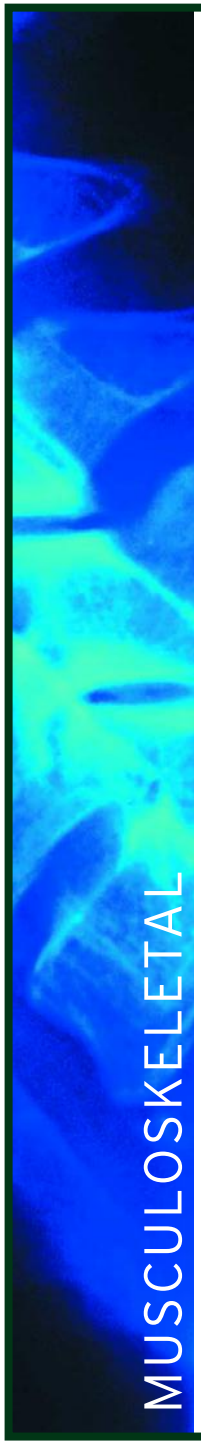


MD PHYSIOTHERAPY SERVICES

YOUR GUIDE TO

# GENERAL FOOT PAIN

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## Introduction

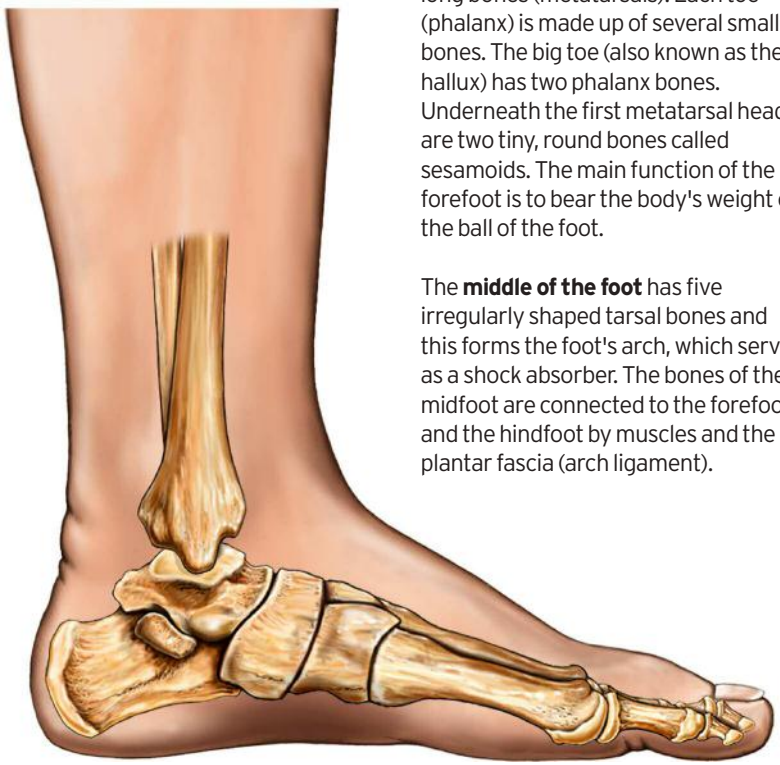
**Please take note of the following before starting any of the exercises in this guide:**

- The information contained in this guide is intended to assist in managing your recovery.
- This guide is based on the latest medical research in the field and contains, to the best of our knowledge, the best advice available.
- This guide is complimentary to other medical services and is not intended as a substitute for a health care provider's consultation.
- Never disregard medical advice or delay in seeking it because of something you've read in this guide.
- Should you doubt a particular exercise in your situation, please consult your health professional.

**When consulting your health professional, it is wise to take this guide with you to show them.**

# The Foot Joint

The human foot combines mechanical complexity and structural strength. The ankle serves as a foundation, shock absorber, and propulsion mechanism in walking and standing. It can sustain enormous amounts of pressure (several tons over the course of a one-mile run) whilst providing flexibility and resiliency.
One-quarter of the bones in the human body are in the feet, with more than 100 muscles, tendons, and ligaments found in the foot alone. These components work together to provide the body with support, balance, and mobility.



A malfunction in one part of the foot can result in problems elsewhere in the body, such as the knees and the back. In the same manner, abnormalities in other parts of the body can lead to problems in the feet.

The **forefoot** is composed of five toes (called phalanges) and their connecting long bones (metatarsals). Each toe (phalanx) is made up of several smaller bones. The big toe (also known as the hallux) has two phalanx bones. Underneath the first metatarsal head are two tiny, round bones called sesamoids. The main function of the forefoot is to bear the body's weight on the ball of the foot.

The **middle of the foot** has five irregularly shaped tarsal bones and this forms the foot's arch, which serves as a shock absorber. The bones of the midfoot are connected to the forefoot and the hindfoot by muscles and the plantar fascia (arch ligament).



The **back of the foot** is composed of three joints and links the midfoot to the ankle (talus). The top of the talus is connected to the two bones of the lower leg (the tibia and fibula), forming a hinge that allows the foot to move up and down. The heel bone (calcaneus) is the largest bone in the foot. The bottom of the heel bone is cushioned by a layer of fat.

A network of muscles, tendons, and ligaments supports the bones and joints in the foot. There are 20 muscles in the foot that give the foot its shape and allowing movement. The main muscles of the foot are:

- the **anterior tibialis**, which enables the foot to move upward;
- the **posterior tibialis,** which supports the arch;
- the **peroneal tibialis**, which controls movement on the outside of the ankle;
- the **extensors**, which help the ankle raise the toes to initiate the act of stepping forward; and
- The **flexors**, which help stabilize the toes against the ground.
- Smaller muscles enable the toes to lift and curl.

There are elastic tissues (tendons) in the foot that connect the muscles to the bones. The largest and strongest tendon of the foot is the **Achilles tendon,** which extends from the calf muscle to the heel. Its strength and joint function facilitate running, jumping, walking up stairs, and raising the body onto the toes.

Ligaments (fibrous tissue that link bone to bone) hold the tendons in place and stabilize the joints. The **plantar fascia**, forms the arch on the sole of the foot from the heel to the toes. By stretching and contracting, it allows the arch to curve or flatten, providing balance and giving the foot strength to initiate the act of walking. Medial ligaments on the inside and lateral ligaments on outside of the foot provide stability and enable the foot to move up and down. Skin, blood vessels, and nerves give the foot its shape and durability, provide cell regeneration and essential muscular nourishment, and control its varied movements.

# What causes foot pain?

At one time or another, everyone has had a minor toe, foot, or ankle injury that has caused pain or swelling. Most of the time our body movements do not cause problems, but it's not surprising that symptoms develop from everyday wear and tear, overuse, or from an injury. Toe, foot, or ankle injuries most commonly occur from sports or recreational activities, work-related tasks, activities around the home and accidents.

There are 2 types of injuries, acute and chronic. An **acute injury** may occur from a direct blow, a penetrating injury, a fall, or from twisting, jerking, jamming, or bending a limb abnormally. Your pain may be sudden and severe. Bruising and swelling may develop soon after your injury. Acute injuries include bruises, injury or tears to the soft tissues, broken bones (fractures), muscle sprains and dislocations.

**Chronic injuries** are usually overuse injuries which occur when too much stress is placed on your joint or other tissue, often by "overdoing" an activity or repeating the same activity over and over. Overuse injuries include bursitis, tendonopothies, stress fractures, plantar fasciitis, and metatarsalgia.

# Common foot problems

### ACHILLES TENDONITIS

Achilles tendonitis is a painful condition of the tendon that connects the heel of the foot to the calf muscles. Achilles pain commonly occurs from shearing and stretching forces placed on the Achilles tendon. This micro tearing in the tendon, leads to swelling and pain. This can be caused by a variety of factors including extra strain on the tendon from a tight calf muscle, or misalignment of the foot (i.e. excessive pronation or outward tilt of the foot). Other causes can include sudden increase in training or sport activity, or excessive running. Symptoms include pain which may be present at the Achilles tendon during activity and may also increase once activity has ceased.

### ANKLE SPRAINS

An ankle sprain is a common walking and sporting injury. It occurs due to the ankle twisting and causing damage to the soft tissues and ligaments. An ankle sprain may result in a partial or complete tear of the ligament which stabilizes the ankle joint. Once the ligament is torn, it becomes weak which in turn affects ankle stability. An audible "pop" or "snap" may be heard, which sometimes signals ligamentous rupture. If you can walk on the injured ankle, the likelihood of a serious injury is less, but athletic activities should be discontinued. Symptoms include a swollen, painful ankle with possible bruising due to ruptured blood vessels. Apply the R.I.C.E (Rest, Ice Compression, and Elevation). principal to reduce the sprain symptoms.

### BUNIONS

Bunions are one of the most common forefoot problems, and are commonly just described as a bump on the side of the foot. They are actually caused by changes in the alignment of the bones, as the big toe moves in towards the smaller toes. This shifting of the bones causes a bony prominence on the inside of the foot.
A bunion is more common in women than men due to women wearing tighter fitting shoes. Although this is not the cause, it can bring the symptoms on earlier. Causes include family history, arthritis, abnormal foot function, weak ligaments and genetic foot composition. Symptoms include redness, swelling and pain which may be present on the prominent bump on the inside of the foot. The feet may become too wide to fit into their normal size shoe.

### FLAT FEET

This is a condition in which the foot doesn't have a normal arch. It may affect one foot or both feet. Feet that have a low arch or no arch at all are referred to as flat feet or fallen arches. The symptoms vary depending on the severity of the condition. Individuals may experience corns and hard skin under the sole of the foot. The arch area may be tender and shoes will tend to wear out quickly. In severe cases the patient may experience calf, knee, hip and back pain. The causes may be hereditary, or from biomechanical abnormalities, or a ruptured tendon.

### HIGH ARCHED FOOT

Feet that have a high arch are sometimes referred to as cavus type feet. Symptoms include corns, faster wear out of shoes, pain along the arch, stiffness and difficulty fitting shoes. Wear wide fitting shoes and make use of insoles or orthotics to decrease or improve symptoms.

### HAMMER TOES

Patients often refer to all forms of toe abnormalities as a hammer toe. There are in fact four main forms of toe abnormalities, hammer toes, claw toes, mallet toes and trigger toes. A hammer toe can be best described as an abnormal contraction or "buckling" of a toe. This occurs due to a partial or complete dislocation of one of the joints that form the toe. As the toe continues to be deformed, it will press up against the shoe and may cause corns. Symptoms include pain that is aggravated by a shoe, cramps in the toes, foot and leg, and corns. The toe will also appear bent. Some of the causes may include inappropriate

shoes, flat feet, high arched feet, bunions and rheumatoid arthritis. Wear wide fitted, low heeled shoes and make sure that your stockings, tights or socks are not too tight.

### POSTERIOR TIBIAL TENDON DYSFUNCTION

Tendonitis in the foot is a common problem amongst hard working people. This is usually a classic over use injury and affects a particular tendon in the foot, the posterior tibial tendon. This tendon helps to hold the arch of the foot and prevents your feet from rolling in too much. Symptoms include pain at the in step of the foot, especially along the course of the tendon in addition to a sudden acquired flat foot. There may be burning, tingling, shooting or stabbing pain present in the foot. This is due to the inflammation of the nerve that surrounds the tendon. You may also have a sudden change in your walking pattern and feel quite unstable due to the reduced support in the arch of your foot. Initial treatment may include making use of the R.I.C.E principal and anti-inflammatory medication, however it is important to consult your allied health professional to prevent long term deformity.

### HEEL PAIN

The most common cause of heel pain is plantar fasciitis which is commonly referred to as a heel spur. Plantar fascia is a broad band of fibrous tissue which runs along the bottom surface of the foot, from the heel to the toes. Long standing inflammation causes the deposition of calcium at the point where the plantar fascia inserts into the heel. The result is an appearance of a sharp thorn like heel spur on an x-ray. The heel spur is asymptomatic (not painful), the pain arises from the inflammation of the plantar fascia. Symptoms include a dull ache which is felt most of the time with episodes of a sharp pain in the centre of the heel or on the inside margin of the heel. Often the pain is worse on first rising in the morning and after rest and is aggravated by prolonged weight bearing & thin soled shoes. Causes may include excessive load on the foot due to obesity, a sudden increase in activity, tight plantar fascia, biomechanical problems and arthritis. Make use of hot and cold gel packs, stretching exercises and non steroidal anti-inflammatory drugs to reduce symptoms.

### OSTEOARTHRITIS

Osteoarthritis is commonly known as a wear and tear disease of the joints, commonly found in the older population. Symptoms usually develop slowly and gradually, and can affect the hips, knees, thumb joints, lower spine, shoulders, elbows, ankles, toes and wrists. In some cases of OA you will not experience any symptoms at all. Changes in the joint would appear on an X-ray. The symptoms may include pain, swelling, loss of movement, grating or crackling, weakness, and stiffness.



# What treatment can I receive?

The treatment you will receive will depend upon the cause, nature and severity of your foot pain. Your GP or health professional will be able to diagnose your injury from the following information:

**A history of the injury:** The type of injury and how it occurred gives vital information as to the site, and what structures may have been injured. If there has been no violent incident there may be some underlying cause for the injury and it is important that the underlying cause is determined on examination.

**Description of Symptoms:** The type and site of the pain, swelling present and other sensations such as clicking, grinding, locking, giving way, all provide clues of what is going on within the joint.

**X-rays:** If your GP or health professional suspects a broken bone, or structural damage to the bones or cartilage, an X-ray may be done to confirm this.

**MRI scan/Ultra sound scan:** MRI/US scans are done to confirm a diagnosis of a soft tissue injury (such as ligaments or mensci).

In most cases foot pain can be treated with common conservative measures. The goal of treatment is to reduce pain by reducing the inflammation, and to return the knee to full function.

If you have sustained a foot injury from a traumatic event, or if there is swelling present, the **RICE** principle should be followed initially following the accident or injury.

| | |
|---|---|
| **REST** | Stop using the injured area. Allow your injured region to rest from weight bearing, or any activity that brings on symptoms, for approximately 24 hours after the injury. You can move the area, but make sure that it is pain free to prevent any further damage |
| **ICE** | Ice the area every 2 hours for 15- 20 minutes to decrease pain and swelling for the first 48-72 hours |
| **COMPRESSION** | Apply pressure to the area in the form of a stocking, tight sock, brace, strapping or bandage to provide both support and pressure to decrease any swelling |
| **ELEVATION** | Keep the injured area raised. Elevate the area ideally higher than your heart, to reduce swelling and pain |

### PRECAUTIONS WHEN USING ICE THERAPY

- Ice treatment must be used carefully otherwise it may cause a skin burn.
- Never put an ice pack directly onto the skin, always use a damp towel or cloth to prevent an ice burn.
- Only apply an ice pack to areas of skin with normal sensation i.e. you must be able to feel hot and cold.
- Never put an ice pack over an open wound or graze.
- Do not apply an ice pack to an area with poor circulation.
- Never leave an ice pack on the skin longer than the time stated in this advice sheet.
- Adults should always supervise young children when using ice packs. Application may be reduced and extra care should be taken when checking the skin.
- Remember to check the skin underneath every 5 minutes for:
- Blotchy and painful skin
- Excessive numbness

**If you get any of these symptoms remove the ice pack immediately.**

### ANTI-INFLAMMATORY MEDICATION

This can be taken to control inflammation. It is important to get advice from your pharmacist before starting a course of anti-inflammatory medicine.

### PHYSIOTHERAPY

This would include a full assessment and treatments such as soft tissue techniques, education and a full rehabilitation programme to ensure return to full function. They may also refer you to a podiatrist for a biomechanical assessment and advice regarding footwear.



# What exercises can I do?

It is important that you are aware that the exercise programme in this pack is a general exercise programme to encourage the return of muscle strength and range of movement to the foot joint. If you are seeing a health professional regarding your injury, please take this guide with you.

When starting an exercise programme it is important that you start slowly, and ensure that you are able to do all exercises in a controlled, pain free range of movement before moving on to the next exercise phase.

If you are not used to doing exercise, always start gradually, feeling only a slight exertion, and slowly progress as you get stronger. You may feel some discomfort while doing the exercises or afterwards, and this is completely normal, especially if the exercises are not familiar to you. However, the exercises should never exacerbate your existing symptoms.

Try to include aerobic exercises (exercise which gets your heart beating faster) such as cycling, swimming and walking, as long it is pain free, and has benefits for not only your injury, but your general health.

If you experience an increase in your pain during any of the exercises, decrease the intensity of the exercises by:

- decreasing the number of sets
- decreasing the number of repetitions
- decreasing the range of movement
- decreasing the resistance

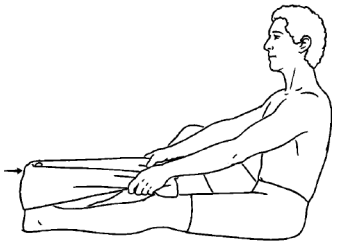
Do all exercises slowly and breathe normally. Progress gradually according to your own level of comfort. Stiffness or fatigue may result following the exercises, but should not last longer than 24 hrs, and your symptoms should not in any way be aggravated by the exercises.

# **Exercises** phase 1

## STRETCHING

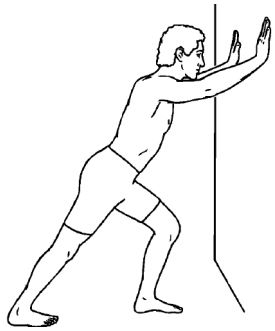
You can start with Phase one exercises when the swelling and the pain starts to decrease. Pain is your guide as to when you can start, and how much activity is enough. The goal of this phase is to increase the range of motion and strength, which will aid in circulation and help eliminate swelling.

- **Hold each stretch for 30 seconds and repeat 2-3 times on each leg**
- **Repeat each stretch 3x on each side, 2-3 times a day. Perform them in a slow and controlled manner, until you feel the stretch but not into the pain threshold**
- **If you do not have tubing you can make use of an old stocking**



### PLANTAR FASCIITIS STRETCH

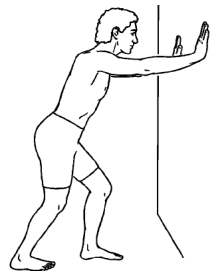
Sit with your leg straight and place a towel or old stocking over the ball of your foot. Pull it towards you until a stretch is felt through the arch of your foot. (You may also feel the stretch in the back of the thigh and the calf)



### GASTROCNEMIUS STRETCH

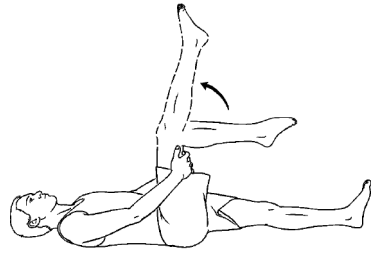
Stand about a meter away from a wall. Place both hands against the wall with one foot further back than the other. Now lean in towards the wall, bending the front knee and keeping the back knee straight and the heel on the floor.





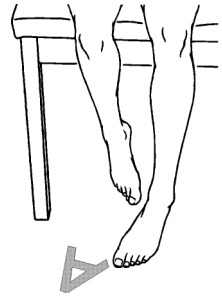
### SOLEUS STRETCH

In the above position, now keep the back leg slightly bent, with the heel on the floor and toes pointing in a straight line to the wall. Lean into the wall until a stretch is felt in the lower calf.



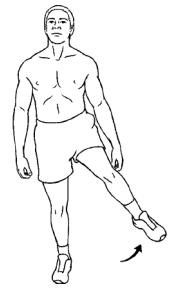
### HAMSTRING STRETCH

Lie on your back and support your thigh behind the knee. Slowly pull the leg towards your chest and then straighten the knee until a stretch is felt in the back of the thigh.



### ANKLE ALPHABET

Sitting/lying with your leg outstretched in front. Now raise the leg, keeping knee straight and leg still. Paint the alphabet in the air, with ankle using capital letters, slowly to get full range of movement in ankle. The movement should not be from your hip, only your ankle and range should be pain free.



### WEIGHT SHIFTING

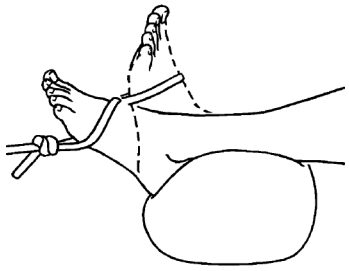
Stand up straight and shift your weight from one leg to another in a slow and controlled manner.

# **Exercises** phase 2

This phase of exercise can be started when you are able to complete phase 1 exercises pain free and with control. You should no longer have swelling or pain and if this is not the case it is important that you consult your health professional to ensure that there are no other problems and that you are completing the exercise programme correctly. Do not be afraid to go back to phase 1 if you feel that you are unable to safely continue with the phase 2 exercise or you can overlap the phases if you are not completely confident to do all the exercises in phase 2 yet. Be aware of pain as your marker of doing too much or maybe even doing the exercise incorrectly. Continue with the stretches as in phase 1.

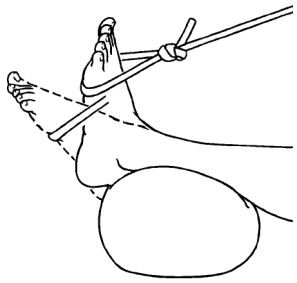
## MOBILITY & STRENGTHENING

- Repeat **2 sets** of **10-15 repetitions** of each exercise
- These exercises should be performed at **least once a day**, twice if possible
- Make sure that you work in a pain free range of movement and gradually increase your range as you go



### RESISTED DORSIFLEXION (TOES UP)

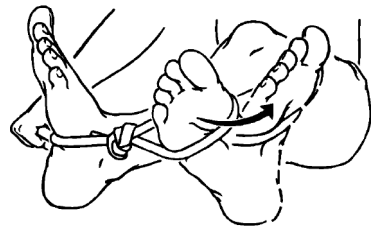
With the tubing (or an old stocking) anchored to a fixed object (table leg), and attached around your foot, pull the foot towards you. Return slowly to your starting position.



### RESISTED PLANTARFLEXION (TOES DOWN)

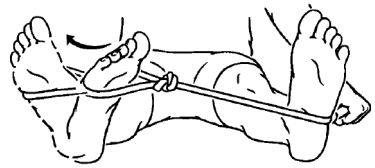
Whilst holding one end of the tubing and the other tied around your ankle, press the foot downwards towards the floor. Return slowly to starting position.





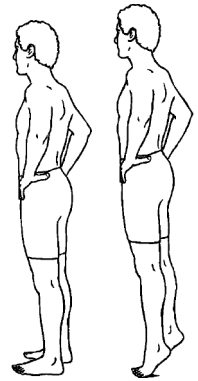
### RESISTED INVERSION (TOES IN)

Tie ends of the band together, and anchor the band around a table. Sitting side on to the table, loop the band around the foot of your injured ankle which should be closest to the table. Move toes up and in toward opposite knee. Be sure to only use your ankle.



### RESISTED EVERSION (TOES OUT)

Now turn around so your injured ankle is furthest from the table, with the band attached around the foot. Now move the toes of the foot up and out toward outer shin, pulling the band away from the table.

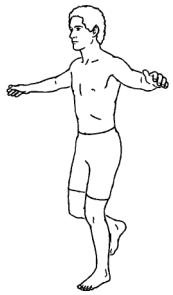


### CALF RAIS

Standing on
your toes in
First onto yc
your middle
your little toe. Repeat this sequence 10 times. Ensure you have something to hold onto, should your balance not be good.

# **Exercises** phase 2 (continued)

**STANDING TOE RAISE**
Standing with your weight now on your heels, raise your toes off the ground in the same sequence as the calf raises, i.e. middle of your heel, outside and inside.



**STORK STANDING**
Balanced on one leg for 30 seconds and repeat with the other leg. Repeat with your eyes closed. Progress the above standing to an unsteady surface e.g. a cushion or a narrow piece of wood.

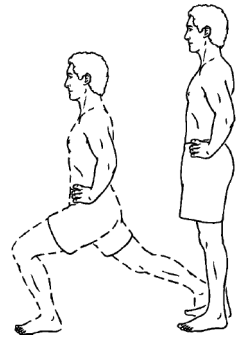
# **Exercises** phase 3

## STRENGTHENING & PROPRIOCEPTIVE

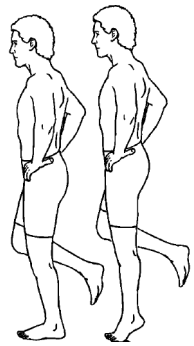
This phase of exercise can be started when you are able to complete phase 2 exercises pain free and with control. You should no longer have swelling or pain and if this is not the case it is important that you consult your health professional to ensure that there are no other problems and that you are completing the exercise programme correctly. This phase of exercises is specifically designed if you are actively participating in sports and like to return back to competitive sports.

- **Repeat two sets of 10-12 repetitions of each exercise.**
- **Make sure that you work in a pain free range of movement and gradually increase your range as you go**

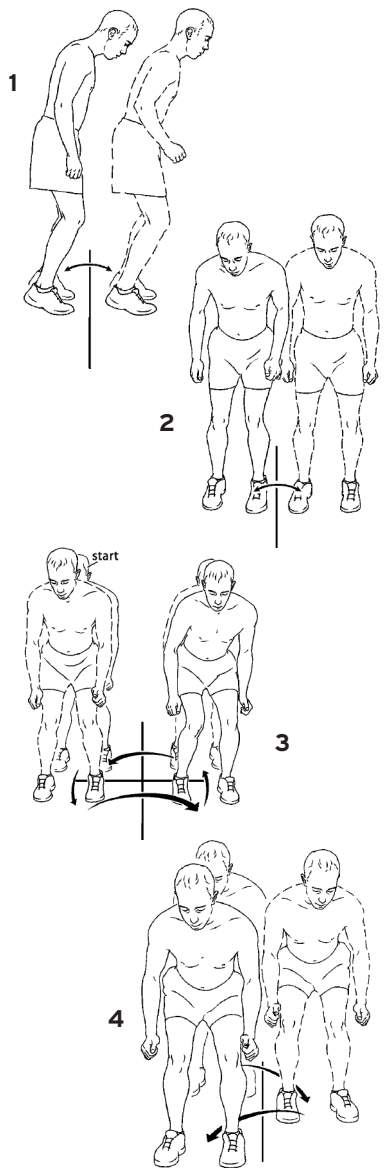
**STEP STRENGTHENING EXERCISES**
Stand on a step (facing down stairs) and tighten the quads (the thigh muscle) as you bend and straighten the knee. Don't let the leg being lowered become weight bearing.



**STATIC LUNGE**
Place one foot in front of the other. Bend both knees together until you have a 90º bend in both. Ensure that your front knee does not go over your front foot when bending to 90º. Return to the starting position. Complete all repetitions on one leg before changing to the other.



**SINGLE LEG CALF RAISE**
Supporting yourself against a wall or holding onto a table, stand on one leg and raise up onto your toes in the following manner; first onto your big toe, then onto the middle of your foot and lastly onto your little toe. This sequence equals one repetition.




## FUNCTIONAL EXERCISES

Only start these exercises once you are able to do the above with no pain and good control, and if you want to return to sporting activities. It is also important that you consult with your allied health professional before starting any jumping activities to ensure that you are safe to do so.

## HOPPING

Standing on two legs hop from one point to another in the following manner

**1.** Forwards and backwards
**2.** Side to side
**3.** In a square (clockwise and anticlockwise)
**4.** In a zigzag forwards and then backwards Repeat each sequence 10 times per leg. Progress to hopping on one leg.

## RUNNING DRILLS

In order to get back to normal activity it is important to practice some of these movements during your rehabilitation programme to ensure that you are ready. Therefore perform various running drills i.e. short sprints, backward running, zig-zag running, stop/start and so on to prepare yourself for your specific sport.



## ACTIVITY SPECIFIC TRAINING

Activity specific exercises may include simply walking or jogging, or may be more intense for athletes who participate in basketball, soccer, or other sports. The key, no matter what level of recreational or competitive athlete you may be, is to progress slowly. Begin at very low intensity, and very low duration of activity, and slowly work up – never suddenly increase either the intensity or duration of your activity.

# Helpful hint

**For pain and swelling on the planter aspect (sole) of the foot. Use a plastic water bottle, fill it with water and put it in the fridge. When the water has frozen you can use this to ice the sole of your foot (instead of the normal ice pack) while applying a gentle stretch to the sole of the foot. Stand up and role your foot back and forth on the icy bottle while putting some weight on the foot being iced. This will allow you to ice the area while also stretching the facia and plantar muscles.**

# Contact us

This guide is designed to assist you in the self-management of your injury/condition.

We are here to assist your recovery in the shortest but safest possible time. If you have any uncertainties or queries regarding the information, please do not hesitate to contact us on:

**Theorem Health, Alcester and Redditch**
**Phone 07380 841468**
theoremhealth.co.uk/podiatry/