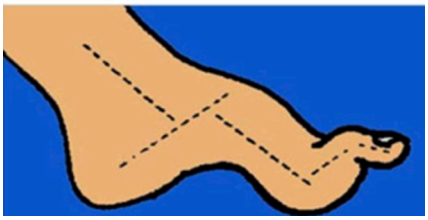
South East ORTHOPAEDIC SURGERY

PATIENT INFORMATION: PES CAVUS (HIGH ARCH)

What is pes cavus?

Pes cavus is an excessively high arch of the foot. Normal feet have a subtle arch but in some people, the arch is very high.



In some instances, this high arch can cause problems that include:

- Clawing of the toes
- Ankle instability
- Stress fractures
- Pressure areas
- Callouses or hard skin

A high arch can be a reflection of muscle imbalance in the lower leg. Importantly, they can be due to some conditions that cause dysfunction to the nerves in the lower leg. This includes diseases like Charcot-Marie-Tooth disease and spinal conditions. Pes cavus can also be due to a fracture in the foot or residual clubfoot from a childhood deformity. In some patients, there is no clear cause of the development of pes cavus.

What other investigations may be required?

Because pes cavus is sometimes associated with other conditions, patients may require further work-up depending on their examination findings. This may include an MRI of the spine to look for nerve root impingement, nerve conduction studies to assess the power to the lower leg muscles and blood tests to assess for rheumatoid arthritis. Further imaging of the foot, such as a CT scan, ultrasound or MRI, may also be required to look more closely at the anatomy of the deformity.

What non-operative treatment options are there?

Treatment options will depend on the reason for presentation. For example, a patient with a high arched foot and ankle instability may benefit from an ankle brace. A patient with pain from a stress fracture may benefit from a period away from high impact sport. Orthotics can help correct the alignment of the heel and a wedge in the back of the shoe can correct the heel so it sits under the main leg bone. Simple analgesics like paracetamol and ibuprofen can help relieve pain from stretching of the soft tissues or pain from impingement or arthritis.

What surgical options are there?

The type of surgery offered will be dependent on a number of factors:

- Whether the deformity is flexible
- Whether the deformity is coming from the forefoot (big toe) or hindfoot (ankle)
- If any arthritis is present

In a flexible deformity, the joint surfaces are preserved and a combination of osteotomies (cutting the bones) to realign the foot and tendon transfers to address the muscle imbalances are made to flatten the foot. This often involves a combination of the following:

- Lengthening the gastrocnemius, or calf muscle, through a 2cm incision at the top of the leg
- Cutting the heel bone and realigning it so it sits under the leg bone. This can be done via a minimally invasive or open approach and is usually stabilised with one to two screws.
- Cutting the middle of the big toe bone and flattening the arch of the foot. This is done through an incision on the top of the foot and is normally stabilised with a plate and screws.
- Transferring the longer peroneal tendon, which runs underneath your foot, to the shorter peroneal tendon to help turn the foot outwards. This is done via an incision on the outside of the ankle.
- Releasing the tibialis posterior tendon via an incision in the middle of the foot, passing it through the two bones in the leg and fixing to the top of the foot.
- The outcome is a flexible foot that has corrected to neutral and is supported by the bony cuts.

If arthritis is present in the joints around your foot and ankle (subtalar joint, talonavicular joint or calcaneocuboid joint) it might be more appropriate to fuse your foot. This procedure is called a triple arthrodesis as these three joints are fused. This is usually done via a combination of arthroscopic, or keyhole surgery, and open surgery. There are normally two incisions, one on each side of the foot. This procedure treats the pain from the arthritis in these joints but as a consequence the foot is quite stiff.

What happens after the operation?

Both procedures commonly require an overnight stay in hospital. A half-cast is applied to the foot at the end of the operation which helps support the foot and ankle and provide some pain relief. Patients are required to be non-weight bearing for two weeks while the wound heals. After two weeks, patients will have a wound check, stitches removed and be fitted with a walking cast or moon boot. Patients are normally permitted to partially weight bear in the cast or boot until six weeks after the operation. They are progressively allowed to increase their weight bearing status over the following four weeks and fully weight bear in the cast or boot ten weeks following the operation. An x-ray will be taken out of the plaster. If this shows the osteotomies and/or fusions have united, patients can then weight bear as tolerated out of the cast.

Two weeks post-operatively	Non weight bearing
Two to six weeks post-operatively	Partial weight bearing in a walking cast or boot
Six to ten weeks post-operatively	Gradually increase weight bearing in a walking cast or boot
Ten weeks post-operatively	Weight bear as tolerated in a cast or boot

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What are the risks of a flexible carvovarus foot reconstruction (tendon transfer)?

Sometimes the deformity can recur. Patients at high risk for recurrance include patients with a significant neurological condition which progresses despite treatment. In the event of a recurrence of the deformity, revision surgery may be required which is normally a triple fusion.

Rarely the wounds can become infected. These can be treated with dressings and/or antibiotics. More rarely, a formal wound debridement under a general anestehtic is required.

Occasionally the osteotomy site, where the heel bone is cut to support the tendon transfer, fails to unite. In this instance revision surgery may be required to encourage the bone to heal.

Sometimes metalware used to hold the corrected position of the foot is prominent and requires removed. In particular, studies suggest the use of a screw in the sinus tarsi requires removal of the screw in 30% of paitents.

There are many small nerves in the foot and sometimes they can be damaged during the surgery. This may result in numbness or tingling over the toes or the scar itself.

This is a painful procedure and you will experience some discomfort following the surgery.

It can be difficult to completely correct the deformity. Sometimes, a partial correction is all that is able to be achieved with removing significant amounts of bone or causing instability to the foot and ankle.

There is a small chance of developing a blood clot which can form in your legs or your lungs. This risk of this will be discussed with you. Being non-weight bearing for two weeks following the surgery increases the risk of a blood clot. In some patients, blood-thinning medication such as aspirin may be prescribed to reduce the risk.

What are the risks of a triple arthrodesis?

Your foot will become stiff following the procedure. You may have a small, mildly noticeable limp due to the change in your gait.

The stiffness in the joints that are fused increases the stress around the fusion and arthritis can occur in the ankle or midfoot as the patient ages. Sometimes patients need to have these joints treated as well.

There is a small risk of non-union at the fusion sites. The risk of a non-union is five times higher in smokers compared to non-smokers so it is generally preferable to cease smoking prior to the procedure. In an established non-union, revision surgery may be required to encourage the bones to heal.

Sometimes the metalware is prominent and needs to be removed once the bones have healed.

There is a small chance of developing a blood clot which can form in your legs or your lungs. This risk of this will be discussed with you. Being non-weight bearing for two weeks following the surgery increases the risk of a blood clot. In some patients, blood-thinning medication such as aspirin may be prescribed to reduce the risk.

South East Orthopaedic Surgery
0484 739 550
admin@southeastortho.com.au
Level 1, Frankston Private Hospital
24-28 Frankston-Flinders Road
Frankston, Victoria