

ABOUT PEDORTHISTS – C. PED (C)

Canadian Certified Pedorthists are trained in the assessment, design, modification and fit of foot orthoses and footwear to help deal with pain, discomfort and disabilities in the legs and feet. To find a local Canadian Certified Pedorthist, please visit www.pedorthic.ca/find.



FOREFOOT CONDITIONS

Metatarsalgia

Many conditions that cause pain in the forefoot are collectively known as metatarsalgia. Metatarsalgia is a non-specific term to describe pain in and about the metatarsal head (ball of the foot) or metatarsal phalangeal joint and the adjacent soft tissue structures. Examples of common types of painful forefoot conditions include:

METATARSAL STRESS FRACTURES (MARCH FRACTURES)

Symptoms

- Local point tenderness of the involved metatarsal is evident initially during activity and with deep palpation and may progress to pain at rest if left untreated
- Diffuse swelling and pain will increase as the injury progresses
- Most commonly seen in the 2nd or 3rd metatarsals or in the 5th metatarsal in people who tend to supinate

What is it?

Stress fractures are a break in the bone caused by repetitive stress. These fractures generally occur when bone is reabsorbed faster than it is replaced. This results in micro fractures that coalesce to form a complete stress fracture.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to help distribute pressure evenly beneath the foot in order to reduce high pressure areas and mechanical deficiencies. Orthoses may feature the use of metatarsal pads and metatarsal bars to support the transverse arch and unload the pressure beneath the metatarsal heads.

METATARSAL PHALANGEAL JOINT CAPSULITIS

Symptoms

- Tenderness, which is localized to the plantar aspect of the metatarsal head
- Patients often report it feels like a stone under the foot and it is worse when barefoot or in thin-soled shoes

What is it?

This refers to a local inflammation of the plantar aspect of the metatarsal head sometimes due to degeneration of the ligaments that stabilize the metatarsal head.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to help distribute pressure evenly beneath the foot, reducing high pressure areas and mechanical deficiencies. Orthoses may feature the use of metatarsal pads and metatarsal bars, if tolerated, to support the transverse arch and unload the pressure beneath the metatarsal heads. A metatarsal head cut-out also assists in offloading the painful area.

FREIBERG'S DISEASE (AVASCULAR NECROSIS OF THE 2ND METATARSAL HEAD)

Symptoms

- The dorsal aspect of the metatarsal phalangeal joint is sore with palpation and worsens with activity
- Most often affects the 2nd metatarsal head during adolescence
- Commonly affects females

What is it?

This condition occurs from a lack of blood supply which results in death of the bone at the metatarsal head. The avascularity leads to eventual collapse and deformity of the metatarsal head.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to help distribute pressure evenly beneath the foot in order to reduce high pressure areas and mechanical deficiencies. Orthoses should feature the use of metatarsal pads and metatarsal bars to support the transverse arch and unload the pressure beneath the affected metatarsal head.

MORTON'S NEUROMA (INTERDIGITAL NEUROMA)

Symptoms

- Pain, tingling, burning and/or numbness is reported between the metatarsal heads, often radiating into the toes
- Tenderness is found in the web space between the metatarsals and there may be a palpable click when squeezing the metatarsals together (Mulder's click)

What is it?

A Morton's Neuroma is a mechanical entrapment of the interdigital nerve, most commonly occurring between the 3rd and 4th metatarsals.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses, which feature the use of metatarsal pads to support the transverse arch and lift the metatarsal bones allowing the nerve to flow through freely and prevent the bones from compressing on the neuroma.

BUNION

Symptoms

- The 1st metatarsal will often be red, enlarged and painful especially when irritated by ill-fitted footwear
- Some people with a bunion may also have a corresponding medial drift of the metatarsal and lateral drift of the hallux (hallux valgus)

What is it?

A bunion is a bony enlargement on the medial aspect of the 1st metatarsal head. This area is often irritated

and made more painful by a poor fitting shoe, or by an over pronated gait which increases pressure on the 1st metatarsal phalangeal joint.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to help address mechanical deficiencies such as over pronation which may contribute to the development of a bunion.

HALLUX LIMITUS (HL) / HALLUX RIGIDUS (HR)

Symptoms

- General enlargement of the 1st metatarsal phalangeal (MTP) joint that is tender along the joint line
- Pain is aggravated with increased weight-bearing
- Dorsal joint line osteophytes may be palpable
- Pain with dorsiflexion of the 1st MTP joint

What is it?

Hallux limitus is diminished motion in the 1st MTP joint due to bony changes in the joint. Hallux rigidus is when the 1st MTP joint motion ceases to occur as changes have caused pronounced degeneration of the joint.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to help address mechanical deficiencies or accommodate reduced mobility. The orthosis may have a rigid splint under the 1st metatarsal phalangeal joint to reduce the motion of the painful joint. Footwear with a rocker sole is useful in decreasing painful motion of the 1st MTP joint.

PEDORTHIC POINTERS FOR PATIENTS

To alleviate the pain caused by forefoot conditions, Canadian Certified Pedorthists recommend selecting footwear with:

- Wide, square toe boxes to allow proper room for toes and avoid friction with sensitive areas
- Low heeled shoes (less than 1" or 2.5cm) to reduce stress put on the ball of the foot
- No stitching over bony prominences
- Thicker soles to help absorb shock
- Stiff, rocker bottoms to help off-load the ball of the foot by reducing how much it bends during the push-off phase of gait
- Strong heel counters to aid in control of foot motion
- Purchase shoes which are shaped like your foot

Orthoses are also helpful to control mechanical faults commonly found in many forefoot conditions.



HEEL CONDITIONS

Plantar Fasciitis

Heel pain is one of the most common problems seen by Canadian Certified Pedorthists. Plantar fasciitis, calcaneal stress fractures, retrocalcaneal bursitis and Achilles tendonitis are some of the most commonly seen heel ailments. Poor foot mechanics, body weight, activity, footwear, surface and aging are all factors which can contribute to these conditions:

PLANTAR FASCIITIS

Symptoms

- Pain at the central/medial heel, through the medial longitudinal arch and/or proximal to the metatarsal heads
- Pain is often worse in the morning and upon rising after periods of rest and usually gets better after a few steps
- Pain can also be worse at the end of an active day

What is it?

Plantar fasciitis is the inflammation and irritation of the plantar fascia. Excessive pronation or supination can strain the plantar fascia resulting in micro tears and increased tension where the fascia attaches to the calcaneus. This is often complicated by a decrease in the person's ability to dorsiflex their ankle due to the calf muscle being too tight. Heel spurs may also be seen in conjunction with plantar fasciitis but the two are independent conditions, as heel spurs are not the cause of plantar fasciitis. Conversely, many people may have heel spurs with no symptoms at all.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to support, unload and reduce strain on the plantar fascia caused by poor biomechanics. Orthoses may feature a deep heel cup to help prevent splaying of the heel's fat pad when bearing weight and protect the painful heel region. Stretching of the calf muscle and plantar foot tissue (especially after rest periods) can help reduce strain put on the plantar fascia by surrounding soft tissues. In persistent conditions, a Canadian Certified Pedorthist can provide a dorsiflexion night splint to help keep the ankle and toes in a

dorsiflexed position for an extended period time, allowing the fascia to heal in this extended position.

CALCANEAL STRESS FRACTURE

Symptoms

- Marked antalgic gait and usually total avoidance of weight-bearing will be seen in an individual with a stress fracture of the calcaneus
- A positive test for this type of fracture is the "heel squeeze" test – if there is pain upon squeezing the heel that is a positive sign for a calcaneal stress fracture (the heel squeeze will not be positive with plantar fasciitis)
- Unlike other types of heel pain it does not get better with a few steps

What is it?

Calcaneal stress fracture of the heel is usually a result of some sort of trauma but can also result from increased activity done improperly. Often the calcaneus is fractured as it is driven into the body of the talus, often seen in falling injuries. This condition frequently results in permanent leg length differences, as well as excessive heel valgus and pes planus arch deformities.

Pedorthic Treatment

Patients with these symptoms should first be seen by their physician and, once diagnosed with calcaneal stress fracture, will usually require a cast or a removable walking cast. Once healing is complete, a Canadian Certified Pedorthist will create a custom-made foot orthosis to be used to cushion heel impact, distribute force evenly beneath the foot, control flexible mechanical abnormalities, and address leg length discrepancies.

RETROCALCANEAL BURSITIS (ACHILLES BURSITIS)

Symptoms

- Tenderness is found in the Achilles tendon just proximal to its insertion in the calcaneus
- Swelling of the bursa produces symmetric widening of the heel around the distal aspect of the Achilles tendon
- Pain increases with passive dorsiflexion of the ankle or when standing on toes

What is it?

Retrocalcaneal bursitis is the inflammation of the bursa that lies between the Achilles tendon and the posterior calcaneal tuberosity. This type of bursitis is caused when the bursa is pinched or sheared between the calcaneus and the Achilles tendon, often the result of the calcaneus being rubbed against the shoe's heel counter. Retrocalcaneal bursitis can be aggravated by overuse or insufficient conditioning.

Pedorthic Treatment

A Canadian Certified Pedorthist can help treat this condition by adding foam or gel padding, or cutting out a portion of the shoe's heel counter, to help protect the inflamed area. Custom-made foot orthoses will help reduce shearing of the Achilles tendon over the bursa. Orthoses may include a slight temporary heel lift to unload the Achilles tendon until the bursa has healed and/or a heel bumper to keep the inflamed area away from the back of the shoe.

ACHILLES TENDONITIS

Symptoms

- Pain, swelling and possible nodule formation along the Achilles tendon or where it is attached to the back of the calcaneus

- Pain usually develops gradually but sudden onset or more severe pain may indicate partial or complete tearing of the Achilles tendon
- It is most painful when patient goes up on his toes or during activity
- Stiffness may be present after sitting or resting
- Most often seen in athletes particularly distance runners or in activity requiring sudden stops and starts and jumping (i.e. basketball, baseball, tennis)

What is it?

Achilles tendonitis is an inflammation of 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. Causes may include running on very hard surfaces, sports that require frequent stopping, starting and jumping and patients who have increased their activity significantly over a short period of time. Women who go from wearing high heels to lower heeled athletic shoes may develop Achilles tendon pain if proper stretching is not performed.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to support, unload, and reduce strain on the Achilles tendon caused by poor biomechanics. Orthoses may feature a slight heel raise to help reduce the tension on the Achilles tendon insertion on the heel. Flexibility training helps reduce strain put on the Achilles tendon. In persistent conditions, a dorsiflexion night splint helps to keep the ankle and toes in a dorsiflexed position for an extended period of time, allowing the tendon to heal in this extended position.

PEDORTHIC POINTERS FOR PATIENTS

Heel pain is often a result of poor lower limb mechanics (how the foot moves) combined with changes in activity or trauma. To prevent and alleviate heel pain, Canadian Certified Pedorthists recommend:

- Carefully and slowly increasing activity while allowing the tissues of the lower limb time to properly adapt
- When injury does occur, consulting a Canadian Certified Pedorthist to recommend the use of over-the-counter or custom-made orthoses and appropriate footwear to help the healing process and stop the recurrence of problems
- Selecting stable shoes with sturdy heel counters (the back of a shoe) that control motion or provide shock absorption as needed
- Avoid going barefoot or just wearing socks at all times
- Consulting a physiotherapist or other referring healthcare provider can also provide relief from heel conditions



Lesser Toe Deformities

Deformities 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 toes) except for the big toe.

Deformities and conditions of the lesser toes may be caused by, but are not limited to:

- External factors, such as improper shoes or improper fit of the shoes
- Neuromuscular factors, such as Charcot Marie Tooth disease, cerebral palsy or multiple sclerosis
- Peripheral neuropathy, caused by diabetes or leprosy
- Inflammatory processes, including rheumatoid or psoriatic arthritis
- Trauma
- Muscle imbalance (internal factors)

While the cause of the problems can vary greatly, deformities of the lesser toes are dealt with similarly, by determining the most appropriate way to off-load or accommodate the problem. Conditions may include:

CLAW TOE DEFORMITY

Symptoms

- Pain and calluses or corns may occur dorsally on the distal interphalangeal (DIP) or proximal interphalangeal (PIP) joints, or inferiorly at the tip of the toe
- Pain at the metatarsal phalangeal (MTP) joint region

What is it?

This is a flexion deformity at both the DIP and PIP joints of the toe. These deformities can be fixed or flexible in nature. A flexible deformity can be passively corrected with the use of an orthosis or by passively manipulating the affected joint, but this is not possible with a fixed deformity where more accommodation is required in the treatment plan.

HAMMER TOE DEFORMITY

Symptoms

- An irritation or corn is often seen at the dorsal aspect of the PIP joint or plantarly under the pad of the toe tip

What is it?

This is a flexion deformity of the PIP joint with an extension deformity of the DIP joint, while the MTP joint remains in a neutral or extended position. This condition can be fixed or flexible.

MALLET TOE DEFORMITY

Symptoms

- Pain and/or a corn may develop over the DIP joint dorsally and possibly on the plantar aspect of the tip of the toe

What is it?

This is a flexion deformity of the DIP joint with an extension deformity of the PIP joint, while the MTP joint is neutral. This condition can be fixed or flexible.

CORNS

HARD CORNS:

Have a nucleus (cone shaped centre or root) whose tip or point can penetrate into the deeper layers of the skin.

Symptoms include:

- Pain usually on lateral aspect of the 5th toe or on the tops of toes (due to pressure/friction of a shoe)
- Usually caused by poor fitting shoes
- Also tend to present under areas of high pressure such as under metatarsal heads

SOFT CORNS:

Also have a core but are not always painful.

Symptoms include:

- White, damp soft corns are usually found in the web space between toes

- Soft corns occur due to chronic irritation to skin between adjacent toes and can be caused by:
 - pressure (constant squeezing together of toes)
 - underlying bony prominence (most often between 4th and 5th toes where the metatarsal heads or phalanx rubs against the base of phalanx of adjacent toe)

What is it?

Corns are conical hyperkeratoses that develop on the skin due to friction/shearing and pressure. Primary causes of abnormal shearing are abnormal subtalar joint pronation or hypermobility of weight-bearing bones. Ill-fitted footwear can also create shearing and pressure leading to the development of corns.

CALLUSES

Symptoms

- Patches of thick, hard skin over an area of high pressure

What is it?

Calluses are areas of localized thickening of skin which develop in response to repeated friction and pressure. A callus formation usually occurs to protect underlying tissue from repeated pressure and friction. As calluses grow and thicken in response to continued pressure, they can cause pain and discomfort. In some individuals with metabolic disorders like diabetes, calluses can develop into open wounds and require careful monitoring and treatment to relieve the cause of the pressure.

PLANTAR WARTS

Symptoms

- Pain on the sole of the foot
- Usually identified as a rough or spongy area with tiny dark spots
- Scraping at a wart may cause it to bleed
- Painful if the area is squeezed side-to-side (a callus is usually painless when squeezed side-to-side)

What is it?

Warts are the most common type of skin infection caused by a virus. Plantar warts occur when the human papilloma virus invades the skin usually through tiny cuts or breaks in the skin. In some cases the virus may die within a period of time and the wart will simply disappear. The virus is often encountered where people share common bathing areas such as public locker rooms, showers and pools.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses featuring metatarsal pads or metatarsal bars to redistribute pressure away from the painful or affected areas, as well as reducing the metatarsal head contact with the ground. Additionally, cushioned materials may be incorporated into shoes to directly reduce the discomfort of the painful areas and provide better distribution of pressure over a wider surface area to decrease specific mechanical irritations. Appropriately fitted footwear is important in reducing pressure on prominent joints of the lesser toes.

PEDORTHIC POINTERS FOR PATIENTS

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

- Wide, deep, square toe boxes to allow proper room for toes
- Toe boxes without stitching to avoid irritation
- Rockered sole (where toe part does not touch the ground) to decrease stress and pressure on the ball of the foot
- Proper fit to prevent mechanical irritation

Where required, Canadian Certified Pedorthists will also spot stretch leather over areas where the shoe rubs to minimize discomfort and potential irritation. Custom orthoses 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.



Pediatrics

Children can benefit from seeing a Canadian Certified Pedorthist whether it is for a custom orthosis, over-the-counter device (OTC) or footwear evaluation. The following common disorders in children can be affected by poor biomechanics and can result in lower limb and foot problems:

SEVER'S DISEASE (CALCANEAL APOPHYSITIS)

Symptoms

- Pain is usually localized to the point where the Achilles tendon inserts into the calcaneus
- Squeezing the sides of the heel bone is often painful
- Running and jumping make the symptoms worse
- In more severe cases, the child may be limping
- Walking on the toes may relieve pain
- Swelling and redness at the site of pain is uncommon

What is it?

Most commonly seen between the ages of 10 to 14 years old, Sever's Disease is a disturbance to the growth plate at the back of the calcaneus where the strong Achilles tendon attaches. It is one of several different osteochondroses, and is also known as calcaneal apophysitis. Sever's Disease is more commonly seen in boys than girls but is possible in both sexes. During adolescence, when the growth of bone is taking place faster than the growth of tendons, there is a relative shortening of the heel cord compared to the leg bones. This results in increased tension of the heel cord at its insertion into the calcaneus. Coupled with an incompletely developed calcaneus, this tension can result in injury to the region. It is often a result of increased activity, repeated minor trauma from sporting activities, an overpronated foot, tight calf muscles and/or increased body mass index.

Pedorthic Treatment

A correct diagnosis from a prescribing physician is extremely important in addition to ongoing management by a healthcare professional such as a Canadian Certified Pedorthist. Sever's Disease symptoms can

be treated by reducing activity levels, using ice and consistently wearing appropriate shoes. During inflammation, using a heel lift inside the shoe will help to reduce strain. As a pronated foot is common in children with this problem, a Canadian Certified Pedorthist may recommend the use of over-the-counter devices or custom-made orthoses to reposition the foot and ankle complex (sub-talar joint) to a more neutral position, reducing the tension of the Achilles tendon on the calcaneal apophysis. After the calcaneal apophysitis resolves, it is important to employ preventative measures such as stretching exercises and wearing supportive, shock-absorbing shoes.

OSGOOD-SCHLATTER'S DISEASE

Symptoms

- Pain with contraction of the quadriceps and with direct pressure on tibial tuberosity
- Swelling and tenderness at the tibial tuberosity both during and after exercise
- A lump on the tibial tuberosity may develop due to the inflammation process creating fibrous tissue rather than bone between a partial avulsion and the remaining bone
- Many children first signal the start of the problem by rubbing the top of their "shinbones" with their hands

What is it?

Osgood-Schlatter's disease is probably the most frequent cause of knee pain in children. The condition occurs most commonly in children between the ages of 10 and 15 years old but it can occur in younger children. It is more common in boys but girls are also susceptible to its debilitating effects. This condition refers to a partial avulsion of the tibial tuberosity with no involvement of the tibial physis. This is a condition where the tibial tuberosity becomes inflamed due to pulling of the patellar tendon at its attachment. It is often related to sports requiring extensive running, jumping, kneeling and squatting.

Pedorthic Treatment

Rest is crucial. Weight-bearing exercise will make it worse. The goal of treatment is to decrease stress at the anterior tibial tubercle, where the patellar tendon attaches. A period of 4 to 8 weeks of restriction from physical activity may be sufficient. A Canadian Certified Pedorthist may use an over-the-counter device or create a custom-made orthosis to be used to position the foot in a neutral position thereby maintaining balance and leg alignment when walking or running. A Canadian Certified Pedorthist may also recommend appropriate footwear to help maintain the knee in a better position and reduce the stress on the tendon.

JUVENILE RHEUMATOID ARTHRITIS (JRA)

Symptoms

- Persistent joint swelling, pain, and joint contracture/ stiffness that typically is worse in the morning or after a nap
- Some children with Juvenile Rheumatoid Arthritis may have growth problems
- Depending on the severity of the disease and the joints involved, growth in affected joints may be too fast or too slow, causing one leg or arm to be longer than the other

What is it?

Juvenile Rheumatoid Arthritis (JRA) is the most prevalent form of juvenile arthritis. It is usually seen in children under the age of 16 years old. JRA is an autoimmune disorder, which means that the body mistakenly identifies some of its own cells and tissues as foreign. The result is inflammation, marked by redness, heat, pain, and swelling in joints. Any joint can be affected but knees and ankles are commonly involved. Inflammation may limit the mobility of affected joints.

Pedorthic Treatment

The main goal of treatment is to preserve a high level of physical and social functioning and to maintain a good quality of life. Major structural changes may occur in time in the midfoot and forefoot due to the combination of chronic synovitis and weight-bearing. Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to maintain the proper foot alignment, decrease pain and lessen long term damage to joints due to abnormal mechanics. For a child with JRA, the goals of orthoses are to redistribute weight evenly under the foot surface and reduce the stress in the joints. The aim of a Canadian Certified Pedorthist will be to maintain comfort by allowing the foot to work as normally as possible. Appropriate footwear may also be recommended to aid in shock absorption and reduce stress to painful joints.

PEDORTHIC POINTERS FOR PATIENTS

For some diseases or injuries affecting children’s lower limbs, time and rest are important factors in the recovery process. Some conditions will self-resolve with time as the child grows. During that time, measures that can be taken to help decrease pain until healing occurs include:

- Adding heel lifts to shoes to help lessen the strain on the back of the heel (as in Sever’s Disease)
- Ensuring that the foot is in an optimal alignment - and not causing undue rotation of the lower leg nor stress to the tibial tuberosity - can help with Osgood Schlatter’s disease
- Accommodating painful joints, by using softer materials in orthoses and selecting appropriate footwear, can be helpful for the child managing Juvenile Rheumatoid Arthritis
- Buying shoes that fit perfectly. It is not a good idea to buy shoes that a child will “grow into.” A shoe that is too big allows for a sloppy fit and poor support which may aggravate problems
- Not using hand-me down shoes for children as the wear patterns already created by previous owners will not allow for the best support possible for the child

Where required, Canadian Certified Pedorthists will also spot stretch leather over areas where the shoe rubs to minimize discomfort and potential irritation. Custom orthoses 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.



Sports Injuries

Athletes of all kinds, whether they are active for recreational purposes or with more competitive or professional goals in mind, can be at risk for lower limb injuries. These injuries may be caused by overuse, accidents, training or equipment errors. Common sport injuries of the lower limbs may include:

ACHILLES TENDONITIS

Symptoms

- Pain generally develops gradually
- Pain, swelling and possible nodule formation along the tendon or where it is attached to the back of the calcaneus
- Stiffness may be present after sitting or resting
- It is most painful when patients use their calf muscle or go up on their toes

What is it?

It is an inflammation of the Achilles tendon which is just above the heel on the back of the leg.

TIBIALIS POSTERIOR TENDONITIS

Symptoms

- Pain and possible swelling may be noted along the path of the tendon during activity
- Pain is located posterior to the medial malleolus of the ankle and along the tendon's path to the insertion point on the navicular
- Patients frequently describe pain on the inside aspect of the foot and ankle

What is it?

It is an inflammation of the tibialis posterior tendon that wraps around the posterior aspect of the medial malleolus due to excessive traction or strain on the tendon when the foot pronates excessively.

MEDIAL TIBIAL STRESS SYNDROME

Symptoms

- Pain is usually noted along the middle and distal thirds of the posteromedial tibia
- Initially, pain subsides with rest from the aggravating activity
- In more chronic stages, the pain can be experienced during all weight-bearing daily activity and can be very tender to touch

What is it?

This condition is a more specific term for the commonly-used general term of shin splints. It is stress/strain along the middle and distal thirds of the posteromedial tibia where the muscle attaches to the bone.

EXERTIONAL COMPARTMENT SYNDROME

Symptoms

- Chronic cases are usually characterized by a gradual onset of aching leg pain and fullness over the involved compartments
- Acute cases are characterized by intense pain and swelling in the affected compartment
- Weakness and paresthesia may accompany the pain; these are related to ischemic changes within the compartment
- Physical examination may appear normal unless the patient has recently exercised
- There will be no tenderness over the distal medial tibia as in medial tibial stress syndrome

What is it?

Pain and swelling in exertional compartment syndrome is thought to be caused by increased intracompartmental pressures possibly produced by swelling within the compartments of the lower leg.

PATELLOFEMORAL PAIN SYNDROME (PFPS)

Symptoms

- Pain is experienced under or around the patella with activity, climbing stairs (especially going down stairs) and prolonged sitting

What is it?

PFPS is a tracking disorder where the patella is not moving in the proper groove on the femur.

ILIOTIBIAL BAND FRICTION SYNDROME (ITBFS)

Symptoms

Pain is experienced on the lateral aspect of the knee or thigh and usually occurs at a certain mileage for a runner or cyclist

What is it?

ITBFS is an overuse injury to the tissue on the outside of the thigh that extends from the hip and inserts on the lateral condyle of the tibia.

Pedorthic Treatment for These Conditions

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to control excessive motion of the foot and leg, and provide improved shock absorption through the appropriate selection of materials to adequately support the foot and treat the presenting condition. Canadian Certified Pedorthists may also provide recommendations on appropriate footwear for the presenting condition.

PEDORTHIC POINTERS FOR PATIENTS

Sports injuries can often be a result of poor training techniques combined with poor lower limb mechanics (how the foot moves) and inappropriate footwear. To prevent and alleviate pain caused by sports injuries, Canadian Certified Pedorthists recommend:

- Slowly and carefully increasing activity while allowing the tissues of the lower limb time to properly adapt to new activity levels
- When injuries occur, custom orthoses and appropriate footwear choices may help the healing process and stop the recurrence of problems
- Selecting a stable shoe with a sturdy heel counter (the back of a shoe) that controls motion and/or provides shock absorption as needed
- Over-the-counter devices can often prevent simple cases of overpronation and assist with healing
- If a foot injury occurs rest it and use ice or heat
- If a condition persists it can help to visit a referring health professional, such as a physiotherapist or massage therapist, who specializes in sports medicine



Arthritis

Arthritis is a very common disease which can affect the joints, skin and various internal organs. In many cases, arthritis causes pain, stiffness and sometimes swelling in or around joints and can destroy the joint surfaces affecting their mobility. Because the effects of arthritis often spread to or from the feet, Canadian Certified Pedorthists can help patients retain and enhance mobility.

The two most common presentations in the foot are:

- Inflammatory arthritis, for example rheumatoid arthritis or gout, often marked by episodes of stiffness, heat, redness and/or swelling, and
- Degenerative arthritis, for example osteoarthritis, an age-related wear and tear of the cartilage which worsens gradually over time.

Some of the most common types of arthritis are:

OSTEOARTHRITIS

Symptoms

Common locations of degenerative arthritis are the 1st metatarsal phalangeal (MTP) joint, talo-cruel joint and subtalar joint resulting in:

- Tenderness along the joint line
- Reduced range of motion
- Crepitus, pain in weight-bearing
- Formation of osteophytes

What is it?

Osteoarthritis (OA) is a degenerative joint disease, and is one of the most common types of arthritis. For many people, osteo- arthritis pain and inflammation cannot be avoided as the body ages. In fact, many people over the age of 50 years old show some signs of wear and tear arthritis as joints naturally degenerate over time. OA is characterized by the breakdown of the joint's cartilage, causing the bones in the joint to rub together. The result is inflammation, redness, swelling and pain in the joint. A traumatic injury such as a broken bone, torn ligament or a moderate sprain can sometimes cause an injured joint to become arthritic in the future.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to help address mechanical deficiencies, limit excessive motion and accommodate painful areas of the foot by providing full contact cushioned orthoses. To further restrict joint dorsiflexion, a morton's extension or a hallux rigidus splint for 1st MTP joint OA may also be incorporated. Canadian Certified Pedorthists can also accommodate bone spurs/osteophytes within the orthoses or by modifying footwear for increased comfort. The goal of pedorthic treatment is to lessen any abnormal or increased movement between joints in the foot which may aggravate the pain and tenderness caused by osteoarthritic changes to a joint.

RHEUMATOID ARTHRITIS

Symptoms

- Foot pain, swelling and stiffness
- Symptoms usually appear in the toes or forefoot first, followed by the midfoot and then usually the ankles
- If the midfoot is affected, the bones may shift position causing the medial longitudinal arch of the foot to collapse, resulting in pain and difficulty walking
- Prominent, painful metatarsal heads and hammer toes
- Rheumatoid nodules commonly seen beneath the skin as bumps over a bony prominence such as the metatarsal heads (ball of the foot)

What is it?

Rheumatoid arthritis (RA) is the most common form of inflammatory arthritis. It is a condition caused by an irritation of the lining of the joint known as the synovium, or synovial lining. Rheumatoid arthritis is a systemic disease that attacks multiple joints throughout the body. In RA, cells of the immune system within the synovium attack surrounding tissue and can cause inflammation within the joint. If the inflammation persists, nearby cartilage, bone, tendons and ligaments can be damaged and lead to deformity of the joint. People with rheumatoid arthritis often have rheumatoid nodules and misaligned joints in the toes making shoe fitting difficult.

Pedorthic Treatment

Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses featuring metatarsal pads or bars to off-load painful metatarsal heads with additional accommodations to off-load rheumatoid nodules. The goal of pedorthic treatment is to stabilize the heel, to limit excessive motion which can aggravate inflamed joints, and accommodate painful areas and joints of the foot by providing full-contact cushioned orthoses. Shoes are a key treatment area for the foot affected by RA as an appropriately fitted shoe can help alleviate the pain.

GOUT

Symptoms

- Sudden onset of severe pain, tenderness, redness, warmth and swelling in the affected joint
- Commonly seen in the big toe, but can occur in other joints as well
- Usually affects one joint at a time
- People with gout will often report that they cannot tolerate anything touching the affected area and, if gout affects the feet, patients may be unable to weight-bear

What is it?

Gout is characterized by sudden, severe attacks of pain and tenderness, redness, warmth and swelling in joints. It is caused by a build up of uric acids which forms crystals that deposit in joints. As the body tries to remove the crystals, painful inflammation occurs. It commonly affects men over 40 years old, but can affect anyone of any age. Women with gout usually develop it after menopause. Gout pain seems to be very unique and once experienced is often not mistaken again for any other condition.

Pedorthic Treatment

The goal for treatment is to control the pain of inflammation by decreasing the irritation to the joint, allowing the joint to work as normally as possible. Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to stabilize the heel to limit excessive motion, particularly excessive pronation which can result in increased pressure over the medial aspect of the 1st MTP joint. There may also be accommodation to an orthosis or shoe to offload the 1st MTP joint and to provide some pain relief. Accommodation and modification of footwear to relieve pressure over the affected joint can also provide increased comfort.

PEDORTHIC POINTERS FOR PATIENTS

To alleviate the pain caused by arthritis, Canadian Certified Pedorthists recommend selecting footwear featuring:

- Rigid rocker soles to decrease stress on the ball of the foot and provide a more efficient push-off
- Soft leather uppers or materials that will mold around deformities or sensitive areas
- Wide, deep, square toe-boxes with no seams over hammer toes or other sensitive areas to avoid pressure on painful joints
- Velcro closures or elastic laces to eliminate the need to lace up a shoe, if fine dexterity in the fingers is difficult
- Heels should be lower than 1" or 2.5 cm – avoidance of high heels is recommended



Diabetes

Diabetes is one of the most prevalent diseases of our time and is affecting more and more Canadians. It is a disease where the body is unable to produce insulin (Type I – juvenile onset), or the body does not produce enough or cannot effectively utilize what insulin it does make (Type II – late onset). There is a third type of diabetes that occurs during pregnancy called Gestational Diabetes.

Although diabetes affects several parts and systems of the body, long-term complications are frequently manifested in foot problems. Since the extreme consequence of these complications can be amputation, footcare for someone with diabetes must become a daily priority. In fact, foot problems such as infection, ulceration or gangrene that may lead to amputation, are a leading cause of hospitalization for Canadians who have been identified as having diabetes.

Symptoms

There are various effects of diabetes on the lower limbs ranging from slight skin discoloration to severe skin breakdown (ulcers) and infections. Some of these symptoms are:

- **Skin blanching:** refers to the “white” discoloration of the skin when pressure is applied to an area and then removed. If significant skin blanching is present it can indicate that circulation is compromised to that area. Precautions must be taken to increase circulation and decrease pressure points in order to minimize potential skin damage due to pressure such as calluses and blisters which can lead to further complications and health issues.
- **Redness:** refers to the remaining “red” areas that appear even after shoes are removed. Typically the joint of the big toe, the tops of the toes, or the dorsum of the foot are areas to consider carefully. To healthy patients, these skin irritations might not pose any problems, but are of great concern to people with diabetes as they indicate areas of high pressure from the shoe that could ultimately turn into ulcers and infections (secondary to limited blood flow required for adequate healing).
- **Leg hair:** as hairs need oxygen to grow properly, patients with very limited circulation will often have dry, flaky skin with very little hair on their calves and feet.

- **Numbness or tingling (neuropathy):** constant elevated blood sugars can damage nerve endings, causing numbness or a tingling feeling in the feet. Patients may notice lessened feeling in their feet or that they get cold easily – possibly followed by sensations of pain and burning. Patients may be equally unaware of this loss of sensation.
- **Ulcers:** open sores and wounds can easily become infected when bacteria invade brittle skin. If left untreated, these infections can become serious and involve the underlying bone (osteomyelitic ulcers). Very advanced stages can develop gangrene and the infected part of the limb may need to be amputated.

For people with diabetes, gradual loss of feeling in the feet can interfere with their ability to monitor the health of their feet. As a result, friction or rubbing can go unnoticed and worsen into a break in the skin or an ulcer. Shoes can be tied too tightly, hindering circulation. For these reasons, it is important for all people living with diabetes to have annual checkups and have shoes professionally fitted.

Pedorthic Treatment

Patient treatments will vary according to the presence of ulcers, foot deformity and loss of sensation. Canadian Certified Pedorthists may use over-the-counter devices or may create custom-made orthoses to “offload” risk areas of the foot, or simply to increase cushioning to the soles of the feet. This is particularly important for patients with neuropathy. Canadian Certified Pedorthists can also modify a patient’s existing footwear to relieve pressure areas by removing stitches at heavy seams, on the joint of the big toe for example, or stretching the shoes.

Additionally, Canadian Certified Pedorthists can offer a range of stockings and socks including graduated compression stockings that help control swelling and seamless socks that reduce pressure across the tops of the toes.

The goal of treating a patient with diabetes is to educate the person and train them to visually examine their feet rather than relying on how their feet “feel.” It is also important to reduce any pressure areas to reduce risk to the foot and to control abnormal motion to allow the foot to work as efficiently as possible.

PEDORTHIC POINTERS FOR PATIENTS

People living with diabetes often have reduced circulation and sensation in their feet and are not able to feel if something in the shoe is irritating their feet. If the foot is irritated by the shoe, it can cause a wound or ulcer, which can be very dangerous for a person with diabetes. Shoe selection and footcare are vitally important. For patients with diabetes, Canadian Certified Pedorthists recommend the following footcare and shoe fitting tips:

FOOTCARE

- Check your feet daily by visually inspecting them. Be alert for redness, swelling, broken skin, sores or bleeding. See your doctor immediately if any of these problems arise
- Wear shoes around the home – as well as outdoors – to protect feet from injury
- Wash your feet with soap and warm water every day, but do not soak them
- Avoid heat pads or hot water bottles even though your feet might get cold easily because with a lack of sensation it is easy to burn the feet if the water is too hot
- Avoid socks with heavy seams as they can cause irritation of the skin and lead to breakdown or ulceration
- Avoid tight constrictive socks and clothing that can limit blood flow to the extremities

SHOE SELECTION

- Have your shoes fitted properly by a trained specialist such as a Canadian Certified Pedorthist
- Key features for diabetic footwear include soft uppers with minimal seams, firm but cushioned soles, removable insoles, a strong heel counter and a rockered sole
- Avoid restrictive footwear such as high heels with pointed toes or shoes that are narrow in style
- When buying new shoes, a good practice is to remove the insole from the shoe and stand on it to see if your foot overlaps the insole, indicating that the shoe is too narrow or short for your foot
- There should be a full finger width between the end of the longest toe and the end of the shoe
- Avoid seams over the toe area of your shoes. Seams resist stretching and create bumps that can rub against the skin and cause it to break down or ulcerate
- If you have a problem with lower limb swelling, graduated compression stockings can help control swelling and improve the fit of shoes over the course of a day

ABOUT PEDORTHISTS – C. PED (C)

Canadian Certified Pedorthists are trained in the assessment, design, modification and fit of foot orthoses and footwear to help deal with pain, discomfort and disabilities in the legs and feet. To find a local Canadian Certified Pedorthist, please visit www.pedorthic.ca/find



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