“Expert Wound Solutions: What Treatment Should I Order?
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Learning Objectives: Upon completion of this program, the participant will be able to:
- List 5 valuable rules for required for wound healing.
- Select treatment options based upon wound base characteristics, etiology, and goal of wound care.
- Describe 3 options for difficult to dress wounds

I. The Wound Problem
   A. It is estimated that more than 400 million people worldwide have wounds of various etiologies.¹
      1. In the United States alone, chronic wounds affect approx. 6.5 million patients.²
      2. 1.7 million People developing pressure ulcers each year.²
      3. There are currently 2.5 million people in the U.S. with a Venous Leg Ulcer²
      4. 2.3 million diabetics suffer from diabetic foot ulcers²

II. Wound Healing
   A. How wounds heal
      1. When the skin gets injured, the body springs into action to heal the wound.
         a. First, the body works to limit blood loss by reducing the amount of blood flowing to the wounded area. Proteins in blood, such as fibrin, work with the blood platelets already in place and plasma to form a protective covering called a scab.
         b. While the skin regenerates underneath the protective layer, the scab protects the wound from outside infection.
      2. If the cut or scrape was a shallow one that only affected the outer epidermis layer, then there will not be a scar when it heals. Starting at the edges of the wound, the new tissue forms, and works its way toward the center until it has covered the entirety of the lesion.
      3. If the cut went deeper, into the dermis of the skin, then the body moves to create fibrous scar tissue to fill in the wound. This fibrous tissue (granulation tissue) fills in from the bottom of the wound up toward the top of the wound. At the same time new tissue (epithelial tissue) forms at the edges and works its way across the top of the wound.
      4. Any interruption of this process will result in a wound that will not heal.
   B. How long to heal a wound?
      1. After the wound is closed, collagen fibers shorten, and become stronger, damaged blood vessels regenerate, more layers of epithelial cells cover the wounded area. The scar tissue will begin strengthening to a maximum of 80% of the original strength of the wounded area. This can take up to 2 years to settle into its permanent appearance.³

III. Five Most valuable rules for wound healing
   A. #1. Determine and Remove the Cause.
      1. Consider Location, Shape, and Tissue Type, Surrounding Tissue, Characteristics, and History.
   B. #2. Keep it Warm
      1. Cells, enzymes function best at normal body temperature. A temp fall (cooling) of 2° C is sufficient to affect biological and healing process of a wound.⁴
      2. Causes of wound bed cooling:
         a. Dressing Change
         b. Loose dressing
         c. Wound left uncovered
      3. How does this happen:
         a. Transepidermal Water Loss
1) Normal evaporation of water from body to the outside.
2) The loss of moisture from any surface by evaporation is accompanied by cooling of that surface; therefore as wound tissues lose moisture, there is local cooling of the wound.
b. Trans-epidermal water loss (TEWL) through intact skin is 42gm of water vapor per square meter of skin every day.
c. Trans-epidermal water loss (TEWL) through skin with top layer of stratum corneum removed (e.g. stripping of skin from tape removal) increases to 7,874 gm of water vapor per square meter of skin every day.\(^4\)
d. A dressing change can drop the wound base temp for up to four hours before it returns to normal.
e. An open wound left uncovered will stop healing.

C. #3. Keep it Moist
1. George Winter, PhD, University of London questioned if allowing wound to dry out was the best method of healing.
2. 1962 conducted study by creating multiple small partial thickness wounds on the backs of pigs. Portion of the wounds were allowed to dry out and form scabs, while others were covered with a polymer film.
3. Results: Wounds that had been covered by polymer film, epithelialized twice as quickly as the wounds exposed to air.
4. Wounds exposed to the air result in the escape of moisture vapor from the tissues which causes death of superficial cells (dehydration necrosis) resulting in the formation of a scab composed of dried blood & dead cells.
5. Our body is mainly composed of water, and the natural environment of a cell is moist, therefore a dry cell is a dead cell.

D. #4. Manage the Bacteria
1. Every square inch of the human body has an average of 32 million bacteria on it. When a break in the skin occurs – bacteria move into the wound.
2. The presence of bacteria in a wound can create a burden on the wound healing process as the bacteria compete for the oxygen and nutrients in a wound. The more bacteria in a wound, the greater the effect on the healing process. Bioburden is the number of microorganisms on a contaminated object.
3. Signs and symptoms of bacteria in wounds:\(^5\)
   a. Classic symptoms: Redness, pain, heat, and swelling around the wound; increased or purulent drainage; odor from the wound; or discoloration of the tissues in the wound
   b. Delayed healing
   c. Abnormal odor
   d. Friable granulation tissue
   e. Increased serous exudate
   f. Change in color of the wound bed
   g. Absent or abnormal granulation tissue
   h. Increased pain at the wound site
4. Infection - Invasion of pathologic organisms into healthy surrounding tissue - Lab results 100,000 organisms/ml, (a.k.a. $10^5$ guideline); occurs when bacteria invade healthy tissue and multiply to such an extent that they overwhelm the host’s immune response and result in multiple host reactions. Wound infection should be diagnosed primarily on the basis of clinical signs and supported by microbiological observations. Three (3) or more Signs/Symptoms.

E. #5. Feed a wound
1. Adequate nutrition is needed for all phases of wound healing. Nutrition is also essential for adequate immune system and to fight off infection.
2. Healing of wounds involves the activity of an intricate network of blood cells, tissue types, cytokines, and growth factors. This results in increased cellular activity, which causes an intensified metabolic demand for nutrients.  
   a. Normal healing requires adequate protein, fat, carbohydrates and vitamins and minerals.  
      Deficiencies in any of the nutrients will result in delayed or impaired healing.  
3. Delayed or impaired wound healing occurs if nutritional supplies are lacking due to intake (malnutrition), abnormal absorption (GI tract disease or surgery), and/or increased metabolic demands (draining wounds).  

IV. Topical Dressings  
   A. Choosing the right dressing to suit the conditions of a patient’s wound is vital for optimum healing and quality of life.  
   B. Factors to Consider when choosing a dressing  
      1. Goal  
         a. Heal  
         b. Maintain  
         c. Prevent  
      2. Patient Factors  
         a. Reduce pain  
         b. To produce rapid and cosmetically acceptable healing  
         c. To cause minimum distress or disturbance to the Patient  
         d. To hide or cover a wound for cosmetic reasons.  
         e. Cost effectiveness  
         f. Activity Level  
         g. State of continence  
         h. Mental status  
         i. Known sensitivity to medicated dressings  
         j. Fragile or easily damaged skin  
         k. The need to bathe or shower frequently  
         l. Compliance  
         m. Caregiver  
      3. Wound Factors  
         a. Control odor or drainage  
         b. Add moisture  
         c. Combat infection  
         d. Debridement  
         e. Compression  
      4. Environment  
         a. Formulary  
         b. Safety  
         c. Convenience  
         d. Pressure distribution  
   C. Regularly reassess your patient’s progress. If no improvement has been noted in 2 weeks, reassess the care plan and change it as needed.  

V. Wound Bed Characteristics and Topical Treatment Options  
   A. Red Unbroken Skin  
      1. Goal: Maintain skin integrity  
      2. Rationale: Any break in the skin integrity can cause a variety of consequences including: infection, pain, and complications associated with healing, some of which can be life-threatening.  
      3. Intervention Options:  
         a. Remove the cause.
b. Provide appropriate offloading equipment IE: Heel elevation, support surface, splint, appropriate footwear, padding, securement of medical devices
c. Topical treatments: Transparent dressing, Hydrocolloid, liquid skin barrier film, thin foam.
d. May leave open to air.
e. Do not massage reddened area

B. Beefy Red Granulation Tissue
1. **Goal:** Promote moist wound healing
2. **Rationale:** A moist wound surface increases re-epithelialization, decreased dehydration and cell death (Neutrophils, macrophages, & fibroblast necessary for wound healing; cannot thrive in a dry environment), Increased angiogenesis, enhanced autolytic debridement and decreased pain – moist wound bed insulates and protects nerve endings thereby reducing pain. 
3. **Intervention Options:**
   a. Topical Dressings - Any dressing that supports moist wound healing.
      1) Extended wear dressings – Dressings designed to be used for extended times frames 3-7 days. Examples: Foam, Hydrocolloid, Transparent, Composite Dressings
      2) Dynamic dressings – dressing that make something happen within the wound; for granulated but static wounds. Examples: Collagen dressings, Platelet-derived growth factors, cadaveric skin, and allograft products (cellular and noncellular)
      3) Hydrogel, Impregnated dressings, honey dressings, silicone dressings
   b. Negative Pressure Wound Therapy

C. Fill dead space – Purpose to avoid potential of abscess formation by premature closure of the wound. Full thickness/deep wounds tend to heal quicker from the sides than from the bottom, potentially leaving an empty dead space under the healed wound. This dead space has the potential for infection/abscess to occur.
1. Fill/pack depth of wound to the surface. Packing should touch wound base and sides.
2. Fluff not stuff. Do not pack tightly, as this will cause pressure and impair circulation.
3. Examples: fluff saline moistened woven gauze and place loosely into space, wound filler products, hydrogel impregnated gauze, and alginates may also be used.
4. Determine the need – absorb exudate or hydrate the wound bed.
5. Examples wound fillers: Gold Dust™, FlexiGel™ Strands, PolyMem™ WIC, Allevyn® Cavity

D. Protect peri-wound skin of all wounds with a skin sealant, moisture barrier ointment or barrier wafer to prevent damage from exudate, wound products, & trauma.

E. Slough in Wound Bed
1. **Goal:** Promote debridement.
2. **Rationale:** Devitalized tissue impairs healing because it provides a growth medium for bacteria, increasing the probability of infection. Dead tissue also exudes endotoxins that inhibit the migration of fibroblasts and keratinocytes into the wound. Presence of necrotic tissue prevents formation of granulation tissue, wound contraction and epithelialization.
3. **Intervention Options:**
   a. Topical Dressings: Hydrocolloid, foam, transparent dressing, hydrogel sheets, Activated Polycrlylate Dressing, impregnated gauzes or composite dressing. May use alginate or hydrofiber dressing if moderate exudate. Any dressing that promotes moist wound healing.
   b. Topical Treatments: Enzymatic debridement ointment (Santyl®), amorphous hydrogel
   c. Adjunctive therapies: Pulsed lavage, Irrigation, Ultrasonic Wound Therapy (UWT), Maggot Debridement Therapy (MDT), Sharp debridement

F. Dry intact stable eschar heel
1. **Goal:** Keep eschar dry and intact, prevent infection
2. **Rationale:** The heel has relatively lower resting blood perfusion levels, higher amounts of surface pressure when under stress, and the possibility of compromised local blood flow if the patient has lower extremity arterial disease. Stable (dry, adherent, intact without erythema or
fluctuance) eschar on the heels serves as ‘the body’s natural (biological) cover’ and should not be removed.  

3. **Intervention Options:**
   a. Remove the cause.
   b. Observe wound daily and monitor for complications that would require debridement such as symptoms of infection/Unstable eschar: erythema, tenderness, edema, purulence, fluctuance, crepitus, and/or malodor (e.g., signs of infection) in the area around the dressing.  
   c. Offloading
      1) Place the leg in a device that elevates the heel from the surface of the bed, (heel suspension device) completely offloading the pressure ulcer.  
      2) Elevation of the heel on a pillow is usually inadequate.  
   d. Leave wound open to air.
   e. Dry dressing for protection.
   f. Paint eschar with betadine or alcohol daily to keep dry.
   g. Liquid skin barrier film.

G. Softened unstable eschar
   1. **Goal:** To promote debridement
   2. **Rationale:** Devitalized tissue impairs healing because it provides a growth medium for bacteria, increasing the probability of infection. Dead tissue also exudes endotoxins that inhibit the migration of fibroblasts and keratinocytes into the wound. Presence of necrotic tissue prevents formation of granulation tissue, wound contraction and epithelialization.  

3. **Interventions:**
   a. Topical dressings: Hydrocolloid, hydrogel, transparent film, foam dressing, impregnated gauze, if exudative: alginate, hydrofiber
   b. Topical treatments: Enzymatic debriding ointment (Santyl®) Thick eschar may need cross-hatching prior to application.
   c. Adjunctive therapies: Pulsed lavage, Irrigation, Ultrasonic Wound Therapy (UWT) www.arobella.com, Maggot Debridement Therapy (MDT) [www.monarchlabs.com](http:)//www.monarchlabs.com, Sharp debridement
   d. Protect peri-wound skin with a skin sealant, moisture barrier ointment or barrier wafer.

H. **Dry Wound Bed**
   1. **Goal:** Add moisture to wound bed
   2. **Rationale:** Our body is mainly composed of water, and the natural environment of a cell is moist, therefore a dry cell is a dead cell. A moist wound surface increases re-epithelialization, decreased dehydration and cell death (Neutrophils, macrophages, & fibroblast necessary for wound healing; cannot thrive in a dry environment), Increased angiogenesis, enhanced autolytic debridement and decreased pain – moist wound bed insulates and protects nerve endings thereby reducing pain.  

3. **Intervention Options:**
   a. Identify and remove the cause.
   b. Topical treatments:
      1) Dressings that add moisture: amorphous hydrogel, impregnated dressings
      2) Moist wound healing: Hydrocolloids, foams, transparent film, composite dressings, hydrogel sheet
   c. Insulate wound bed.
      1) Use securement dressings that will stay in place and prevent buckling along edges.
      2) Decrease number of dressing changes.
      3) Reapply loose or removed dressings immediately. Avoid leaving open to air for extended periods.

I. **Draining (Moderate to High Exudate) Wound Bed**
1. **Goal:** Control Exudate

2. **Rationale:** Moderate to High levels of exudate will macerate surrounding tissues and tissue breakdown will occur due to the released enzymes. Chronic wounds – high levels of proteolytic enzymes will breakdown healthy tissue. (Not found in acute wounds)

3. **Intervention Options:**
   a. Determine cause of exudate. Causes: High bacteria counts, necrotic tissue, edema, chronic wound status. As a result of debridement, increased exudate levels may be seen due to liquefaction of necrotic tissue. If due to bacterial levels follow care plan for high bacteria counts.
   b. Topical treatments: Alginate, Hydrofiber, Hydrophilic powder Gold Dust™, Specialty absorptive dressing Enluxtra™ Xtrasorb™, Hydro-active cavity dressing, and specialty high exudate foam dressing, Sharp debridement followed by Negative Pressure wound therapy. Enzymatic debriding ointment with wound drainage collector.
   c. Protect peri-wound skin with a skin sealant, moisture barrier ointment or barrier wafer.

J. **Infected or High Bacterial Counts in Wound Bed**

1. **Goal:** Decrease bacterial levels

2. **Rationale:** High levels of bacteria in a wound delays the healing process, may cause additional injury and result in wound deterioration. Bacteria compete for oxygen in wound bed resulting in hypoxia. Wound infection extends the inflammatory response, delays collagen synthesis, slows epithelialization, and causes injury to tissues.

3. **Intervention Options:**
   a. Effective wound cleansing (PSI between 4-15) with normal saline or commercially prepared cleansers to remove debris
   b. Topical antimicrobial dressings – Silver impregnated dressings and powders, Cadexomer Iodine, Activated Polyacrylate Dressing, PVA sponge impregnated with Methylene Blue and Gentian Violet, Honey dressings
   c. Topical treatments – silver sulfadiazine, Hydrogel with Sodium hypochlorite or Silver, Cadexomer Iodine paste
   d. Topical antiseptics – Dakin’s (Sodium hypochlorite) solution, acetic acid, Chlorhexidine and iodine.
   e. Antibiotics

1) Limit the use of topical antibiotics, except in special situations where the benefit to the patient outweighs the risk of antibiotic side effects and resistance.

2) In general, topical antibiotics are not recommended.

3) Oral or IV antibiotics – Administer per physician order when there is a systemic response to infection such as cellulitis, leukocytosis, fever, sepsis, bacteremia or osteomyelitis.

K. **Hypergranulation Tissue**

1. **Goal:** Decrease granulation tissue to level even with wound margins.

2. **Rationale:** A wound will not heal if hypergranulation tissue is present, as epithelial cells will not resurface over the hyper-granulated tissue.

3. **Intervention Options:**
   a. Silver nitrate application.
   b. Foam dressing with slight compression.
   c. Conservative sharp debridement.
   d. Antimicrobial dressings if high bacteria count present.
   e. Hypertonic NaCl dressing products, such as Mesalt® or Curasalt®, Over the counter Granulotion™

L. **Epibole**

1. **Goal:** Remove epibole.
2. **Rationale:** If epithelial tissue migrates over the wound margin causing rolled edges/epibole, further wound healing will not occur. The body’s response will be that the wound is healed. The margins must be re-injured to renew the wound healing cycle.

3. **Intervention Options:**
   a. Rub and rough up wound edges with dry cotton gauze.
   b. Apply silver nitrate to affected area. NOTE: Since silver nitrate is a corrosive substance, it should be applied only to tissue to be treated, and care must be exercised both in confining it to the desired area by a suitable barrier such as petroleum jelly or ringed plaster, and in preventing any excess from wandering by covering as necessary afterwards.
   c. Surgical debridement.
   d. DebrImitt™

M. **Wound Odor**

1. **Goal:** Remove cause of odor and neutralize odor.

2. **Rationale:** Problems associated with odor include social isolation, loss of appetite, inhibition of intimacy, and distress for patients and their caregivers. In chronic wounds, odor is due to tissue degradation or anaerobic bacteria generating odor by emitting compounds.

3. **Intervention Options:**
   a. Symptom management should include regular wound cleansing; assessment and management of infection; and debridement of devitalized tissue.
   b. Application of 0.75% topical metronidazole gel is effective with odors. The gel can be spread on all of the wound surfaces once or twice a day, can be used in combination with alginate, hydrofiber or foam dressings.
   c. Consider use of charcoal or activated charcoal dressings to help control odor.
      1) CarboFLEX® Odor Control Dressing
      2) - Restore® Odor-Absorbent
      3) - ACTISORB® Silver 220
      4) - Lyofoam® C
   d. Dressings impregnated with silver or Sodium hypochlorite will reduce bacteria load, thus decreasing odor.
   e. Antibacterial cleansing solutions can be utilized to reduce odor.
   f. Wound pouch or drainage collection device if wound is exudative.

N. **Bleeding in Wound Bed**

1. **Goal:** Control Bleeding

2. **Rationale:** In malignant wounds, bleeding occurs because malignant cells erode blood vessels, and may be compounded by decreased platelet function within the tumor. Bleeding may be result of friable granulation tissue which is potential indicator of wound infection. Bleeding may also occur as a result of trauma or injury.

3. **Intervention Options:**
   a. Direct pressure and ice often are often used to decrease bleeding. Using palm on gauze or cloth, direct pressure ~ 5 min. Length of time will vary. Do not remove gauze if blood soaks through – add more gauze.
   b. Elevation – body part needs to be elevated above heart if necessary
   c. Calcium alginate
   d. Silver nitrate sticks can be applied to control specific areas of bleeding in the wound. Cauterize by applying to bleeding source ~15 – 30 sec. Repeat 2-3 times if necessary.
   e. Gelfoam® Sterile Sponge is a medical device intended for application to bleeding surfaces as a hemostatic. It is a water-insoluble, off-white, nonelastic, porous, pliable product. It may be cut without fraying and is able to absorb and hold within its interstices, many times its weight of blood and other fluids.
   f. QR Powder™ - Stops bleeding instantly. After pouring QR Powder onto the wound, applying light pressure ensures that the powder is in contact with the wound bed. The hydrophilic
polymer then absorbs the water from the blood, causing the polymer to swell. The potassium salt serves as a binding agent to form a protective scab. This instant artificial scab adheres to the wound bed, seals and protects the wound, and enables the body's natural healing process to immediately begin.

VI. Wound Types and Topical Treatment Options

A. Dry surgical incision
   1. Goal: Promote healing and prevent infection.
   2. Rationale: Dehiscence may be caused by pressure, shear, improper lifting, vascular compromise, infection, or skin weakness caused by corticosteroids or other medications.
   3. Intervention Options:
      a. Post-Op (CDC guidelines)\(^9\)
         1) Incision closed by primary intention, the incision is usually covered with a sterile dressing for 24 to 48 hours.
         2) Incision closed by tertiary intention the incision is packed with a sterile dressing.
         3) Incision closed by secondary intention, it is also packed with sterile moist gauze and covered with a sterile dressing
         4) Use sterile technique for dressing changes first 48 hours
      b. Purpose of dressing to incision – absorb drainage, provide sterile environment, barrier to further trauma, type – nonadherent, absorptive
         1) Low-adherent postoperative dressings or vapor-permeable polyurethane film dressings with or without absorptive, central ‘island’ pad
         2) Negative Pressure Wound Therapy
         3) Montgomery straps
         4) Applying soft cloth tape parallel to the incision appears to be associated with fewer skin tension injuries than taping perpendicular to the incision.
      c. After 48 hours, incisions can be cleansed with mild soap and water.
      d. Once the incision has completely epithelialized, the skin’s bacterial barrier is re-established, and dressing over the incision is usually considered optional.\(^9,10\)
         1) When there is no drainage or chance of infection on suture line, may leave open to air.
         2) Patients may elect to wear a light, dry dressing to protect the incision and prevent staples/sutures from rubbing against their clothing.
      e. Keep the frequency of dressing changes to a minimum to avoid disrupting healing tissue.
      f. Use sterile saline for wound cleansing up to 48 hours after surgery.
      g. Do not use topical antimicrobial agents for surgical wounds that are healing by primary intention.

B. Incontinence Associated Dermatitis (IAD)
   1. Characterized by skin damage (inflammation with or without erosion of the epidermis and dermis) following exposure to urine or stool
   2. Goal: Promote healing and prevent infection
   3. Rationale: Any break in the skin integrity can cause a variety of consequences including: infection, pain, and complications associated with healing, some of which can be life-threatening. Overhydrated skin is more permeable to irritating substances, more easily colonized by microorganisms, and at greater risk for erosion and loss of skin integrity.
   4. Intervention Options:
      a. Remove/Control the cause. Behavioral interventions such as diet and fluid management or toileting techniques, and may progress to pharmacologic or surgical interventions.
      b. Regularly clean with ph balanced cleanser and remove soiling from skin.
      c. Clean soiled area using gentle motions along with a soft, reusable or disposable washcloth, avoid abrasive wash cloths.
      d. Use of higher absorbent capacity or containment products and/or indwelling devices recommended as needed
e. Topical Treatments
   1) Use effective barrier ointment/cream/skin barrier film after each exposure
   2) Avoid zinc oxide, as it can damage skin to remove
   3) Product examples: Flanders Buttocks ointment, Ilex ointment, Baza® ointment, Selan®, Calmoseptine®, Boudreaux’s Butt Paste, Aloe Vesta® protective Ointment, Critic Aid, and Elta® Seal Ointment.

C. Intertriginous Dermatitis (ITD) Cutaneous inflammatory process on opposing skin surfaces, AKA, Intertrigo. Skin damage caused by trapped perspiration (moisture) and skin-on-skin friction and typically presents as inflammation and linear lesions occurring at the base of skin folds.

1. Treatment strategies should focus on elimination of skin-to-skin contact without causing harm to friable tissue, reducing heat and moisture in the skin fold, and providing skin hygiene.
2. A structured regime with specialized products is the best approach to treatment of this condition.
   a. A pH balanced non-irritating cleanser should be used followed by a skin protectant. Although inexpensive, the use of ordinary soap and water should be avoided since it may cause skin irritation. Instead use:
      1) Disposable cleansing cloths or soft baby washcloths
      2) No-rinse bathing products, cloths, or solutions may be preferred since they offer a one-step process
   b. The skin folds should be gently patted dry and never wiped dry. Skin folds can also be left open to air or fanned, where feasible.

3. Absorptive fabric is recommended to manage moisture issues.
   a. Interdry® AG Textile with Antimicrobial Silver Complex - knitted polyester textile impregnated with silver complex; specialty fabric wicks away and relocates excess moisture and its polyurethane coating helps keep the skin dry. The soft, knitted texture reduces skin-to-skin friction in folds. The ionic silver embedded in the fabric provides broad-spectrum antimicrobial action for up to 5 days, combating fungal and bacterial infections. One sheet of fabric can be used for up to 5 days and typically does not require further replacement. www.us.coloplast.com
   b. Tranquility ThinLiner™ Absorbent Sheets - Soft, supple absorbent sheets used for the collection and retention of skin-fold moisture, are ideal for tucking into skin folds, groin area and for breast care. ThinLiners™ inhibit bacterial growth and eliminate odor. www.tranquilityproducts.com

4. Many strategies traditionally used to manage ITD have questionable benefit and some may exacerbate the condition.
   a. For example, talc or cornstarch-based powder to reduce moisture in skin fold can cause skin breakdown from caking and possibly facilitate fungal growth in the skin fold.
   b. Gauze, towels, pillowcases, draw sheets, or paper towels in the skin fold initially absorb moisture but do not allow it to evaporate, which exacerbates skin hydration and subsequent damage.

5. Use manufactured sling devices, towels, or draw sheets if needed, to lift or shift large areas of adipose tissue, legs, arms, etc., in order to minimize discomfort, tissue friction/drag or pain.
6. Patients should be encouraged to wear loose-fitting, lightweight clothing made from natural fibers to absorb moisture from skin folds. Other options include athletic clothing specifically designed to draw moisture away from the skin.

D. Peristomal Dermatitis Treatment
1. Address cause.
2. Application of a non-oily steroid cream such as Kenalog.
3. Ilex™ Ointment may be used under ostomy appliance.
4. Skin barrier (stoma) powder; crusting procedure
   a. Cleanse with water (avoid soap) and pat area dry.
b. Sprinkle skin barrier powder onto denuded skin.
c. Allow powder to adhere to the moist skin.
d. Dust excess powder from the skin.
e. Using a blotting motion, apply the polymer skin barrier or use a polymer skin barrier wipe.
f. Allow the area to dry.
g. Repeat steps 1 - 6, two to four times to achieve a crust.
5. For retracted stomas, use wafers with convexity, contact ostomy specialist for assistance with proper convexity.
6. Ostomy paste to seal fissures and cracks to prevent leakage.
7. Adhesive skin barrier rings and strips to fill indentations and wrinkles.
   b. Adept® barrier strips – www.hollister.com
8. Ostomy belt to hold wafer in place during activity.

E. Xerosis
1. Goal: Restoring moisture to the skin and stopping the itch-scratch cycle so irritated skin can heal
2. Rationale: Dry skin or chapped skin, common problem in the elderly caused by dehydration of the skin due to low humidity, excessive use of harsh soaps, and or diuretics
3. Intervention Options:
   a. Agent to maintain skin moisture.
      1) Emollient lotions or creams are one of the most effective treatments for xerosis. These lotions or creams have three basic properties:
         2) Providing a layer of oil on the surface of the skin to slow water loss and thus increase the moisture content
         3) Increasing the water-holding capacity
         4) Adding a slip or glide across the skin
   b. Avoid products that contain alcohol because they evaporate and their drying action compounds the original problem.
   c. Petroleum based products seal the skin surface and prevents what little lubrication is made from evaporating, but they do not penetrate the surface of the skin and do not replace skin moisture.
   d. Alpha hydroxy acids are frequently used to treat xerosis. Alpha hydroxy acids include glycolic, citric, lactic, mandelic and tartaric acid. Through a chemical process, these acids accelerate the softening of the skin, dissolving or peeling the outer layer of the skin to help maintain the skin’s capability to hold moisture. Lactic acid in concentrations of 2.5 percent to 12 percent is the most common alpha hydroxy acid used for moderate to severe xerosis.
      1) Examples: Atrac-Tain® Cream, Eucerin® 10 % Urea Lotion, Lac-Hydrin 12%, AmLactin® Foot Cream Therapy. Moisture Associated skin damage, peristomal skin, surgical incision, fungal, skin tears, large wound, fragile skin, xerosis

F. Candidiasis
1. Goal: Remove moisture
2. Intervention Options:
   a. Remove moisture
   b. Curity AMD Dressings
      – Effective against yeast/fungi
      – Gauze, 4x4’s, roll, drain sponges
   c. Teach the patient and caregiver(s) meticulous skin care.
   d. Frequent linen and gown changes may be necessary
   e. Minimize friction and shear to the skin when cleansing and use a pH-based, skin-friendly cleanser. No-rinse cleansers are particularly appropriate.
      1) Aloe Vesta Bathing Cloths – www.convatec.com
2) Secura Personal Cleanser – www.smith-nephew.com
f. Dry the skin well, especially in skin folds.
g. At the first sign of redness, itching or discomfort, apply an over-the-counter or prescription antifungal powder or a silver powder/cream to the area daily per package instructions.
1) Polyene Antifungal (for Cutaneous Candidiasis)
2) Nystatin
3) Imidazole Antifungal (broad spectrum for Tinea Infection and Cutaneous Candidiasis)
4) Clotrimazole (Lotrimin, OTC)
5) Miconazole (Micatin, OTC)
6) Econazole (Spectazole)
7) Ketoconazole (Nizoral)
8) Oxiconazole (Oxistat)
9) Sulconazole (Exelderm)
h. If, after 10 to 14 days of treatment with an antifungal product, the rash is not resolving, consider switching to another preparation, as candida resistance can occur.
i. Daily inspection of the skin should target the abdomen, pannus, breasts, back folds, thighs, posterior neck, and perineal areas, as well as any surgical incision site. Teach patients to use a mirror, ideally a long-handled one, for self-inspection.

VII. Difficult to Dress Wounds Securement Strategies
A. Head/Neck Wounds
   1. Stretch Net
   2. Conform Gauze a.k.a. Kling - Conforms to difficult body contours and clings to itself
   3. TAPEless Head Dressing - http://www.tapelessmedical.com/head.htm
   4. Scalp wound: shaving a small area surrounding the wound will help with adhesion. If the patient’s hair is long enough, a small pony tail can be gathered in a rubber band to help secure the dressings without tape.¹
   5. Creative options: Sweatband, knit stocking cap, Baseball cap, shower cap, bandana, turban, sleeping cap, headband, turtleneck shirt.

B. Ear
   1. Wounds on the curve of the ear
      a. Use a thin hydrocolloid dressing (5x7cm).
      b. Cut the hydrocolloid into a strip, fold in half lengthways, and then cut a fringe along one edge. The cuts should be approximately 0.5cm apart.
      c. Apply the uncut edges of the dressing first and then use the cut edges to fold around the edge of the ear.
      d. A small piece of alginate may be used underneath if the wound is exudating.
   2. Wounds behind ear or at ear/head junction
      a. Use a small rectangle of thin hydrocolloid (approximately 5x7cm).
      b. Fold the dressing in half lengthways.
      c. One-third of the way along cut the dressing up to the fold.
      d. Apply the longer piece of the dressing above the ear, with one square folded over the ear and use the other square to secure the dressing.

C. Joints
   1. Dressing should not restrict movement
   2. Ready-made heel and elbow dressings
   3. Square dressing can be cut to fit joint
      a. Cut 1/3 of the way from one corner of dressing toward center.
      b. Cut corresponding corner 1/3 of the way from corner toward center. (Making V shape of the two cuts)
   4. Thin hydrocolloid cut into strips
a. 15x15cm dressing, cut into three equal strips (remembering to cut through, not in line with, the peel-able back)
b. To apply, the joint should be held at a right angle as this gives the best flexibility when complete.
c. The first strip of dressing is applied directly over the angle of the joint; the second strip is applied overlapping one edge of the first but at an angle of approximately 30 degrees. The third strip is applied in the same way but over the other edge of the first strip. The dressing is then molded to the shape of the joint.

5. Self adherent wraps
6. To secure dressing and provide padding: Knit Heel and Elbow Protector’s or Elastic Knee Support/brace
7. Tubular Dressing Retainers

D. Body Folds
1. Interdry AG - knitted polyester textile dressing impregnated with silver complex; manages moisture, odor and inflammation, may be left in place up to 5 days; no secondary dressing needed. www.us.coloplast.com
2. Kerlix™ AMD Antimicrobial Gauze - Broad-spectrum effectiveness provides protection against gram negative, gram positive, and fungi/yeast microorganisms including MRSA and VRE.
3. Apply skin sealants or protective ointments to protect intact skin.
   a. Bodyglide – arrests friction and creates a smooth, non-oily protection barrier. It helps prevent blisters, chafing, dry skin, cracked skin, and rash. www.bodyglide.com
   b. Cavilon No-Sting Barrier -3M - alcohol-free liquid barrier film that dries quickly to form a breathable, transparent coating on the skin.
4. Abdominal binder
5. Adhesive Under Breast Dressing using Allevyn™
   a. Take an ALLEVYN™ Adhesive dressing 12.5cm x 22.5cm. For highly exuding wounds select an ALLEVYN™ Plus Adhesive dressing 12.5cm x 22.5cm.
   b. Make 2 slim triangular incisions into the width of the dressing.
   c. These should be approximately 4cm deep.
   d. Ensure surrounding skin is dry.
   e. Lift the breast if necessary and place the dressing onto the skin.
   f. The incisions made will allow the dressing to fit the curved contour. If more flexibility is necessary make the incisions deeper.
   g. Ensure the dressing is flush to the skin. Smooth edges all around.

E. Large Wounds
1. Look for dressings that meet the needs of the wounds and can remain in place for longer periods of time.
2. Large surface area
   a. Foam on a Roll - 3M™ Tegaderm™ Foam Dressing 4 inch x 24 inch
   b. Flexzan® - sterile, ultra-thin, highly conformable, semi-occlusive polyurethane foam adhesive dressing available in 8x8”; http://www.udllabs.com
   c. Mepilex Border Lite - thin all-in-one foam dressing that absorbs and retains exudate; available up to 15”x15” http://www.molnlycke.com
   d. OpSite on Roll - 4” x 11 yds.
   e. EXU-DRY™One-piece wound dressing made up of multiple layers. Available in Large dressings, pads, sheets, torso vest, pediatric, arm/hand, and foot dressings. http://global.smith-nephew.com
3. Negative Pressure Wound Therapy
4. ABD pads available in 10"x30"

F. Tape Free Alternatives
1. Stretch Net - Brand Names: Surgilast™, Elastinet™, Spandage™, Stretch Net™, Bandnet™
2. Montgomery Straps - Medical-grade adhesive tape panels to hold frequently changed dressings in place
3. Cohesive bandage Examples: Coban™, FLEX-WRAP™, Duban®, CoFlex® NL TAPEless Dressings - www.tapelessmedical.com
4. Ace wraps
5. Tubular Dressing Retainer- Dermafit™, TubiFast™ Meditube™
6. Geri-gloves
7. Utilize clothing to secure dressings:
   a. Scarf or cap
   b. Turtle neck
   c. Knit vest
   d. Sport bra
   e. Supportive underwear
   f. Halter top

Bibliography


Lawson C, Juliano L, Ratliff CR. “Does sterile or nonsterile technique make a difference in wounds healing by secondary intention?” Ostomy Wound Manage. 2003 Apr;49(4):56-8, 60.


<table>
<thead>
<tr>
<th>Category</th>
<th>Action</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alginate</td>
<td>Absorb drainage, promote moist wound healing</td>
<td>AlgiSite*, Currasorb®, Kaltostat®, Sorbsan®, 3MTegagen™</td>
</tr>
<tr>
<td>Antimicrobials</td>
<td>Reduce bacterial levels</td>
<td>Amerigel®, Anasept®, Aquacel® Ag Hydrofiber® Dressing with Silver, Hydroferra Blue™, Actisorb™, Argaes™, SilvaSorb™, ActiCoat®, Silverlon®, Iodosorb®, Kerlix®, AMD™ Antimicrobial Super Sponge</td>
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<tr>
<td>Antiseptics</td>
<td>Reduce bacterial levels</td>
<td>Betadine, Dakins Solution, Acetic Acid, Di-Dak-Sol®, Burrows Solution, Domboro Solution</td>
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<tr>
<td>Bio-synthetics</td>
<td>Derived from natural sources — advanced wound healing, burns, donor sites</td>
<td>Hyalofiill®, Integra™, Biobrane®, Dermagraft®, Transcyte®</td>
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<tr>
<td>Collagen</td>
<td>Donate collagen to wound</td>
<td>Fibracol®, Prisma®, Promogran®, CellerateRx, Stimulen™</td>
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<tr>
<td>Composite</td>
<td>Provide cover by combining two physically distinct components</td>
<td>3M™ Medipore®, Covaderm®, Alldress®, Coversite®, ThinSite®</td>
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<td>Contact Layers</td>
<td>Non adherent, protect from direct contact with fragile tissues or wound agents</td>
<td>3M™ Tegapore™, Dermanet®, Mepitel®, Conformant 2®, Drynet®</td>
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<tr>
<td>Foam</td>
<td>Absorb small to moderate amounts of exudate, moist wound healing, thermal insulation, useful with hyper-granulation tissue</td>
<td>Allevyn®, Biatain®, Curafom®, Polymem™, Flexzan®, Lyofoam®, Tegaderm™ Foam, Tielle®, Mepilex®, Optifoam™, Versiva®</td>
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<td>Gauze - Impregnated</td>
<td>Used for packing, cleaning, debridement</td>
<td>Adaptic, Dermagran®, XeroForm®, Mesalt®, Vaseline Gauze, Scarlet Red Ointment®</td>
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<td>Hydrocolloid</td>
<td>Occlusive, autolytic debridement, moist wound healing</td>
<td>3M Tegasarb®, Combiderm®, Comfeel®, Duoderm®, Hydrocol®, RepliCare®, Restore™, Ultec®</td>
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<td>Hydrogel</td>
<td>Donate moisture, autolytic debridement, moist wound healing</td>
<td>AmeriGel®, Carrasyn®, Curafil®, Dermagran®, Elasto-Gel™, IntraSite®, Regenecare® Wound Care Gel, Saf-Gel®, Solosite®,</td>
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<td>Category</td>
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<tr>
<td>Hydrogel Impregnated</td>
<td>Sponges, ropes, strips impregnated with hydrogel</td>
<td>AmeriGel®, Curasol®, Dermagran®, Etla®, TransiGel®</td>
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<tr>
<td>Hydrogel Sheets</td>
<td>Hydrophilic polymers that interact with aqueous solutions by swelling</td>
<td>AquaClear®, Curagel®, Derma-Gel®, Elasto-Gel™*, FlexiGel®, Nu-Gel®, TenderWet™, Vigilon®</td>
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<td>Honey</td>
<td>Medical Grade Active Leptospermum honey, Moist wound healing, lowering wound pH, debridement</td>
<td>MANUKApili®, MediHoney® Paste, MediHoney® Adhesive Honeycolloid Dressing, MANUKAhd®</td>
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<tr>
<td>Moisture Barriers</td>
<td>Protect skin from moisture, oil based (petroleum), thick consistency</td>
<td>AloeVesta®, Baza®, Boudreaux’s Butt Paste®, Calmoseptine®, Cavilon® Cream, Critic-Aid®, Dermagran®, Elta®, ProSheild®, Secura™, Selan®, Sensi-Care®, Soothe &amp; Cool®, Xenaderm® Ointment</td>
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<tr>
<td>Skin Sealants</td>
<td>Formulations to protect vulnerable areas, form transparent coating on skin</td>
<td>Cavilon™ No Sting Barrier, Skin Prep®, Preppies®</td>
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<tr>
<td>Transparent Films</td>
<td>Moisture vapor permeable, transparent, moist wound healing, autolytic debridement</td>
<td>3M Tegaderm®, Blisterfilm®, CarraFilm™, Comfeel® Film, Transeal®, Mefilm®, Opsite®, Polyskin®</td>
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<tr>
<td>Tapes</td>
<td>Adhesive used to secure dressings or other devices</td>
<td>3M™ Cloth Adhesive Tape, Hy-Tape®, Hypa-Fix®, Medifix™, Medipore™, Omnifix, Sta-Fix™, Tenderfix™, Transpore™</td>
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<tr>
<td>Wound Fillers</td>
<td>Fill dead space, moist environment, promote debridement, require secondary dressing</td>
<td>Bard® Absorptive Dressing, Ferris Poly-Wic® Cavity, Flexigel® Strands, Hyalofill® Iodoflex®, Silverlon®, Gold Dust®</td>
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