Dressings in Wound Care: They Do Matter…

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“Dressings do not heal wounds…properly selected dressings enhance the body’s ability to heal the wound.”


Wound Bed Preparation

- Clean, viable wound bed
- Non-infected wound
- Control of contamination
- Minimal exudate
  - Surgically debride
  - Pre-treat with systemic and/or topical antimicrobials
  - Optimize wound bed and decrease bacterial load
- MMP Balance
- Culture?


Progression Towards Healing
Properties of the “Ideal” Dressing

- Maintain a moist wound environment
- Provide mechanical protection
- Non-adherence to the wound
- Absorb excess exudate
- Allowance of gaseous exchange
- Barrier for contamination
- Ease of use
- Cost effectiveness

Factors Influencing Dressing Selection

- **Wound Type**
  - superficial, partial thickness, full thickness, cavity
- **Wound Description**
  - necrotic, slough, granulating, epithelializing
- **Wound Characteristics**
  - dry, moist, heavily exudative, difficult to dress, friable, painful, malodorous
- **Bacterial Profile**
  - sterile, colonized, critically colonized, infected

Categories of Dressings

- Films
- Hydrocolloids
- Alginites
- Carboxymethylcellulose
- Foams
- Enzymatic debriders
- Biologics
- Growth Factors
- MMP Inhibitors
- Antisectics
- Hydrofibers
- Antimicrobial topicals
- Silver
- Hydrogels
- Atraumatic
- Collagens
- Gauze
- Compression Therapy
- NPWT
- Nonadherent
- Absorptives
- Larval therapy

Topical Antiseptics and Wound Cleansing

- 0.25% Acetic Acid
- ½ Strength Dakin’s Soln
- Normal Saline

- Avoid H₂O₂ and Iodine
- Surgical Debridement
- Maintenance Debridement
Cellular and Tissue Based Products for Wounds

**Non-Living Tissue Adjuncts (DermoConductive):**
- porcine intestinal submucosa
- porcine urinary bladder
- bovine collagen and chondroitin-6-sulfate
- gamma irradiated human allograft skin
- human dermal allograft
- equine pericardium

**Living Tissues (DermoInductive):**
- human dermal fibroblasts and epidermal keratinocytes in bovine collagen matrix
- human dermal fibroblasts cryo-preserved in polyglactin mesh
- amnionic membrane

Bio-Active Wound Adjuncts

**Tissue Scaffolds**

**Dermal Regeneration Layer**
- Three-dimensional porous matrix of cross-linked type I bovine collagen and glycosaminoglycan
- Controlled porosity
- Defined degradation rate
- Promotes cellular infiltration

**Temporary Epidermal Substitute Layer**
- Composed of synthetic polysiloxane polymer (silicone)
- Controls moisture loss from wound
- Mechanically protects the wound

Negative Pressure Wound Therapy

- Closed Wound Environment
- Stimulates Angiogenesis
- Efficient Exudate Removal
- Moist Wound Base
- Minimal Disruption of Wound
- ‘Exercise’ Cell Membrane
- Re-approximates Skin Edges
- Amputations vs. Ulcers
- Adjunct to grafting and other wound closure techniques

Negative Pressure Wound Therapy after Partial Diabetic Foot Amputation: a multicentre, randomised controlled trial.


**Study Summary:**
- 162 patients
  - 16 week study
  - 18 centers in USA
- Inclusion Criteria
  - Partial foot amputation up to TMA
  - Adequate perfusion
- Study Arms:
  - NPWT (n=77) with dressing changes q48h
  - Control (n=85) standard moist dressings
  - Treated to healing or 112 days
Negative Pressure Wound Therapy after Partial Diabetic Foot Amputation: a multicentre, randomised controlled trial.

- Findings:
  - More patients healed in the NPWT than control
    - 43 (56%) vs. 33 (39%) with p=0.040
  - Rate of wound healing was faster in NPWT than control
    - Based on time to complete closure with p=0.005
  - Rate of granulation tissue formation was faster in NPWT than control
    - Based on time to 76-100% formation in the wound bed p=0.002
  - Frequency and severity of AE was similar in both treatment groups
  - NPWT patients were less than a fourth as likely as control to need a second amputation

Methods
- Retrospectively analyzed consecutive patients with historical control
- Data gathered from inpatient charts from a single institution (MedStar Georgetown University Hospital)
- 4 surgeons: 2 plastic surgeons, 2 podiatric surgeons
- 142 patients who received NPWT or NPWTi for the same time period

Device
- Negative pressure
  - V.A.C.Ultra™ System with V.A.C. VeraFlo™ (Kinetic Concepts, Inc.)
    - -125 mm Hg, continuous
    - 3.5 hours/2 hours of NPWT (for NPWTi)
- Instillation
  - Prontosan®, polyhexanide + betaine (B.Braun Medical Inc.)
    - 6/20 minute soak (dwell) time
    - Volume: varies on wound size; when the foam is visibly saturated

Negative Pressure Wound Therapy with Instillation

Methods

- **Independent Variables**
  - OR visit #1 post-debridement qualitative cultures vs OR visit #2 pre-debridement cultures
  - Number of OR visits
  - Length of hospital stay
  - Percent closed prior to discharge
  - Number of days to closure (from the time of admission)

- **Qualitative Bacterial Cultures**
  - Cultures taken from deepest margin of the wound or infected site
  - Results converted to nominal data
    - No growth = 1
    - Scant growth = 2
    - Few growth = 3
    - Moderate growth = 4
    - Heavy growth = 5


Results

<table>
<thead>
<tr>
<th>Table 3. Outcomes</th>
<th>NPWT</th>
<th>NPWT:6</th>
<th>NPWT:20</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of OR visits</strong></td>
<td>3.0 (0.9)</td>
<td>2.4 (0.9)</td>
<td>2.6 (0.9)</td>
</tr>
<tr>
<td><strong>Length of hospital stay</strong></td>
<td>14.0 (6.5)</td>
<td>11.9 (7.9)</td>
<td>13.1 (1.1)</td>
</tr>
<tr>
<td><strong>Time to final surgical procedure</strong></td>
<td>11.9 (5.4)</td>
<td>7.6 (5.2)</td>
<td>7.6 (8.1)</td>
</tr>
<tr>
<td><strong>No growth</strong></td>
<td>46 (02)</td>
<td>32 (04)</td>
<td>27 (00)</td>
</tr>
<tr>
<td><strong>Scant growth</strong></td>
<td>53 (01)</td>
<td>24 (03)</td>
<td>14 (02)</td>
</tr>
<tr>
<td><strong>Few growth</strong></td>
<td>55 (08)</td>
<td>29 (09)</td>
<td>17 (09)</td>
</tr>
<tr>
<td><strong>Moderate growth</strong></td>
<td>28 (08)</td>
<td>29 (09)</td>
<td>17 (09)</td>
</tr>
<tr>
<td><strong>Heavy growth</strong></td>
<td>17 (05)</td>
<td>19 (98)</td>
<td>13 (65)</td>
</tr>
</tbody>
</table>

*Comparison of NPWT and NPWT:6
*Comparison of NPWT and NPWT:20


Case Study: CT

- **Patient Information:**
  - 39 y/o male left forefoot ulceration x 11 months

- **Medical History:**
  - Diabetes Type 2 x 7 years
  - Hypercholesterolemia, HTN
  - 1989 Foot injury following lawnmower incident

- **Surgical History:**
  - 1989 Achilles tendon repair

- **Medications:**
  - Cozar, Lipitor Humalog, Lantus

- **Family History:**
  - Diabetes, Stroke

- **Social History:**
  - Denies ETOH and Smoking

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Conclusions