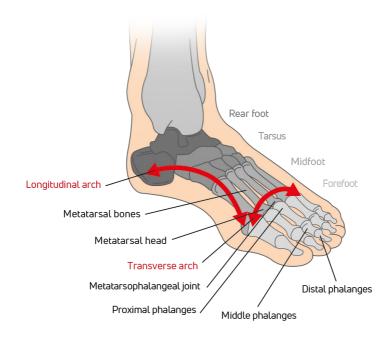


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#### IN A NUTSHELL

The foot consists of 26 bones, nearly 30 joints, and almost 60 muscles and tendons.

The foot is built up as a double arch construction supported by several ligaments and muscles. In the forefoot area between the 1st and the 5th toe is the transverse arch. The longitudinal arch is formed between the forefoot and the rear foot and is significantly higher on the inside of the foot than on the outside of the foot. Heavy stress or exhaustion on the supporting apparatus of the foot can cause the arch of the foot to give way.

Some disorders of the foot, such as arched feet and splayfoot, are based on a sagging arch of the foot. The sole of the foot has a solid body of fat that does not slip even under heavy stress and thus provides cushioning and protection similar to suspension in a car. The so-called construction fat is particularly thick in the main stress zones of the foot.

This distributes the body weight over three main stress zones - the heel, the ball of the big toe and the ball of the little toe. When moving, however, the stress distribution in the forefoot changes: The area under the 2nd and 3rd metatarsal heads is particularly challenged.

## | CLINICAL CONDITIONS and options for their treatment



#### IN A NUTSHELL

Hallux valgus, hallux rigidus, hammer, claw and mallet toes, tailor's bunion, metatarsalgia and Morton's neuralgia, are among the most common foot conditions.

Foot pain can occur at any point, making it a common condition in people of all ages. Everyday stress on the foot, such as standing and walking, especially in closed shoes, can become unbearable for the patient.

While some deformities of the foot can be treated conservatively with insoles, special shoes or foot exercises, surgery to relieve symptoms may be unavoidable for some patients.

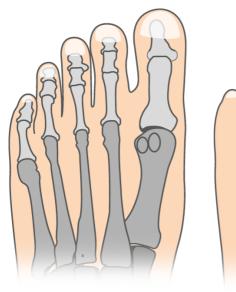


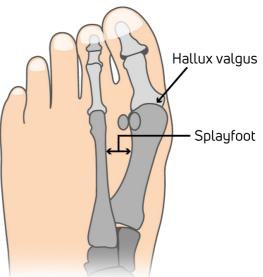
#### SPLAYFOOT WITH HALLUX VALGUS

(BALL OF THE BIG TOE)

Normal foot shape

Hallux valgus: mild form





#### IN A NUTSHELL

Hallux valgus, or bunion, affects 23% of adults aged 18-65 and 35.7% of elderly aged over 65 years.

Hallux valgus, or bunion, is a deviation of the big toe in the metatarsophalangeal joint towards the small toe side.

Hallux valgus usually develops as a result of years of splayfoot, the most common painful deformity of the foot. This causes the 1st and 2nd metatarsal bones to spread causing incorrect stress on the foot.

The cause of hallux valgus is related to weak connective tissue and obesity, and tight and raised shoes contribute to the progression.

The misalignment of the big toe often increases over time due to the changed stress caused by the splayfoot and the changed tendon pull. In severe cases, the misalignment of the big toe can also affect the adjacent foot skeleton and lead to a misalignment of the 2nd and 3rd toes.

#### THERAPY OPTIONS

Depending on how advanced and pronounced the respective clinical condition is, different therapy options come into play. In mild forms, special hallux valgus splints or insoles can be used. Otherwise, a change in footwear and targeted foot exercises can be used as a conservative therapy. Local decongestant and cooling measures often help with inflamed bursae.

For stronger pain and permanently occurring pain continuing during rest, surgery may sometimes be unavoidable.

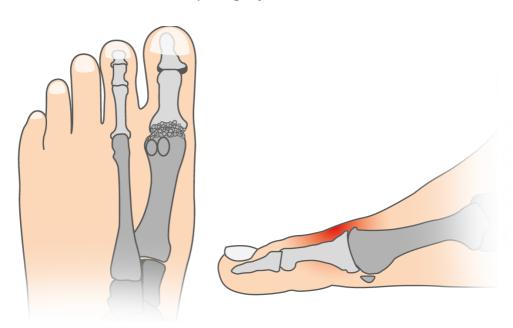
In most cases, removing the protruding bone or the bony attachments is not sufficient. In the case of moderate and severe forms, the axis of the 1st metatarsal must often be corrected.

- Long-soled, flat bandage shoe or forefoot relief shoe (duration: depending on the extent of the surgery)
- Lymph drainage is possible immediately after surgery if necessary
- Depending on the extent of the surgery and the follow-up treatment scheme, the duration
  of the relief of the affected foot may last from a few days to several weeks. The stress relief
  phase is followed by a gradual increase in stress
- Start of mobilizing physiotherapy after the wound has healed safely (after approx. 2 3 weeks)
- After the bone has healed and the swelling has subsided, it is possible to return to normal footwear (shoes with raised heels should be avoided)

#### **HALLUX RIGIDUS**

(BIG TOE JOINT OSTEOARTHRITIS)

Wear and tear of the metatarsophalangeal joint (arthrosis)



#### IN A NUTSHELL

Arthrosis in the metatarsophalangeal joint of the big toe can stiffen the joint.

Over time, due to incorrect positions, congenital or acquired foot diseases, accidents, gout or age, wear and tear can affect the metatarsophalangeal joint of the big toe.

Because of the loss of the protective layer of cartilage, this leads to an increase in bone-bone friction. Since the surface of the bone is sensitive to pain, different degrees of pain can occur depending on the extent of wear and tear, and also from person to person.

In an attempt to heal itself by reducing the pressure in relation to the surface, the body grows bony attachments which enlarge the joint surface.

However, this often leads to the joint becoming walled in, which limits the range of motion and causes incorrect positions. This results in pain when walking, especially during the rolling motion of the foot. In advanced stages, pain is felt at night, during rest, and when standing. Standing on tiptoes becomes close to impossible.

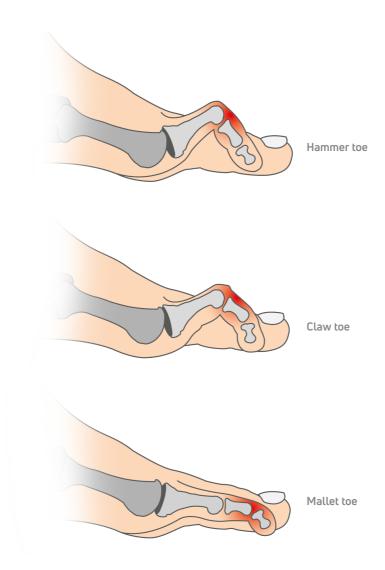
#### THERAPY OPTIONS

In the early stages of osteoarthritis, changes to footwear - special rigid insoles, some with stiffening soles or a ball roll - can lead to improvement. Hyaluronic acid injections into the metatarsophalangeal joint of the big toe are also frequently used as part of conservative therapy.

In the case of very advanced and painful conditions, surgery may be performed. Smoothing and removing the bony attachments often only partially relieves the symptoms, which is why joint replacement surgeries may be preferred.

- Long-soled, flat bandage shoe or forefoot relief shoe (duration: depending on the extent of the surgery)
- Lymph drainage is possible immediately after surgery if necessary
- Depending on the extent of the surgery and the follow-up treatment scheme, the duration
  of the relief of the affected foot may last from a few days to several weeks. The stress relief
  phase is followed by a gradual increase in stress
- Start of mobilizing physiotherapy after the wound has healed safely (after approx. 2 3 weeks)
- After the swelling has subsided, it is possible to return to normal footwear (shoes with raised heels should be avoided)

### HAMMER, CLAW AND MALLET TOES



#### IN A NUTSHELL

Hammer and claw toes often appear in combination with one another.

Hammer, claw and mallet toes are fixed claw-like flexions of the little toes. In addition to the metatarsophalangeal joint of the big toe, the other toes can show painful changes. Usually the 2nd and 3rd toes are affected.

The hammer toes are named after the hammer-like deformations of the affected toe(s), which are based on a claw-like flexion in the associated central joint. In the case of the claw toe, the base joint is overstretched even more and the tip of the toe loses contact with the ground. The less common mallet toe is characterized by an isolated claw-like flexion of the end joints.

Hammer, claw and mallet toes occur most frequently in the course of foot conditions such as splay or arch foot, hallux valgus, after direct trauma, in the case of neurological diseases or when shoes that are too short or tight are worn. Characteristic of the diseases mentioned above are painful corneal calluses over the protruding bones of the affected toe phalanx or in the toe tips area.

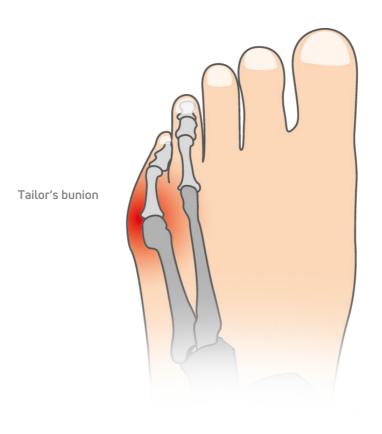
#### THERAPY OPTIONS

Conservative therapy options range from sufficiently wide, long and padded footwear to pressure pads made of soft gel for toe correction. Night splints are also used.

However, since the above measures usually only provide sufficient pain relief for the onset of slight misalignments, surgery is often advisable in advanced stages.

- Long-soled, flat bandage shoe or forefoot relief shoe (usually until the wound has healed)
- Forearm crutches if required. Full weight bearing on the operated foot is possible depending on the severity of the pain
- Outpatient, painless pulling of inserted correction wires after 2 4 weeks without renewed anaesthesia
- Lymph drainage is possible immediately after surgery if necessary
- Depending on the extent of the surgery and the follow-up treatment scheme, the duration
  of the relief of the affected foot may last from a few days to several weeks. The stress relief
  phase is followed by a gradual increase in stress
- Mobilizing physiotherapy can begin after approx. 4 6 weeks
- After the swelling has subsided, it is possible to return to normal footwear (shoes with raised heels should be avoided)

#### **TAILOR'S BUNIONS**



#### IN A NUTSHELL

The tailor's pad in the 5th little toe is similar to the hallux valgus in the big toe.

The tailor's bunion owes its name to the tailors who used to sit cross-legged on hard ground, putting a lot of strain on their little toes.

In addition to hallux valgus on the big toe, incorrect positions can also occur on the little toe if the corresponding 5th metatarsal is spread too far. This creates a painful pressure point and thickens the callus on the head of the 5th toe which then presses in the shoe.

Today, tailor's bunion is usually the result of an increasing splayfoot. This causes the metatarsal bones to spread leading to incorrect stress on the foot. As a result, the little toe is splayed outwards while being pressed inwards in the shoe. The shoe rubs and exerts pressure on the fifth metatarsal head, which in addition to the formation of calluses causes the tailor's bunion deformity. The cause of the tailor's bunion may be hereditary, along with wearing tight and heightened shoes.

#### **THERAPY OPTIONS**

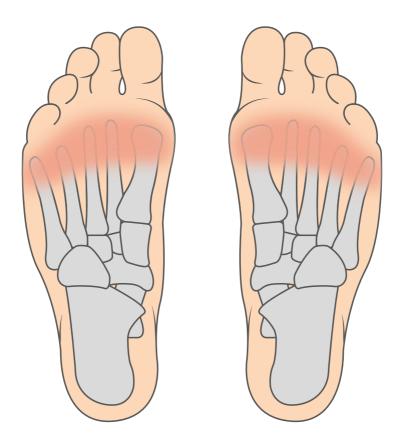
As with the hammer, claw and mallet toes, conservative therapy options range from sufficiently wide, long and padded shoes to pressure pads made of soft gel or the like, or individual insoles. Cold therapy may also provide relief for acute symptoms. In addition, the excess callus should be removed regularly.

However, since the above-mentioned measures usually only provide sufficient pain relief for the onset of slight misalignments, surgery is often advisable in advanced stages.

- Long-soled, flat bandage shoe or forefoot relief shoe (usually until the wound has healed)
- Corrective buddy splints
- Forearm crutches if required. Full weight bearing on the operated foot is possible depending on the severity of the pain
- Outpatient, painless pulling of inserted correction wires after 2 4 weeks without renewed anaesthesia
- Lymph drainage is possible immediately after surgery if necessary
- Depending on the extent of the surgery and the follow-up treatment scheme, the duration of the relief of the affected foot may last from a few days to several weeks. The stress relief phase is followed by a gradual increase in stress
- Mobilizing physiotherapy can begin after approx. 4 6 weeks
- After the swelling has subsided, it is possible to return to normal footwear (shoes with raised heels should be avoided)

#### **METATARSALGIA**

#### (FOREFOOT OR METATARSAL PAIN)



#### IN A NUTSHELL

An incorrect stress on the foot is the most common reason for a painful forefoot condition (metatarsalgia).

Metatarsalgia is a collective term for several clinical conditions, all of which include pain in the area of the forefoot or in the metatarsus.

There are many reasons for this condition: These include nerve constrictions, osteoarthritis and inflammation as well as incorrect stress distribution between the metatarsal heads, shoes that are too tight or too high-heeled or a second or third metatarsal bone that is too long.

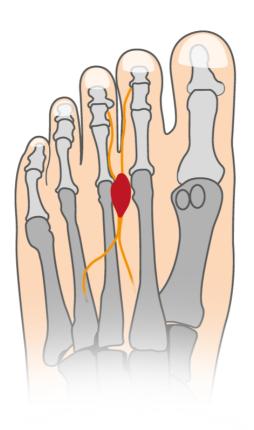
#### **THERAPY OPTIONS**

The pain therapy depends on the stress and the cause, all of which are determined by the treating physician. The conservative therapeutic measures used include changing the footwear (soft shoe bed, wide front shoe, avoiding high heels), prescribing insoles, taking anti-inflammatory medication or having a podiatrist remove the calluses.

If conservative therapy fails, surgery can be necessary in certain cases. The type and extent of the surgery will depend on the underlying disease. However, it should only be done if all other possible causes have been excluded.

- Long-soled, flat bandage shoe or forefoot relief shoe (duration: depending on the extent of the surgery)
- Lymph drainage is possible immediately after surgery if necessary
- Depending on the extent of the surgery and the follow-up treatment scheme, the duration
  of the relief of the affected foot may last from a few days to several weeks. The stress relief
  phase is followed by a gradual increase in stress
- Start of mobilizing physiotherapy, depending on the underlying disease being treated
- After the swelling has subsided, it is possible to return to normal footwear (shoes with raised heels should be avoided)

#### **MORTON'S NEUROMA**



#### IN A NUTSHELL

Morton's neuroma is a painful disease caused by a nerve constriction at the level of the metatarsal head.

Morton's neuroma is a painful disease in the forefoot area, the cause of which is believed to be a thickening of the tissue around one of the nerves leading to the toes. It usually occurs between the 2nd and 3rd or the 3rd and 4th space between the toes.

Morton's neuroma is characterized by acute shooting pain in the metatarsus. Pain is particularly common in tight footwear and often even at rest and at night.

The clinical examination usually shows tenderness in this area, and patients also describe numbness in the affected toes. The diagnosis can be confirmed by a manual examination and the detection of a nerve nodule on an MRI or ultrasound.

#### THERAPY OPTIONS

First, the splayfoot that is often present alone or with other accompanying misalignments of the foot is treated, for example, with insoles. Local injections also often lead to an improvement in symptoms. However, if the pain persists, surgery may be necessary to expose the nerve and remove the nerve nodule or the affected nerve.

- Long-soled, flat bandage shoe or forefoot relief shoe (usually until the wound has healed)
- Forearm crutches if required. Full weight bearing on the operated foot is possible depending on the severity of the pain
- · Lymph drainage is possible immediately after surgery if necessary
- Depending on the extent of the surgery and the follow-up treatment scheme, the duration
  of the relief of the affected foot may last from a few days to several weeks. The stress relief
  phase is followed by a gradual increase in stress
- Mobilizing physiotherapy can begin after approx. 2 3 weeks
- After the swelling has subsided, it is possible to return to normal footwear (shoes with raised heels should be avoided)

# **3** | POST-OPERATIVE ADVICE to help you get back on your feet after surgery

#### IN A NUTSHELL

You should take care of yourself and your feet in the first few days after the surgery regular cold therapy and elevation are particularly important. Your treating doctor will advise you on the most appropriate follow up care.



#### AFTER THE SURGERY

After your surgery, either a so-called flat-sole bandage shoe or a forefoot relief shoe is usually applied. Wearing the shoe in combination with lymphatic drainage, regular cold therapy, elevation and immobilization of the foot - especially in the first 48 hours - should counteract swelling after the surgery.



Your doctor should regularly check the wound as it progresses.

If possible, you should not use scar ointments until after the wound has healed. It is advisable to discuss prophylaxis options with your physician.

It cannot be precisely predicted when you will be able to put full stress on your foot again, or when it is reasonable and possible to start physiotherapy, work, do sport or other leisure activities. This depends on many factors such as the surgical technique. It is best to discuss your options with your treating physician.

#### WHAT CAN YOU DO TO ENSURE THE OPTIMAL COURSE AFTER YOUR SURGERY?

Your cooperation in the follow-up treatment phase is decisive for a good surgical result.

Aside from regular cold therapy, you should also regularly elevate your feet and take care of yourself as much as possible by only doing the most essential domestic activities. Your stress phases should be short (not more than a few minutes). It is advisable to put your foot up again immediately afterwards. Standing for too long or letting the operated foot hang down can increase swelling.

If possible, use cold therapy on the operated area of your foot 3 to 4 times a day for 10 to 15 minutes. As early as possible, move the areas of your leg that are adjacent to the operating area and are not immobilized by the bandage shoe or forefoot relief shoe. Measures such as lifting your leg and moving your ankle promote lymphatic drainage and thus counteract swelling.

## **4** | FOOT CARE PRODUCTS and how they can help your recovery

A large number of aids such as therapeutic shoes, walkers (lower leg and foot orthoses), insoles, cold therapy systems and other orthoses are available to help recovery.





Your treating doctor will prescribe the appropriate orthopedic aids where necessary.



#### IN A NUTSHELL

Walking correctly with therapeutic shoes is necessary to help recover quickly after surgery.

#### 1. How do you go up and down stairs safely without putting weight on an injured foot?

#### How to walk down stairs without bearing weight

If the stairs have a handrail, it is preferable to hold this with one hand and a crutch in the other while carrying the spare crutch.

From a starting position (Figure 1), move the injured foot clear of the edge of the step to avoid contact, then place the crutch on the step below (Figure 2). Using the crutch and the handrail to take your weight, step down with the good foot (Figure 3). If you're using two crutches for support, make sure you've got your balance before you step down.



#### How to walk up stairs without bearing weight

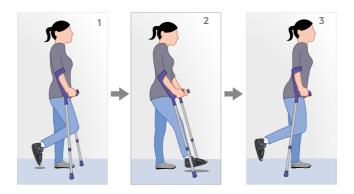
Again, if available, using a handrail and a single crutch provides better support than two crutches.

Standing at the bottom of the stairs (Figure 1), use the handrail and the crutch to take your weight and place your good foot on the step above (Figure 2). Then, putting your weight on your good leg and the handrail while being careful to avoid making contact with the injured foot, place the crutch on the same step (Figure 3). If you're using two crutches for support, make sure you've got your balance before you step up.



## 2. How do you walk correctly with crutches WITHOUT bearing weight on an injured foot (3-point gait)?

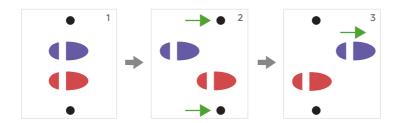
From the starting position (Figure 1), put your weight on your good leg and move the crutches forward (Figure 2). Then shift your weight onto the crutches and swing your good leg forward to take a step (Figure 3). Be careful to keep the injured foot clear of the floor as you move.



## 3. How do you walk correctly with crutches WHILE bearing weight on an injured foot (4-point gait)?

From the starting position (Figure 1), move the crutches forward one step length, then bring the injured foot forward to join them (Figure 2), before following with the good leg (Figure 3).

A weight test on a scale is recommended beforehand in order to get a feel for the permitted partial stress.



#### 4. How do you walk correctly with FULL WEIGHT BEARING in the forefoot relief shoe?

Note: Exert stress on the foot only in the heel region. Avoid exerting stress on the forefoot.

Do not roll over your forefoot when walking. Always put your heel on the ground first and lift your heel first when walking.















#### IN A NUTSHELL

There are plenty of things you can do to help protect your feet. Regular foot exercises are useful for both healthy feet and ones with existing problems.

Targeted foot exercises will gradually help you to exert full stress on your foot after surgery. They also promote strength, endurance, coordination and flexibility.

The aim of these exercises is to help restore the performance of your joints. There are different exercises to promote the mobilization of your joints, strengthen the foot muscles and the mobility of your toes and ankles.

To complement the advice from your physiotherapist, the following pages contain some useful exercises to help you get back on your feet again.

#### Do you want to prevent foot problems or treat them conservatively?

Then you can do all of the following exercises.

#### Are you about to have surgery?

We recommend all of the following exercises to stretch your ligaments and tendons.

#### Have you just finished your surgery?

If so, please talk to your doctor and/or your physiotherapist before starting the exercises.

## Please note the recommended duration and number of repetitions when performing the exercises:

- Alternating (right and left)
- 4 5 sets per exercise
- Hold the respective position for 5 seconds

#### 1. Stretching and bending the big toe and little toe



Place the heel of the right foot on the left thigh, for example. Put your right hand under the ball of your foot and slowly pull your foot towards your shin with your toes.



Place the heel of the right foot on the left thigh, for example. Place your left hand on the top of the toe and slowly pull your foot towards the sole of your foot with your toes.

#### 2. Mobilization of the ankles and the tarsus

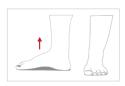


Place the heel of the right foot on the left thigh, for example. Grasp the ball of your foot with both hands and slowly turn the forefoot to the left so that the ball of the big toe turns towards the ground.

#### Activation of the muscles of the sole of the foot and straightening or stabilizing the arch of the foot



Starting position: Relax the longitudinal arch while standing.



Actively tense the longitudinal arch until it straightens up and a clear arch is visible on the inside of the foot. Press the ball of your foot lightly to the ground and do not curl your toes.

#### 4. Activation of the inner big toe muscles and correction of the hallux valgus angle



Pull the big toe outwards away from the little toes.

**FOOT EXERCISES** 

#### 5. Mobilization of the metatarsus



Place your foot on a stool or a slight elevation. Grasp the forefoot with both hands from above: Your thumbs should remain on the back of the foot in the direction of the toes; your fingers should lie on the side of the sole of the foot. Use your fingers to press the transverse arch from below upwards while the balls of your thumbs press the edges of your feet downwards.

#### 6. Stretching the thigh, lower leg and foot muscles



In the supine position, bend one leg very close to your chest.



Then straighten your leg knee to stretch the knee flexors. Point your toes towards the ceiling to stretch your foot and toe extensors.



Point your toes towards your nose to stretch your foot and toe flexors.

### 7 PERSONAL CHECKLIST

### to help you keep track of your progress

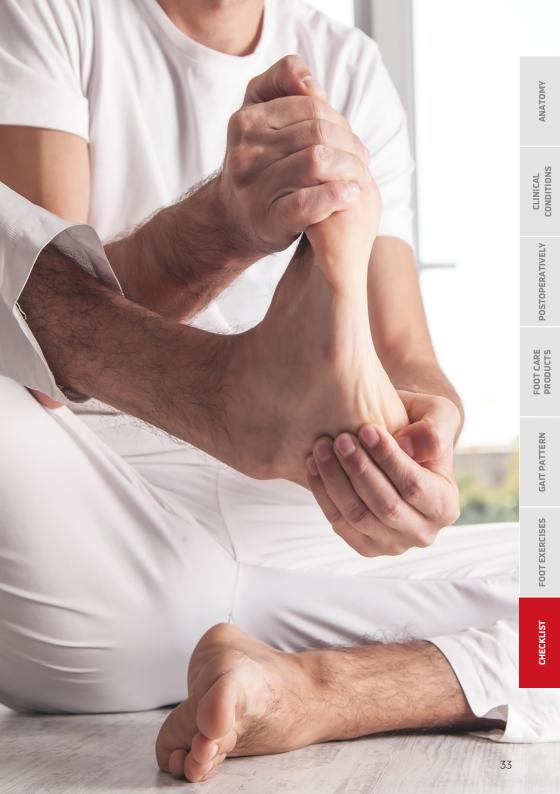
#### **BEFORE THE SURGERY**

- Find out which foot exercises you can do to stretch ligaments and tendons
- Find out what tools you can use post-surgery, such as for pain relief
- · Quit smoking at least 4 weeks before your surgery date

#### AFTER THE SURGERY

- Make appointments for follow-up and x-ray checks, if necessary
- Place the injured foot as high as possible and avoid long periods of sitting with your leg hanging down
- · Avoid walking around frequently
- Keep the affected foot as still as possible for the first few days after the surgery
- Discuss with your doctor whether the therapeutic shoe can be removed to use cold therapy on the injury
- Use the prescribed aids consistently
- Discuss with your physiotherapist and/or treating doctor which exercises you are allowed to perform to mobilize and strengthen your feet
- Extend and bend your hips and knees in all directions at regular intervals so that the unaffected joints can move freely
- Avoid water contact with the wound in the first few weeks (shower plaster if necessary)
- Discuss with your doctor which ointments and sprays you can use

#### We wish you a quick recovery!





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