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Wound Care



Objective:

1. Differentiate between acute and chronic wounds
2. Identify the three stages of wound healing
3. Recognize the role of prompt recognition and treatment of wounds
4. Identify high risk factors that can delay wound healing
5. Recognize the role nutrition plays in wound healing
6. Differentiate between various dressing types and indications
7. Describe the wound measurement process
8. Review the signs of infection in a wound

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The assessment and treatment of wounds has become a specialty field in healthcare in the past several years. It is important for all healthcare professionals who have contact with patients to understand some basic concepts for wound care to assist in the proper diagnosis and treatment of wounds. As our patient population ages we find more opportunities to impact the care delivery system in the field of wound management. The economic impact of wounds in the health care system is startling, estimated to be approximately 6 billion a year in pressure sores alone.

Compounding the situation is the health insurance industry's reluctance to reimburse health care facilities for the associated costs of pressure sores that have occurred while hospitalized (hospital acquired). This review will focus on the assessment, documentation and treatment of wounds.

The skin is the protective barrier that provides the internal body with protection from the outside elements. Any break in the skin results in a wound. Wounds can be caused from accidents, burns or surgical procedures. The skin is the largest organ in the body and while its primary job is to provide protection, it also provides several other important functions for the body such as:

✓ Temperature Regulation –

Also called thermoregulation, the skin is a major player when it comes to regulating the body's temperature by constricting and expanding the blood vessels found on the surface of the skin to control how much heat is lost from the body. Shivering is the body's attempt to maintain heat while sweating helps to allow heat removal from the body.

✓ Sensory Perception –

In addition to blood vessels, the skin contains nerve endings, which allow a person to touch and feel pressure and experience both pain and pleasure. It further protects the internal body by acting as a warning mechanism when we encounter things that can be dangerous to the body such as a hot stove.

✓ Absorption and Excretion –

The skin has over 2 million pores that carry water and other products out of the skin and on to its surface. Approximately 500 ml of water is lost through the skin daily. This is important because it assists the body in maintaining temperature control and proper fluid and electrolyte balance. And while the skin can easily secrete excess fluid it also absorbs certain substances and deposits them in the bloodstream. This is why certain medications such as nitroglycerin and some pain medications work well when applied to the skin directly. The skin manages to allow substances to pass through it in both directions while screening them properly in response to the needs of the body.

✓ Vitamin D Synthesis –

When exposed to sunlight, the skin produces vitamin D through a photochemical reaction. This is important because vitamin D is necessary to efficiently metabolize calcium and phosphate, which are two major components in healthy bones and teeth.

Skin is composed of three layers that work together to function together as a single unit. The layer on the outside is called the **epidermis**. New cells are formed at the bottom of the epidermis and take about 2 weeks to travel to the top of the epidermis layer to provide a layer of new cells at the surface. They replace the current layer of surface cells as each minute of the day we lose about 30,000 - 40,000 old dead skin cells. The skin that is visible to the human eye is actually dead skin cells that are waiting to be replaced.

The next layer down is called the **dermis**. The dermis contains nerve endings, blood vessels, oil and sweat glands. The nerve endings are responsible for sensation and work with the nervous system to transmit messages to your brain. This is the area that defines whether something is hot, cold, rough or smooth.

Nerve transmission is a safety feature that protects us from injury when encountering dangerous stimuli. The dermis also contains the oil glands, which lubricates and protects the skin. Collagen and elastin fibers are also found in this layer, which allows the skin to stretch and then return to its original shape.

The **subcutaneous** layer is mostly comprised of fat and helps the body to stay warm and absorb shocks when you bang into something. This is the layer that actually attaches the skin structure to the tissues and muscles that lie underneath it. Hair follicles originate in this layer, form roots and then travel up through the dermis to the skin. It is the sebaceous gland that attaches to the hair follicle and provides the hair with shine and a slight waterproofing quality. Believe it or not – this fatty layer of skin comprises about 15-20% of a man's overall weight and 20-25% of a woman's weight.

Basically, a wound is classified as dirty or clean. A clean wound is one that has occurred as a result of a surgical procedure, usually under sterile conditions. A dirty wound therefore is one that has occurred due to an accident, trauma or otherwise unsterile incident that has caused a break to the skin. Regardless of how the wound has happened, the healing process is basically the same and depends on the extent of tissue damage, the person's age, nutritional status and overall physical condition of the individual.

Most superficial wounds heal by primary intention, which is a process in which the skin's outer layers grow together to close the wound. These wounds involve only the epidermis and because there is no underlying tissue loss and minimal risk of infection to the affected area, healing will take place in about 5-10 days. It is unusual to have a resulting scar from wounds that heal through primary intention.

Wounds that have tissue loss and edges that are not neatly approximated take longer to heal through secondary intention, which involves filling of the wound with granulation tissue, and then closure occurs as the wound edges pull together over the granulated tissue. These wounds often result in scarring and take longer to heal. Examples of wounds that heal through secondary intention include burns, traumatic injuries, pressure ulcers and dehiscent surgical incisions. The wounds are allowed to heal gradually over time without suture placement. In addition to taking longer to heal, these wounds often have a higher rate of complications such as infection.

Tertiary healing occurs when wounds are intentionally kept open to allow the underlying tissue structures to heal first from excessive swelling or the presence of infection or exudates removal. After the underlying tissues are clear, the wound is then surgically closed with sutures or staples. These wounds, when finally closed, often result in scarring.

Regardless of what type of wound is present healing typically takes place in the following four stages:

1. Homeostasis
2. Inflammatory
3. Proliferative
4. Remodeling

Homeostasis –

The initial stage after the skin is broken consists of vasoconstriction of the vessels to the affected area. This action helps to minimize blood loss from the wound by utilizing platelets and fibrin to form a clot and to start to close the edges of the wound together, if possible. This initial response is what keeps people from bleeding to death from simple wounds.



Inflammatory Phase –

Begins shortly after injury and lasts for 2-5 days. In this phase, vasodilatation occurs and causes increased capillary permeability, which allows plasma to leak into the tissue that surrounds the wound. Monocytes and neutrophils are transported to the injured tissue and help to kill bacteria in the affected area. Histamine is also released which causes the vessels around the injury to become porous which allow the tissue to become edematous and draws water to the area. T-cells that secrete cytokines also increase the inflammatory process by enhancing vasodilatation and vessel permeability. T-cells help to boost the activity of macrophages, which help to push the wound healing process into the next phase by creating granulation tissue and laying down a new cellular matrix.

Proliferative Phase –

Depending on the extent of the injury, this phase can last from 3 days post injury to 3 weeks. Wound granulation starts when the inflammatory response subsides, although the 2 phases often overlap. Macrophages and fibroblasts work together to create a network of collagen fibers that support new tissue growth. The collagen bed will fill in the injured tissue area and enhance the growth of new capillaries. This granulated tissue will continue to grow until the wound bed is covered. Fibroblasts start to pull the edges of the wound together and new epithelial cells migrate from the surrounding intact skin to grow over the newly granulated tissue. It is in this stage that the rebuilding of the tissue starts and it requires the wound to remain moist for optimum healing at this time. At this point the wound looks red and granular and the underlying structures are protected but this new tissue remains very fragile and can bleed easily with slight injury.

Maturation/Remodeling Phase –

This is the final stage of wound healing and usually lasts from 3 days to three weeks, although it may take longer in an extensive wound. During this phase, collagen is modified and strengthened as it aligns along the tension line. What eventually remains, after healing occurs, is scar tissue, which is only 80% as strong as the original healthy tissue. The scar tissue will always be less elastic than the surrounding tissue and often does not contain hair or sweat glands.

The healing process is complex and many different factors will affect the progression of wound healing. Issues that affect healing include:

- ✓ Nutrition
- ✓ Age
- ✓ Infection
- ✓ Chronic health conditions
- ✓ Smoking
- ✓ Medications

Experts would agree that **nutritional status** is probably one of the most important factors in the healing process. The incidence of malnutrition is higher than you would think. Approximately 30-50% of adult patients are found to have indicators of poor nutrition with the elderly having the highest incidence of malnutrition. Malnutrition also delays wound healing and increases the risk for other complications such as the development of pressure ulcers. Protein is essential for proper healing and intake should be increased ensure adequate collagen formation and albumin production. Low protein levels will cause wounds to heal very slowly, if at all.

Other nutrients that are important to the healing process are vitamins A, C and E as well as zinc and iron. Extreme weight loss can affect healing and often needs to be partially regained before healing can even start.

Many **elderly** patients experience delayed wound healing due to nutritional factors in addition to other **chronic conditions** such as diabetes or heart disease. It is estimated that over 80% of elderly individuals have one or more chronic illnesses and they are also more prone to skin breakdown.

Elderly individuals should be encouraged to eat a nutritious diet, stay well hydrated and avoid sitting or

lying in one position for long periods of time to promote good wound healing. It is important to remember that once a wound is healed in the elderly, it will not be covered by strong tissue due to age related thinning of the skin and is easily prone to re-injuries.

The presence of **infection** is another factor that will influence the speed in which healing occurs. It is easy for a wound to become infected because the tissue is open to the environment and not protected against the invasion of bacterial organisms. Signs of infection include redness, swelling, fever or pain to the affected area. Drainage may or may not be present but prompt medical attention is indicated when infection is suspected.

Smoking also delays wound healing because of the reduction of circulating oxygen in the bloodstream. Good oxygenation is crucial for wound healing because it provides the wound and surrounding tissue with essential nutrients necessary for optimal healing.

It is always important to take an inventory of **medications** that are taken by the patient to ensure that none of them are interfering with the healing process. Sedatives, pain medications and steroids may delay wound healing and will need close evaluation to determine if they are indicated during the acute stages of healing.

Most simple wounds (acute) heal easily and without complications. Some examples of acute wounds are abrasions, simple lacerations and superficial burns. However, some wounds take longer than normal to heal and will require more advanced treatment. These wounds are considered to be chronic wounds. Some examples of chronic wounds include:

- ❖ Pressure ulcers
- ❖ Vascular ulcers (venous and arterial)
- ❖ Diabetic foot ulcers

Pressure Ulcers are also known, as bedsores are the result of prolonged pressure on the skin. They most often occur on areas that cover prominent bony sections. They are commonly found on the sacrum, hips or heel areas. In hospitalized patients, pressure ulcers occur in approximately 10% of the overall patient population. These ulcers often add about 20,000 dollars on to the patient's hospital bill and insurance companies are becoming increasingly reluctant to provide reimbursement for ulcers that are acquired in the healthcare setting. Whereas 10% of hospitalized patients develop pressure ulcers, the incidence in long-term care facilities is known to be as high as 28%. The cost of treatment for pressure ulcers in the United States is estimated to be over 6 billion dollars annually.

Pressure ulcers are classified according to the following 4 stages:

- ✓ Stage 1: The skin is still intact although visible redness is evident over a bony area. This redness may also be accompanied by a sensation of warmth, tenderness or itching.
- ✓ Stage 2: Results in a shallow open ulceration with a pink center. It may also appear initially as an intact or ruptured blister. (Partial thickness)
- ✓ Stage 3: This stage reveals a full thickness wound that presents with tissue damage that extends through the subcutaneous layer but not to the underlying fasciae. Undermining of adjacent may or may not be present.
- ✓ Stage 4: This stage involves extensive tissue loss accompanied by necrosis and damage to the underlying structures like muscle and tendons. These wounds often present with extensive tunneling or undermining as well. The risk of osteomyelitis (infection of the bone) is also greatly increased at this time.



Individuals who have a pressure sore should be counseled to avoid additional injury to the area and not to massage the skin on or around the ulcer and not to use donut shaped cushions, which will cause more skin damage. Prevention of pressure ulcers can be accomplished by turning a patient every 2 hours, providing a well-balanced diet with adequate protein and keeping the skin clean after exposure to urine or stool has proven to decrease the incidence of ulcers.

Vascular ulcers are classified as either arterial or venous in origin. Arterial ulcers occur due to a complete or partial occlusion of blood flow. These painful ulcerations may be accompanied by a weak or absent pulse to the affected extremity. The skin often feels cool to touch and delayed capillary return time is evident. The skin on the extremity appears, shiny, dry and thin. Although these ulcers can be found anywhere, the most common location is the dorsum (top) of the foot.

Venous ulcerations are the most common type of ulcer that affects the lower extremities. They are found in approximately 70% of chronic lower extremity ulcers. Venous ulcers can occur in people with superficial or deep vein insufficiency. Venous insufficiency eventually causes venous hypertension in the legs and this is what causes the ulcer to develop. Some common skin changes that might be indicative of venous insufficiency include:

- ✓ Edema of the foot or lower leg
- ✓ White plaque looking spots on the leg that are surrounded by areas of hyperpigmentation
- ✓ Eczema

Individuals with venous insufficiency tend to have discolored skin present in the affected leg. This area of hyperpigmentation is due to red blood cells, fibrin and fluid leakage into the tissues and is often present even without evidence of ulceration. Venous ulcers are found from the mid-calf area to the ankle. They are most commonly found on the medial area of the ankle and may extend around the leg. The ulcer is usually shallow with dry, crusty borders. They tend to heal very slowly and have a tendency to recur unless the underlying problem (venous insufficiency) can be corrected.

Diabetic foot ulcers are a complication found in people that have diabetes. Elevated blood glucose levels can, over time, damage the nerves and the blood vessels making some individuals more prone to develop these types of ulcers. Diabetes is sometimes called “small vessel disease” because the narrowing of the blood vessels (arteries) leads to tissue ischemia and necrosis and plantar ulcerations. Diabetics are instructed to maintain a tight control on their blood sugar, exercise, lose weight and avoid smoking to reduce the risk for small vessel disease. If ulcerations are present, they are most likely found on the plantar area (bottom) of the foot.



Simple wounds can often be cared for at home, by cleaning the area with a mild soap and water, applying an antibacterial ointment and covering it with a band-aid or a simple bandage. Bleeding can be controlled by applying direct pressure to the wound and, if necessary, elevation of the area to above the level of the heart. If the wound is deep it will be necessary to seek medical care. Sooner is better than later because if a wound is older than 6-12 hours, it might not be sutured because of the increased risk of infection. A tetanus shot may be indicated if the wound is a dirty one (booster is needed within 48 hours). Wounds that are caused by an animal or human bite should always be evaluated by a healthcare professional. It is estimated that 100% of human bites become infected followed by 50% of dog bites and 80% of cat bites. Unknown source animal bites are also a consideration for rabies immunizations.

Chronic wounds need to involve a treatment plan to ensure that the best possible care is being administered to encourage healing. The wound plan is specific to the patient and will take into consideration the individual profile (age, mobility and the presence of chronic conditions such as diabetes or vascular insufficiency). Nutritional status will be closely evaluated with necessary additions of proteins or vitamins and minerals to enhance an optimal wound healing environment. Although the type of care that is needed to heal a wound will vary depending on the source, many common factors are found in overall wound basics. It is important to remember that good handwashing is one of the essential elements of wound care. Hands should always be washed prior to dressing changes; gloves need to be worn during the procedure and then hands should be washed after the removal of gloves. In order for handwashing to be effective, hands should be washed for a minimum of 15-20 seconds – using an antimicrobial soap and good friction. Always rinse under running water with fingers pointed downward. In addition to good hand hygiene, assessing the wound and proper documentation, the following elements are basic concepts of wound management:

Assemble your supplies- after confirming your patient's identity; gather the supplies that you will need to get the job done. Once the wound is exposed it is easier to run the procedure by having the necessary supplies at the bedside. The supplies often used include:

- ❖ Workspace table
- ❖ Tape or gauze netting
- ❖ 3 pairs of gloves (may be sterile or unsterile-depending on the wound)
- ❖ Personal protective equipment (gowns, face shields etc.) depending on the task
- ❖ Cleansing solution – usually sterile saline
- ❖ Antiseptic solution, if ordered
- ❖ A bowl – sterile or unsterile, depending on the wound.
- ❖ Sterile 4x4 gauze pads
- ❖ Bandage scissors
- ❖ Wound measurement device
- ❖ Foam tip applicators
- ❖ Plastic trash bag




Put on the first pair of gloves and work at gently removing the old dressing. Start by finding a corner of the dressing and gently loosen it from the skin while applying slight pressure to the skin next to the tape. If the dressing is stuck to the wound, apply some sterile saline to the dressing to assist with removal. Take the soiled dressing and discard it into the trash bag. Remove your gloves, discard them and wash your hands. Apply the second pair of gloves and assess the wound.

Wound Assessment:

Proper assessment of a wound is necessary to document the progress of a wound through the healing process. As a healthcare provider this documentation also reflects that the correct medical interventions are being carried out and becomes a legal reference for chart review. When available, a photograph should also accompany the documentation process.

Some wound specific cameras also include a grid overlay area, which is helpful to measure wound dimensions accurately. In addition to photography the following information will need to be included in the assessment of the wound:

- Location – Note the exact location that the wound is found on the body. Some common areas include the sacrum, heel, and shoulder. Also document whether it is located on the anterior, posterior, medial or lateral surface area.

- Dimensions – This is the actual measurement of the wound surface. Common methods of measurement include a flexible ruler or a disposable tape measure. These tools should only be used for one patient and never carried into other rooms to prevent cross contamination of the measurement device. The first measurement is to be taken across the longest section of the wound and is labeled as length. The second measurement is width, which is recorded as the longest measurement perpendicular to the length measurement. If the patient has multiple wounds, do not cross contaminate the wounds by using the same ruler, gloves or other implements such as cotton swabs etc. Depth is also included in these measurements and is obtained by placing a flexible foam tipped device into the deepest part of the visible wound and then marking the area that meets the skin. The distance from the mark to the tip is then measured and recorded for tracking purposes.
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- Tunneling – Also known as undermining, these are extensions of the wound that are found in the surrounding tissue. The measurement of these areas is accomplished by carefully inserting a foam tip into the tunnel to the end of the area, mark the stick and measure as you would for depth. Large tunnels may be palpated with a gloved finger, if necessary to record the depth of the tunnel.
- Drainage – The evaluation of drainage starts with inspection of the dressing as it is removed. Observe the drainage and estimate the amount that is present according to heavy, moderate or light. Note if any color is present in the drainage and note the characteristics present such as bloody, purulent, or serous. If the drainage has yellow or green color, a culture may be indicated, as these colors are usually indicative of an infection such as staphylococcus or pseudomonas. Also note the texture of the drainage (thick, thin, creamy etc.)
- Odor - Usually a wound that is not infected and clean will not have a strong odor associated with it. If a smell is present, document the type of odor that is associated with the wound. Also note if the odor subsides with wound cleaning. If the odor is one that lingers, use an odor eliminator in the area to prevent embarrassment to the patient.
- Margins – Wound margins are the areas surrounding the wound bed. It is important to evaluate these areas for color and texture. If healthy skin is surrounding the wound it will be smooth and light pink colored. If the skin is white and blanched it often indicates too much moisture is present in the wound and will require a more absorbent dressing or a protective barrier to be applied to the skin that is surrounding the wound. Red skin may be a sign of ongoing tissue inflammation from pressure to the area or trauma from tape being applied and removed daily to the surrounding skin area. Gently palpate the skin to determine if it's soft or hard. Hardness (indurations) often signals the presence of infection to the tissue.
- Moisture – Wounds should be somewhat moist, not wet. *If they are too dry they cannot heal*, as the healing cells will not be able to move freely across the wound bed.

Other information that is important for documentation purposes are whether the wound is consists of **partial thickness** or **full thickness**. The depth of the wound is what provides this information. A partial thickness wound tends to involve the superficial layer of the epidermis only or shallow extension into the dermal layer. Because of the limited depth involvement, they tend to heal quickly and rarely become infected. They do need to be initially covered and kept clean to prevent infection to the wound. Full thickness wounds completely penetrate through the layers of the skin into the underlying tissue. These wounds often expose muscle, fat or bone, take longer to heal and are more prone to infection.

Documentation tools vary according to facilities but they need to be utilized when treating a wound. This documentation becomes a legal part of the chart and often indicates to the third party payment sources that the correct treatment is being monitored and provided to the client. The physician to assist with the treatment plan also reviews these tools. Any complications such as infection or drainage needs to be noted on the documentation tool to provide information to the team and assist with early intervention directed towards optimal wound healing.

After the assessment is completed the wound should be cleaned with the sterile saline solution. Apply the solution to sterile gauze pads and clean from the least to the most contaminated areas. Wipe the area gently and discard the pad while using a clean one with each wipe of the area. You may wipe in a circular or linear motion until the wound appears clean.

When the wound is clean, wash your hands, apply clean gloves and measure the wound. Assess the area for tunneling or undermining and reassess the overall status of the wound. If necrotic (dead) tissue is present it will have to be removed by debridement. This is only to be provided by wound care nurses or physicians who have received specialized training in debridement.

Debridement; the first phase of chronic wound care, is the removal of necrotic tissue, gangrene, and residual material from dressings and other foreign debris. Autolytic debridement supports the body's own capacity to dissolve necrotic tissue combined with dressings that concentrate and encapsulate white blood cells and enzymes in the wound bed. One drawback to autolytic debridement is that patients with compromised immune systems may be unable to control the bacterial overgrowth under these dressings. In addition, wound healing takes longer if there is a large amount of nonviable tissue.

Biochemical/mechanical debridement: employs enzyme preparations to dissolve the necrotic tissue. Mechanical debridement involves applying moist, coarse-mesh gauze to the wound and allowing the dressing to dry, which is also known as a wet-to-dry dressing. Necrotic tissue adheres to the dressing when removed. This debridement method is painful and should be discontinued when the wound begins to granulate or form a pebbly surface that results from capillary and fibroblast proliferation in the second phase of healing. The aptly named "sharp debridement" method is the surgical dissection of necrotic tissue from viable tissue with a scalpel or scissors. It is the most rapid form of debridement. Procedure time should not exceed 20 minutes, as this is often an uncomfortable or painful process. For example, in one cleansing technique, the wounded area is placed in a tepid temperature (80-92 degrees) whirlpool. The swirling water softens any necrotic tissue, making it easier to remove with the sharp debridement method. Keep in mind these procedures are often painful and often must be done daily. The administration of prescribed pain medication is very important to the patient for their comfort during this phase of healing.

Check for any signs of **infection**, which include redness around the outer edges of the wound, increased exudate, pus, foul odor, green or yellow drainage and pain. A fever may also be present so it is important to record all vital signs, including temperature prior to the procedure. Chronic wounds easily and often become infected and prompt recognition and treatment of infection is essential to facilitate the wound healing process. To confirm the type of bacteria that is present in the infection, a culture of the wound drainage will need to be obtained. The most common way to obtain a culture is with a sterile culture tube. While wearing gloves, rotate the tip of the culture swab in a circular motion in the wound and return the swab immediately to the culture tube and ensure the proper labeling of the container. Other measures for obtaining specimens include needle aspiration of the wound fluid or punch biopsy procedure. These advanced specimen collection practices are only to be performed by wound care specialists or physicians after obtaining consent from the patient.

Finally, the wound is ready to have a dressing applied. Remove your gloves, wash your hands and put on another pair of clean or sterile gloves. There are many different types of dressings available for wound care and a careful evaluation of the specific characteristics necessary for healing will determine the kind of dressing that will be utilized. Often wound care orders will take the guesswork out of the process and the following is an overview of the different products that are available on the market. Supplies will need to be sterile if the procedure is to be performed using aseptic technique.

Gauze Dressing:

This type of dressing is best suited for a wound that has minimal drainage. It will serve to *protect the wound* from injury while healing and *prevent bacteria* from getting into the site. This dressing consists of sterile gauze pads that vary in size. The gauze pads should be moistened with sterile saline and carefully laid over the wound surface. The gauze does not need to be tightly packed into the wound – lighter is better. Fluff the top layer of pads over the wound and secure the dressing with tape. This dressing will need to be changed often so that the wound does not dry out, but rather remains moist.



Transparent Film Dressing:

These dressings are generally used for *superficial or partial thickness wounds*. They are clear so that the wound can be examined daily, without having to remove the dressing to do so as these dressings are typically left in place for three to five days. They don't hold up well with wounds that have heavy drainage, as they are not absorbent. Select a dressing size that will overlap the edges of the wound by 1-2 inches. Gently lay the dressing over the top of the wound and apply pressure to the edges to adhere it to the surrounding skin. Be careful not to allow the dressing to wrinkle and do not stretch it tightly across the wound bed. The edges may need to be sealed with tape to prevent them from curling up. Once the dressing is applied, it should remain in place for 3-5 days unless fluid has accumulated under the area or it is no longer adhering to the skin.



Hydrocolloid Dressing:

These dressings contain a gel-forming agent similar to gelatin. This gel is combined with polyurethane foam to create a waterproof barrier. They also keep bacteria out of the wound surface. They have become a popular choice because they are flexible and adhere to wet or dry wounds. Unlike transparent film



dressings, the hydrocolloid dressing can *absorb drainage and provide a protective barrier* that will not allow bacteria to enter the wound from the outside environment. Lowering the pH inside the wound bed further diminishes bacterial growth. They are easy to apply; waterproof and actually helps to keep the wound clean by encouraging debridement of the area. They also can be left in place for 3-5 days and do not tend to cause surrounding skin damage when removed. When choosing this type of dressing, one that overlaps the wound by 1 inch is preferred. Remove the paper backing and apply it to the wound. Then place your hand over the wound to adhere it to the site. The edges of this dressing may also need to be taped for added stability. This dressing should be left in place unless the patient complains of pain or there is too much drainage present for the dressing to absorb. If this is the case, another more absorbent type of dressing should be applied.

Alginate Dressings:

These absorbent dressings are actually made from brown seaweed and may be used on multiple wound types. The calcium and other minerals are processed from the seaweed and transferred into the nonwoven dressing material. *Alginate dressings can absorb up to 20 times their weight*, depending on the type of seaweed used in the compound. As they absorb the fluid content from the wound, a gel forms that promotes healing. They are available in flat form (wafers), or rope form. They are applied to the wound directly and require a cover dressing to be applied over them. They are easy to use and cost effective as they are typically left in place for 3-7 days. They are best utilized on wet, draining wounds and are generally contraindicated for dry wounds because the fibers will stick to the new growth skin cells and aggravate the wound bed. When used for wet wounds, assessment will be needed to note the point at which the drainage decreases and it will be necessary to switch to another dressing type to continue with optimal healing. After removing alginate dressings the area will need to be irrigated with normal saline to clean the wound and remove any fibers from the wound bed. A silver impregnated alginate dressing may be used for wounds that are infected.



Hydrogel Dressings:



These dressings are used when a wound needs to have *moisture applied* to the affected area. They are used to hydrate dry wounds and to soften and loosen necrotic (dead) wound debris. They can be used for many types of wounds including pressure and vascular ulcers. Because they provide moisture to the wound, they are noted to have soothing and cooling properties. They are also popular choices for skin tears, dermabrasion procedures and radiation burns. Another benefit of hydrogel dressings is that they can be used with other topical or antibiotic agents. These non-adherent dressings are available as sheets, gels, or saturated gauze pads. They are applied to the wound site, covered with a secondary

dressing and may require tape to secure the edges. Once again, these are not to be used with wounds that are draining heavily. They are usually changed daily although the sheets that contain hydrogel may be left on for 2-3 days.

Foam Dressing:



Foam dressings are a *very absorbent* and one of the most adaptable dressings available. They are used on wounds that have a moderate to high drainage rate. They may also be used as padding to *provide protection over bony prominences* or skin areas of high friction. They should not be used on dry wounds, as they will cause irritation to the newly forming skin. They are available in many different sizes and shapes. The foam dressing is applied directly to the wound bed, making sure to put the foam side against the wound bed. They can be cut to fit the size of the wound and are often left in place for up to 7 days. The dressing usually requires tape or netting to secure them to the site, although some of the

newer foam products are coming on to the market with adhesive borders. Removal is easy and painless, as the foam does not stick to the site.

Keep in mind that you will need to wear personal protective equipment when doing wound assessments and during dressing changes. The type of personal protective equipment you will need will depend on the type of pathogens or fluids that you may be exposed to during these procedures. You must ALWAYS wear your gloves but you may also need to wear a gown or have a face shield or goggles available if you suspect that

any splashing may occur. If dressings are wet with body fluids when removed, they should be placed in red biohazard bags for disposal. Good hand hygiene practices will help to protect you from infection while changing or applying a dressing and it will also help to protect the patient from any unwanted pathogen invasion into the wound tissue.

A successful wound-healing program has a tremendous impact on a patient's overall well-being and quality of life. A chronic, non-healing wound is one of the more difficult challenges a person can face. Healthcare professionals can help patients to overcome these obstacles by being educated and proficient in the various aspects of wound management. The treatment decisions must be patient centered to reflect the patient's goals and overall outcome. The treatments and approaches in this education article were created on evidence based research and are a reflection of currently accepted practices but will need to be tailored according to physician preference and individual client needs.