Wound Care in the Home: Current Best Practice

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Objectives
1. Discuss the financial aspects of managing wound care patients in home health
2. Discuss the benefits of a product formulary and standardized wound guidelines for controlling costs and improving patient outcomes.
3. Describe a systematic approach to identifying and managing chronic wounds
4. Identify and differentiate Pressure vs Moisture Associated Skin Damage
5. Describe the DIMES model of wound bed preparation and product selection
6. Discuss the current evidence regarding the use of honey and silver dressings.

Wound Statistics
1. 6.5 million patients with chronic wounds in U.S.
2. $25 billion estimated annual costs
3. 14% of home care population


Increasing Wound Patient Discharges to Home Health

![Bar chart showing percent of patients discharged to home health]

Supply management is crucial to handling patients with chronic wounds.

One of the Top 5 least profitable Diagnosis

Average profit margin of 3.4% per episode

Mismanagement of a wound can result in:

- Loss of Revenue
- Adverse Events
- Infections
- Hospitalizations
- Loss of Referrals

Wound Care Patients Can Break You!

- Screen your patient referrals
- Not every admission is a good admission!
- Seek out a Certified Wound Care Professional
- Establish a Program of education and training
- Stick to your guns when it comes to formulary compliance. You don’t have to provide specific brand name products.
Wound Care Patients Can Break You!

- Daily dressing changes
- Non-effective dressing regimens
- Brand specific demands
- Pt Non-adherence
- Who is supervising your wound patients?
  - Do they have expertise?
  - Do they understand how to manage wound patients in the HH environment?
  - Multidisciplinary Wound Team?
  - Are you getting the outcomes?

Formulary Management

- Today we must track supply costs per patient and understand how to analyze trends and look at benchmarks based on diagnosis
- Understand that Medical Supplies are a revenue source
- Requires Accurate Clinical Assessment
- Partnership with supply vendors
- Review and update your formulary regularly

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
Benefits of Standardized Wound Protocols/Guidelines

- Compliance - Increased compliance with product formulary
- Consistency – Every one doing the same thing the same way
- Competency – Increased competency of clinical staff
- Confidence - Increased confidence of clinical staff leads to increased patient confidence
- Confusion - Decreased confusion over product selection
- Cost controls – Decreased visit frequencies and supply costs
- Clinical outcomes – Improved healing rates, pain reduction, improved patient satisfaction

Do you have a Comprehensive Wound Care Program?

- Comprehensive Wound Care Guidelines
  - Requires Certified Wound Professional
  - Best Practice Interventions (EBP)
- Interdisciplinary Approach
- Improves outcomes
  - Treating Wounds and Preventing Pressure Ulcers now publicly reported on Home Health Compare
  - Prevents Unplanned ER visits and Hospitalizations
  - Improves Patient Satisfaction (HHCAHPS)
- Cost Effective

Reducing Costs and Improving Outcomes

- Comparison of Clinical Outcomes and Cost of Care between SNF residents with chronic wounds receiving structured, comprehensive wound management protocol vs SNF residents receiving range of wound care treatments (non-structured).
- Study group guided by Wound Care Specialist under contract
  - Interdisciplinary approach included: Nutrition, Support services, Wound off-loading, PT, Pain control, Vascular Compromise, Diabetes management, Functional expectations.
- Results:
  - 47% lower cost in study group vs compare group ( $21,499.64 vs $40,678.83)
  - 35.3% lower total Medicare episode cost per day over the entire wound care episode ($229.07 vs $354.26)
  - 21 day shorter length of episode (94 days vs 115 days)
- Conclusion:
  - Standardized treatments provided by a trained multidisciplinary wound care team significantly improved healing outcomes and reduced treatment costs.
Evidence Based Practice (EBP)

EBP acknowledges that care provided to patients should not be based in habit/tradition but rather supported by the best possible evidence of effectiveness.

Bryant R and Nis D, 2011

Do You Have Wound ESP?

WOUND ESP
E - Etiology
S - Systemic Support
P - Prevention/Preparation/Product Selection

A Systematic Approach to Identifying and Addressing Barriers to Wound Healing

*Credit for Wound ESP goes to Doughty, Dorothy, Program Director, Emory WOCN Education Program

Wound ESP

Person with Chronic Wound

Etiology
Identify and Treat Causative Factors:
Pressure, Venous Insufficiency, Arterial Insufficiency, Moisture (MASD), etc...

Systemic Support
Address Systemic Factors that affect wound healing
Perfusion/Oxygenation, Nutrition, Diabetes, Anemia, etc...

Prevention – First and Foremost!
Wound Bed Preparation/Product Selection

Dimes

Debridement
Infection/Inflammation
Moisture Balance

Edge/Environment
Supportive Products, Services, and Education
The first step in clinically effective and cost effective dressing selection is accurate identification of the wound etiology.

Etiology must be determined before treatment plan can be developed and realistic goals established.

Clues to Etiology:
- History and Physical Assessment
- Location
- Characteristics
- Distribution

Failure to improve is most commonly due to factors such as: Persistence of Causative Factors or Systemic Factors such as Ischemia, Infection, or Malnutrition – NOT THE DRESSING!

*For wounds failing to show improvement within 2 weeks, reassess Etiological and Systemic Factors before changing Topical Therapy

Bryant, Ruth A, Nix, D.P. Acute and Chronic Wounds 4th Ed. p. 83

### Pressure vs Moisture Associated Skin Damage

#### An Important Distinction

- Accurate Assessment and Identification of the Etiology is critical

- Staging skin damage that is not related to pressure fails to address the etiology and also affects your quality data.

- Failure to treat the cause results in poor healing outcomes, and misuse of valuable resources.

### Pressure vs Moisture Associated Skin Damage

#### Ongoing Differentiation

**Pressure vs Moisture: What's the difference?**

- **Pressure ulcers are ischemic injuries** that may result in full-thickness tissue damage usually located over bony prominences and/or under medical devices/objects

- Partial thickness lesions due to moisture and/or friction do not involve ischemic changes and should not be classified as pressure ulcers

- Skin damage caused by moisture with or without friction should be classified as moisture-associated skin damage (MASD)

- Incontinence-associated dermatitis (IAD) lesions are typically characterized by partial thickness skin loss and irregular edges

- Linear lesions (fissures) in the intergluteal cleft are caused by moisture with or without friction and should be classified as intertriginous dermatitis (ITD)

*WOCN Consensus Statements: 2011 & 2012

Incontinence Associated Dermatitis (IAD)

- Often misdiagnosed as a pressure ulcer
- Prolonged contact with urine and/or feces
- Skin more susceptible to damage from pathogens
- Exacerbated by:
  - Soaps and detergents
  - Occlusive containment devices

Gray et al., 2012

Intertrigo/Intertriginous Dermatitis (ITD)

- Skin touching skin
  - under breasts
  - abdominal folds
  - groin, scrotum
  - Intergluteal Cleft
- Caused by
  - Trapped moisture
  - Heat
  - Friction
- May be complicated by
  - Fungus
  - Bacteria
  - Virus


ISTAP Skin Tear Classification

- Type 1: No Skin Loss
  - Linear or flap tear that can be repositioned to cover the wound bed
- Type 2: Partial Flap Loss
  - Partial flap loss that cannot be repositioned to cover the wound bed
- Type 3: Total flap loss
  - Total flap loss exposing entire wound bed

Leblanc, K., Baranoski, S., Holloway, S., & Langemo, D. D. (2013). Validation of a New Classification System for Skin Tears. Advances In Skin & Wound Care, 26(6), 263-265. doi:10.1097/01.ASW.0000430393.04763.c7
Traditional Treatment of Skin Tears
(No longer considered evidence-based treatment)

- Traditional dressings:
  - Transparent Films
    - Do not handle fluid well
    - Pooling and leaking of fluid onto surrounding skin
    - Adhesive - can cause epidermal stripping or tearing of the skin upon removal
  - "Non-adherent" pads with topical antibiotics
    - Adhere to skin and wound and can cause damage with removal
    - Do not provide an optimal moist environment for healing
    - Require more frequent changes
    - More costly and labor intensive
    - Neomycin is a very common sensitizing agent
    - Indiscriminate use of antibiotics promotes resistance

Treatment of Skin Tears

- Experts generally discourage use of transparent films, closure strips, and hydrocolloid dressings because their removal can cause more skin damage and pain
- Alternatives include:
  - Hydrogel/Hydrogel Sheet dressings
  - Non-adherent mesh contact layer dressings
  - Alginate/Gelling fiber dressings
  - Non-adherent Foam dressings
  - Cyanoacrylate liquid skin protectant
  - Petroleum based dressings (Xeroform, Vaseline Gauze, etc...) – Poor moisture balance properties, may dry and adhere to wound bed causing trauma upon removal

Systemic Support

- Provide Systemic Support for wound healing
  - Address underlying co-morbidities
    - Diabetes – Tight Glucose Control
  - Measures to support perfusion/oxygenation
  - Nutritional Support
  - Hydration
  - Identify and Treat infection (local & systemic)
- Other barriers to wound healing
  - Address potential enzyme imbalances within the wound
Wound ESP

Identify and Treat Causative Factors:
- Pressure
- Venous Insufficiency
- Arterial Insufficiency
- Moisture (MASD), etc...

Address Systemic Factors that affect wound healing
- Perfusion/Oxygenation
- Nutrition
- Diabetes
- Anemia, etc...

Prevention – First and Foremost!

Wound Bed Preparation/Product Selection

DIMES

D – Debridement
I – Infection/Inflammation
M – Moisture Balance
E – Edge/Environment
S – Support Products, Services and Education

*But first, you must determine your goal for this wound.

Goals for Wound Care

Healable
- Individual whose body can support the phases of healing within expected lifetime
- Aggressive wound treatment

Maintenance
- An attempt to keep a wound from deteriorating by providing comprehensive care

Non-healable (Palliative)
- Individual who cannot support the phases of wound healing within the expected lifetime
- Comfort rather than cure

Wound Cleansing

- Prior to dressing change & assessment
- Remove surface contaminants
  - Bioburden, debris, toxins
- Minimize chemical and mechanical trauma
- Protect the healing wound

Wound Cleansing Agents

- Skin cleansers and soaps should only be used on intact skin
  - Do not clean ulcer wounds with skin cleansers or antiseptic agents (e.g., povidone iodine, isopropyl alcohol, sodium hypochlorite solution [Dakin's® solution], hydrogen peroxide, acetic acid).
  - Skin cleansers contain chemicals that are cytotoxic to wound tissue and should not be used as wound cleansers.
  - (AHCPR Pressure Ulcer Treatment Guidelines, 1994)
- Normal Saline
  - May be sufficient for clean wounds
  - In the majority of cases, water or saline is sufficient for cleansing a proliferative or granulating wound. Avoid wound cleansers that may be cytotoxic to the granulating wound tissue. (WOCN Pressure Ulcer Guidelines, 2010)

Wound Cleansing Agents

- Commercial Cleanser with surfactants
  - Reduces surface tension
  - Releases debris from the wound bed
- Antimicrobial Cleansers
  - Benzethonium chloride
  - CHG irrigant
- Antiseptic Cleansers
  - Sodium hypochlorite
  - Acetic acid
  - Hypochlorous acid
  - (should only be used in limited circumstance for short periods of time)
"D" -- Debridement
Remove Non-Viable or Deficient Tissue

Types of Debridement
- Surgical/sharp
- Mechanical (Wet-to-Dry)
- Enzymatic (Collagenase)
- Margat
- Hydrosurgery
- Autolytic
  - Advanced Wound Care Dressings
  - Polyacrylate
  - Medical Grade Honey
  - Hypertonic Saline

Polyacrylate – Gentle AND Effective
- Rinses & debrides for up to 24 hours
- Creates a moist wound healing environment
- More effective than wet gauze therapy – great alternative to wet-to-dry dressings
- Will not stick to wound, gentle for patient
- Easy to apply, easy to teach to patients and caregivers
- Can reduce microorganisms and binds MMPs
- Offers rapid debridement
  - Average rate of debridement 38.11% of the wound surface area per wk

1. (Paustian, Stegman The use of polyacrylate containing dressings for Wound Debridement, September 2002)
Medical Grade Honey

- Available in variety of carrier dressings
- Promotes autolysis by
  - Pulling fluid into the wound bed (Osmosis)
  - Produces H$_2$O$_2$ - activating MMP’s
- May have anti-inflammatory properties
- Change frequency:
  - Can be left in the wound up to 7 days. Depends on wound condition and drainage levels. Can be changed daily if necessary.

Bryant and Nix, 2011

Promotes Autolytic Debridement

- High sugar content (87%) leads to osmosis – fluid moving from high to low concentrations of sugar$^{1,2}$
- The osmotic action of honey pulls lymph fluid from tissue layers up through the wound. The fluid and enzymes actually prevent slough or necrotic tissue from adhering and/or breaks the connection from the wound bed.
- Fluid from deeper tissue clears debris (dead tissue and bacteria) while moving towards sugar at wound bed$^{1,2,3}$


Promotes Autolytic Debridement

![Diagram showing autolytic debridement process](image-url)
Low pH

- pH: 3.2 to 4.5 (acidic)
- Lowering pH helps kick start difficult, stalled wounds
  - Research shows that for wounds with a pH < 7.6, each reduction of 0.1 pH units was associated with an 8.1% reduction in wound size\(^1\)
- Lowering the pH of the wound also inhibits bacterial growth
- May result in transient stinging due to lowering of pH

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Current Evidence
The Cochrane Review

- Cochrane Collaboration meta-analysis was based on studies of 14 different types of honey.
- Of the 25 studies included for review only one study investigated an FDA-cleared Manuka honey product.
- The review did not review the use of Manuka Honey for debridement.
- The reviewers concluded that the evidence on honey’s efficacy in wound healing is inconclusive.
- This position taken by the Cochrane reviewers is not unusual in the field of wound therapies, whether they be drugs or devices.
- The current evidence is sufficient and clear that Manuka Honey based wound dressings are beneficial for promoting wound healing and autolytic debridement.

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“I” -- Infection or Inflammation
Reduce Microorganisms and Inflammatory Cells
Identify and Treat Infection

All open wounds are contaminated with microorganisms – low levels of bacteria actually seem to stimulate repair but high levels severely retard or prevent repair.

The assessment of infection in a chronic wound is a clinical skill and the decision to prescribe antibiotics or apply topical antimicrobial agents should be based primarily on clinical presentations. - Sibbald G, Woo K, Ayello E, 2009

WOCN Pressure Ulcer Guidelines Recommendations

Consider a 2 week course of topical antibiotics/antimicrobial dressing for clean wounds that do not heal or continue to produce purulent exudate after two to four weeks of standard wound care

AHCPR, 1994; WOCN, 2010

NPUAP/EPUAP Guidelines

“Consider the use of topical antimicrobial silver or medical-grade honey dressings for pressure ulcers infected with multiple organisms, because these dressings offer broad antimicrobial coverage.”

“Limit the use of topical antibiotics on infected pressure ulcers, except in special situations.

In general, topical antibiotics are not recommended for pressure ulcers. Reasons for this include inadequate penetration for deep skin infections, development of antibiotic resistance, hypersensitivity reactions, systemic absorption when applied to large wounds, and local irritant effects, all of which can lead to further delay in wound healing.”

How is the Antimicrobial Activity of Silver Dressings Affected by the Presence of Medical Grade Honey Dressing?

Yang QP, David KT, Schultz GS.
Institute for Wound Research, University of Florida, Gainesville, Florida

Conclusions

1. The combination of a medical honey gel contact layer does not interfere with the antibacterial effects of the silver antibacterial barrier ion dressings in vitro.
2. The combinations of the honey gel with the silver dressings increased the reduction of bacterial levels compared to either silver dressings or medical honey alone.

Antimicrobial Dressings

Bactericidal – an agent that destroys bacteria
- Silver
- Cadexomer iodine
- CHG
- Cationic polymers

Bacteriostatic – an agent that is capable of inhibiting growth or multiplication of bacteria
- Gentian violet/methylene blue
- Hydrofera blue (Hollister)
- DACC (dialkylcarbamsyl chloride)
- Sorbact (BSN Medical)
- Polyacrylate
- TenderWet (Medline)
- Glycerin based hydrogel
- Derma-Gel (Medline)
- Elasto-Gel (Southwest Technologies)
- Many others

Silver

1. The most common antimicrobial agent used in modern advanced wound dressings
2. Broad spectrum of antimicrobial action including antibiotic resistant organisms
   - Aerobes/Anaerobes, Fungus, MRSA, VRE, Pseudomonas, E. Coli
3. Enough silver to kill microbes
   - Reduces proteases and inflammatory cytokines
   - Reduces release of exotoxins
4. No known medically significant resistance
5. No known allergies to ionic silver
The Use of Silver as an Antimicrobial

- **Antiquity**: 1000 BC - Vessels for water
- **Ravelin**: 1869 - Antimicrobial effect
- **Crede**: 1881 - Ophthalmic rinse
- **von Behring**: 1887 - Anthrax
- **Burke**: 1894 - Silver nitrate for burns
- **Fox**: 1908 - Silver Sulfadiazine
- **Medline**: 1995/96 - Arglaes Film
- **Westaim**: 1995/96 - Acticoat for burns
- **Medline**: 2002 - SilvaSorb

Things to consider when selecting a Silver Dressing

- Ionic vs. metallic
  - Ionic compatible with cleansers, saline or water
  - Metallic compatible with sterile water NOT NS (refer to manufacturer instructions)
- Continuously delivered vs. bolus
- Noncytotoxic to wound and host
- Silver release activated by:
  - Moisture from skin, atmosphere or external source

Appropriate Use of Silver Dressings in Wounds

International Consensus Panel

- The major roles for antimicrobial dressings such as silver dressings in the management of wounds are to:
  - Reduce bioburden in acute or chronic wounds that are infected or are being prevented from healing by microorganisms - Treatment
  - Act as an antimicrobial barrier for acute or chronic wounds at high risk of infection or re-infection - Prophylaxis

Appropriate Use of Silver Dressings in Wounds

Treatment - THE TWO WEEK 'CHALLENGE'
- The two week "rule" for silver use should be considered a two week 'challenge' period during which the efficacy of the silver dressing can be assessed.
- If after two weeks:
  - There is improvement in the wound, but continuing signs of infection – it may be clinically justifiable to continue the silver dressing with further regular reviews
  - The wound has improved and the signs and symptoms of wound infection are no longer present – the silver dressing should be discontinued
  - There is no improvement – the silver dressing should be discontinued and consideration given to changing the dressing to one that contains a different antimicrobial agent and if the patient is unwell using a systemic antibiotic and re-evaluating possibly untreated comorbidities.

PROPHYLACTIC USE
- "Antimicrobial dressings such as silver dressings may be used as a barrier to microorganisms in wounds at high risk of infection or re-infection.
- Examples may include: burns, surgical wounds, pressure ulcers near the anus, wounds with exposed bone, or wounds in patients who are immunocompromised, have poor circulation, unstable diabetes or neoplastic disease.

Other Bactericidal Dressings
- Cadexomer Iodine
  - Iodoflex / Iodosorb (Smith & Nephew)
- Cationic Polymers
  - PHMB (polyhexamethylene biguanide)
  - XCELL AM, Kerlix AMD (Covidien)
  - Biocides
  - BIOGARD (Derma Sciences/Medline)
  - CHG (chlorhexidine gluconate)
  - Biopatch (Systagenix)
  - Hibidens
"M" -- Moisture Balance
Absorb Excess Exudate, Prevent Dessication

Not too wet

Not too dry

Maintain Moist Wound Surface

Dressings that provide a moist wound environment:
- Enhanced cell migration
- Decreased cell death
- Decreased risk of infection
- Increased Leukocyte activity
- Provides a Bacterial Barrier

“A dry cell is a dead cell”
Polysaccharides in Wound Dressings

- Polysaccharide - a carbohydrate that can be decomposed by hydrolysis into two or more molecules of monosaccharides; especially: one (as cellulose, starch, or glycogen) containing many monosaccharide units and marked by complexity.

- Popular polysaccharides in wound dressings:
  - Cellulose - The major structural material of plants. (Wood is largely cellulose; Cotton is almost pure cellulose)
  - i.e. Gauze Dressings

  http://www.scientificpsychic.com/fitness/carbohydrates2.html

And now, Chitosan

- Chitosan is the principle derivative of chitin.
- Second most abundant natural polysaccharide after cellulose.
- Naturally abundant and renewable.
What is Chitosan?

Linear Polysaccharide
- Molecule consisting of a long chain of sugar molecules
- Different from Glucose and Sucrose

Derived from Crustacean Shells
- Chemically modified
- Purified
- Sterilized

Biological Properties of Chitosan

Biocompatible
- Natural Polymer
- Biodegradable
- Safe, Non-toxic

Medical Properties
- Hemostatic
- Fungistatic
- Immunoadjuvant
- Regenerative effect on connective gum tissue
- Accelerates bone formation

Why Chitosan?

Much Research Exists on Chitosan (more than alginate or carboxymethyl cellulose in terms of interaction of the material with tissue)

- Used as a hemostat by the military
- Taken as a weight loss supplement
- Used in water filtration
- Used in Cosmetics


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Why Chitosan? (cont.)

The amino group has a pKa value of ~6.5, so at a physiological pH range of 5-7, the amino group is protonated, meaning it has a positive charge.

Chitosan becomes a polycationic supermolecule in body fluid.

What is a polycationic supermolecule?

- Ions are atoms or molecules which have gained or lost one or more valence electrons giving the ion a net positive or negative charge.

- Cations are ions with a net positive charge.
  - Examples: Silver: Ag⁺, hydronium: H₃O⁺, and ammonium: NH₄⁺

- Anions are ions with a net negative charge.
  - Examples: hydroxide anion: OH⁻, oxide anion: O²⁻, and sulfate anion: SO₄²⁻

- Cations bind to negatively charged bacterial cell walls
  - Examples: Silver, Chlorhexidine, etc.

Chitosan Based Dressings

- Absorbent
- Gel forming
- Improved conformability and contact with wound bed
- Inherit benefits of Chitosan
Super Absorbent Polymer Dressings

- Increased absorptive capacity
- Fewer dressing changes
- Dressings with non-adherent facing
- Less disruption to the wound
- Promotes faster healing
- Protection from periwound maceration
- Odor control capability
- Appropriate for minimal to heavy exudate
- Great secondary dressing when using honey

Use of a Superabsorbent Dressing to Control Copious Drainage in Patients with Venous Ulcerations

Study
- Six patients with copious amounts of drainage and history of periwound adhesive related skin injury requiring three times a day using silicone based foam dressings
- Dressing regimen changed to superabsorbent non-adhesive dressing for one month

Results:
- All patients had a reduction in wound dressing changes to a maximum of once daily. (Mean 1.9 days; range 1-3 days)
- Improved periwound maceration was observed in two patients and resolved in four
- Three patients reported no wound pain on removal with three reporting a 90% reduction
- No episodes of periwound adhesive demediations

Milne, C & Saucier, D. Use of a Superabsorbent Dressing to Control Copious Drainage in Patients with Venous Ulcerations. Presented at The Symposium on Advanced Wound Care, Dallas, TX, April 2011

Superabsorbent Foam Dressings

- Foam facing
- Superabsorbent polymer core
- Increased absorption
- Increase fluid retention
- With or without adhesive borders
Wicking Fiber Dressings

- Wicking Fiber dressings
- Rapid transfer of exudate away from wound environment
- Aids in removal of bacteria, MMP's, slough
- Non-adherent
- Effective moisture management in heavily draining wounds

"E" – Edge/Environment
Convert Non-Advancing Edge to Advancing Edge

Non-advancing Edge
Advancing Edge

Failure of the epidermal edge of a chronic wound to migrate over granulation tissue of a chronic wound is probably due to abnormal extracellular matrix components that are damaged by excess proteases and senescent cells.

Non-Healing Wounds

- Stalled, Non-Healing Wounds require:
  - Aggressive treatment
  - Advanced technology dressings
  - Collagen dressings
  - Extracellular Matrix Dressings
  - Growth Factors
- More expensive but worth the investment if wound is not healing.
- Time is money!
  - CMS expects wounds to heal
  - Outcomes = Healing
  - If the wound isn't healing you are losing money!
Imbalanced Molecular Environments Of Healing And Chronic Wounds

**Healing Wounds:**
- Low levels of MMPs
- High levels of anti-MMPs

**Chronic Wounds:**
- High levels of MMPs
- Low levels of anti-MMPs


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**Protease Enzyme Imbalances**

- Failure of the epidermal edge of a chronic wound to migrate over granulation tissue of a chronic wound is probably due to abnormal extracellular matrix components that are damaged by excess proteases and senescent cells
- Matrix Metalloproteases (MMP’s) destroy collagen, extracellular matrix, and growth factors
- Elastase activates MMP’s and destroys anti-MMP’s

Pictures by Dr. Falanga and Dr. Warriner

Wound healing can be improved by locally manipulating growth factors, extracellular matrix (ECM), and the signaling pathways that regulate migration, proliferation, differentiation and metabolism of cells.

Edge/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 healing phases: growth of granulation, enhances epithelialization and contraction
- With or without silver

Advanced Wound Care Dressings (Collagen) vs Saline Gauze Dressings

<table>
<thead>
<tr>
<th></th>
<th>Saline gauze treatment</th>
<th>Sequential treatment with advanced wound care dressings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of dressing change</td>
<td>Daily</td>
<td>Daily or so required</td>
</tr>
<tr>
<td>Dressings costs per dressing change</td>
<td>$2.60</td>
<td>$1.10</td>
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<tr>
<td>Material costs for 2 months*</td>
<td>$1.10</td>
<td>$1.65</td>
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<tr>
<td>Costs for 1 nursing visit</td>
<td>$1.00</td>
<td>$1.00</td>
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<tr>
<td>Costs of 3 months of care**</td>
<td>$2.00</td>
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<tr>
<td>Goals of 3 months of care**</td>
<td>$2.00</td>
<td>$2.00</td>
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<tr>
<td>Wound healing complete wound closure</td>
<td>75%</td>
<td>&lt; 50%</td>
</tr>
</tbody>
</table>

* Average material costs included; saline, gauze, CPOICover and CPOI, dry sterile dressing, tape
** Average nursing costs included (nursing visits + wound evaluation, measurements, and photos when necessary; dressing changes, and charting

A Retrospective Study of Sequential Therapy with Advanced Wound Care Products versus Saline Gauze Dressings: Comparing Healing and Cost
Robert J. Snyder, DPM, CWS; Deborah Richter, RN, CWC A; and Mary Ellen Hill, PT
Ostomy Wound Management 2010;56(11A):9–15
Advanced Wound Care Dressings vs Saline Gauze Dressings

“A retrospective study of sequential therapy with advanced wound care products versus saline gauze dressings: comparing healing and cost”
Robert J. Snyder, DPM, CWS; Deborah Richter, RN, CWCA; and Mary Ellen Hill, PT
Ostomy Wound Management 2010;56(11A):9–15

“S” – Supportive Products, Services and Education

- Appropriate support promotes optimal outcomes
- There are other products that complement DIMES but do not fit into one of these immediate categories. Therefore, always consider the “other” supportive products to complete the treatment.
- Additionally, supportive services (i.e. nutritional therapy) and education are paramount to achieving the best possible outcome

Supportive Products

Composite Dressings
- Alldress (Molnlycke)
- Stratasorb (Medline)
- Versiva (ConvaTec)

Bordered Gauzes
- Bordered Gauze (Medline)
- Covaderm (DeRoyal)
- CovRsite (S & N)

Contact layer
- Versatel (Medline)
- Triact (Hollister)
- Mepitel (Molnlycke)
**Compression Dressings**

- Paste Boot
- Unna boots
- Multilayer compression
- Elastic tubular bandage

**Skin Sealants**

Use with every dressing change

Should be used to protect periwound skin from:
- Wound exudate
- Adhesives

**Cyanoacrylate Liquid Skin Protectant**

- Designed to protect against the effects of friction and moisture
- Forms a fully flexible and strong protective layer over intact and damaged skin
- Uses:
  - Skin Tears
  - Moisture lesions when a dressing will not stay in place
  - Peristomal Ulcers
  - Maceration
  - Partial thickness wounds
How Does it Work?

- Cyanoacrylate
- Monomer in its liquid form
- Polymerizes or "cures" when in contact with moisture (skin) or amino acids
- 100% monomer converts into a polymer
- No evaporation since there is no solvent in the product
- Chemically "bonds" to the skin

Skin Prep/Sealant
- Polymer dissolved in solvent
- Dilution issues: Just 9% of product is left as barrier after evaporation occurs
- Solvent safety issues
- Since it is a barrier on top of skin, it is removed by water or body fluids

Which dressing when?

- Match the needs of the wound
  - Wet or dry?
  - Flat or dead (open) space?
  - Location?
  - Moisture?
  - Infection?
  - Stalled, non-healing?
- Think about change frequency
- Effectiveness
- Cost

Wound ESP

- Person with Chronic Wound
- Identify and Treat Causative Factors:
  - Pressure, Venous Insufficiency, Arterial Insufficiency, Moisture (MASD), etc...
- Systemic Support
  - Address Systemic Factors that affect wound healing
    - Perfusion/Oxygenation, Nutrition, Diabetes, Anemia, etc...
- Prevention – First and Foremost!
  - Wound Bed Preparation/Product Selection
  - DIMES
- Debridement → Infection/Inflammation → Moisture Balance
- Edge/Environment
- Supportive Products, Services, and Education
Summary

- Mismanagement of wound patients can adversely affect your agency both financially and clinically.
- Accurate assessment and identification of the cause of the wound is essential to improving outcomes.
- Formulary Management is essential.
- Evidence-Based Wound Care Guidelines can help to control costs and improve outcomes.
- Effective Wound Management in the home care setting requires a Comprehensive Approach which addresses Etiology, Systemic Support, and appropriate Wound Bed Preparation and Product Selection.
- You Too Can Have WOUND ESP!

Thank You

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References

References


