

**SURGICAL PATIENT
EDUCATION PROGRAM**
Prepare for the Best Recovery

Wound Home Skills Kit:
Diabetic Foot Ulcers



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AMERICAN COLLEGE OF SURGEONS
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SURGICAL PATIENT EDUCATION PROGRAM

Prepare for the Best Recovery

Welcome

We want to help you learn as much as possible about how to care for your diabetic foot ulcer. The American College of Surgeons Wound Home Skills Program was developed by members of your health care team: surgeons, nurses, wound care specialists, and patients. You are also an important member of your health care team. This booklet will help you learn and practice the skills you need to keep your feet healthy, take care of your ulcer, and watch for improvements.

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Watch the accompanying skills videos included online at facs.org/woundcare



Your Diabetic Foot Ulcer

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Definition and Causes

What Is a Foot Ulcer?

Diabetic foot ulcers are breaks in the skin, most often on the ball of the foot, in someone with diabetes (high blood sugar).¹ These ulcers can also occur on your heels, sides, between your toes, or on the top of your feet.

What Causes Diabetic Foot Ulcers?

Foot ulcers may be caused by poor blood flow to your toes, soles, heels, and ankles. There may also be neuropathy (nerve damage), which causes tingling, pain (burning or stinging), loss of feeling, or weakness in your foot. This loss of feeling in your feet decreases your awareness of cold, heat, pain, or injury. Poor blood flow and nerve damage can change the shape of your feet and toes. This places pressure on certain parts of your foot, which can break down and become foot ulcers.



Keeping You Informed

- Approximately 25% of diabetics will develop a foot ulcer in their lifetime.²
- More than 50% of diabetic foot ulcers return within 3 years.³
- If left untreated, diabetic foot ulcers can quickly become infected and may lead to an amputation (loss of a toe, foot, or leg).

How Severe Is Your Foot Ulcer?

Your health care provider will use a scale to describe the stage or grade of your diabetic foot ulcer. The grade will explain your ulcer's appearance, depth, drainage, and amount of infection and will help determine your treatment.



Normal foot



Diabetic foot ulcer

Stage/Grade 0

Intact Skin

Signs/Symptoms

- Diagnosis of diabetes
- No history of ulcer
- No obvious ulcer
- Foot sensation present

What to Do

- Wear corrective shoes
- Check your feet daily
- Follow up with your health care provider regularly



Stage/Grade 1

Superficial Ulcer of Skin or Subcutaneous Tissue

Signs/Symptoms

- No prior history of ulcer or foot deformity
- Sensation absent
- Warmth, redness, swelling, pain, or discharge may be present on your skin's surface

What to Do

- Wear corrective shoes or take the pressure off (See offloading devices on page 12)
- Check your feet daily
- Care for your wound as instructed
- Follow up with your health care provider every 3 months



Stage/Grade 2

Ulcers Extend into Tendon, Bone, or Capsule

Signs/Symptoms

- Sensation absent
- Foot deformity present
- Deeper ulcer involving ligaments and muscle but no bone or abscess

What to Do

- Wear corrective shoes or take the pressure off (offloading devices)
- Check your feet daily
- Care for your wound as instructed
- You may need surgery to correct foot deformity
- Follow up with your health care provider every 3 months



Stage/Grade 3

Deep Ulcer with Osteomyelitis or Abscess

Signs/Symptoms

- Sensation absent
- Foot deformity present
- Deeper ulcer involving ligament and muscle with an abscess (infection) or osteomyelitis (bone infection)

What to Do

- Wear corrective shoes or take the pressure off (offloading devices)
- Check your feet daily
- Care for your wound as instructed
- You may need surgery to correct foot deformity
- Follow up with your health care provider every 3 months



Stage/Grade 4

Partial Foot Gangrene

Signs/Symptoms

- Sensation absent
- Foot deformity usually present
- Necrosis (tissue death) or gangrene (advanced tissue death) present

What to Do

- You may need custom molded shoes or take the pressure off (offloading devices)
- Check your feet daily
- Care for your wound as instructed
- You may need surgery to correct foot deformity
- Follow up with your health care provider frequently



Stage/Grade 5

Gangrene and Infection

Signs/Symptoms

- Sensation may be present
- Advanced infection with drainage and/or necrotic tissue and gangrene

What to Do

- Debridement (removal of dead tissue) and/or bone if indicated
- Care for your wound as instructed
- Medical management or possible hospitalization



Testing and Diagnosis

You will often have a team of health care providers working with you to keep your feet healthy, including:

- Primary care physician
- Endocrinologist (specializes in diabetes)
- Podiatrist (specializes in foot disorders)
- Wound specialist and general or vascular surgeon
- Orthotist (fits custom molded shoes, supports, and braces)
- Nutritionist (specializes in diet)

This team may recommend and perform all or some of your tests and exams.

Tests and Exams

Your tests and exams may include:

- **Complete history and physical exam:** Includes checking circulation (blood flow), sensation (feeling), and your history of infections
- **Review of all medications, illnesses, or conditions; allergies to drugs and dressings; and reactions to anesthesia**
- **Vascular (blood vessel) assessment** may include:⁴
 - **Doppler study:** Uses a handheld wand to hear the sound of blood flowing through your blood vessels.
 - **Ankle-brachial index (ABI) or toe pressure:** Compares the blood pressure at your ankle to the blood pressure in the upper arm.⁵ The test is just like having your blood pressure checked in your arm. A blood pressure cuff is placed on your thigh, calf, foot, and toes. You may feel a little pressure for only about 60 seconds for each measurement. Lower blood pressure in the leg (an ABI less than 0.9) may indicate a narrowing or blockage in the arteries in your legs (peripheral artery disease/PAD).
 - **Laboratory tests and x-rays** as needed

- **Fasting plasma glucose test, oral glucose tolerance test, and HbA1c test** are the main tests used to diagnose diabetes⁶

Test	Instructions	Results
Fasting plasma glucose test	You should not eat or drink for 8 hours before this test. A blood sample is taken through a vein in your arm.	A blood glucose level of 126 mg/dL (milligrams per deciliter) or higher after fasting may indicate diabetes. Other conditions (including stress) may elevate blood glucose levels temporarily, so a doctor may order a repeat test to confirm a diagnosis of diabetes.
Oral glucose tolerance test	You drink a solution containing 75 g of glucose. A blood sample is taken through a vein in your arm 2 hours later.	A blood glucose level of 200 mg/dL or higher indicates diabetes.
HbA1c (hemoglobin A1c or glycated hemoglobin) test	You may usually eat and drink before this test. A blood sample is taken by finger stick or through a vein in your arm.	An HbA1c level measures your average level of blood sugar over the past 2 to 3 months. A level of 6.5% or higher indicates diabetes.

- You may also need to **check your blood glucose levels at home** with a glucose monitor. Your health care provider will tell you what type of monitor you need, how to collect a blood sample from your finger, and how often you should test. The American Diabetes Association suggests the following targets for most non-pregnant adults with diabetes:
 - Glucose before a meal: 80 to 130 mg/dL
 - 1 to 2 hours after beginning of the meal: lower than 180 mg/dL
- **Review of your diet, nutrition, and fluid intake**

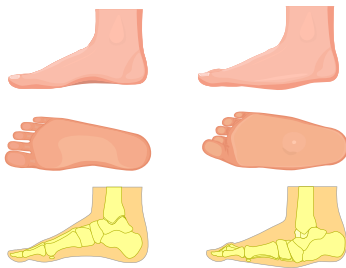


Keeping You Informed

There is no evidence that controlling blood glucose prevents ulcers, but some studies suggest that a reduction in HbA1c by 1% was associated with a 43% reduction in the risk of amputation or death from PAD.⁷ It is important that you monitor your blood sugars very closely when you have an open wound and work with your health care provider to heal your wound.

- **Ulcer examination:** A complete examination of your ulcer and wound measurements is always taken with your foot in the same position.⁸ The following questions are asked:

- Where is the wound located?
- What is the size and depth?
- What is the color/status of the wound?
 - Black: death of cells in tissue (necrosis)?
 - Yellow, red, or pink?
- Is there any exposed bone?
- Is there any foul odor or drainage?



Normal foot

Charcot foot



Charcot foot

- **Detailed foot exam:** Check for the risk of more serious conditions, such as osteomyelitis and Charcot foot.⁹
 - **Osteomyelitis (an infection of the bone):** This may be present if you can see the bone, the bone feels rough or soft, or the ulcer has failed to heal. Healing of your diabetic foot ulcer is unlikely until the infection is controlled.
 - **Charcot foot:** A weakness of the bones and a flattening of the foot caused by neuropathy (nerve damage). Other causes may be osteomyelitis or recent foot surgery. The treatment is to **take pressure off the foot** (offloading). Surgery may be needed to help correct some deformities.



Treatment

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Treatment Options

This chapter will include ways to remove pressure, perform foot care, eat a healthy diet, and manage pain.

Removing Pressure (Offloading)

Depending on the grade or stage of your ulcer, your health care provider may recommend a variety of pressure-relieving (offloading) devices:

- If the ulcer is on the sole (bottom) of your foot, your health care provider may recommend a **total contact cast (TCC)** or a **fixed ankle walking boot**.¹⁰⁻¹¹ These devices meet the standard for relieving pressure on the sole or bottom of the foot by at least 30%.¹²
- If you have a draining wound that requires frequent dressing changes, you may need to use a **removable walker boot** or other specialized offloading device.

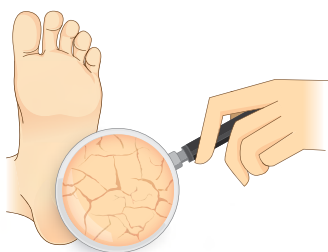


Removable boot

Foot Care

- **Check your feet each day.** Look for changes in color, swelling, skin cracks, pain, or numbness.
- **Check the skin** on the top of your foot, between each toe, and the soles and heels of your feet. Use a mirror if needed.
- **Check calluses and corns.** If your doctor approves, use a pumice stone to keep calluses under control. Do not use sharp objects or chemicals to remove them.

- **Wash your feet daily** using mild soap and water. Dry carefully, especially between your toes.
- **Do not use hot water.** Decreased feeling (neuropathy) in your nerves may cause you to not feel your feet. Hot water can also burn your skin.
- **Keep your nails trimmed.** Ask for help if you need it to avoid cutting your skin.
- **Avoid going barefoot or wearing shoes without socks.**
- **Choose shoes that are the correct size.** The best time for buying shoes is in the afternoon.
- Have your feet checked at each visit to your doctor.



Nutrition

Eating right can help prevent limb loss in diabetic patients.¹³ You can use this form to find out if you are eating a healthy diet: mna-elderly.com/forms/Self_MNA_English_Imperial.pdf.

What to Eat

A healthy diet can also promote wound healing and should include:¹⁴

- **Protein and iron**—important for tissue repair and can be found in meats, poultry, eggs, fish, and nuts
- **Some meatless sources of protein, including:**
 - **Beans**
 - **Quinoa**—a grain substitute for rice
 - **Soy**—a vegetarian option that often comes in the form of tofu

- **Peanut butter**—also provides healthy fats and essential amino acids
- **Buckwheat**—can be ground into flour and also eaten as oatmeal
- **Calcium**—dairy products and leafy greens are generally high in this nutrient
- **Vitamins A, C, E and K**—important for skin repair and can be found in lean meats, fruits, vegetables, dairy, and whole grains
- **Drinking 8 cups of water or other beverages each day**—it is important to make sure you're getting enough fluids

How Much to Eat

A healthy diet should include **30 to 35 calories (energy intake) for every kilogram (kg) of your body weight**. You can find out how many calories you need each day by using the calculation tool below.

Daily Calorie Calculation Tool

Your Weight (lbs.)	
Divide by 2.2	
Multiply by 30	
Total	

Example

$$\frac{150 \text{ lbs.}}{2.2} = 68 \text{ kg} \times 30 \text{ cal.} = \mathbf{2,040 \text{ calories/day}}$$

Weigh yourself daily and adjust your calories if you gain or lose weight. Your health care provider can request that you consult with a dietitian if you have difficulty managing your weight, eating, have dietary restrictions, or have any medical conditions with special diets.

! **Stop smoking** if you are a smoker. The chemicals in cigarettes interfere with your blood flow and your skin healing. For help, you can view **The American College of Surgeons Quit Smoking before Surgery brochure and Quit Plan** online at facs.org/quitsmoking.

Pain Control

Diabetic foot ulcers may be very painful. Your doctor will work with you to develop a pain control plan. Be sure to mention any pain medication you are already taking and how you managed pain in the past.

Non-Medication Strategies for Pain

- Offload or take pressure off your ulcer whenever possible.
- Keep your bed linens smooth and unwrinkled.
- Request a time-out or rest period during your wound care or any procedure that causes pain.
- Keep your ulcer covered and moist, and use a non-stick dressing.
- Use distraction (music or games) and guided imagery to direct your focus away from your pain.¹⁵



Distraction



Guided imagery

Medication for Mild-to-Moderate Pain

- Non-steroidal anti-inflammatory drugs (NSAIDs) such as aspirin, ibuprofen (Motrin[®], Advil[®]), and naproxen (Aleve[®]) are used to treat mild-to-moderate pain.
- Plan to take your pain medication 30 minutes before your wound care.
- Possible side effects include stomach upset, bleeding in the digestive tract, and fluid retention.

Medication for Nerve Pain

- Medications such as gabapentin (Neurontin®) and pregabalin (Lyrica®) are used to prevent nerve pain by calming over-active nerves.
- Possible side effects include dizziness, drowsiness, suicidal thoughts, and swelling in your hands and feet.

Narcotics or Opioids for Severe Pain

- Opioids are used to treat moderate-to-severe pain. Severe pain means you can't focus or sleep because you can't take your mind off your pain.
- Examples include tapentadol (Nucynta®), tramadol (Ultram®), hydrocodone (Norco®), oxycodone (OxyContin®), and oxycodone with acetaminophen (Percocet®, Percodan®).
- Side effects include sleepiness; lowered blood pressure, heart, and breathing rates; skin rash and itching; nausea; constipation; and difficulty urinating. You may also become physically dependent or addicted to opioids.
- If you have pain lasting for several weeks or longer, a treatment plan will be developed to help ensure best pain management practices.

Go to facs.org/safepaincontrol for more information on safe and effective pain control.

Pain Management Guide

How Intense Is My Pain?

- I hardly notice my pain, and it does not interfere with my activities.
- I notice my pain and it distracts me, but I can still do activities (sitting up, walking, standing).

What Can I Take to Feel Better?

Non-medication therapies

+

Non-opioid, oral medications

You may take these to control mild-to-moderate pain when needed

- My pain is hard to ignore and is more noticeable even when I rest.
- My pain interferes with my usual activities.

Non-medication therapies

+

Non-opioid medications

You may be told to take them regularly throughout the day rather than as needed

- I am focused on my pain, and I am not doing my daily activities.
- I am groaning in pain, and I cannot sleep. I am unable to do anything.
- My pain is as bad as it could be, and nothing else matters.

Non-medication therapies

+

Around-the-clock non-opioid medications

+

Short-acting opioids (for a few days)

Call your surgeon if your pain continues



Wound Care

Wound Cleaning

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Wound Cleaning

This chapter will include instructions on cleaning your wound, types of dressings and bandages, removing a dressing, putting on a new dressing, and packing a wound.

Cleaning Your Wound

- Most wounds should be cleaned at least once each day. Follow the instructions of your wound care provider. Some dressings are designed to stay in place for 2 to 3 days. Clean all of your skin in the shower daily if allowed by your health care provider.
- A bandage or dressing should be applied if the wound is draining or needs protection.
- Your health care provider will determine if unhealthy tissue should be removed (debrided) from your wound.
- Wounds should be debrided only by a health care provider using special tools. You should not try to debride your wound, as you can cause harm and make the wound larger.
- There are also bandages and dressings treated with medications that promote debridement when applied directly to the wound.

Goals of Cleaning

- To remove bacteria from the wound surface
- Inspect the wound
- Protect the healing wound

Cleaning Your Wound Skills



Watch
and
Review

- These are general instructions for cleaning a wound. Follow any special instructions you may also receive from your health care provider for cleaning your wound.
- **Watch the Cleaning Your Wound video online at facs.org/woundcare, and then follow each of the steps.**

SKILL Gathering Your Supplies

- Drinking (tap) water or normal saline 0.9%
- A mild cleansing solution, if advised, like Dove® or Ivory®¹⁶
- Clean gloves
- Dressing material
- Tape or a bandage
- Clean gauze or a clean towel
- Scissors
- Cotton swabs (Q-tips®)
- A small plastic bag



SKILL Preparing Your Work Area

- If your hands are visibly dirty, wash your hands with soap and water for 15 to 30 seconds. If your hands are not visibly dirty, you may use a 60% alcohol-based hand gel.
- Put a clean towel over your work area and set a clean bowl on it.
- Pour water or saline into the bowl.
- Open any dressing packages so you can easily remove the contents later.
- Clean tweezers or scissors with alcohol or an alcohol wipe before using.



SKILL

Removing Your Old Dressing

- If the dressing is dry or is stuck to your wound, moisten it with normal saline to loosen it before removing.
- Loosen the tape on the dressing but don't remove the dressing yet.
- Put on a medical glove or use a plastic bag over your hand to grasp and remove the dressing.
- Check the color and amount of the drainage.
- Place the dressing and the glove/bag in a second sealed plastic bag and discard.



Moisten your wound with saline to remove all pieces of an old dressing

SKILL**Cleaning Your Wound**

- Use a 60% alcohol-based hand gel to clean your hands again.
- Put on clean gloves.
- Soak a new gauze or clean towel with water or saline and apply the cleaning solution, if advised.¹⁷
- Starting at the center of the wound, work in a circular pattern and clean toward the edges. Do not return to the wound center after cleaning to avoid recontamination of the wound.
- Remove any loose tissue with the gauze pad.
- Do not press hard or scrub a clean wound because this can damage the tissue and slow healing.¹⁸
- Wet a new gauze or towel with water or saline to rinse off any cleaning solution. Start at the center and work out to the edges.
- Use a new gauze or towel and a mild skin cleanser and water to clean periwound maceration (skin around the wound broken down by moisture).¹⁹
- Use a dry gauze or towel to gently pat around the wound to dry completely.



Warning: Use the products below only if advised by your health care provider:²⁰

- **Hydrogen peroxide** can be harmful to tissues even at low concentrations.²¹
- **Iodine products** should be used with caution if you have renal (kidney) failure, history of thyroid disorders, or known iodine sensitivity.
- **Sodium hypochlorite (Dakin's solution)** can be harmful even at low concentrations. A solution labeled no greater than 0.025%, may be advised for short periods only when no other option is available.

Dressings and Bandages

The correct dressing depends on the wound type, stage, and size, as well as your health condition. As your wound heals, you may need to change to a different type of dressing. If you have complications, your health care provider can help you choose the right dressing.

Wound dressings are used to:

- Keep your wound moist
- Protect your wound from infection
- Remove drainage
- Help your wound heal



Gauze Dressings

- **Do not use dry gauze directly over open wounds.** It can dry and stick to the wound and cause pain and damage when removed.
- Use a single gauze strip/roll to pack deep ulcers and wound spaces. Small, single pieces can grow into the wound edge and become infected if not properly removed.
- Gauze dressings may be used as the secondary (cover) dressing over a moist primary dressing.
- **Loosely woven gauze** may be packed into deep or highly draining ulcers.
- **Tightly woven gauze** is used for minimally draining ulcers.



Loosely woven gauze



Tightly woven gauze

Dressings by Wound Type¹

Your Ulcer	Goals	Primary Dressing	Secondary Dressing	Precautions
<ul style="list-style-type: none"> Early signs of injury or redness with no open skin or drainage 	<ul style="list-style-type: none"> Protect Check frequently Prevent further injury 	<ul style="list-style-type: none"> Lotion Transparent film Hydrogel Silicone foam 	<ul style="list-style-type: none"> Usually not needed 	
<ul style="list-style-type: none"> Shallow pink or red ulcer May have closed blisters May have yellow callous growth with no-to-low drainage 	<ul style="list-style-type: none"> Protect Keep moist Promote new tissue growth Prevent infection 	<ul style="list-style-type: none"> Transparent film Silicone foam Hydrogel Hydrocolloid Alginate 	If needed: <ul style="list-style-type: none"> Gauze Hydrocolloid Bulky gauze pad Foam 	<ul style="list-style-type: none"> Use dressings that won't stick to or tear your skin when removing or cause maceration (skin breakdown) or allergies Count all foam pieces used and removed from dressing
<ul style="list-style-type: none"> Deeper ulcer Clean, red, moderate-to-high drainage 	<ul style="list-style-type: none"> Protect Prevent infection Pack empty wound spaces Promote healthy tissue growth Manage drainage 	<ul style="list-style-type: none"> Hydrogel Foam Alginate Manuka honey²² Negative pressure wound therapy (pg. 31) 	<ul style="list-style-type: none"> Bulky gauze dressing Foam Super absorbent dressing 	<ul style="list-style-type: none"> Avoid bandages and tape that cause maceration (skin breakdown) or allergies Count all foam pieces used and removed from dressing
<ul style="list-style-type: none"> Mixed yellow and red, with slough (dead, separating tissue) present Infected Minimal-to-heavy drainage 	<ul style="list-style-type: none"> Protect Reduce bacteria Manage drainage Control odor Pack empty wound spaces 	<ul style="list-style-type: none"> Hydrogel Antiseptic-treated foam Alginate Silver Manuka honey Iodine Hydrofiber® Negative pressure wound therapy (pg. 31) 	<ul style="list-style-type: none"> Bulky gauze dressing Foam Super absorbent dressing 	<ul style="list-style-type: none"> Avoid bandages and tape that cause maceration (skin breakdown) or allergies Count all foam pieces used and removed from dressing

Your Ulcer	Goals	Primary Dressing	Secondary Dressing	Precautions
<ul style="list-style-type: none"> All slough (dead separating tissue) is yellow, white, tan, or gray Moderate to heavy infection and drainage 	<ul style="list-style-type: none"> Remove slough Keep moist Manage drainage 	<ul style="list-style-type: none"> Hydrogel Hydrofiber® Antiseptic-treated foam Alginate Manuka honey Hydrocolloid Negative pressure wound therapy (pg. 31) 	<ul style="list-style-type: none"> Bulky gauze dressing Foam Super absorbent dressing 	<ul style="list-style-type: none"> Use a dressing that helps remove the slough and absorbs drainage Avoid bandages and tape that cause occlusion, maceration (skin breakdown), or allergies Count all foam pieces used and removed from dressing
<ul style="list-style-type: none"> Eschar (dead separating tissue) is black, brown, or gray and may be wet with infection or dry and lifted 	<ul style="list-style-type: none"> Protect Minimize infection Professionally debride if necessary 	<ul style="list-style-type: none"> Hydrogel, Hydrofiber® Saline- or antiseptic-treated gauze Alginate Cadexomer iodine if prescribed 	<ul style="list-style-type: none"> Bulky gauze dressing Foam Super absorbent dressing 	
<ul style="list-style-type: none"> Necrotic toes 	<ul style="list-style-type: none"> Leave exposed to air and allow to dry so the toes can separate or be surgically removed 	<ul style="list-style-type: none"> None* 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> *If the edges of your toes are moist, an iodine dressing can be applied to fight infection or reduce pain A dry secondary dressing such as gauze can be used

Dressing Skills

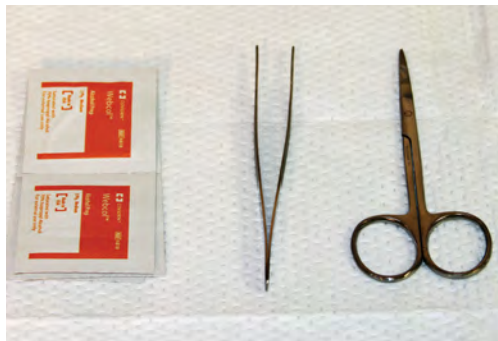


- Your health care provider may advise or prescribe a specific type of dressing for you to use. The chart on the previous page and the online video will help you understand the different types of dressings used for different wound conditions. If your wound is not healing, you may want to consult a wound care specialist.
- **Watch the Dressings and Bandaging video online at facs.org/woundcare, and then follow each of the steps.**

SKILL

Gathering Your Supplies

- Packing material, water, or solution prescribed by your doctor
- Clean gloves
- A clean bowl
- Scissors
- Tweezers
- A clean towel
- Outer dressing material to use as a bandage
- Tape
- Cotton swabs (Q-tips®)
- A small plastic bag
- Alcohol wipes



SKILL**Preparing Your Work Area**

- If your hands are visibly dirty, wash your hands with soap and water for 15 to 30 seconds. If your hands are not visibly dirty, you may use a 60% alcohol-based hand gel.
- Put a clean towel over your work area and set a clean bowl on it.
- Pour water or saline into the bowl.
- Open any dressing packages so you can easily remove the contents later.
- Clean tweezers and scissors with alcohol or an alcohol wipe before using.

**SKILL****Putting On a New Dressing**

- Apply a moist dressing over a clean wound. It is the first layer that absorbs drainage from the wound.
- Wrap a secondary gauze bandage 1 inch past the dressing in all directions to make sure it is completely covered.
- Tape the dressing. Tape the end of the bandage to the bandage itself to hold it in place without tearing the skin.



Packing Your Wound

Wound Packing Skills



- If a wound is deep or tunnels, it will need to be packed to absorb drainage and help it heal.
- Your health care provider will let you know if you need to pack your wound and how to order wound packing supplies.
- **Watch the Packing Your Wound video online at facs.org/woundcare and then follow each of the steps.**

SKILL

Packing Your Wound

- Cut pieces of tape longer than the length and width of the wound to secure the dressing. Hang one end of the tape from the edge of a table or workspace until needed.
- Carefully remove any tape or unwrap the bandage. Cover your hand with a plastic bag or a glove to remove the existing bandage. Check the bandage for drainage or odor, place it in a second bag, and discard.
- Use a 60% alcohol-based hand gel for removing germs from your hands.
- Put on clean gloves.
- Use clean tweezers to lift the packing out of the container. Cut off the amount needed and place it on a clean piece of gauze.
- Gently push the packing material into the wound to fill the wound space. Use a cotton swab, if needed, to push the packing beneath any tunneled areas. You may also use a cotton swab to gently measure the depth of the wound and record it each day.
- Open the outer dressing material package and place the dressing over the packing and wound site.
- Tape the outer dressing in place or wrap a bandage around the wound area to hold the dressing in place.
- Remove your gloves and discard.
- Use a 60% alcohol-based hand gel to remove germs from your hands.

SKILL

Packing Your Wound (continued)

1



Diabetic foot ulcer

2



Pack the ulcer



Packing in place

3



Cover with dry gauze

4



Secure with a toe sock



Negative Pressure Wound Therapy

Negative Pressure Wound Therapy (NPWT)

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Negative Pressure Wound Therapy

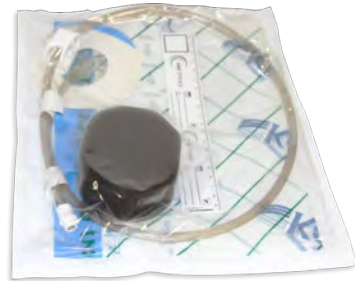
If your wound is infected or has a high amount of drainage, you may need to have a type of dressing called **negative pressure wound therapy (NPWT)**. This therapy has been effective for the treatment of some diabetic foot ulcers.²³ NPWT uses a sealed wound dressing connected to a vacuum pump. NPWT helps draw wound edges together and promotes the regrowth of healthy tissue. This helps increase blood flow to the area and removes excess fluid from the wound. NPWT can be used for a few days to several months.

A medical supply company will set up rental of the equipment and will usually deliver the vacuum pump supplies to your home. A health care provider will change the dressing on a scheduled basis.

NPWT Supplies



Vacuum pump



Foam dressing
and tubing

Applying NPWT

1. The wound is cleaned and debrided, if needed.
2. A foam dressing or filler material is fitted to the shape of your wound. The foam can be many colors, including blue, gray, or white.
3. A protective dressing may be added to the healthy skin around your wound.
4. The foam is sealed with a clear film.
5. The drain tubing is connected to an opening in the film and attached to a canister.
6. The canister is then attached to a vacuum pump.



1

Open wound before NPWT



2

Foam dressing fitted to your wound



3

Tubing attached to a canister



4

Canister attached to vacuum pump

Home Management of NPWT

When your NPWT supplies are delivered, the supplier should tell you:

- How to contact them for equipment problems through a support number available 24 hours a day/7 days a week
- How to access supplier staff for 24/7 technical product questions/information
- To call your health care provider or 911 if a medical emergency arises

Things to know:

- **The first time the pump is turned on**, you may feel a slight pulling sensation.
- **The dressing will pull down against your skin** when the therapy is working, and it will also be firm to the touch.
- **The dressing will be changed by a health care provider, usually every 3 to 7 days**, depending on the size, type, and amount of drainage.
- **You may experience some pain during dressing changes.** You may need to take pain medication 30 minutes before your dressing change.²⁴
- **Most NPWT systems are portable so that you can move around**, so ask your health care provider how much activity you should be doing.
- **Make sure that the pump is positioned so it cannot be pulled off** onto the floor during sleep.

Daily checks

Check your dressing and NPWT daily to make sure:

- The negative pressure seal is not broken and leaks are at a minimum
 - There are no kinks in the tubing
 - The drainage chamber is filling and does not need to be changed
 - The skin around the dressing has not changed
 - The dressing is clean
 - The drainage level in the canister is not full
-

Low battery

If the therapy pump is battery operated, change the batteries when the battery indicator flashes.

To change the batteries:

1. Press the button to pause the therapy.
 2. Take the battery cover off from the pump and put in new batteries.
 3. Put the cover back on and press the start button to continue your therapy.
-

Low vacuum alarm or light flash

This means there may be an air leak around the dressing.

1. Smooth the dressing and strips to ensure there is no way for air to get in.
2. Press the button to restart the vacuum pump.
3. The alarm will also sound if the canister is full or if the tubing is kinked or blocked. Change the canister if it is full and you were trained to do so. The canister is usually changed with your dressing.
4. If the tubing is kinked or blocked, try to straighten it out.
5. Removing the kink or blockage should stop the alarm. Notify your supplier if the alarm does not stop.

Disconnecting, shutting off, and restarting

You will disconnect the pump to take a shower or use the toilet. If you feel more comfortable with assistance, you may want to organize your shower times around the days that you have a home health provider visit.

1. Press the button to pause the therapy. There should be a connector built into the tubing between the pump and dressing.
2. Holding the tubing pointing up, disconnect the two parts of the connector. Place the pump somewhere safe.
3. The dressing on top of the wound is water-resistant. You can shower or wash with the dressing in place, but do not soak the dressing or it may fall off. Point the end of the tubing attached to the dressing down so that water cannot enter the tube.
4. When you are ready to reconnect the pump, connect the two halves back together. Make sure the dressing is smoothed down and has no creases that could cause air leaks.
5. Press the button to restart the pump, and a light will flash to show that the pump is starting to apply therapy.

Shutting off

- If the therapy off button is accidentally turned off, push the same button to turn the unit back on.
- The system should not be off for more than 2 hours each day.

Risks and Safety Information

Bleeding

If you have recently had surgery on your heart or blood vessels, or are taking blood thinners, you may have a higher risk of bleeding, whether you are using NPWT or not.

If you see a sudden increase or a large amount of blood from your wound in the tubing or canister:

1. **Turn OFF the therapy unit right away.**
2. Do not remove your dressing.
3. Apply pressure over the area with gauze or a clean towel.



Call 911 (or local emergency number) and then notify your health care provider.

Wound infection

Call your health care provider right away if you think your wound is infected or if you have any of the following symptoms:

- Fever of 101°F (38.3°C)
- Your wound is sore, red, or swollen
- Your skin itches or you have a rash
- The wound or the area around the wound feels very warm
- Your wound has pus or a bad smell
- Your wound has increased drainage
- You have elevated blood sugar

Serious infection

A wound infection can spread through the rest of your body. Call your health care provider right away if you have any of the following symptoms:

- Vomiting or diarrhea
- Headache
- Confusion
- Feeling faint or dizzy when you stand up
- Sore throat
- A fever of 102°F (39°C)
- Rash

Allergic reaction

Therapy dressings, drapes, and canisters are latex-free and are delivered sterile. Use these items only once. At the end of therapy, follow directions for waste disposal or recycling. It is possible to have a sensitivity or allergic reaction to other wound care products. Call your health care provider right away at the following signs:

- Rash or hives
- Swelling
- Redness
- Severe itching



If you have difficulty breathing, seek immediate emergency medical assistance. Call 911 (or your local emergency number).

Expiration date

Check the expiration date on all parts of the equipment. Do not use it if they are expired. Devices can degrade over time. If your equipment is expired, contact your medical supplier to request a replacement.



Negative pressure wound therapy



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Home Care Planning

To make sure you are ready to go home, you and anyone helping with your care should review the **Skills Checklist** for your wound care and the **Discharge Checklist** with your health care provider. You should be able to explain and demonstrate all parts of your care before you go home.

Supplies may be ordered through a local medical equipment store or pharmacy or national Internet order company. Have any supplies you need ordered before you leave the hospital. It may take 1 to 2 days for them to arrive. Leave the hospital with several days of wound supplies in case there is a delay.

You may need to have prescriptions filled for medication or wound dressings. If you will have home health care, they may be assigned to order your supplies. Your hospital discharge planner can help with the specific details for the coverage of the supplies you need. They can also assist you with setting up delivery of supplies if you need negative pressure wound therapy.

At any point in your care, you can refer to this booklet to review your instructions as well as your checklists and the videos for skill instructions at facs.org/woundcare.

- **Lacerations and Abrasions**
- **Cleaning Your Wound**
- **Packing Your Wound**
- **Dressings and Bandaging**
- **Your Surgical Drain**
- **Negative Pressure Wound Therapy**

Wound Care Resources

Founding Organization

American College of Surgeons Surgical Patient Education Program
800-621-4111
facs.org/patienteducation

Collaborative Organizations

American Burn Association
ameriburn.org

American College of Surgeons Advisory Council for General Surgery,
Advisory Council for Pediatric Surgery, and Advisory Council for Plastic
and Maxillofacial Surgery
facs.org

American College of Wound Healing and Tissue Repair
acwound.org/college

American Association for the Surgery of Trauma
aast.org

American Society of Plastic Surgeons
plasticsurgery.org

Association of periOperative Registered Nurses (AORN)
aorn.org

Wound Healing Society
woundheal.org

Wound, Ostomy and Continence Nurses Society™ (WOCN®)
wocn.org

Additional Resources

Advanced Tissue
advancedtissue.com/the-best-and-worst-ideas-for-open-wounds

Association for the Advancement of Wound Care (AAWC)
Wound Patient/Caregiver Resources
aawconline.org/wound-patientcaregiver-resources

National Pressure Ulcer Advisory Panel (NPUAP)
npuap.org

WOCN® Society™
Patient Information section
wocn.org/?page=PatientResources

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Check Your Knowledge

Question 1

Diabetic foot ulcers can occur:

- A. Only on the heels and soles of your feet
- B. On the heels, sides, between your toes, or on the top of your feet
- C. Only on the balls of your feet
- D. Only on your toes

Question 2

A stage/grade 2 foot ulcer has:

- A. No sensation, a foot deformity, and is a deep ulcer involving ligaments and muscle but no bone or abscess
- B. No obvious ulcer with foot sensation present but possibly a foot deformity
- C. A history of or current foot deformity and a deeper ulcer with infection
- D. An advanced infection with drainage and/or necrotic tissue and gangrene

Question 3

If you have a draining ulcer, you may need to use one of these devices to offload the pressure on your foot while walking:

- A. A total contact cast
- B. A roll-on total contact cast system
- C. Just a dry dressing
- D. A removable cast walking boot

Question 4

Which of these are true about your wound care?

- A. Use tap water to clean your wound unless your health care provider recommends something else.
- B. If your hands are visibly dirty, wash your hands with soap and water for 15 to 30 seconds. If your hands are not visibly dirty, use a 60% alcohol-based hand gel.
- C. Debride (remove unhealthy tissue) yourself with each dressing change.
- D. When cleaning the wound, start at the center and work in a circular pattern, cleaning toward the edges.

Answers: Question 1: B Question 2: A Question 3: D Question 4: A, B, and D

Disclaimer

The information contained in this booklet and the patient education section of the American College of Surgeons (ACS) website does not constitute medical advice. This information is published as a communications vehicle: to inform and to educate the public about specific surgical procedures. It is not intended to take the place of a discussion with a qualified surgeon who is familiar with your situation. It is important to remember that each individual is different, and the reasons and outcomes of any operation depend upon the patient's specific diagnosis, disease state or other medical condition.

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Evaluation Consent

Your Input Is Valuable

You and your family are important members of the health care team. In order to help you safely care for yourself or a family member or friend with a wound, you are being provided with the **American College of Surgeons Diabetic Foot Ulcers Home Skills Kit**.

We would like you to help us make sure that this skill kit prepared you to provide the best care for yourself or someone with a wound.

We are asking you to complete a short evaluation about your care. You should complete this evaluation after your first follow-up visit with a health care provider or surgeon. This visit usually happens 7 to 14 days after your procedure.

If you choose to complete the evaluation, you have two easy options:

- **Mail:** Fill out the printed evaluation included in this kit and mail it back in the enclosed envelope provided.
- **Online:** Visit our website, facs.org/woundcare. Look for the link to Complete the Wound Care Patient Evaluation: We Need Your Opinion!

Some Information about the Evaluation

- It will take about 5 minutes of your time.
- Answering this evaluation may help someone with a wound in the future.
- All answers will be seen only by the study investigator at the American College of Surgeons.
- Only the group response will be reported (for example, the average time patients spent watching the videos was 20 minutes).
- The group responses will help your surgical team know what else can be done to help you or someone else care for a wound after an injury or operation.
- You may check the evaluation website for the updated summary of the responses.

Any questions should be directed to:

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SURGICAL PATIENT EDUCATION PROGRAM

Prepare for the Best Recovery

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