Venous Ulcers

This information was developed to help you understand venous ulcers, the treatment plan and any special care at home. Please ask your doctor or nurse any questions that you may have. This booklet includes the following topics:

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Anatomy

The circulatory system is made up of a network of blood vessels. Blood vessels are tube-like channels that run through the body, and include arteries, veins and capillaries. Arteries bring oxygen-rich blood to all parts of the body. The veins carry blood back to the heart.

Three types of veins are found in the legs.

- The **deep veins**, enclosed by muscle, lie deep in the legs and carry the most blood to the heart.
- The **superficial veins** lie near the surface of the skin. These have the least muscle support and are more likely to become enlarged and twisted.
- The deep and the superficial veins are connected by the **perforator (or communicating) veins** (See Figure 1).
Since veins carry blood to the heart against the force of gravity, the veins have a system of one-way valves. This helps maintain the flow of blood to the heart (See Figure 2). These cup-like valves are spaced at intervals along the inside walls of the vein. The valves:

- Open as blood flows toward the heart.
- Close to prevent blood flow back toward the feet.

The pumping action of the calf muscles against the veins helps push blood upward toward the heart. Moving the feet and walking causes the pumping action to occur.

Figure 1

Figure 2
Causes of Venous Ulcers

When the valve or the calf muscle pump does not work well, normal blood flow is prevented and blood pools in the lower leg. Individuals with a history of blood clots also may have damage to the valves in the veins.

The vein walls then become stretched and the valves are no longer able to close tightly. This allows more blood to pool in the lower leg. This is known as “chronic venous insufficiency.” As this occurs, pressure increases in the veins, resulting in leg swelling. Swollen, congested tissue in the legs cannot receive proper amounts of oxygen and nutrients. Waste products cannot be transported back into circulation, so they build up in the tissue. Even a slight injury to the swollen leg can result in skin breakdown. As a result, the skin of the ankle and lower leg can develop an open sore (venous ulcer). Infection also may occur.

Symptoms of Venous Insufficiency

Signs of venous insufficiency occur mainly in the lower calf or ankle of the leg and may include:

- Pain or “heaviness” when standing (relief with leg elevation).
- Skin discoloration (brownish color).
- Swelling.
- Dry, scaly, itchy or thickened skin.
- Open sore (ulcer).

Diagnostic Tests

Certain tests are done to detect the cause and extent of venous insufficiency.

- Photoplethysmography: This test measures how well the valves in the leg work.
- Venous Flow Study: This test can detect blockage in the deep veins. The test also tells how well veins are returning blood to the heart.
- Duplex Scan: This test provides an image of the vein and measures blood flow in the veins.
- Venography: In special cases, this test is done. During this exam, dye is injected to check for blockages in the veins and look at vein valve function.

Treatment

The goals of your treatment plan are to:

- Promote healing of ulcers.
- Reduce leg swelling.
- Prevent or reduce infection.
- Prevent ulcers from forming.

Treatment is tailored to your specific needs. Your doctor may suggest one or more of the following treatment options:

**Unna Boot**

An Unna boot is a moist gauze bandage made up of zinc oxide, calamine lotion and glycerine. The boot:
- Promotes healing.
- Improves the flow of blood back to the heart.
- Reduces infection.

It is wrapped from the toes to just below the knee, covering the ulcer and the lower leg. The gauze then dries and hardens. An elastic bandage is wrapped snugly over the Unna boot.

A new boot is applied every 1 to 2 weeks until the ulcer is healed. At the start, more frequent changes may be needed for heavily draining ulcers. The larger the ulcer, the longer it will take to heal. Small ulcers heal in a few weeks; large ulcers sometimes take several months to heal.

Keep the Unna boot dry. Do not take a tub bath or shower when wearing an Unna boot unless you cover the boot with a large plastic bag. In some cases, sponge bathing may be the only option.

You should be able to wear a sock or stocking over an Unna boot as well as your regular shoes. If your foot is swollen, a wider shoe or slipper may be needed.

**Multi-layer Compression Wrap**

This dressing consists of 3 to 4 layers that are wrapped from the toes to just below the knees. The first layers are for padding and control of drainage and the outer layers provide compression. This dressing is similar to an Unna boot in:
- Its care.
- Frequency of dressing changes.
- Its ability to heal ulcers.

**Dressings**

If the leg ulcers are large and/or infected, another type of dressing may be used. Depending upon the ulcer, these dressings may need to be changed more than once a day. An elastic bandage is applied over the dressing and wrapped from the toes to just below the knee.

Remove the dressing before bathing and showering. After bathing, dry the leg well and re-apply the dressing and the elastic support.

If an infection is present, oral or IV (into the vein) antibiotics may be needed.
**Leg Elevation**
Elevate your legs above the level of the heart for 30 minutes 3 to 4 times a day. This is helpful if the boot begins to feel tight or the ulcer hurts. A foam wedge or several large pillows may also be used to help raise the legs. (See page 6 for other suggestions.)

**Elastic Support**
Strong elastic support is needed.
Wear an elastic bandage or special elastic stocking at all times.
Apply the bandage or stocking before getting out of bed. The bandage may be removed at night.
If you use an elastic bandage, wrap the bandage snugly from the toes to just below the knee. Overlap the edges (See Figure 3). Do not use elastic bandages if they have lost their shape or become stretched out. Bandages can be purchased at most drug stores. Bandages may be washed with mild soap and water and reused.
A compression pump may be used for severe swelling.

**Surgery**
The doctor can decide if surgery is an option by examining the skin around the ulcer while you are standing. Surgery may prevent venous ulcers by removing the superficial and/or perforating veins that cause blood to pool and block the supply of nutrients to the skin. The veins are removed by making small incisions over the area of the venous ulcer. The surgery is done under general anesthesia in the operating room. For more severe ulcers, a skin graft may be needed.

**After the Ulcer Has Healed**
After the ulcer has healed, you will be measured for a special elastic leg stocking. It will promote blood return and help prevent leg swelling and ulcers. You must wear this stocking whenever you are out of bed (except when bathing). It should be applied early in the morning to avoid leg swelling. These stockings must be replaced every 6 months as they become stretched and lose their level of compression. You must continue to elevate your legs 3 to 4 times per day.
Preventive Measures

To help prevent venous ulcers, follow these basic guidelines.

**Foot/Body Care**

- Inspect your skin each day. Look for cracked skin, breakdown and changes in skin color and/or temperature.
- Tell your doctor about any changes.
- Keep your skin in healthy condition.
- Wash your feet and legs daily; dry well.
- If your skin is dry, use a hand lotion, lanolin or cocoa butter at bedtime.
- Wear clean stockings daily along with elastic support as suggested.

**Activity**

Exercise your legs regularly, even when you are lying in bed. Avoid standing or sitting in one position for a long period of time. It causes blood to pool in your legs.

If you must stand in one position for a long time, exercise your legs while standing. Raise up on your toes several times an hour. Shift your weight from one foot to another. While riding in the car, stop every 2 hours for brief walks to exercise your legs.

You cannot swim when wearing an Unna boot, but swimming is good exercise after the boot is removed. Walking and cycling also are good forms of exercise.

Avoid activities that may cause leg swelling, such as long periods of being on your feet.

**Leg Elevation**

Leg elevation is the best way to prevent skin breakdown. Elevate your legs several times a day for at least 30 minutes.

Raise your legs higher than the level of your heart. You can do this by lying on the floor with your legs on a chair or against the wall. If you cannot elevate your legs this way, try a foam wedge or several large pillows (See Figure 4). If you are working, plan rest periods for leg elevation. Elevate your legs every night, all night.

**Clothing**

- Do not wear constricting garters or other tight garments such as tight knee-high boots, girdles or overly tight panty hose.
- Wear shoes that fit well to avoid skin breakdown on pressure points.
- Wear stockings or socks with your shoes at all times to avoid blisters.
Prevent Injury

- Avoid bumping, cutting, bruising or scratching your legs.
- Do not go barefoot.
- Use an electric razor to shave your legs.
- Avoid using pillows under the knees. Pressure may damage the blood vessel wall as well as obstruct blood flow.
- Protect your feet from extreme heat or cold.
- Avoid using heat lamps, hot water bottles, heating pads, cream hair removers or any harsh chemicals on the legs or feet.
- Test bath water with your hands, not your toes. Water should be lukewarm (body temperature).

Nutrition

- Eat a well-balanced diet.
- Reduce your sodium intake. Too much salt in your diet can cause you to retain fluid, which may result in leg swelling.
- Avoid overeating. Extra weight increases the pressure in the veins.
- A diet high in fiber aids regular bowel movements and avoids straining. Straining during bowel movements puts pressure on leg veins. The main sources of fiber are raw fruits, especially those with skin and seeds; vegetables such as celery, corn and lima beans; and whole grain breads and cereals.

Smoking

Smoking has been known to contribute to blood clotting in the veins. It causes narrowing of the arteries, which decreases blood flow. Northwestern Memorial offers a smoking cessation clinic. Call 312-908-7014 for information.

Medical Follow-Up

Regular medical check-ups are needed. Keep all of your appointments.

Notify your doctor if any of the following occur:

- Severe pain in the legs.
- Sudden weight gain or swelling of feet, ankles or legs.
- Increase or decrease in temperature of the leg.
- Unusual color or odor from the wound.
- Increased or foul-smelling drainage from the wound.
- Increase in swelling, redness, tenderness or pain in the leg.
- Inability to move your toes.
- Color of your foot becomes pale.
- Skin breakdown (new ulcer) or larger ulcer.
- Fever higher than 100° F.

**Important Phone Numbers**

If you have any questions, do not hesitate to call your doctor.

Physician: ____________________________

Phone number: ____________________________

Office location: ____________________________

Vascular Nurse Practitioner: ____________________________

Physician: ____________________________

Phone number: ____________________________

**Health Information Resources**

For more information, visit one of Northwestern Memorial Hospital’s Health Learning Centers. These state-of-the-art health libraries are located on the third floor of the Galter Pavilion and on the first floor of the Prentice Women’s Hospital. Health information professionals are available to help you find the information you need and provide you with personalized support at no charge. You may contact the Health Learning Centers by calling 312-926-LINK (5465) or by sending an e-mail to hlc@nmh.org.

For additional information about Northwestern Memorial Hospital, please visit our Web site at www.nmh.org.