

# FootCareMD<sup>®</sup>

*A step in the right direction*

## Diabetic Foot Problems

### What is it?

Diabetes mellitus results in serious foot problems that can cause loss of limb or life. These conditions include diabetic neuropathy (loss of normal nerve function) and peripheral vascular disease (loss of normal circulation), which can lead to:

- Diabetic foot ulcers: wounds that do not heal or become infected.
- Infections: skin infections (cellulitis), bone infections (osteomyelitis) and pus collections (abscesses).
- Gangrene: dead tissue resulting from complete loss of circulation.
- Charcot arthropathy: fractures and dislocations that may result in severe deformities.
- Amputation: partial foot, whole foot or below-knee amputation.

### Symptoms and Clinical Presentation

Symptoms of neuropathy may include the loss of protective sensation or the presence of pain or tingling sensations. The patient may develop a blister, abrasion or wound but may not feel any pain. Decreased circulation may cause discoloration of skin, temperature changes or pain. Depending on the specific problem that develops, patients may notice swelling, discoloration (red, blue, gray or white skin), red streaks, changes in skin temperature (increased warmth or coolness), injury with no or minimal pain, a wound with or without drainage, staining on socks, tingling pain or deformity. Patients with infection may have fever, chills, shakes, redness, drainage, loss of blood sugar control, or shock (unstable blood pressure, confusion and delirium).

### Cause (including risk factors)

Neuropathy is associated with the metabolic abnormalities of diabetes. Vascular disease is present in many patients at the time of diagnosis of diabetes. Ulcers may be caused by external pressure or rubbing from a poorly fitting shoe (too loose or too tight) against the skin on an area of bony prominence, an injury from walking barefoot, or a foreign object in the shoe (rough seam, stone or tack). Infections usually are caused by the entry of bacteria directly through a break in the skin such as an ulcer, area of toenail pressure, ingrown toenail or areas of skin degeneration between the bases of the toes. Gangrene may be caused by a loss of circulation.

### Anatomy

Typical sites of bony prominences for ulcer formation are:

- Along the bottom of the foot (at the base of the toes, in the midfoot or in the heel)
- Side of the foot (along the little toe or the fifth metatarsal from rubbing in a shoe; back side of heel from lying in bed)
- Ankle bones (rubbing in a boot or lying on a bed)
- Top of foot (toes rubbing in a shoe)

Infections may start in one location and spread rapidly along tendon sheaths, such as infections that start at the bottom of the metatarsal heads and spread rapidly along the tendons to the ankle.

### Diagnosis

Nerve function may be abnormal, so the patient may not feel pain. This frequently causes a delay in the diagnosis, and the patient may be diagnosed late with a limb- or life-threatening infection.

Diagnosis is based on symptoms and signs noted above. The absence of protective sensation may be confirmed, and radiographs may show gas in the soft tissues, soft tissue swelling or defect, or changes consistent with bone infection, fracture or dislocation.

Ulcers are graded for size, depth and vascularity. Additional imaging studies may be helpful, including bone scan, gallium scan, indium scan, MRI (magnetic resonance imaging scan) or CT (computed tomography scan). Cultures of tissue from the base of an ulcer may be more reliable than swab cultures from the ulcer. Vascular studies may help determine how well blood is circulating, which is important for wound healing.

### Treatment Options

## Non-Surgical

Wounds may be debrided and treated with dressings and immobilization devices such as cast boots or total contact casts. Infections are treated with debridement and antibiotics (intravenous or oral). Non-operative treatment for Charcot joints may include protective immobilization with or without weightbearing. Gangrene of the toes may be treated with observation (if infection is under control) until auto-amputation or a natural separating from the foot occurs.

## Surgical

Severe infections such as abscess may be treated with urgent operative debridement (removal of decaying tissue) or amputation. Surgical treatment for Charcot foot may include operative stabilization (fusion) and correction of deformity. Vascular disease may be treated by vascular surgeons with arterial bypass procedures. Gangrene may be treated with partial foot amputation or below-knee amputation.

## Recovery

Close follow-up of diabetic foot patients is done because recovery may deteriorate despite minimal warning symptoms. Prolonged recovery times are common.

## Outcome

Ulcer healing may require several weeks or months depending on the size and location of infection, adequacy of circulation and patient compliance. Severe infections may result in partial foot or below-knee amputation.

## Complications

Non-healing ulcers lead to amputation in 84 percent of lower extremity amputations in diabetic patients. The mortality frequency of diabetic patients after major amputation ranges from 11 to 41 percent by year one, 20 to 50 percent by year three, and 39 to 68 percent by year five. Infections may spread rapidly and be limb- or life-threatening.

## Frequently Asked Questions

### How frequently should I examine my own feet?

Daily and after removing shoes. If self-examination is not possible, a family member or caregiver may be trained in daily foot examination. Patient instruction sheets are available in many languages. Daily self-examination should include inspection for signs of pressure (redness, whiteness of skin or other discoloration) or skin breakdown on all skin surfaces including the spaces between the toes and edges of toenails.

### How frequently should my feet be examined by a health care provider?

Patients without neuropathy, vascular disease or deformity may be examined annually. Patients with neuropathy, vascular disease or deformity should be examined by an orthopaedic foot and ankle specialist every one to two months.

### How frequently should I see the doctor if I'm being treated with a total contact cast for a foot ulcer?

After the first cast is applied, the follow-up examination is within one week. Subsequent follow-up is every one to two weeks. Any unusual symptoms should be reported to the doctor's office immediately, including a feeling of tightness or looseness of the cast, soreness, pain, foul odor, fever, red streaks or breakdown of the cast.

## Additional Resources

[Diabetic Foot Overview](#)

[How to Care for Your Diabetic Feet](#)

[Shoes and Orthotics for Diabetics](#)

[Foot Ulcers and the Total Contact Cast](#)

[The Diabetic Foot and Risk: How to Prevent Losing Your Leg](#)

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