

Monthly Newsletter

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Contact Your Podiatrists

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Foot and Ankle Biomechanics

Your feet and ankles play a vital role in walking and running. Walking and running can be described in terms of two main phases; the stance phase and the swing phase, which make up the gait cycle. Stance is the time when the foot is on the ground. For part of the stance phase during normal walking, both feet touch the ground for a period of time. However, during the Swing phase one foot is on the ground and the other foot in the air, which is said to be in "swing".

Stance Phase

Stance phase is the most important phase of running, during which the foot and leg bear your body weight. Stance can be divided into three stages:

1. Contact
2. Mid-stance
3. Propulsion

Gait is cyclical and as such, no point necessarily is regarded as the beginning or end phase.

Contact: The undersurface of your foot makes contact with the ground and it can be either the fore-foot, mid-foot or heel-strike. For the fore-foot strike, the initial contact is on the ball of the foot. For the mid-foot strike, the ball and heel of the foot make contact simultaneously whereas in heel-strikes, only the heel makes contact.

Absorption phase begins with the foot-strike during which your hip joint undergoes extension from being in maximal flexion from the previous swing phase. Your knee joint flexes and the ankle moves in front of the body to undergo pronation at the Subtalar joint (your foot touches the ground).

Oh No!!

In Aug, we had 12 patients that failed to attend their appointment!



Foot and Ankle Biomechanics (Cont'd from previous page)

Mid-stance: In this portion of Stance phase, the weight bearing limb is in knee flexion directly underneath the trunk, pelvis and hips. At late mid-stance propulsion begins to occur as the hips undergo a hip extension and the knee joint undergoes extension.

Propulsion Phase: It involves the movement which begins during the mid-stance with the heel plantarflexing and heel rising, till your toes are off the ground.

During propulsion, the body is propelled forward while weight is shifted to the opposite foot.

Swing Phase

Swing begins with the toe-off and ends right before the contact of foot to the ground with the start of the next gait-cycle. The 'float phase' of running when both the feet are off the ground occurs during swing phase.



Swing phase can be further classified as:

1. Initial Swing
2. Mid Swing
3. Terminal Swing

Initial swing: Initial swing is the reaction of both stretch reflexes and concentric movements to the propulsion movements of the body, during which hip flexion and knee flexion occur. The limb returns to the starting position and is set up for another foot-strike.

Mid swing: Initial swing ends at mid-swing, when the limb is again directly underneath the trunk, pelvis and hip with the knee joint

flexed and hip flexion being continued.

Terminal swing: It begins as the hip flexion continues to the point of activation of the stretch reflex of the hip extensors. The knee begins to extend slightly as it swings to the anterior portion of the body and the foot then makes contact with the ground with foot-strike, completing the walking cycle of one side of the lower extremity.

Plantar Fasciitis - Common cause of heel pain

Plantar Fasciitis is the most common cause of heel pain among runners and active individuals. Plantar Fasciitis is described as an inflammation of the Plantar Fascia, a fibrous sheath that runs along most of the length of your foot soles. This most often occurs at the site of attachment of the fascia to the heel bone.

Plantar Fasciitis pain commonly occurs over and inside the heel and radiates downwards towards the inside of the sole of the foot.

Pain occurs with activity (activity dependent) and is most severe in the morning while taking the first steps of the day. It usually improves slightly during the day and worsens again by the end of the day.

Causes:

- *Improper Footwear*
- *Repetitive Stress* during weight bearing and push-off



- *Abnormal biomechanics of the foot* like “over-pronating foot” where inner arch of the foot rolls over too much during walking and running
- *Anatomical abnormalities* like rigid Pes Cavus, shortened Achilles tendon and Hypermobility forefoot etc.
- Modification of activity- Discontinue running; rest until pain is relieved.
- Ice packs and ice massage
- Non-steroidal anti-inflammatory (NSAID) medication such as Aspirin or Ibuprofen
- Heel/Foot stretching- By pulling the toes towards the shin; particularly done when pain has subsided
- Use of soft heel pad

Treatment

Plantar fasciitis is dealt with using conservative treatment which is effective in some 95-98% of cases. Treatment consists of the following:

Plantar Fasciitis - Common cause of heel pain

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- Orthotic devices and taping techniques- reduces pronation of foot and thus decreases the load on plantar fascia
- Laser Therapy, Ultrasound or Extra Corporeal Shockwave Therapy

It is important to treat plantar fasciitis as plantar fascia disease (called Plantarfasciopathy) can worsen into plantar fasciosis. If heel pain is present and plantar fasciosis or plantar fasciitis is suspected, speak to your foot health specialist today!

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If you would like a copy of this newsletter emailed to you every month, then please let reception know and they will ensure that your email address is added to our distribution list.



*The Care,
Professionalism and
Time that your feet
deserve*

New carpet in reception

Please see our new carpet laid in our reception/hallway area.

Calendar of Events

We can't wait to welcome Steven to take over his role of Podiatrist at The Footcare Centre.

See this space next month for his photograph and a short piece about him.

Attribution: All images are from 123RF

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