Dressing Wounds: Using DIME$ to $ave Dollar$

Elizabeth O’Connell-Gifford
RN, BSN, CWOCN, DAPWCA, MBA
Clinical Education Specialist
Medline Industries, Inc.
(518) 461-0743
Eo’connell-gifford@medline.com

Objectives
• Compare & contrast acute vs chronic healing
• List 3 phases of wound healing
• Describe the wound healing pathways
• List 5 principles of wound healing
• Explain the wound bed preparation concept represented by DIMES
• Describe 2 mechanisms of action for wound healing by each topical wound care product category

1.5hrs

11-10-10

Acute Wounds
• Usually progress to closure in an orderly, organized fashion
• Acute inflammatory phase lasts up to 5 days
• Epithelialization begins within hours
• Proliferative phase is 5-25 days
• Collagen remodeling is prominent at 3 weeks, lasts as long as 2 years
• Normal is not necessarily “ideal”
• May be left open to close by secondary intention by following the same process—may be delayed

Phases of Wound Healing and Present on Admission (POA)

Hemostasis (immediately)
− Key cell is platelet which release cytokines such as PDGF
Inflammatory phase (1-5 days)
− Key cells are leukocytes and macrophages
− Key activity vasoconstriction– vasodilation
Proliferative phase (day 6 to 25, several weeks)
− Key cells fibroblasts, which stimulates production of collagen and granulation tissue. Angiogenesis begins.
Maturation phase (25 days to months to years)
− Collagen reorganizes, remodels, matures and gains strength
− Scar formation, increased tensile strength
Wound Healing Pathways

<table>
<thead>
<tr>
<th>Healable</th>
<th>Prescription may heal with treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>Preservation slim chance it will heal; stabilize and prevent deterioration</td>
</tr>
<tr>
<td>Non-healable</td>
<td>Palliation inadequate factors for healing; manage symptoms</td>
</tr>
</tbody>
</table>

Healing Restorative Care
- Goal is Healing
- Aggressive wound care: Return to former level of functioning
- Maintenance care: Hope for healing; stabilize and manage symptoms; prevent infection
- Palliative Care: Comfort rather than cure
  - Non-healable:
    - Arterial, non-progressing, malignant or fungating, Dry/wet gangrene

Predicting Healing Probability
- FRAIL Program (For Recognition of the Adult Immobilized Life) helps to identify wounds that are unlikely to heal
- 20 parameters
- Holistic approach
- Data on wounds, activity level and nutrition

Letizia MJ, Uebelhor J, Paddack E. Providing Palliative Care to Seriously Ill Patients with Non-Healing Wounds. JWOCN. 2010;37(3) 277-282

Assess the wound: Identify the goals for healing
Select the treatment: Will it achieve the goals?

Desired Outcomes
- Decreased time to wound healing
- Pain reduction
- Improved quality of life
- Prevention of recurrence/complications
- Ease of use
- Decreased costs

www.frailcare.org/healing probability assessment tool
Benefits of a Product Formulary

- Standardization
- Eliminating waste in product duplication
- Creating an efficient clinical tool for product sourcing
- Building a time saving cross reference for products with similar function
- Removing the confusion from similar products and their applications
- Cost reduction
- Optimal service levels
- Quality control

MacInnes S, Falcasio-West N, 2008

Principles of WOUND Healing

Is the Wound healing? Infected?
Optimal amount of moisture present?
Understand/protect the periwound skin
Is the tissue necrotic, senescent or viable?
Is there Depth or Dead space?

Wound Cleansing

Goal
- Remove bacteria and surface contaminants
  - allows the wound to move more rapidly from inflammation to proliferation phase
- Protect the healing wound
  - minimize risk of infection
- Minimize chemical and mechanical trauma

Topical Antiseptic Cleansing

- use lowest concentration documented to be effective
- use for shortest possible duration
- when bacterial contamination eradicated, resume non-antiseptic cleansing
- if symptoms persists consider further evaluation

Wound Cleansing Agents

- Normal Saline
  - Sufficient for clean, granulating wounds
- Commercial Cleansers
  - Non-Ionic surfactants
    - reduces surface tension, releasing debris from the wound bed
  - Antimicrobial
    - Use for 2 weeks and re-evaluate wound
- Force 4-15 PSI
- Amount 60-100cc to irrigate

Robeheaver G, 1999; AHCPR 1994
Periwound Protection

- Injuries
  - Maceration
  - Denudation
  - Tape stripping
  - Chemical burn
- Protection
  - Primary barriers-petroleum
  - Polymers-skin preps
  - Secondary barriers-zinc
  - Monomers-cyanoacrylates

Periwound Moisture Management

Maceration from exudate, eczema, crusts. Very painful—gentle removal

Super Absorbent Polymer Pad

Wound Bed Preparation Paradigm

<table>
<thead>
<tr>
<th>Debridement</th>
<th>The removal of nonviable tissue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infection/Inflammation</td>
<td>Addressing the biofilm and inflammation within the wound</td>
</tr>
<tr>
<td>Moisture Balance</td>
<td>Achieving and maintaining the moisture balance in the wound</td>
</tr>
<tr>
<td>Edge/Environment</td>
<td>Treating stalled wounds where epithelium fails to migrate</td>
</tr>
<tr>
<td>Support Products/Services and Education</td>
<td>Appropriate support promotes optimal outcomes</td>
</tr>
</tbody>
</table>
Types of Debridement
P4P there is a “Need for Speed”
- Surgical – Fastest
- Conservative sharp - advanced practice clinician
- Mechanical - slow and painful; creates chronic edges 10-12%
- Enzymatic – 18-20%
  – Santyl (Collagenase)
- Autolytic (gel, film, hydrocolloid, foam & alginates) 10-12%
- Biological - maggots
- Polyacrylate - 30-35%

Enzymatic Debriding Agent
- Collagenase (Santyl Healthpoint)

Mechanical Debridement:
* Wet-Dry not appropriate for clean wounds

“Wet-to-dry is not appropriate for clean wounds”

Polyacrylate Debridement
- Polymer gel pad
- Able to remove large protein molecules ie Pseudomonas, dead tissue
- Non-adherent polypropylene material
- Saturated with isotonic Ringer’s solution
- Stays moist - 24hr. wear time
- Debrides

How Polyacrylate Therapy Works

Debrides and promotes granulation at the same time
Polyacrylates for Biofilm Management

- New research shows that polyacrylate gel absorbents debride just as well as collagenase\(^1\).
- Recent literature has revealed that the product may be effective in reducing wound bioburden by interfering with biofilm\(^2\).


When not to debride!

- Intact, stable heel eschar
- Severe PVD
- Dry gangrene

AHCPR Pressure Ulcer Treatment Guideline 1994
NPUAP 2007

Managing Infection/Bioburden

Topicals in Wound Care

- Silver Sulfadiazine (Rx required)
- Sulfaamylon
- Ointments-
  - Triple Antibiotic Ointment, Bacitracin, Muparicin, Neosporin powder etc
- Hydrogen peroxide & alcohol
- Betadine
- Hibiclens (CHG)
- Acetic Acid and Dakins Solution

Antimicrobial dressings-Silver

Things to consider:
- Ionic vs. metallic
- Continuously vs. bolus
- Enough silver to kill bacteria
- Non-cytotoxic to wound and host
- Activate silver release by:
  - Moisture from skin
  - Moisture from atmosphere
  - Added external moisture
Modes of Action

- Cell wall
- Membrane transport
- RNA function
- DNA synthesis
- Protein function
- Enzyme Activity

Antimicrobials

- Cadexomer iodine
  - Iodoflex / Iodosorb
- CHG
  - Biopatch
- Gentian violet/methylene blue
  - Hydrofera blue
- PHMB (polyhexamethylene biguanide)
  - XCELL AM
  - Kerlix AMD gauze

Topical antimicrobials to the rescue!

- First 2-4 weeks of wound bed prep
- Poor blood flow antibiotics may not be effective
- Consider trial topical antimicrobial
- Needs to be effective against gram- positive, gram-negative and anaerobic organisms
- Reduces bioburden
- Prevents critical colonization leading to infection

Moisture Balance

Hydrocolloids

- Create optimal moisture in dry to moderately draining wounds
- Autolytic debridement
- Supports growth of viable tissue
- Waterproof/bacterial barrier
- Adhesive
- Decreases rate of infection
Hydrocolloids

- **Weartime**
  - Up to seven days
  - If need to change more than three times per week consider another dressing option

- **Limitations**
  - May not hold up well with repeated shearing and friction forces
  - Special considerations with incontinence
  - Do not use occlusive dressings on immunocompromised patients
  - Odor and appearance of drainage

Alginates

- **Moderate to heavy drainage**
- **Autolytic debridement**
- **Supports growth of viable tissue**
- **Wear time**
  - As drainage indicates by "strike through" on secondary dressing, up to 7 days
  - If used in combination with foams the wear time may increase, decreasing the frequency of dressing change

- **Limitations**
  - Should not be used on dry to minimally draining wounds
  - Should not be combined with hydrogels
  - Do not fill cavity/tunnel/dead space unless the alginate can realistically be retrieved
Fill undermining

Connecting bridge underneath

Foams
- Appropriate for moderate to heavy drainage
- Autolytic debridement
- Supports growth of viable tissue
- May retard growth of hyperplasia

Wear time
- Up to seven days, or as drainage indicates by "strike through"
- If used as a secondary dressing in combination with alginates, may increase wear time and decrease frequency of dressing change

Limitations
- Should not be used in conjunction with a hydrogel
- Not appropriate for dry wounds
**Hydrogels (Amorphous & Sheets)**

- Donates moisture
- Autolytic debridement
- Supports growth of viable tissue
- Wear time
  - Gel/Impregnated gauze –up to three days, as necessary to maintain a moist wound bed
    - Do not use absorptive secondary dressing (foam or alginate)
  - Sheets - Up to q 5 days depending upon drainage
    - Excellent when gentle adhesion is required
  - Change dressing when necrotic tissue hydrates and becomes softer, and/or mushy.

**Amorphous Hydrogels**

**Hydrogel Sheets**

**Transparent Film**

- Create optimal moisture in dry to moist wounds
- Autolytic debridement
- Supports growth of viable tissue
- Waterproof/bacterial barrier
- Adhesive
- Semi-permeable
- Transparent
Transparent Film

- Wear Time
  - Up to 7 days wear time
  - Moisture level is appropriate if the drainage stays within the confines of the wound edge
  - May apply polymer or monomer barrier around wound edges to protect against maceration

Edges/Environment Collagen Containing Dressings

- Collagen
  - Major protein in human tissues
- Patients with insufficient protein stores, or systemic impediments to healing may benefit from topical collagen
- Supports all healing phases
  - Growth of granulation, enhances epithelialization and contraction
- Available with silver

Collagen Containing Dressings

- Collagen
- Patients with insufficient protein stores, or systemic impediments to healing may benefit from topical collagen
- Supports all healing phases
  - Growth of granulation, enhances epithelialization and contraction
- Available with silver

Scanning Electron Micrograph of Dressing Containing Native Collagen:

*Build it, and they (fibroblasts) will come*

Growth Factors

- Responsible for enhancing a single cellular process
- Recombinant platelet-derived growth factor (PDGF)
- Enhances formation of granulation tissue
- Lower extremity neuropathic/diabetic ulcers that are full thickness, and have adequate blood supply
- Surgical debridement prior to use

*FDA 2008 Black Box Warning*

Bioengineered Skin Substitutes

- Bilayered
- Single Layered
- Dermagraft

*FDA 2008 Black Box Warning*
Edges/Environment
Extracellular Matrix Dressings (ECM’s)
• Maintain and support healing environment
• Biodegradable
• Submucosa (in SIS) more prone to allow cell penetration and in growth
• Basement Membrane (in Bladder Material) more prone to allow cell spreading

Supportive Products
Secondary Dressings
Composite Dressings
• Alldress (Molnlycke)
• Covaderm Plus (DeRoyal)
• CovRsite Plus (S & N)
• Stratasorb (Medline)
• Versiva (ConvaTec)
Bordered Gauzes
• Bordered Gauze (Medline)
• Covaderm (DeRoyal)
• CovRsite (S & N)
• Bordered Gauze (Gentell)

If you cannot use tape...
• Self-adherent wraps
• Elastic netting
• Dressing retention sheet
• Tubular bandage

Non - Healing Wounds...
• Pressure
• Non adherence to care plan
• Edema
• Systemic disease
• Malnutrition
• Cytotoxicity
• Foreign body
• Bacterial contamination
• Osteomyelitis
• Infection
• Inadequate circulation or perfusion
• Inappropriate product selection