

# Monthly Newsletter

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**Accepting new patients**

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).



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

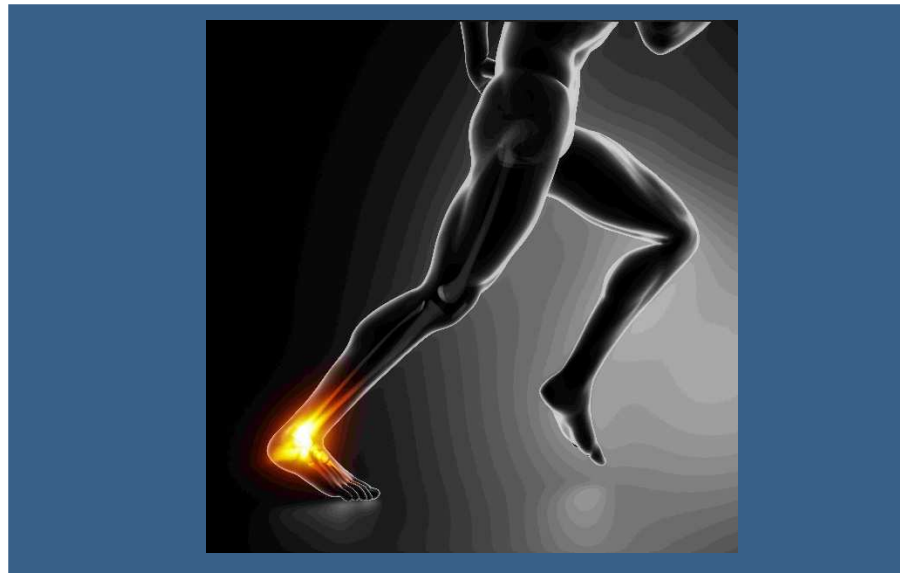
Mid-stance: In this portion of Stance phase, the weight bearing limb is in knee flexion directly underneath the trunk, pelvis and hips. At late mid-stance propulsion begins to occur as the hips undergo a hip extension and the knee joint undergoes extension.

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. ♦

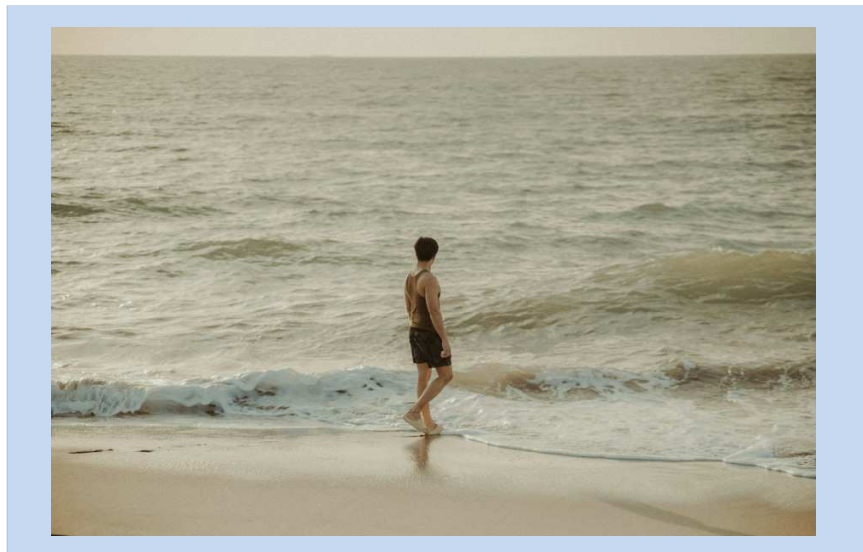
## Skin Cancer on the Feet

Skin cancer occurs when the DNA of skin cells experiences mutations, causing them to multiply uncontrollably. These mutations can result from various factors, including exposure to high levels of ultraviolet (UV) radiation, genetic predisposition, and certain environmental exposures.

On the feet, skin cancer can also be influenced by chronic irritation, trauma, and exposure to chemicals. Other risk factors include a history of skin cancer, compromised immune system, and having many moles or atypical moles.

*Key signs to look for include:*

- Unusual Lesions or Growths: Any new or changing spots
- Non-Healing Ulcers: Sores that do not heal within a reasonable timeframe.
- Color Changes: Patches of skin that change color or have irregular pigmentation.
- Nodules: Small, firm lumps that may be skin-colored, red, or black.



- Asymmetry and Irregular Borders: Moles or spots that are asymmetrical or have irregular, poorly defined borders.
- Bleeding or Oozing: Spots that bleed, ooze, or become crusty

### *Typical Treatments*

Treatment for skin cancer on the feet depends on the type, stage, and location of the cancer. Treatment methods may include:

- Surgical Excision: Removing cancerous tissue with a small amount of healthy skin
- Mohs Surgery: A precise surgical technique used primarily for high-risk skin cancers, which involves removing thin layers of cancerous tissue and examining them until only cancer-free tissue remains

- Cryotherapy: Freezing the problematic cells with liquid nitrogen, often used for small, superficial skin cancers.
- Topical Treatments: Applying creams or ointments containing anti-cancer agents for early-stage or superficial skin cancers
- Radiation Therapy: Using high-energy rays to target and kill cancer cells
- Chemotherapy: Using drugs to kill cancer cells. These may be topical, oral, or systemic.

*The following preventive measures can drastically lower your risk of developing skin cancer:*

## Skin Cancer on the Feet (Cont'd from previous page)

- **Sun Protection:** Apply sunscreen to exposed areas, including the feet. This is especially true when wearing sandals or walking barefoot. Use a broad-spectrum sunscreen with an SPF-30 or higher rating.
- **Protective Footwear:** Wear shoes that cover the feet when outdoors
- **Regular Inspections:** Examine your feet regularly for changes or unusual spots. Check between the toes and the soles, and use a mirror for hard-to-see areas.
- **Avoid Tanning Beds:** Refrain from using tanning beds
- **Stay Hydrated and Maintain Skin Health:** Keep the skin on your feet moisturized and healthy to avoid cracks and irritations that could develop into cancerous lesions.
- **Seek Professional Advice:** Have regular check-ups with a medical professional, especially if you have risk factors or notice any suspicious changes on the feet. ♦



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



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