

Connecticut Surgical Group



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Health Education Sheet

Wound Care

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What is a chronic wound and why is wound care important?

A chronic wound is an ulcer, pressure sore, laceration or puncture that can't be healed or even improved within a reasonable period of time, and dealing with it is important because such injuries carry with them a risk of ever-expanding infection and the potential for loss of a limb or even death.

Depending on the source, a wound is considered to be chronic if it hasn't healed in as little as two months to as long as six months.

The most common causes of chronic wounds are diabetes mellitus (in which nerve damage leads to a loss of sensation that allows minor injuries to be ignored and become serious ones) and venous stasis (in which impaired blood supply to the legs slows down or

prevents tissue repair, leaving the feet and legs vulnerable to the development of ulcers, or open sores). Pressure sores, or ulcers that develop as a result of prolonged immobility (such as confinement to a bed) are a major cause. By some estimates, more than 4.5 million Americans have problems with chronic, non-healing wounds.

Treatment options available today for chronic wounds range from improved techniques for cleaning, bandaging and dressing wounds; medical therapies such as antibiotics to fight infection; surgical reconstruction to restore blood supply to the area; the use of growth factors, skin substitutes and hyperbaric (or increased atmospheric pressure) to stimulate healing.

The podiatrists of Connecticut Surgical Group have extensive experience in these problems, and are leaders in techniques of wound care.

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How does diabetes mellitus cause chronic wounds?

Among the consequences of diabetes mellitus are neuropathy (or nerve damage that causes an inability to have feeling or sensation in a region of tissue) and vascular disease (in which narrowing and hardening of arteries result in inadequate circulation of blood to your extremities). Among diabetics, the feet are particularly susceptible to wound or ulcer problems.

The loss of sensation in your feet, or neuropathy, exposes them to the development of serious injury without your even being aware of it. Neuropathy can cause paralysis of the small muscles in the foot, resulting in development of clawing in the toes — and both deformity of the metatarsal bones and development of corns and calluses that can lead to contamination and infection.

An "injury" can also start with a problem as seemingly minor as a blister from wearing an ill-fitting shoe or a tiny puncture wound or abrasion from walking barefoot on pavement. Continuing to walk on an injury you can't feel and are unaware of can make it worse.

Beyond this, the impaired blood flow of vascular disease can seriously interfere with your body's ability to heal such a wound, or prevent it from healing altogether. At this point, the "minor" injury becomes a foot ulcer, an open sore that is difficult to heal.

The American Podiatric Medical Association estimates that 14 to 24 percent of diabetics who develop a foot ulcer end up undergoing amputation of a lower limb. It's also estimated that 50 percent of diabetics who lose on foot to the disease will lose the other within five years.

More extensive information about Diabetic Foot Care can be obtained under the topic by [\(clicking here\)](#).

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If I have diabetes, what should I be concerned about?

Specific treatments for chronic wounds are described in a later section.

However, as a diabetic, the chances are that your major risk of developing chronic wounds resides in your feet. A real issue isn't how your foot problem is diagnosed — it's that as soon as you are diagnosed with diabetes you should establish a relationship with your podiatrist so that he or she can monitor your foot health and intervene before any problems become serious issues. Neuropathy usually doesn't begin to develop until 10 years or more after diagnosis of diabetes, so careful monitoring from the beginning offers a chance to prevent or minimize problems.

Tingling, pain or loss of feeling in the feet can all indicate developing foot problems caused by nerve damage related to your diabetes. Stiff joints, calluses on the bottoms of your feet and corns on the sides, a history of open sores, and deformities such as hammertoes also represent foot problems, although these also can be caused by problems unrelated to diabetes. Dry skin can become a problem, as the nerves that control oil and moisture in your feet cease to function. The resulting dryness can cause your skin to peel and crack — opening the risk of ulceration and infection.

The earlier a foot wound or injury such as a puncture can be treated, the better. For this reason, you should call your podiatrist as soon as you experience a cut, corn, callus or ingrown toenail so that you can receive timely treatment before a small problem becomes a big one.

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How does venous stasis cause chronic wounds?

Venous status ulcers are related to impairment in the movement of blood through the veins within the legs.

While oxygen-rich blood from the heart flows through the arteries serving the legs, once the blood has delivered its oxygen and is returning to the heart and lungs through the veins, it does so with much lower force (or blood pressure) than it had during its journey through the arteries. The veins compensate for this with a series of one-way valves that keep your blood moving up your veins each time the muscles of your legs contract.

When these valves cease to function correctly, the blood begins to pool in the feet and legs, possibly causing swelling and a bluish coloration (reflecting the oxygen-depleted blood's color). At this point, there is a risk of a blood clot forming, as well.

Since blood supply is essential to effective tissue repair, the blood circulation insufficiency that results makes the patient with venous

stasis vulnerable to the development of leg and foot ulcers — wounds that are difficult to heal. Poor blood supply not only makes the patient vulnerable to development of difficult wounds, it also retards the healing process.

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As a patient with venous stasis problems, what should I be concerned about?

Specific treatments for chronic wounds are described in a later section.

However, if you are vulnerable to venous stasis problems you should pay close attention to your doctor's guidelines both for treatment and for activities of daily living.

For example:

- You should avoid standing or sitting in one place for prolonged periods. The muscle action of walking and similar forms of exercise performed as frequently as possible can play a significant role in improving blood circulation. Simply raising yourself up and down on your toes will stimulate blood flow by action of your leg muscles. Similarly, when confined to a sitting position — such as on airplanes — for extended periods, you may want to periodically exercise your leg muscles by walking, if at all possible.
- Blood flow in veins near the surface of the legs can be improved with the support of elastic bandages or support hose, best applied at the start of the day while still in bed, when the arteries and veins are least swollen.
- You should avoid garters, tight belts or other articles of clothing that may constrict the flow of blood to the legs and feet.

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How do pressure sores cause chronic wounds?

Simply put, pressure ulcers are generally caused by external pressure on arteries and veins that pushes against them and reduces the flow of blood through them. The best-known example of this, perhaps, is bed sores, which develop in patients who are confined to bed for prolonged periods.

When blood supply to an area of tissue is severely reduced over an extended period, the result is the death of cells that make up that tissue — leading to development of a chronic wound, or ulcer that is difficult to heal. The problems of inadequate blood supply are exacerbated by the physical stress of extended immobilized contact on the patient's skin and underlying tissues, which contribute to reduced blood flow and tissue death.

And, again, inadequate blood supply not only makes the patient vulnerable to development of difficult wounds, it also interferes with the chances of healing.

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As a patient with pressure wound problems, what should I be concerned about?

Specific treatments for chronic wounds are described in a later section.

However, if you are vulnerable to pressure wound problems you should pay close attention to you clinician's guidelines both for treatment and for activities of daily living. Since a common origin of pressure wounds is confinement to bed, especially during hospitalization, the assistance and resources of your caregivers are key.

In general, pressure wound treatment emphasizes tissue load management — that is, paying attention to the positioning of your body and the type of surface it's sitting or lying on, avoiding placing stress on a pressure ulcer itself, using pillows to keep the heels off the bed and keeping the head of the bed at the lowest angle possible, and moving the patient at least every hour.

Extensive research on prevention of pressure wounds and surface materials that minimize them (such as "egg shell" mattresses) has been done, and your doctor and nurses are your best resources in discussing these.

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What are other possible causes of chronic wounds?

Although diabetes, venous stasis and pressure wounds are the most frequent causes of chronic wounds, other causes can include tissue damage caused by radiation during radiotherapy treatments, burn scars, surgical scars that fail to heal, infections and skin disorders.

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What are lifestyle factors that contribute to the failure of wounds to heal?

There are several prominent lifestyle factors that can interfere with the ability of tissue to repair itself — that is, with the ability for wounds to heal. These include smoking, being obese, having poor nutritional habits and lack of exercise. Age can be a factor; the older we get (and the more health issues we have), the more slowly our tissues may be able to repair themselves.

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How are wounds assessed and treated?

Treatment of chronic wounds can involve a number of specialists — including endocrinologists, podiatrists, vascular surgeons, plastic and reconstructive surgeons and nutritionists. In assessing a wound and developing a treatment plan, your doctors will determine the severity of the wound — for example, whether the skin is irritated but intact, whether and how much underlying tissue is affected, and whether muscle, bone or tendon tissue may be affected.

Your Connecticut Surgical Group doctors have a large arsenal of treatments available to deal with your wound problems. They can:

- Debride, or clean out, dead or infected tissue from your wound
- Prescribe antibiotics to fight any infection that is identified
- Apply medication and dressings to the ulcer, emphasizing approaches that keep the wound covered and moist in order to facilitate tissue repair
- Seek to take pressure off a chronic wound by having you use a wheelchair or crutches or fitting you with a cast or special shoe while it heals
- Have you undergo physical therapy treatments intended to foster healing and that may include the use of ultrasound, hydrotherapy (that is, whirlpool) and electrical stimulation

For wounds that prove unduly resistant to the traditional treatments indicated above, your doctor may additionally:

- Use growth factor medications to enhance healing
- Use skin substitutes to support healing
- Use hyperbaric oxygen therapy to facilitate tissue repair under increased atmospheric pressure

In some cases, surgery may be necessary to correct bone and joint deformities that have developed, such as bony prominences on the bottom of the foot, bunions and hammertoes. The podiatrists of Connecticut Surgical Group have extensive experience in surgical management of diabetic feet.

If it is determined that impaired circulation is an issue in your ability to heal, a referral to a vascular surgeon may be deemed appropriate for vascular reconstruction to improve blood supply in your legs.

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What are growth factors?

Growth factors are biotechnology-developed medications that stimulate the body's growth of new tissue in deep wounds that have proven difficult-to-heal.

The growth factor medication REGRANEX was approved by the FDA in the late 1990s for treatment of diabetic foot ulcers.

Applied as a topical gel, it uses a genetically engineered platelet-derived growth factor that mimics a protein that occurs naturally in the body. Produced by recombinant technology in yeast cells (and not derived from blood), REGRANEX encourages the migration of cells to the wound site to encourage new tissue growth.

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What are skin substitutes?

Skin substitutes are genetically engineered living skin cells that essentially serve as dressings for wounds and that stimulate the healing process.

One such tissue is Apligraf, approved by the FDA for treatment of venous leg ulcers in 1998 and of diabetic foot ulcers in 2000. Manufactured from donated human tissue — the foreskins of circumcised newborn male infants — Apligraf is used to cover and protect the wound with an outer protective epidermal layer and an underlying dermal layer. The wound would then be covered with an elastic compression bandage and continued to be treated with regular wound care practices.

A biotech-developed product approved by the FDA in 2001 is DERMAGRAFT, a skin substitute that also contains growth factors. DERMAGRAFT is developed from human fibroblast cells seeded onto a scaffold of dissolvable, suture-like material and allowed to multiply.

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What is hyperbaric oxygen therapy?

Hyperbaric oxygen therapy, the technique of placing a patient within a chamber whose air pressure is higher than that of the normal atmosphere, has long been used to treat scuba divers experiencing decompression sickness, firemen dealing with smoke inhalation and other problems.

It has also proven to be useful for treatment of wounds that have proven difficult to heal, including diabetic foot ulcers and venous leg ulcers as well as burns and skin grafts. The process of breathing pressurized oxygen stimulates the growth of new blood vessels to serve the wound, reduces tissue death and enhances the blood's anti-infection properties.

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For additional information

You can find much additional information about chronic wound problems at web sites sponsored by government agencies, professional societies and healthcare institutions. It should perhaps be noted that the World Wide Web is open to many sources posting questionable information and promises, and you are encouraged to seek information from established, reputable organizations.

Likely sources include:

The American Diabetes Association

www.diabetes.org

The American Orthopaedic Foot and Ankle Society

www.aofas.org

The Wound Care Information Network

www.medicaledu.com

Product Information:

www.apligraf.com

www.regranex.com

www.dermagraft.com

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