Pearls for Wound Care in Family Practice

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Objectives

- Describe Moist Wound Healing Principles
- Describe Acute and chronic wound treatment options and documentation
- Discuss when to refer out

Moist Wound Healing

Moist wound healing principles to promote wound healing

Surgical Healing Rates

Rates of infection
Screening and immunizations up to date

Puncture wounds

BITES

SPIDER BITES VS MRSA
I & D of abscess

http://skinabscessimages@yahoo.com

How phases of acute and chronic wound healing differ

Acute and chronic wound treatment options and documentation

Anatomical Locations

Practice Principles

A wound location may assist in determining the etiology

Practice Principles

A wound location may assist in determining the etiology (eg, potential for contamination, difficulty accessing for cleansing) when selecting type or shape of cover dressing
Anatomical Locations

Type/Etiology

Practice Principle

Product indications/contraindications may be stated by classification or etiology, this guides safe product selection.

Skin Tear

Perineal Dermatitis

Pressure Ulcer

Venous Ulcer

Diabetic Ulcer

Arterial Ulcer

Surgical Wound

Burn

Wound Classification Algorithm

Wound Classification by Depth

Partial Thickness

Skin Tear

Ficition Injury

Stage II Pressure Ulcer

Partial Thickness Burn
Wound Classification by Depth

Full Thickness

- Amount
  - Minimal or no exudate
  - Light
  - Moderate
  - Heavy

- Type
  - Serous - clear or light yellow. Thin and watery
  - Sanguineous - red (with fresh blood). Thin
  - Serosanguineous - pink to light red. Thin, watery
  - Purulent - creamy yellow, green, white, or tan. Thick and opaque

Practice Principles

- Document amount and type. Consider absorptive dressing capacity for amount of exudate.
- Certain dressings interact with wound fluid and leave a gel or residue in wound that may resemble purulence.
- Exudate amount guides product choice.

Wound Exudate

- Type
  - Serous - clear or light yellow. Thin and watery
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Wound Odor

- Evaluate odor
- Document presence or absence

Practice Principles

- Autolytic and enzymatic debridement may result in odor.
- Odor is a natural result of semi-occlusive or occlusive dressings.
- Odor should not be noticeable after a thorough cleansing.
- Odor may be an indicator of other signs and symptoms.
- The presence of odor may guide product selection.
- Charcoal dressings may decrease odor in palliative care, silver dressings may reduce odor if secondary to burn tissue.

Surrounding Skin

Visual Assessment

- Maceration - softening of the tissues is due to excess moisture and is considered an abnormal finding. It presents as white tissue at the edges of the wound.
- Erythema - redness around the wound edges.
- Hyperpigmentation, or hemosiderin - discoloration may be present around the wound edges and should be documented when observed. It is a coloring or discoloration of the periwound tissues.
Surrounding Skin

Palpatory Assessment

- **Edema** - Assess for the presence of edema (swelling) within 4.0 cm of the wound edge, which may be pitting or non-pitting
- **Assess for heat**
- **Induration** - an abnormal firmness or hardness within the tissue margins

Assessing for edema


Documenting Tissue Types & Surrounding Skin

- Hemosiderin
- Epithelial tissue
- Granulation tissue
- Eschar
- Eschar/Slough
- Epithelial tissue
- Hemosiderin

Surrounding Skin

Tissue Type- guides product selection

- **Hypergranulation** - A thickening up building up of the tissue that inhibits epidermal cell migration or resurfacing across the wound, by proliferating above the intact margins of

Wound Edges/Margins

- **Indistinct** - “diffuse—unable to clearly distinguish wound outline”
- **Attached**, even with wound base -- “even or flush with wound base, no sides or walls present”
- **Not attached**, well-defined and not attached to wound base -- “sides or walls are present, floor or base of wound is deeper than edge”

Indistinct

Attached

Not attached

Practice Principles

- Seldom see hypergranulation in Diabetic foot ulcers or arterial ulcers BECAUSE THEY ARE USUALLY DRY WOUNDS
- Frequently seen in Venous ulcers and full thickness wounds NEEDING MOISTURE CONTROL

Tissue Types

1. Hemosiderin
2. Epithelial tissue
3. Granulation tissue
4. Eschar
5. Eschar/Slough
6. Epithelial tissue
7. Hemosiderin
Wound Margins/Edges

- Rolled under (epibole) – “thickened—soft to firm and flexible to touch.”
- Well defined, fibrotic, scarred, or hyperkeratotic – “callus-like tissue formation around wound and at edges.”

Practice Principles

- Rolled edges occur when the wound is allowed to dry out.
- Wounds with epibole will not heal unless the edges are removed.
- Calluses will lead to delayed healing.
- Wound edges/margins guide product selection.

Pain

Assess pain level at wound site using the pain scale/rating according to policy.

- At rest
- During palpation of surrounding skin
- During dressing changes

Pain Scales

- 0 None
- 1 Mild
- 2 Moderate
- 3 Severe

Clinical Signs of Infection

Acute Wounds - demonstrate local signs of inflammation

- Erythema
- Heat
- Pain
- Purulent exudate
- Edema

Classic Signs
Clinical Signs of Infection

Chronic Wounds can be subtle
- New breakdown or thickness
- Drainage - change in color and consistency, increase
- Pain or tenderness
- Ulceration, Debridement
- Skin breakdown
- Pocketing or undermining
- Bridging at the base of the wound
- Necrotic tissue superficially infected
- Delayed healing, non-healing
- Increased size or satellite areas
- Swelling, induration
- Probing to bone
- Undermining

Wound Culture Methods
- Swab cultures
- Wound fluid aspiration
- Wound biopsy

Practice Principles

Practice Principles

Wound Culture Methods
- Swab cultures
- Wound fluid aspiration
- Wound biopsy

Obtaining Swab Wound Cultures
- Z-Stroke Technique
- Levine Technique
When a Clinical Infection is Suspected

- Obtain order for culture
- Consider topical antimicrobial dressing (ie, silver, methylene blue/gentian violet impregnated dressing, or dressing with a hypochlorite solution)
- Obtain order for systemic antibiotics based on culture results

Wound Bioburden/Biofilm

- The presence of bacteria in the wound bed competing for a limited supply of oxygen and nutrients, creating a burden on the wound healing process
- More than the number of bacteria present
- Diversity, virulence, and interactions of organisms are also key factors
- A common reason for chronic wound deterioration and failure to heal

Progress Toward Healing

Documenting Healing

- Granulating or healing Stage IV wounds
- In long-term care, this would be reverse staged and documented as a Stage III for purposes of the MDS 2.0
- Granulating full-thickness diabetic ulcer

Progress Toward Goals

- Expected outcome
  - Decrease in amount of eschar/slough
  - Increase in amount of granulation tissue
  - Decrease in size, depth, tunneling/undermining
  - Palliative or hospice outcomes
  - Maintain the wound and minimize further deterioration of the periwound skin/tissues
  - Minimize the potential for wound infection
  - Enhance comfort and manage pain
  - Manage odor and exudate
  - Decrease the frequency of dressing changes
Progress Toward Goals

- Documenting percentage of tissue types illustrates progress toward goals.

Practice Principles

- Consider a high bioburden in wounds where healing is delayed.
- Excess Matrix Metalloproteinases (MMPs) and elastase may contribute to delayed wound healing.
- Topical antibiotics or hyaluronic acid may be indicated for delayed healing.
- Remove external contamination (e.g., feces, urine) from the wound that may contribute to bioburden. Consider fecal collection devices.
- Delayed healing guides product selection.


Skin Ingredient Definitions

- Humectant
- Surfactant
- Emollient


Protecting skin early on

- Teaching caregivers, patients, and families to be aware.
- Getting them to assess on a regular basis.
- Alerting them when something is found.
- Educate on what you are doing and why.
Skin exposed to fecal drainage at risk for pressure ulcers

Skin Tears

Definition – International Skin Tear Advisory Panel, 2011

A skin tear is a wound caused by shear, friction, and/or blunt force, resulting in separation of skin layers. A skin tear can be partial-thickness (separation of the epidermis from the dermis) or full-thickness (separation of both the epidermis and dermis from underlying structures).

New Classification System – International Skin Tear Advisory Panel (ISTAP) Consensus June 2013

Type 1: No skin loss
Linear or flap can be repositioned to cover wound bed

Type 2: Partial Flap Loss
Partial flap loss that cannot be repositioned to cover the wound bed

ISTAP Skin Tear Classification

Type 3: Total Flap Loss
Total flap loss exposing entire wound bed
Skin Tears — Risk Factors

- Elderly — advanced age
- Individuals requiring total care (e.g., bathing, dressing, repositioning, and/or toileting)
- Independent, ambulatory elderly
- Sight-impaired elderly — high risk of bumping into objects
- Sensory/cognitive impairment
- History of previous skin tears
- Fragile skin
- Use of assistive devices (e.g., wheelchair, walker, side rails, etc.)
- Use of adhesives
- Long term corticosteroid use
- Sex — Female
- Race — Caucasian

Skin Tears Prevention Highlights Include:

- Identify individuals at risk of developing skin tears (e.g., elderly)
- Provide a safe environment
- Avoid skin care products that dry skin (e.g., soaps and products containing alcohols)
- Bathe less frequently to avoid skin dryness (e.g., every other day)
- Apply moisturizers to dry skin
- Avoid scrubbing and rubbing skin

Signs of infection

- Fever
- Pain
- Abcess
- Abnormal smell
- Cellulitis
- Persistent inflammation with an exudate
- Warmth and redness
- Delayed healing
- Continued or increasing pain
- Edema
- Weak, crumbly granulation tissue that bleeds easily

Chronic Wounds

- Any wound greater than six weeks old is considered a chronic wound
- As the population ages, chronic wounds will become more frequent and prevalent, with increased chronicity.
Host impact on wound healing

Proportion of CMS Beneficiaries with Multiple Chronic Conditions

- Smoking causes vascular constriction, which decreases circulation and leads to chronic wounds.
- Elevated blood sugars
- Edema
- Poor arterial blood flow
- Pressure
- Poor Nutrition
- Poor hydration
- Maceration
- Age
- Infection
- Bioburden

Causes of delayed wound healing

Identifying Gaps in Caregiver Knowledge

- Assessment
- Dressing and wound care selection
- Establishing a plan of care

The Diabetic Foot
Lower Extremity Vascular Ulcers

- Venous Ulcer
- Arterial Ulcer
- Mixed Venous/Arterial Ulcer

Ankle Brachial Index

- ABI is a noninvasive test to detect LEAD
- An indirect method of assessing arterial blood flow in the lower limbs by comparing the brachial systolic pressure to the systolic pressure at the ankle
- Using a Doppler measure the brachial, dorsalis pedis, and posterior tibial systolic pressures.
- ABI = Higher Ankle Systolic
  Higher Brachial Systolic

Ankle Brachial Index (ABI) is a noninvasive test used to detect LEAD (Lower Extremity Artery Disease). It is an indirect method of assessing arterial blood flow in the lower limbs by comparing the brachial systolic pressure to the systolic pressure at the ankle. This is done using a Doppler, which measures the brachial, dorsalis pedis, and posterior tibial systolic pressures. The formula for ABI is the higher ankle systolic divided by the higher brachial systolic.
Ankle Brachial Index ratio

- ABI ratio is assessed to establish whether the patient’s lower extremity arterial blood flow is robust enough to withstand compression.
- An Ankle Brachial Index ratio is an ankle systolic pressure divided by a brachial systolic pressure.
- The determination of the ABI ratio is of paramount importance prior to deciding what level of compression therapy is suitable for the patient.

<table>
<thead>
<tr>
<th>ABI measurement value</th>
<th>Diagnosis</th>
<th>Compression</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.8-1.0</td>
<td>Venous</td>
<td>Normal</td>
</tr>
<tr>
<td>0.5-0.8</td>
<td>Mixed</td>
<td>Moderate</td>
</tr>
<tr>
<td>≤ 0.5</td>
<td>Arterial</td>
<td>None</td>
</tr>
</tbody>
</table>

Interpretation of ABI:

- > 1.3 Elevated (non-compressible arteries)
- ≥ 1.0 Normal
- ≤ 0.9 LEAD
- ≤ 06.08 Borderline
- ≤ 0.5 Severe Ischemia
- ≤ 0.4 Critical limb Ischemia

Venous Ulcers

*Venous ulcers are chronic skin and subcutaneous lesions usually found on the lower extremity at the pretibial and the malleolar medial areas of the ankle, where the perforator veins are located.*

Risk Factors for Alteration in Venous Flow:

- Thrombophlebitis (DVT/PE)
- Pregnancy
- Obesity
- Thrombophilic conditions
- Leg trauma

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<th>Risk Factor</th>
<th>Effect on Venous Flow</th>
</tr>
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<td>Thrombophlebitis (DVT/PE)</td>
<td>Damage to valve leaflets or chronic partial deep vein obstruction</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>Pressure on pelvic veins create resistance to venous return</td>
</tr>
<tr>
<td>Obesity</td>
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</tr>
<tr>
<td>Thrombophilic conditions</td>
<td>Increase the coagulability of blood</td>
</tr>
<tr>
<td>Leg trauma</td>
<td>Fist damage to the vessel walls and valves</td>
</tr>
</tbody>
</table>
Venous Ulcers

- Account for 70-90% of all leg ulcers
- More common in women than men
- Risk increases with age
- History of deep vein thrombosis (DVT) also increases risk of developing venous ulcers

Venous Stasis Surrounding Skin Assessment

- Venous dermatitis: erythematous, weeping, scaling, crusting
- Hemosiderosis: brown staining
- Lipodermatosclerosis: Atrophy Blanche
- Temperature: normal; warm to touch
- Edema: pitting or non-pitting; possible induration and cellulitis
- Scars from previous ulcers, ankle flare, tinea pedis
- Infection: Induration, cellulitis, inflamed, tender bulla
- Pain: Minimal unless infected or desiccated
- Peripheral pulses – Palpable/present
- Capillary refill – Normal (< 3 sec.)

Arterial Ulcers

Ulcers that are caused by an impairment in the arterial circulation, that results in ischemia, necrosis, and eventually ulcerations.

"Arterial ulcers are wounds that will not heal due to compromised or inadequate arterial blood flow."

Arterial Ulcer

- "The most common cause of Lower Extremity Arterial Disease (LEAD) is atherosclerosis."
- Prevalence - "4-39% of persons over the age of 70 and 29% of those 50-69 years of age who use tobacco or have diabetes."
- Patients with LEAD are at risk for non-healing wounds, infection and limb loss
Risk Factors for Alteration in Arterial Flow

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Effect on Arterial Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Past and present cigarette smoking</td>
<td>Vasoconstriction, platelet aggregation and clot formation</td>
</tr>
<tr>
<td>Diabetes</td>
<td>Platelet aggregation, clot formation, vessel hypertrophy</td>
</tr>
<tr>
<td>Hypertension</td>
<td>Vessel wall changes</td>
</tr>
<tr>
<td>Obesity</td>
<td>Atherosclerosis, compression</td>
</tr>
<tr>
<td>Sedentary lifestyle</td>
<td>Platelet aggregation, thrombus formation</td>
</tr>
<tr>
<td>Elevated cholesterol</td>
<td>Endothelial injury and atherosclerosis</td>
</tr>
</tbody>
</table>

Arterial Insufficiency Ulcer

Wound Assessment
- Location: Toe tips or web spaces, phalangeal heads, lateral malleolus, mid tibial areas exposed to pressure or repetitive trauma, or rubbing of footwear.
- Color: Base of wound pale
- Granulation tissue: Rarely present
- Necrosis, eschar, gangrene may be present
- Depth: May be deep
- Wound margins: Edges rolled, punched out, smooth and undermining
- Exudate: Minimal
- Infection: Frequent

Surrounding Skin Assessment
- Color: Pallor on elevation, dependent rubor
- Skin temp: Decreased/cold
- Skin: Shiny, taut, thin, dry, hair loss on lower extremities, atrophy of subcutaneous tissue
- Edema: Variable, localized edema may indicate infection
- Intermittent claudication, resting, positional, nocturnal
- Peripheral pulses: Absent or diminished
- Capillary refill: Delayed
- ABI <0.9

Arterial Ulcers

Wound Management Highlights Include:
- "...seek care guided by a clinical wound expert."
- Determine vascular status and select treatment plan based on perfusion status.
- Cleanse wound with a noncytotoxic wound cleanser or normal saline.
- Do not debride stable, black eschar until perfusion status is determined. Debridement may be contraindicated in arterial wounds.
- Moist wound dressings may be beneficial for open and draining ischemic wounds with soft devitalized tissue or exposed bones or tendons.
- Choose dressings that allow for frequent assessment and monitoring.
- Identify and treat infection.
Indications for Debridement:

- "... any wound, acute or chronic, when necrotic tissue (which may be slough or eschar) or foreign bodies are present."
- "... wound is infected."

Contraindications for Wound Debridement:

- "Dry, stable (ie, noninfected or nonfluctuant) ischemic wounds or those with dry gangrene should not be debrided until perfusion to the extremity has improved."
- "Stable eschar covered heels (ie, absence of edema, erythema, fluctuance or drainage)"
- "Clean, viable tissue"
Mixed Venous-Arterial Ulcers

- **Location**: Medial aspect of the lower leg and ankle, superior to the medial malleolus
- **Color**: Base ruddy or pale
- **Surrounding skin**: Erythema or brown staining common
- **Depth**: Usually full-thickness
- **Wound margins**: Regular or irregular
- **Exudate**: Moderate to heavy
- **Edema**: Present
- **Skin temperature**: Cool due to arterial disease
- **Granulation tissue**: May be present
- **Infection**: May be present

**Wound Management Highlights Include:**

- "...seek care guided by a clinical wound expert."
- Determine vascular status and select treatment plan based on perfusion status.
- Cleanse wound with a non-irritating wound cleanser or normal saline.
- Moist wound dressings may be beneficial for open and draining ischemic wounds with soft devitalized tissue such as slough or exposed bones or tendons.
- DO NOT debride stable, black eschar until perfusion status is determined or for non-infected arterial wounds.
- Light compression (23-30 mmHg) for patients with ABI between 0.5-0.8. For ABI < 0.5 refer to a vascular surgeon.
- Choose dressings that allow for frequent assessment and monitoring.
- Manage wound infection

**Wound Product Category Examples**

<table>
<thead>
<tr>
<th>Product Type</th>
<th>Description</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrogel</td>
<td>Retains moisture and helps hydrate wounds; supplied in aqueous gel or sheet form.</td>
<td>On Wound or Ulcer's edge, covering type 2 or 3 skin tear.</td>
</tr>
<tr>
<td>Foam</td>
<td>Absorbent adhesive or non-adhesive – most adhesives are silicone-based.</td>
<td>Primary on shallow; prepping, meshing on deep wounds; prophylactic on fingers of adverse areas type 1, 2, or 3 skin tear.</td>
</tr>
<tr>
<td>Product Type</td>
<td>Description</td>
<td>Uses</td>
</tr>
<tr>
<td>------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------</td>
</tr>
<tr>
<td>Alginate/Hydrofiber®</td>
<td>Absorbent, non-adherent, gelling, hemostatic activity, promotes MWH.</td>
<td>Primary dressing on moderate to heavily draining wounds; require cover dressing on Type 2 or 3 skin tears.</td>
</tr>
<tr>
<td>Composite Dressings</td>
<td>Multi-layer dressings designed to absorb and cover the wound, promotes MWH.</td>
<td>Primary dressing on shallow wounds; secondary dressing on deep wounds; Type 1, 2, or 3 skin tears.</td>
</tr>
<tr>
<td>Antimicrobial</td>
<td>Examples include silver impregnated, honey, cadexomer iodine dressings in different types of dressings.</td>
<td>Highly contaminated or infected wounds; Type 2 or 3 full thickness skin tears.</td>
</tr>
</tbody>
</table>

Foams and hydrocolloids

A Nonwoven Dressing With Hydrofiber Technology

Hyrdogels

Winter G (1962) Formation of the Scab and the Rate of Epithelisation of Superficial Wounds in the Skin of the Young Domestic Pig. Nature 193, 293 – 294

HONEY impregnated products

http://www.honeyforwoundcareimages

NPWT
(Negative Pressure Wound Therapy)

http://www.negativepressurewoundtherapyimages

Antimicrobial solutions and gels

- Hypochlorite solutions/gels
- Sulfamylon solution
- Dakins solution
- Acetic Acid solution

Use Dressings that Adhere and stay on for daily activities
Hydrofiber AG with thin hydrocolloid

Skin protected from maceration on and ostomy effluent
Painful lower extremity

12/01/10 12/26/10

LEG ULCERS – compression is the GOLD Standard for healing

2/12/2010 3/13/2010

Debridement:
- Wet to dry is out
- Autolytic
- Enzymatic
- Biomedical
- Sharps

3 dress changes with hydrocolloid dressing
- Day 1
- Day 20
Components of wound care team

Effective healing of chronic wounds requires patients to comply with a treatment regimen and/or health advice

Basic needs of client
- Environment
- Physical support
- Emotional Support
- Nutrition

Factors impacting Patient Compliance
- Caregiver bias/communication
- Patient: knowledge of Disease/Wound healing process
- Patient's literacy, economic and cultural
- Examine pain practices including cultural
- Low Income/immigration status/uninsured
Nutrition in wound healing

A thorough nutritional assessment MUST include:

- Food and Nutritional history
- Cultural and religious eating habits

Every effort must be made to meet the needs within the context of cultural and religious beliefs.

Non-healing chronic wounds and wound emergencies

Necrotizing Fasciitis

http://necrotizingfaciitisimages@yahoo.com

Necrotizing Fasciitis
TENS - Toxic Epidermal Necrolysis
SJS - Stevens-Johnson Syndrome

SJS - also known as erythema multiforme major
- SJS involves less than 10%

TENS
- TEN involves more than 30% of the body surface
- TEN with spots
- TEN without spots
- Overlap Stevens-Johnson syndrome and TEN (SJS-TEN)

Resources:
The concise, convenient and comprehensive handbook that fits in a lab coat pocket!

- What's new in this edition?
- The latest updates on new products, antibiotics and evidence-based guidelines
- New section on medicolegal considerations in managing wounds in nursing home patients
- New section on pediatric wound management

http://www.swmhandbook.com/


