

LIVING WITH PARALYSIS

# PRESSURE INJURIES & SKIN MANAGEMENT



CHRISTOPHER & DANA  
REEVE FOUNDATION

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# CAN WE TALK ABOUT PRESSURE INJURIES?

*Most people are barely aware of how much their bodies are in motion, every moment of every day. Whether we're sitting, lying down, or standing in one place – even when we're “still” or sleeping – our limbs, trunk and head make continual micro-adjustments to shift and relieve the pressure that our body's weight exerts on the bones, tissue and skin that are bearing its weight at any given time. This is an automatic response that keeps blood and oxygen flowing to every last capillary, the tiny blood vessels that branch out throughout the body to nourish cells in all the organs and tissues.*

*You don't normally have to think about shifting your weight to keep the blood flowing; it just happens. When you have spinal cord injury or paralysis, that all changes.*

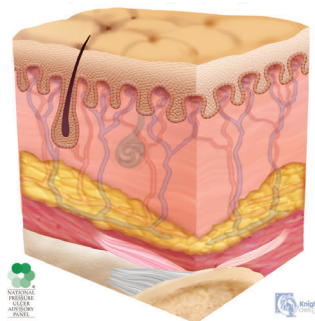
*In 2016, the National Pressure Ulcer Advisory Panel changed the recommended terminology from “pressure ulcer” to “pressure injury”. [www.npuap.org](http://www.npuap.org)*

Skin care is no small issue for people living with paralysis. The risk of skin complications increases if blood flow to the skin is restricted, even for a relatively short time in some cases pressure injuries (also called pressure sores, pressure ulcers or bed sores) can be painful and debilitating if not caught early and treated fully. Severe pressure injuries can take months to heal, sometimes requiring surgery. Age and other health conditions (e.g., diabetes) can increase the risk of sores and complications.

## **Make No Mistake: Pressure Injuries Can Be Deadly.**

Preventing infection is of paramount concern. Ulcers, cracks, and calluses compromise the integrity of the skin's barrier and become potential entry points for bacteria, which can lead to infections. Some systemic (system-wide) infections, such as sepsis, can be life-threatening, and require aggressive treatment. Treating infections generally involves taking antibiotics.

The best line of defense against skin complications is prevention – a combination of good skin care, regular movement to relieve and disperse pressure, and continual vigilance against signs of a problem.



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*Healthy Skin - Lightly Pigmented*

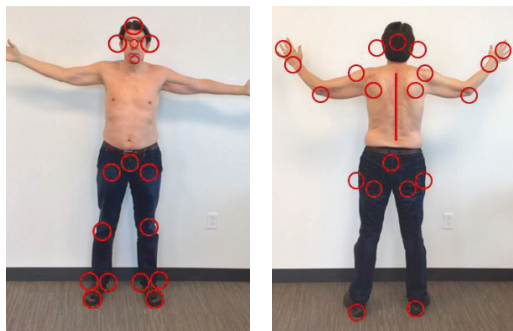
Illustrations used with permission of the National Pressure Ulcer Advisory Panel 2-14-17

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## SKIN & BONE BASICS

Skin is the largest organ in the body, a vital, living multi-layered barrier that is continually regenerating itself with the sloughing-off of old cells and the creation of new cells.



**Where there is minimal muscle between skin and bone, the risk of pressure injury is greatest.**

Bony prominences are places where the bone is close to the surface of the skin. Pressure from the weight of the body concentrates at these points, which can cut off the critical blood supply to the skin. These are areas where

the skin is most vulnerable, and they should be checked carefully for changes in color, broken skin, or open wounds.

- Hips, elbows, knees, heels, the sacrum, and the ischial bones of the buttocks (sitting bones) are at particular risk.
- People who are overweight are at increased risk because fat does not disperse pressure.
- In people who are very thin, each vertebra of the back might be an area of risk.
- The back of the head can be a trouble spot for people who cannot move their head from a wheelchair headrest or are largely confined to bed. Long hair can mask problems on the head.

### **Why Does Skin Break Down?**

***Skin can break down with paralysis due both to a lack of movement and to the physiological changes that occur when pressure is not relieved at a given spot.***

When the skin and the tissue below it are compressed due to the weight of the body, the pressure cuts off blood flow to the compressed area. It then takes more work for your heart to move your blood through the arteries and veins and finally into the tiny capillaries that nourish the skin, muscles, and nerves. When pressure in any area of the body is greater than the heart's ability to pump blood through that area, those capillaries get pinched off and that part of the body doesn't receive the nutrition it normally gets from blood and oxygen.

When you relieve the pressure – by shifting your weight, moving your body, tilting your chair, or being adjusted – you allow blood to flow back to the area that has been constricted. The goal is to interrupt any constriction in blood flow before damage is done to the skin and underlying tissue.

Immobility also slows the normal sloughing-off of dead skin, which can build up in vulnerable areas and make them more prone to cracks or breaks in the skin's integrity.

## PREVENTING SKIN COMPLICATIONS

### Know Your Skin

Paralysis often entails loss of sensation, so you may not realize a problem is starting because your brain isn't receiving the messages that signal discomfort or pain. Noticing changes in your skin at the earliest time possible is therefore paramount.

- Even if you have a caregiver, you still need to be aware of the look and feel of your own body.
- Don't overlook any part of your body: Use a mirror or cell-phone camera to look at the back of your heels, backside, back of the head, and other places that you cannot otherwise see.
- Take note of any existing scars, blotches, or birthmarks that are normal for you so you can recognize changes in your skin's appearance.
- Use a cell phone to take a picture of any area that you think you might see a change in, so you will have a point of reference to compare against when you check the area the next day.

By being familiar with every inch of your skin, you are more likely to be able to identify a change that might be problematic before it becomes a bigger problem.

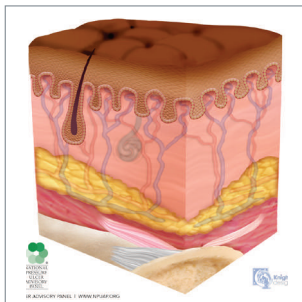
**Nurse Linda Says...** *“Get familiar with your own skin. You are responsible for your own body. Even if you have a caregiver or healthcare provider who assists you, you are the one who needs to take daily responsibility for ensuring the integrity of your skin. The day you don't look may be the day you get a red spot.”*

### What to Look For

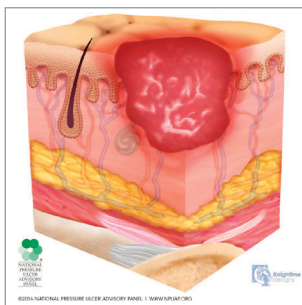
Healthy skin should appear clear and intact without redness, broken skin, or any open wounds.

Check your skin for any change in color or texture, such as a darkened area, a rough patch, or a callus, and for any breach of the surface, such as a crack, a cut, or a hole, or any evidence of abrasion or shearing of the skin.

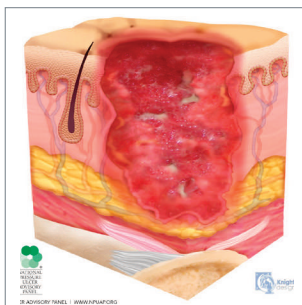
# SYMPTOMS & APPEARANCE BY STAGE OF PRESSURE INJURY



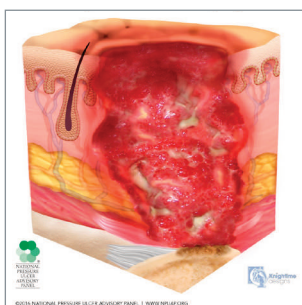
**STAGE 1**  
Pressure Injury  
*Darkly Pigmented*



**STAGE 2**  
Pressure Injury



**STAGE 3**  
Pressure Injury



**STAGE 4**  
Pressure Injury

Illustrations used with permission of the National Pressure Ulcer Advisory Panel 2-14-17



**Pressure injuries are grouped by the severity of symptoms, with Stage I being the mildest and Stage IV the worst.**

**STAGE 1:** A pigmented, painful area on the skin. The color may vary depending on the skin tone: in lighter skin, the area may appear red; in darker skin, it may appear bluish or purplish. This is a sign that a pressure injury is forming. The skin may be warm or cool, firm or soft.

**STAGE 2:** The skin blisters or forms an open sore. The area around the sore may be red and irritated.

**STAGE 3:** The skin now develops an open, sunken hole called a crater. The tissue below the skin is damaged. You may be able to see body fat in the crater.

**STAGE 4:** The pressure injury has become so deep that there is damage to the muscle and bone, and sometimes to tendons and joints.

*Two other types of pressure injury don't fit into any one of the four stages:*

- “Unstageable” sores are covered in dead skin that is yellow, tan, green, or brown. The dead skin makes it hard to tell how deep the sore is.
- Pressure injuries that develop in the tissue deep below the skin are called deep tissue injuries. The area may be dark purple or maroon, and there may be a blood-filled blister under the skin. This type of skin injury can quickly become a stage III or IV pressure injury.

### **Practice Good Skin Care**

The first step in preventing skin complications of spinal cord injury or paralysis is to practice good skin-care habits. The good news is that practices that help maintain your skin's integrity are closely aligned with lifestyle habits that benefit your overall health and well-being.

- Eat a healthy, balanced, varied diet that includes healthy oils (e.g., olive oil and coconut oil); plenty of vegetables and leafy greens; nuts, seeds, and legumes, and whole-grain breads or pasta. Limit sweets, added sugar, processed foods, refined carbohydrates, and saturated fats.
- Maintain a healthy weight and preserve/build muscle tone as much as possible. Ask your doctor about an appropriate exercise routine for your level of function.
- Get plenty of sleep – 8 hours a day is a good rule of thumb.
- Stay properly hydrated, which for most people means drinking 8 glasses of water every day. Limit alcohol and caffeine, which have a dehydrating effect.

- Don't smoke. Smoking interferes with hydration and oxygenation of cells.
- Moisturize dry skin. People with spinal cord injury or paralysis may have patches of dead skin that would normally slough off with movement. Regular application of moisturizer – preferably a perfume-free emollient-type moisturizer – will help retain the skin's natural hydration.
- Protect your skin from extremes of heat and cold. Use sunscreen to prevent sunburn and properly cover hands, feet, and face in extreme cold to prevent frostbite. Some prescription drugs – e.g., antibiotics and acne medications – can make your skin more sensitive to sunburn, so use extra caution if you're taking them, and pay attention to the side effect listings of any drugs you're taking.

**Nurse Linda Says...** *“Smoking is about the worst thing you can do for your skin. Nicotine binds to oxygen, so when you smoke, your cells are not receiving the same amount of oxygen that they otherwise would be. As a result, it becomes even easier for your skin to be oxygen-starved, which makes it more prone to damage. Talk with your healthcare provider and kick the habit.”*

### **Manage Your Weight**

Weight, either too little or too much, can increase the risk of pressure sores: extra weight puts more pressure on your bones, while too little weight can make bones protrude, creating more places where pressure sores can form.

It may seem somewhat counterintuitive, but having a layer of fat cushioning the bones does not offer protection against pressure sores. That's because fat just sits there and body weight sinks into it, creating areas of constriction. Fat does nothing to distribute pressure. Muscles, on the other hand, naturally disperse weight throughout the muscle, helping to relieve undue pressure on any one spot. That's why it's important to maintain muscle mass as much as possible.

### **Use Pressure-Dispersing Cushions**

Special cushions are readily available that act to disperse weight over a wider surface so pressure is not concentrated on one area.

Ordinary pillows act in a similar manner as a layer of fat: rather than dispersing pressure, your weight sinks in to the cushion, potentially creating pressure and constriction of blood vessels. This is true also for donut-shaped pillows. So-called “memory foam” is not recommended, because it tends to create heat and moistness, which make skin more susceptible to sores. On the other hand, pillows can be useful to prop up limbs into comfortable positions

without increased danger of pressure injuries. However, pillows are not used under bony points like the heels. For heels, use *Heelbo*'s heel protectors if the heel is just red or, if there is a pressure injury already, use bed ankle boots which support the leg to keep heels off the bed entirely.

Air, foam and gel cell cushions should be checked daily for flat cells or areas that could cause issues.

It's important to note that the use of pressure-dispersing cushions or bed surfaces, while helpful to reduce the likelihood of pressure injuries does NOT eliminate the risk altogether. You still need to release pressure regularly through movement. Don't make the mistake of believing that, since you are sitting or lying on a pressure-dispersing pad, that you don't need to be concerned about pressure injury.

### **Attend to Problem Areas**

Make note of where your body is under pressure, and pay special attention to these areas. If you're in a chair for extended periods, check the area around your ischium (sitting bones); if you're lying down, there is a higher risk for sores around the sacrum (tailbone) and the back of the head.

Make it a point to release pressure regularly by moving or being adjusted. You may need to do this every few minutes, depending on the integrity of your skin. Find ways to work this into your day in a routine fashion. For example, if you're watching television, adjust your position every time a commercial comes on. Or, set a timer to remind yourself to re-adjust. If you're in a wheelchair, tilt the chair back on a regular basis. Determine the optimal interval for YOUR body by starting out with small increments of time and slowly working up to longer periods in between movements.

Be very vigilant about any areas of your body that are warm and moist: anything in the groin area, folds in the belly when sitting, underarms, under women's breasts, under men's scrotum. Keep these areas dry by letting them air out frequently and/or applying a pure cornstarch powder (talcum powders have been linked to certain cancers, so avoid them).

***Nurse Linda Says... "It's really important to stay clean and dry in all the dark moist places of your body. This can be especially challenging if you have incontinence or leaking from a catheter, because urine and fecal material are corrosive to the skin. Even getting caught in the rain can be problematic if you're in a wheelchair and end up sitting in a damp chair or clothes for an extended time. Use extra vigilance in these instances to prevent a pressure injury from developing."***

## ***Don't Be Callous About Calluses***

Calluses tend to occur on elbows, heels, or other areas that are subject to prolonged or continual friction. Dry skin around fingernails and toes – any crack in the skin's surface through which bacteria might enter – can also be problematic.



Lots of people overlook calluses, thinking it means their skin is tough and they don't need to be concerned about a sore on callused skin. This is a misconception. In fact, calluses can be problematic because they can lead to broken skin, which creates an entry portal for bacteria and possible infection.

Most calluses gradually disappear when the friction or pressure stops. Soaking the affected area in Epsom salt and using a pumice stone to gently buff the callus off may also be useful. Your doctor may shave the top of a callus to reduce the thickness.

## ***Address Friction Wounds and Skin Shears Promptly***

Friction wounds occur when part of the body is in repeated or constant contact with something else, such as a bed sheet, clothing, a piece of equipment, or even other skin. For example, if you are using a new piece of mobility-assistance equipment and it is in continual contact with part of your arm, a friction wound can develop. Constrictive waistbands can sometimes cause friction wounds on the belly.

Skin shears are related to friction wounds, but generally occur when the body's weight is dragged across a surface. For example, sliding from a chair to the toilet, or being moved across a bed surface, can cause a skin shear. Lifting one's body (or being lifted) during movement is crucial to preventing skin shears.

A telltale sign of friction wound or skin shear is skin discoloration. In light-skinned individuals, skin may appear red; in people with darker skin, the color may be ashy or purplish. The affected area generally will have unclear edges, and may feel warm to the touch.

Treatment involves keeping the area clean and dry, gently applying a layer of antibiotic ointment if there is broken skin, and removing any source of friction.



Any added pressure to the area could increase damage, so it's best to keep weight off the area and protect it from contact with anything that might exacerbate the damage.

If a scab develops on the wound, it should stay in place until it falls off by itself. The scab is a protection that will keep bacteria out of the wound, reducing your chance of infection.

## TREATING PRESSURE INJURIES

Stage I or II injuries will heal if cared for carefully. Stage III and IV injuries are harder to treat; they almost always require medical intervention and may take a long time to heal.

Below are some guidelines for how to care for a pressure injury at home. Ask your doctor about any special instructions for home care, and follow the instructions meticulously.

### **Relieve the pressure on the area**

- Use special pressure-dispersing pillows, cushions, booties, or mattress pads to reduce the pressure on the damaged area. Some pads are filled with water or air to help support and cushion the area. The type of cushion you use depends on your wound and whether you are in bed or in a wheelchair. Talk with your doctor about what choices are best for you, including what shapes and types of material.
- Change positions often. If you are in a wheelchair, try to change your position every 15 minutes. If you are in bed, you should be moved about every two hours.

***Nurse Linda Says...*** *“The only way to clear up a pressure injury is to stop the pressure that’s being applied to that area. It is far better to identify a problem early and address it right away, when it might resolve in a day or two. The longer you let it go, the more challenging it will be to heal.”*

## **Prevent infection**

Care for the pressure injury as directed by your doctor. Keep the wound clean to prevent infection. Clean the sore every time you change a dressing.

- For a stage I sore, you can wash the area gently with mild soap and water. If needed, use a moisture barrier to protect the area from bodily fluids. Ask your doctor what type of moisture barrier to use.
- Stage II pressure sores should be cleaned with a salt water (saline) rinse to remove loose, dead tissue. Or, your doctor may recommend a specific cleanser.
- Do not use hydrogen peroxide or iodine cleansers, which can damage skin.
- Keep the sore covered with a special dressing. This protects against infection and helps keep the sore moist so it can heal. Talk with your doctor about what type of dressing to use. Depending on the size and stage of the sore, you may use a film, gauze, gel, foam, or other type of dressing.

## **Osteomyelitis (Bone Infection)**

Wounds that are severe can even extend to the bone and lead to osteomyelitis, a serious condition in which bone tissue becomes infected. The infections are usually bacterial, but can also be fungal. They may spread to the bone from nearby skin or muscles, or from another part of the body through the bloodstream. Osteomyelitis should be considered as a possibility when wounds don't close or reopen after they have healed.

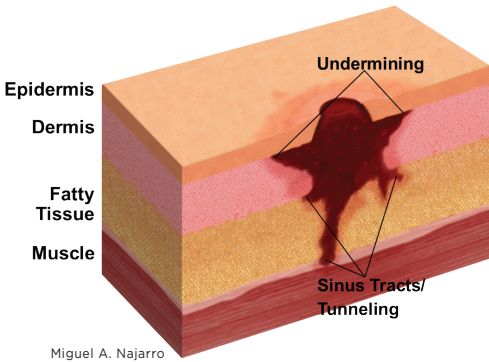
*Symptoms of bone infections include:*

- Wound keeps reopening
- Pain in the infected area
- Chills and fever
- Swelling, warmth, and redness

A blood test or imaging test such as an x-ray, CT scan, or MRI can tell if you have a bone infection. Treatment includes antibiotics or even surgery to remove the affected bone in order to prevent the spread of the infection.

## **Debridement**

Pressure injuries that are Stage II or higher may require debridement to remove dead, devitalized, or contaminated tissue, as well as any foreign material from a wound. Debridement is the medical removal of dead, damaged, or infected tissue to improve the healing potential of the remaining healthy tissue. Debridement helps to reduce the number of microbes, toxins,



and other substances that inhibit healing so that the wound improves and doesn't worsen or become infected. Debridement should only be done by specially trained healthcare professionals.

Sometimes there is "tunneling" of a wound. This is a sore that may appear to be healing because the wound is closing up at the

surface, but in fact the damage is affecting unseen, deeper layers of tissue. Often tunneling is found while a wound is being debrided; medical personnel may be able to check for tunneling without debridement.

In some cases, a wound vacuum may be used to draw fluid from open or tunneling types of sores that are not healing. This is generally a last step before surgery and can sometimes prevent the need for surgical intervention.

### **Avoid further injury or friction**

- Powder your sheets lightly with cornstarch so your skin doesn't rub on them in bed.
- Avoid slipping or sliding as you move positions. Avoid positions that put pressure on your sore.
- Care for healthy skin by keeping it clean and moisturized.
- Check your skin for pressure injuries at least twice a day once your skin tolerance is established. Ask your caregiver or someone you trust to check areas you can't see. You should also check these areas yourself by using a mirror or camera.
- If the pressure injury changes or a new one forms, tell your doctor.
- Do not massage the skin near or on the ulcer. This can cause more damage. Do not use donut-shaped or ring-shaped cushions. They reduce blood flow to the area, which may cause sores.

**Surgery** may be necessary to close up a more advanced pressure ulcer. Surgical intervention involves cleaning out any infected tissue and closing the ulcer with stitching or, in some cases, a flap of muscle tissue. Flap surgery is a technique in plastic and reconstructive surgery where any type of tissue is lifted from a donor site and moved to a recipient site with an intact blood supply. Surgery typically requires a long recovery time during which you must stay off the area until it fully heals.

**Scar Tissue:** Whenever the skin's integrity is breached for any reason, scar tissue forms. Scar tissue doesn't have the same elasticity that the rest of your skin has and is more sensitive to developing future pressure sores, so you need to be hypervigilant in checking for problems.

## WHEN TO SEEK MEDICAL CARE

Call your doctor if you develop blisters or an open sore.

*Call immediately if there are signs of infection, such as:*

- A foul odor from the sore
- Pus oozing out of the sore
- Redness and tenderness around the sore
- Skin close to the sore is warm and/or swollen
- Fever

### **Know the Warning Signs of Sepsis**

If a pressure injury becomes infected, and the infection is not controlled locally, it can escalate to sepsis and spread throughout the body via the bloodstream.

**Sepsis** - also referred to as blood poisoning or systemic inflammatory response syndrome (SIRS) - is a life-threatening condition that arises when the body's response to an infection injures its own tissues and organs. Sepsis can lead to shock, multiple-organ failure, and death; especially if not recognized early and treated promptly. Septic shock is severe sepsis with a drop in blood pressure leading to organ failure. Both sepsis and septic shock are life-threatening. Treatment is most successful within the first hour of onset.

Anyone with an infection must be aware of the risks and symptoms of sepsis and seek medical attention immediately.

*Some or all of the following symptoms may be present:*

- Infection
- Elevated body temperature
- Fast heart rate, greater than 90 beats per minute
- Fast respiratory rate, greater than 20 breaths per minute

*Other symptoms that may be present:*



- Confusion or coma
- Edema (swelling) especially in the extremities, neck, or face
- Elevated blood sugar in the absence of diabetes
- Basal body temperature below what is normal for the individual (people with paralysis sometimes have a lower basal body temperature than the average person)

Prevention is the best course of action to avoid the development of sepsis. Individuals should check with their healthcare provider for any infection that is not improving or seems to be increasing in symptoms such as redness, swelling, discomfort, pain, localized heat over the affected area or fever/chills.

If you have an infection and experience any of these symptoms or body reactions, call or visit your healthcare provider immediately.

***For more information about sepsis, you can request a copy of the Reeve Foundation's wallet card on sepsis by calling the Paralysis Resource Center at 800-539-7309 and asking to speak to an information specialist, or by visiting [www.ChristopherReeve.org/cards](http://www.ChristopherReeve.org/cards).***

## WOUND CARE CENTERS

*A wound care center, or clinic, is a medical facility for treating wounds that do not heal. You may have a non-healing wound if it has not started to heal in two weeks, or has not completely healed in six weeks.*

*When you go to a wound clinic, you will work with a team of healthcare providers trained in wound care. Your team may include doctors, who oversee your care; nurses, who clean and dress your wound and teach you how to care for it at home; and physical therapists, who help with wound care and work with you to help you stay mobile. These healthcare providers will also keep your primary care physician up to date on your progress and treatment.*

*Your wound-care team will examine and measure your wound, check the blood flow in the area around the wound, determine why it's not healing, and create a treatment plan. Goals of treatment include healing the wound, preventing the wound from getting worse or becoming infected, preventing limb loss, preventing new wounds from occurring or old wounds from coming back, and helping you maintain the level of mobility that you had before the wound. Your provider will clean out the wound - including debridement if necessary - and apply dressing.*

### ***Protein is Essential to Healing Wounds***

*Because severe wounds can decrease levels of key proteins in the body such as albumin (any protein that is soluble in water and moderately concentrated salt solutions and is coagulable by heat) and prealbumin (a protein component of plasma), which are essential building blocks of cells, your doctor may recommend laboratory work to determine your levels of these proteins and prescribe appropriate nutritional measures if they are low.*

## **SUMMARY**

### ***The bottom line: Prevention is critical.***

Do what you can to avoid getting a pressure injury in the first place and spare yourself a long and difficult recovery. At the same time, recognize that you may do everything right and develop a pressure sore nonetheless. In that case, the rule of thumb is to treat it early and thoroughly, and use extra care to prevent a recurrence.

**You can never be too vigilant with your skin!**

[www.npuap.org/](http://www.npuap.org/)

### **National Pressure Ulcer Advisory Panel (NPUAP)**

NPUAP serves as the authoritative voice for improved patient outcomes in pressure ulcer prevention and treatment through public policy, education and research.

<http://sci.washington.edu/info/pamphlets/index.asp>

### **Northwest Regional Spinal Cord Injury System: SCI Patient Education Pamphlets – Staying Healthy After a Spinal Cord Injury**

This page has three pamphlets with information on maintaining healthy skin and taking care of pressure sores.

[www.pva.org](http://www.pva.org)

### **Paralyzed Veterans of America publication: Pressure Ulcer Prevention and Treatment Following Spinal Cord Injury: A Clinical Practice Guideline for HealthCare Professionals, 2014.**

Offers publications written for the health care professional that are downloadable for free.

[www.msktc.org/sci/factsheets/skincare](http://www.msktc.org/sci/factsheets/skincare)

### **Model Systems Knowledge Translation Center (MSKTC): Skin Care and Pressure Sores in Spinal Cord Injury**

MSKTC is a national center that works to put research into practice to serve the needs of people with traumatic brain injuries, spinal cord injuries, and burn injuries.

### **Photo Credits:**

Linda M. Schultz, PhD, CRRN and the patients at Kennedy Krieger Institute. Illustrations used with permission of the National Pressure Ulcer Advisory Panel 2-14-17



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Points of view or opinions do not, therefore, necessarily represent official Administration for Community Living policy.