

Skin and Wound Care

Skin is the largest organ of the body and plays an important role to ensure our health. The skin functions as a protective barrier from the outside environment to prevent invasion from illness and germs. It serves to keep bodily fluids and nutrients inside the body, while assisting in controlling body temperature during cold and hot weather.

People in health care settings are particularly susceptible to health complications when skin integrity is compromised because they are exposed to a lot of other people during the recovery process. Caregivers, therapists, staff, patients and family all potentially share germs. The body is already stressed and busy healing bones and muscles, leaving the skin more vulnerable to infection.

The potential for skin problems increases when someone has sustained a brain or spinal cord injury, particularly when movement, sensation (feeling), or cognition (thinking) are altered.

Working with the entire treatment team provides the client with the expertise to intervene to heal and decrease complications of skin problems. Early intervention is the primary goal, and compliance with established skin care practices is essential to effectively treat and manage wounds if and when they do occur.

Keeping skin healthy

When skin is healthy, it is intact and well lubricated with natural oils and nourished with a good blood supply. There are several ways to maintain healthy skin through good hygiene.

Keep the skin clean and dry. After bathing, dry the skin well without rubbing too hard, as it may increase irritation. Do not bathe daily unless needed. Bathing every day washes away natural oils that lubricate the skin. Use a gentle lotion on a regular basis.

Nutrition

Make sure to eat a well-balanced diet. Include protein, vitamins and iron (note: using a blender or chopping food does not change the nutritional value of the food). Try to drink six to eight cups of water daily. Hydration is essential for healthy skin.

Inspecting skin

Daily skin inspection will provide early detection and minimize the effects of any skin tissue damage. Inspect the entire body, focusing on the bony areas which are more



susceptible to break down. When using new medical equipment and devices, check the skin frequently to monitor for irritation or damage. Pay special attention to areas that were previously injured and healed areas. Scar tissue breaks down more quickly than unharmed skin tissue.

Look for redness, blisters, rashes and any openings in the skin. If a reddened area is identified, use the back of the hand to feel for heat. The groin area is particularly susceptible to skin problems, particularly in men who wear external catheters.

Common skin conditions

Specific skin conditions that may arise include:

- Pressure ulcers/pressure sores develop when someone cannot re-position themselves and lie or sit in the same position for long periods of time.
- Cuts or burns, due to the decrease in ability to feel something sharp or hot.
- Cuts and bruising may occur as a result of bumping objects due to impulsive or quick movements.
- Skin irritation/rashes are often related to restlessness and constant rubbing of a body part against an object (such as rug burn).
- Skin breakdown due to bladder and/or bowel accidents causing irritation.
- Generalized unhealthy skin care practices due to cognition deficits and forgetfulness to perform daily care activities. Examples include insufficient bathing and washing.

Relieving pressure

When a patient is lying down, avoid any pressure to the heels. Bony areas of skin, including heels, are especially susceptible to breakdown. It is common to position pillows beneath heels when in bed to help this. While not as common as heels, ankles and hips are also more susceptible to breakdown.

While lying on the side, do not rest one leg on top of the other. The top leg should be forward while the bottom leg is behind. Place a pillow between the knees to help relieve pressure.

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Lying on the stomach can be done by lying completely on the stomach or at a tilt. If a patient has a feeding tube or tracheotomy, he or she should not be positioned on the stomach as this could cause complications.

When sitting in a wheelchair, pressure should be relieved every 30 minutes by having the client lean from one side to the other.

Pressure can also be relieved while sitting by having the client bend at the waist to lift the pressure off the bottom. This technique should only be used with someone assisting the client.

As the largest organ of the body, it is essential to take good care of the skin and maintain good hygiene. Remember to inspect skin daily, practice good hygiene and maintain a balanced diet. Doing so helps to ensure that the skin functions properly as a protective barrier from illness and germs.

Assessing wounds

By definition, a wound is a physical injury that results in an opening or breaking of the skin. It is important to assess the type of wound, its cause, and its severity, being careful to include any potential environmental influences, size, location and the presence or absence of infection to develop the most appropriate treatment interventions. Serious wounds or non-healing wounds must be evaluated and treated by a health care professional to prevent infection and/or development of serious complications. Additionally, patient factors such as vascular, nutritional, and medical status; odor control requirements; comfort and preferences; and cost (financial and psychological) versus benefit must be taken into consideration to develop a comprehensive approach.

Types of wounds

There are several types of wounds: surgical, traumatic, and chronic wounds. *Traumatic wounds*, the most common type of wound, may be caused by mechanical, traumatic or thermal injury, including contusions, abrasions, punctures, fractures, burns, and frostbite.

The *surgical wound*, induced by surgery, is usually clean and easiest to heal.

By definition, *chronic wounds* may be more difficult to heal, and include pressure sores, diabetic ulcers, arterial ulcers and venous ulcers.

Categories and stages of wounds

Two categories of wounds exist: partial and full thickness. Partial thickness wounds involve the upper or top two layers of the skin. Full-thickness wounds involve a loss of deeper layers

of skin and fat and disrupt the blood vessels and produce a scar when healed.

Wounds are further classified by stage. Stage I wounds are characterized by redness or discoloration, warmth, and swelling or hardness.

Stage II wounds partially penetrate the skin.

Stage III wounds are characterized by the deeper full-thickness wounds that do not extend past a tough white membrane (fascia) that separates the skin and fat layer from the deeper tissues.

Stage IV wounds involve damage to muscle or bone and undermining of adjacent tissue.

Four principles of basic wound care

The following are common principles that need to be performed when caring for any type of wound:

1. Debride (remove dead tissue) and cleanse
2. Maintain a moist environment
3. Prevent further injury
4. Provide supportive dietary nutrients for healing

When a wound is not healing

There are signs when a wound is not healing properly. They include:

- Redness, excessive swelling, or tenderness in the wound area
- Throbbing pain and/or tenderness in the wound area or surrounding tissues
- Red streaks in the skin around the wound or moving away from the wound
- Pus or watery fluid beneath the skin or draining from the wound
- Tender or swollen lymph nodes or lumps in your armpit, groin, or neck
- Foul odor from the wound
- Chills with or without fever

Wound care options

The primary objective in caring for a wound is to heal the wound in the shortest time possible, with the least pain and discomfort and to minimize the potential of scarring. In order to accomplish this, early intervention is vital and encompasses various strategies for healing.

Once a wound is identified and causes have been established, a specialized treatment plan is developed with

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physicians, nurses and other members of the treatment team. Complicated wounds can incorporate alternative wound care treatments including:

- Debridement
- Alleviation of weight-bearing wounds
- Compression therapy
- Antibiotics
- Hyperbaric oxygen therapy
- Whirlpool therapy
- Ultrasound treatment
- Electrical stimulation
- Magnetic therapy
- Therapeutic touch
- Bio-engineered skin grafting
- Edema management
- Non-invasive vascular assessment
- Surgery

In addition to the techniques listed above, patients also benefit from certain whole body wound healing approaches, such as:

- Nutritional assessment and counseling
- Diabetes education and blood sugar control
- Patient and caregiver counseling
- Physical and/or occupational therapy
- Pain management

Hyperbaric oxygen therapy

Approximately 20 percent of wound care patients become ideal candidates for hyperbaric oxygen therapy (HBOT), a medical treatment that uses pure oxygen to accelerate and enhance the body's natural ability to heal.

During HBOT, the patient is placed in a pressurized chamber where he or she breathes 100 percent oxygen for an extended period of time. (The air we normally breathe contains only 19 to 21 percent oxygen.) As a result, high concentrations of oxygen are quickly delivered to the bloodstream. This hastens wound healing, helps fight infections, stimulates the growth of new blood vessels and improves circulation.

V.A.C. Therapy

V.A.C. Therapy promotes wound healing through Negative Pressure Wound Therapy (NPWT) and is a therapeutic technique used to promote healing in acute or chronic wounds, fight infection and enhance healing of burns. A vacuum source is used to create sub-atmospheric pressure in the local wound environment. NPWT is thought to benefit wound healing by:

- Removing wound fluid and desiccated tissue
- Decreasing the level of bacteria in the wound
- Improving blood flow in the wound bed and surrounding tissue
- Promoting granulation tissue
- Pulling the wound edges together and stimulating cell growth

The dynamic interplay of these methods of action are thought to improve the state of the wound and promote healing.

Best practice guidelines for practitioners

Assess wound bed including edges and measure the wound(s) weekly and as needed between dressing changes.

Document and coordinate treatment progress with the physician while looking for changes or developing signs of infection, advancing in stage, increased necrosis, non-adherence to treatment, and others.

Initiate teaching patient/caregiver on wound care and/or foot care techniques.

Stage pressure ulcer correctly and complete the Braden Risk Scale on admission, initiate preventive measures such as turning and positioning, skin care and use of lifting devices. The Braden Risk Scale for Predicting Pressure Ulcer Risk is divided into six risk categories that rate each person's level of sensory perception, moisture, activity, mobility, nutrition and friction and shear.

Assess need, order and instruct in the use of supportive surfaces, such as a special bed, mattress, chair cushion and heel support.

Assess nutritional status and teach the importance of adequate nutrition e.g., protein intake; recommend nutritionist as needed.

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Use **compression therapy** for confirmed venous ulcer diagnosis as ordered by a physician and refers to vascular clinic if indicated.

Evaluate and recommend other services such as physical therapy and follow up as services are ordered. ❖

4 phases to the healing process

The wound healing process consists of an orderly progression of events that are designed to reestablish the integrity of the damaged tissue. Most wounds respond to the body's innate ability to heal; however, some wounds do not heal easily usually due to the severity of the wounds themselves or because of the poor state of the individual's health.

1. Inflammatory phase: The inflammatory phase begins with the injury itself. Here you have bleeding, immediate narrowing of the blood vessels, clot formation, and release of various chemical substances into the wound that will begin the healing process. Specialized cells clear the wound of debris over the course of several days.

2. Proliferative phase: A matrix or latticework of cells forms supporting new skin cells and blood vessels. It is the new small blood vessels that give a healing wound its pink or purple-red appearance. These new blood vessels will supply the rebuilding cells with oxygen and nutrients to sustain the growth of the new cells and support the production of proteins (primarily collagen). Collagen acts as the framework upon which the new tissues build and is the dominant substance in scar formation.

3. Remodeling phase: This begins after two to three weeks. The framework made of collagen makes the tissue stronger. Blood vessel density becomes less, and the wound begins to lose its pinkish color. Over the course of six months, the area increases in strength, eventually reaching 70 percent of the strength of uninjured skin.

4. Epithelialization: This is the process of laying down new skin or epithelial cells forming a protective barrier to protect against excessive water loss and bacteria. This layer begins to form within a few hours of the injury and is complete within 24-48 hours in a clean, sutured (stitched) wound. Open wounds may take seven to 10 days because the inflammatory process is prolonged, which contributes to scarring. Scarring occurs when the injury extends beyond the deep layer of the skin.

Wound Care Products

The variety of available wound care products can be overwhelming. There are 13 different categories of products to care for wounds. No single skin or wound care product provides an optimum environment for skin health or healing all wounds. To save time, the most common wound care applications will be discussed here. The dressing should provide a moist healing environment and thermal insulation, and protect the wound from secondary infection. It should also remove drainage and debris from the wound.

Alginates:

Alginates absorb exudates (drainage) and are not used if the wound is dry. Alginates, developed from brown seaweed, form a gel in the base of the wound at the time it touches the exudate. They can be used for longer periods of time when treating pressure ulcers. Their advantage is their ability to mold to the wound, absorb the exudate and keep the wound moist. Additionally, they are easy to use. These dressings tend to be expensive if used in large wounds. Some alginate examples are Sobrbsan, Curasorb and Medihoney. Alginates should be covered with a secondary dressing and should not be used with a Hydrogel (another type of product).

Antimicrobials:

These are supplied from various product lines and include cleansers, creams, and ointments.

Hydrogels:

These dressings provide moisture to a dry wound bed. They are useful in softening eschar (scab) and cooling painful wounds. These work best in Stage III and IV wounds, abrasions, and burns. Their advantage is to provide hydration to non-viable tissue to promote debridement. Hydrogels facilitate wound repair and epithelization. They are not recommended for wounds with heavy exudate. Hydrogels will dehydrate if they are not covered and can cause maceration around the wound edges. Examples include: Solosite, DuoDerm Hydroactive Gel, NuGEL, Dermagran. These should be changed three times weekly but only if the wound remains wet. Protect the edges of these wounds with a secondary dressing.

Collagen:

Collagen products promote granulation. Collagen should be used for partial/full thickness and tunneling wounds with minimal to heavy exudate, skin grafts, donor sites and granulating wounds. These absorb exudate, are easy to mold

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and remove and can be used in infected wounds. Collagen should not be used in third degree burns or eschar.

Hydrocolloids:

Hydrocolloids are occlusive (closed) wafers that cover the wound, protecting it from oxygen, bacteria and fluids. They should be used on intact skin or newly healed wounds. Hydrocolloids should not be used with infected wounds or wounds with heavy exudate. They should be changed every three days but may be left in place up to seven days. Warm them before use to help them conform to the wound area. Do not use hydrocolloids on a diabetic wound. The most common example of a hydrocolloid is DuoDerm.

Transparent films:

Two transparent films are Tegaderm and Opsite which provide a moist environment and promote autolysis while protecting the wound from mechanical trauma and bacterial invasion. These dressings are used on non-infected wounds, blisters, eschar and necrotic (dead) tissue. Their biggest advantage is the ability to see the wound base while providing water and bacteria resistance. They cannot be used in a high moisture environment and their adhesive can cause stripping of the surrounding skin.

Gauze dressings:

Gauze is the most cost effective of all dressing choices as well as the most readily available. It may be impregnated with different substances; sodium chloride, iodine, petroleum, and bacteria-killing substances. One such product; Kerlix with PHMB is effective against Methicillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant enterococcus (VRE) and Acinetobacter Baumanni (MDRAB).

Prescription products:

Depending on the wound, prescription products may be necessary to promote healing. Products like Santyl, Accuzyme, Regranex, Xenaderm, Optase Gel and Granulex are a few examples.

Santyl is the only enzymatic debrider listed on the 2008 CMS Formulary for Medicare Part D plans. It has the ability to digest collagen in necrotic tissue.

Accuzyme does not harm viable tissue.

Regranex contains a platelet-derived growth factor best used for diabetic foot ulcers.

Xenaderm is made with Trypsin, Balsam Peru and castor oil, stimulates circulation and has mild anti-bacterial action.

Optase Gel is the gel form of Xenaderm.

Granulex Spray stimulates capillary beds of chronic wounds and uses a mild debriding agent.

Additional Products:

Abdominal dressing holders and binders

Tapes and closures

Wound pouches

Wound cleansers

Skin sealants

Composites

Specialty absorptive

Foam

Elastic bandages

Compression bandage systems

nutritional Supplements:

Centella

Aloe Vera

Arginine

Glutamine

Zinc

Copper

Superoxide Dismutase

Vitamin C

Vitamin B5

Vitamins B5 and C in combination

Bromelain

Curcumin

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