Wound Dressing Product Selection

A Holistic, Interprofessional Patient-Centered Approach©

A Kestrel *WoundSource* White Paper

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INTRODUCTION & CONCEPTUAL FRAMEWORK

Many wound care clinicians remember the "good old days" when wound dressing product selection simply involved choosing between a handful of products that were essentially variations on the same theme. There was gauze, impregnated gauze and filled gauze pads. In the earlier 20th century, clinicans added antimicrobial solutions, creams and ointments (like Dakin's solution developed during World War I and silver sulfadiazine developed in the 1960's) and the wound care formulary was limited and simplistic.

Fast forward to the 21st century and wound care clinicians are confronted with a totally different situation: hundreds of products, scientific rationale for moist interactive dressings and an emerging evidence-base for product selection.

Current wound care expertise encompasses numerous dressing-related skills including:

- *Treating the cause of the wound* and addressing *patient centered concerns* to set the stage for local wound care
- Properly *assessing the wound* and identifying the dressing requirements
- Selecting *dressings based on their form and function* for an individual wound's needs
- Meeting *setting-specific requirements* for dressing change frequency and maintenance
- Addressing *formulary or healthcare system availability* as well as reimbursement requirements

Wound care product selection today must be as sophisticated and as evidence-based as possible. This Kestrel White Paper presents a conceptual framework for the wound dressing product selection process that is based on three principles:

- Holistic Perspectives (1)
- Interprofessional Considerations (2)
- Patient-Centered Concerns (3)

This conceptual framework is illustrated in Figure 1 below and is discussed in detail in this paper.

For every complex problem,
there is a simple solution,
and it is wrong.
–H. L. Menken

Selecting appropriate wound dressing products and supportive care to maximize healing and patient outcomes is a complex process. Dressing and local wound care options based on science and best practices must be filtered by clinical experience and must be consistent with patient preferences, caregiver requirements and setting/access issues (4). Additionally, effective dressing selection and local wound care planning involve the perspectives of the entire interprofessional team (2).

Knowing the performance parameters of dressing categories/ individual products and matching these attributes to an individual's wound can optimize the healing process (5). But dressings are only one piece of the puzzle. Dressings alone will not promote wound healing, unless the underlying cause(s) for the wound are also addressed (e.g. treatment of the wound cause, blood supply, nutrition, patient centered concerns, local wound care etc.). As the wound changes, the plan of care must change and dressing products may have to be changed. Appropriate dressing product selection:

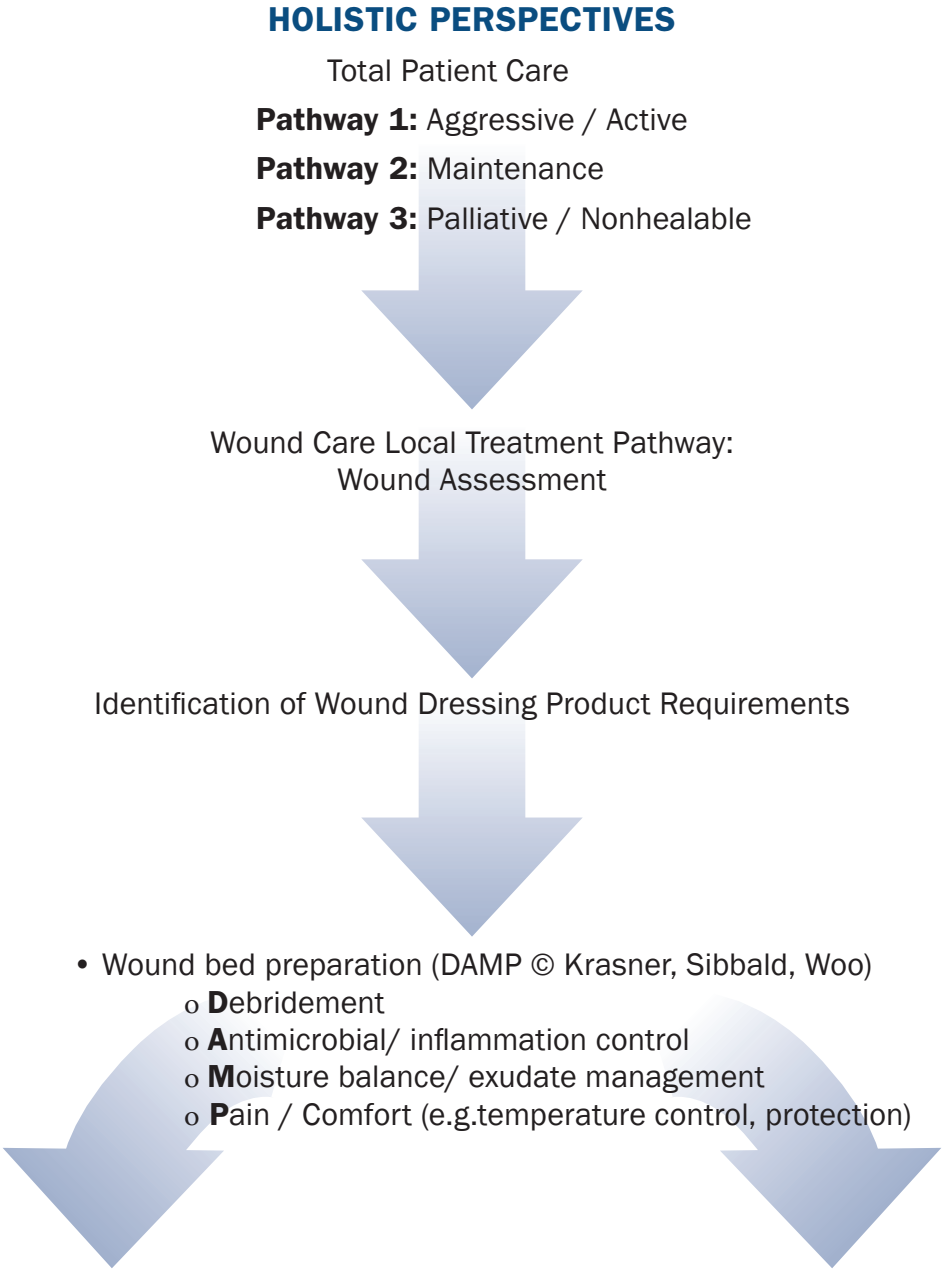
- Optimizes the local wound healing environment
- Reduces local pain and suffering
- Improves activities of daily living and quality of life

Inappropriate dressing selection can:

- Cause the wound status to deteriorate (e.g. wound margin maceration, increased risk of superficial critical colonization or deep infection, skin stripping).
- Increase local pressure or pain especially at dressing change (dressing removal and cleansing).
- Increase costs with the need for frequent dressing changes or the selection of an inappropriate advanced or active dressing.

National and international wound care guidelines and best practice documents mean that there is no longer a local standard of care. No matter where you practice, you will be held to national/international standards of wound care practice (6). Some experts have argued that the selection of the wrong dressing is just as problematic as the administration of the wrong drug and the clinician would be just as liable in a court of law. If dressings can be shown to delay the healing process (e.g. wet-to-dry gauze dressings in a wound that requires moist wound healing, pain from inappropriate adhesives, failure to treat critical colonization that can lead to deep infection), their use might be deemed negligent by a jury in a court case.

FIGURE 1
CONCEPTUAL FRAMEWORK FOR WOUND DRESSING PRODUCT SELECTION©



HOLISTIC PERSPECTIVES

Wound dressing product selection must be consistent and congruent with the total plan of care for the person with a wound. Four questions that the clinician should consider are:

1. What type of wound is it? What is the underlying etiology/ cause & and can you treat or correct the cause? (e.g. pressure, venous, neuropathic, neuroischemic, ischemic, etc)
2. Is it healable, maintenance or non-healable/palliative?(7)
3. Is the wound colonized, critically colonized or infected in the deep or wound margin? (8, 9)
4. Is the plan of care aggressive/active, maintenance or palliative/non-healable?

If the overall plan of care for the person is aggressive / active, the dressing plan should be aggressive / active. So for example, if a person has an exudating, infected diabetic foot ulcer with osteomyelitis that is being treated with hyperbaric oxygen therapy and serial debridements, a dressing such as a silver alginate or a silver foam dressing would be the dressing of choice (10). On the other hand, if a person is dying and on hospice and the goal of care is to palliate an exudating, infected diabetic foot wound with osteomyelitis, then a topical antimicrobial such as cadexamer iodine or povidone iodine, chlorhexidine or its derivatives (PHMB: Polyhexylmethylenebiguanide) might be a congruent choice.

In clinical practice, occasions occur frequently when patients are too sick to choose an aggressive pathway for their wound care. A common scenario is when a patient is in critical condition in an intensive care unit, on a respirator, immobilized, anticoagulated and his life hangs in the balance. The patient develops a sacral pressure ulcer that quickly goes from a partial thickness lesion to a full thickness wound with eschar. A holistic approach to wound care would lead to the maintenance pathway. Aggressive / active care in a critically ill patient would be unreasonable. Debridement of eschar in an anticoagulated patient with little healing potential is not a reasonable or prudent practice. A more reasonable option is to maintain the wound using a dressing that would protect the area and keep the eschar stable until the patient improves (at which point the aggressive / active pathway kicks in) or the patient deteriorates (at which point the palliative / nonhealable pathway is chosen).

WOUND ASSESSMENT AND IDENTIFICATION OF WOUND DRESSING REQUIREMENTS

Wound care requires a holistic approach looking at the 'whole' patient not just the 'hole' in the patient. The very first step of the assessment should aim to determine the accurate wound diagnosis and the cause of the wound. Despite the importance of dressings, wound healing can only be optimized when the underlying wound cause is corrected. For example, strategies to reduce tissue deformation (pressure, friction and shear) are crucial to promote healing of pressure ulcers. Patients with venous leg ulcers benefit from venous congestion improving compression therapies (bandages for healing or support stockings to prevent recurrence). Footwear or devices should be considered to redistribute pressure away from diabetic or other neurotropic foot ulcers. It is important to remember that wounds are not likely to heal if arterial supply is deficient unless patients undergo bypass or dilation of the affected arteries. Other related factors that may influence wound healing and warrant regular evaluation include nutrition, coexisting medical diseases and certain medications. When healing is not the realistic objective, moisture is contraindicated; instead, conservative debridement without cutting into living tissue, bacterial reduction, and moisture reduction should be considered.

The first step in wound care is to carefully document the wound characteristics;

- Location
- Size: Longest length and the widest width (at right angle to the longest length or oriented by a head to foot perspective)
- Depth as usually measured by a cotton swab or sterile probe
- Undermining and tunneling: location on the clock and extent as measured by a probe
- Wound Margin: normal, macerated, erythema, edema, warmth or increased temperature
- Wound Base: by percentage
    - o Black-brown firm eschar
    - o Brown yellow soft slough (harmful)
    - o Yellow firm tissue that may serve as a foundation for granulation (healthy)
    - o Pink firm healthy granulation tissue or unhealthy red friable tissue
    - o Exudate:
        - serous, sanuginous, or pustular or combinations
        - Large, moderate,scant, absent
    - o Epithelial edge
        - Sloped purple of advancing healing epithelial margin
        - Steep slope of stalled chronic wound
    - o Exposed tissues (tendon, bone) that may not allow granulation on top
    - o Foreign bodies (e.g. gauze fragments, sutures, hardware)

To prepare a wound bed for healing, devitalized and damaged tissue such as firm eschar or sloughy materials that promote bacteria growth should be removed or debrided. Topical dressings are used to promote autolytic debridement through the activities of phagocytic cells and endogenous enzymes. Another key function of wound dressings is to manage localized wound infection. All chronic wounds are colonized by bacteria. If bacteria were allowed to proliferate crossing a critical threshold, local tissue damage can lead to delayed healing. Many modern dressings contain active antimicrobial ingredients that are released into the wound surface compartment in an exchange with wound fluid. Dressings with silver are one of the most popular choices of topical agents. Alternatively, bacteria can be entrapped and sequestered in the micro-architecture of a dressing where they may be inactivated. For non-healable wounds, topical antiseptics dry the wound surface and provide bacterial reduction.

For wounds that have the potential to heal, moisture balance (not too much or too little) is essential for all phases of wound repair. An ideal dressing should be able to keep the wound bed moist for cellular proliferation and migration but at the same time sequester excess drainage to avoid peri-wound damage.

The major categories of wound dressings are foams, alginates, hydrofibers, hydrogels, and hydrocolloids. These are discussed briefly below.

FOAM DRESSINGS are designed to wick up a large volume of exudate. The fluid handling capacity of various foams can be affected by the polyurethane film backing and its ability to transfer moisture vapor out of the dressing but form a barrier to bacterial contamination. Depending on the level of wound exudate, foams have a wear time of one to seven days.

Foams absorb moisture but also give moisture back to a wound if the gradient on the surface becomes dehydrated. This function can lead to periwound maceration but advanced foam dressings have variable pore sizes that will facilitate partial moisture retention and partial moisture exchange with the wound surface. These second generation foams are less likely to macerate the wound margin. Foams have also been combined with antiseptics (silver, PHMB) and other agents to serve as a delivery vehicle for active therapies at the wound surface (third generation of foam development.) Foams that are associated with excessive periwound maceration can be cut to the wound size, fenestrated on the top to wick to a secondary dressing or changed more frequently.

ALGINATE DRESSINGS are also capable of handling copious exudate while the gelling effect of these materials will keep the wound base moist. Unlike foams, calcium alginates are bioresorbable (may disappear) and bind fluid to the outside of the fibers rather than the inner pores. Alginates are derived from brown seaweed or kelp. Depending on the species and origin of the calcium alginate (leaf, stem), they may have more gelling (high manuronic acid concentration) or a higher fiber strength (high galuronic acid concentration). These dressings are manufactured in sheets (lateral fluid wicking) or in ropes (vertical fluid wicking). When the alginate is extracted from kelp, it is a sodium hydrogel that can be combined with calcium to form a fibrous structure. When they are applied to the wound, the calcium as part of the alginate is released into the wound and may also trigger the coagulation cascade to facilitate hemostasis. The sodium is exchanged for calcium at the level of the alginate, recreating a sodium alginate hydrogel. In comparison to foams, calcium alginates are less absorptive but they have the ability to act as excellent autolytic debriders. Dressings with alginates are often changed daily or as infrequently as three times a week.

HYDROFIBER DRESSINGS consist of Carboxymethylcellulose and have a water hating (hydrophobic) component (methylcellulose) that gives this dressing its tensile strength and a water loving (hydrophilic) component (Carboxy) that acts as a fluid lock. As the dressing absorbs fluid, the hydrofiber is converted into a gel consistency. Hydrofiber dressings are thin and have moderate absorbency forming a fluid lock. When the hydrofiber is saturated wound fluid strike through will occur. These dressings require a secondary dressing to keep them in place because the addition of an adhesive will interfere with the fluid absorption properties of the dressing.

HYDROGEL DRESSINGS are usually indicated for dry wounds. The major ingredient of hydrogels is water (70 to 90%) that donates moisture into the wound base. The backbone for a hydrogel may be a hydrocolloid, propylene glycol, saline or other substance. This backbone gives them their viscosity or tack to stay on the wound bed. They are excellent autolytic debriders and preserve moisture balance, largely through donating moisture to the wound surface. They are often changed daily to three times a week.

HYDROCOLLOID DRESSINGS consists of a backing (often a film or polyurethane) with carboxymethylcellulose, water absorptive components (such as gelatin and pectin) and an adhesive. Hydrocolloids are designed for wear times of one to seven days and for this reason their absorbency is lower than foams or calcium alginates but similar to hydrogels. When these dressings are used for autolytic debridement, they may need to be changed more frequently and may require the removal of non-viable slough from the surface of the wound to prevent odor or secondary bacterial proliferation under the wound. These dressings often lower the wound surface pH that may contribute to their antimicrobial effect. Some hydrocolloids leave more residue on the wound surface than others and this residue may contribute to wound odor under the hydrocolloid dressing.

FILM DRESSINGS are often used for local protection. The choice of a non-adherent (no adhesive) versus a film with adhesive backing should be determined by the fragility of the surrounding skin. Film materials are semi-occlusive with various degrees of permeability (referred to as the Moisture Vapor Transmission Rate: MVTR) that allow a water molecule to pass through the dressing and evaporate into the ambient environment at a variable rate depending on the moisture vapor transmission rate. They are not designed for fluid accumulation below the film. When fluid develops under the dressing it needs to be evacuated or the dressing changed because the relatively alkaline pH under these dressings with fluid accumulation will promote bacterial proliferation. As an alternative to traditional adhesives (accrylates, hydrocolloids), silicone coatings have been used to reduce local trauma and prevent pain on dressing removal.

INTERPROFESSIONAL CONSIDERATIONS

When different professional groups are involved in a wound patient's care, there may be interprofessional considerations that will have bearing on the dressing selected. Finding a way to accommodate each discipline's unique perspectives and needs enhances interprofessional wound care (see Figure 2 below)(2). Here are several common examples:

- In an acute care facility, the Surgical Team wants to examine a dehisced surgical wound on daily rounds, so a dressing that is changed daily and can be lifted off and replaced without compromising the dressing adherence is the best choice (e.g. silicone foam vs. adhesive foam or gauze dressing).
- In any setting, the physicians need to measure the output from a draining tube site (e.g. nephrostomy tube site). Discontinuing absorbent gauze pads (e.g. abdominal dressings – ABDs) and using a cut-to-fit urostomy pouch allows accurate measurement of the drainage and protects the peri-wound skin from maceration and erosion.
- In an outpatient wound center, the hyperbaricist needs to assess the wound daily following hyperbaric treatment. A non-adhesive, daily or between treatment dressing change is needed (e.g. hydrogel, hydrocolloid or other modern moist interactive dressing).
- In a nursing home, the Physical Therapy Department will begin Rehabilitation Therapy on a resident with a diabetic foot ulcer. A dressing that minimizes pressure on the wound bed when the resident ambulates is optimal (e.g. a piece of alginate rope versus a gauze 2x2) with a thin but secure secondary dressing to avoid interfering with the plantar pressure redistribution.

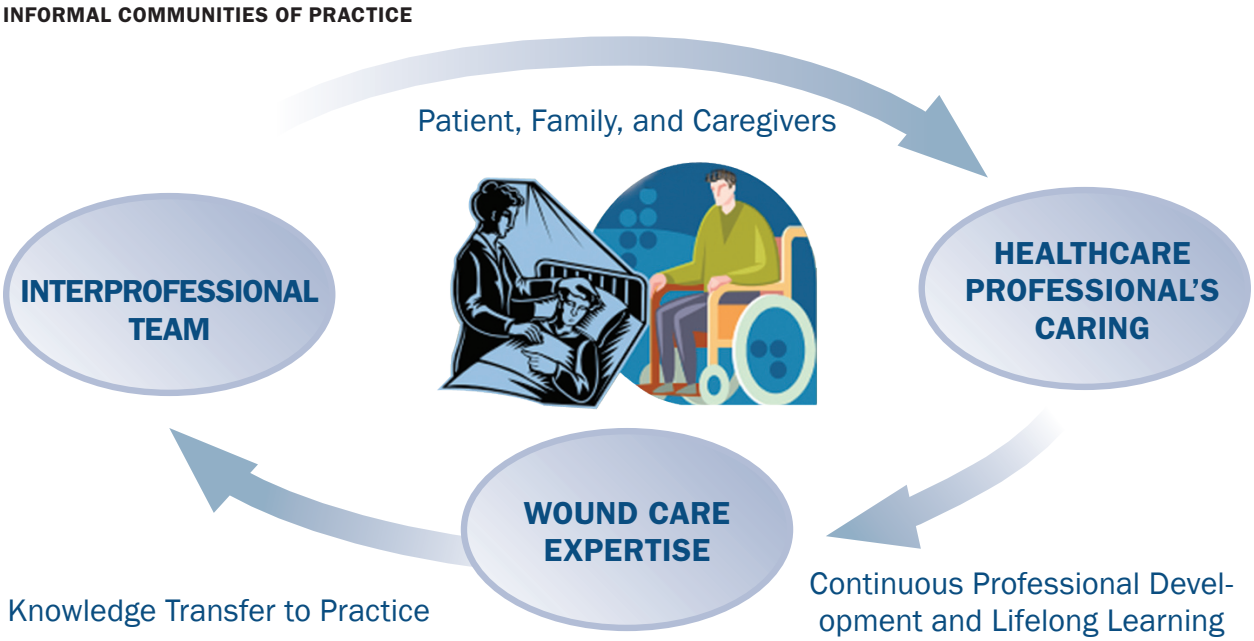
Interprofessional collaboration on dressing selection can prevent complications (such as skin stripping or skin tears) from changing dressings too frequently, having inappropriate adhesive backing or inadequate moisture balance or lacking required anti-microbial properties. Careful coordination reduces costs and dressing-associated labor.

Another occasion when careful dressing coordination is needed is during wound patient/ client transfers from one healthcare setting or service to another including a discharge home. For example, the optimal dressing for acute care may not be available or reimbursed in long-term care or home care. In the United States, if the person has been a resident in long-term care and is moved to hospice care, the Hospice will provide the dressings for the resident while he/she is in the nursing home as part of the per diem Hospice Benefit. This may necessitate a change of dressing depending on the hospice dressing formulary.

Finally, is your interprofessional team up to standards? Are you able to provide holistic, patient-centered care? Ask yourself the following three questions:

- Does your wound team have the resources (human and otherwise) and knowledge to provide advanced patient-centered wound care?
- Do you have the referral sources in place to meet the needs of selected wound patients (especially their psychosocial and social needs) along with rehabilitation support?
- Does your wound team and dressing formulary enable you to address the needs of special populations (such as bariatric, diabetic, frail elderly and palliative) in a timely and appropriate manner?

FIGURE 2. THE INTERPROFESSIONAL WOUND CARING MODEL©



PATIENT-CENTERED CONCERNS

Individualized wound care plans that address specific patient centered concerns are most likely to succeed and promote the best outcomes for the patient with a wound. Standardized, "canned" wound care plans often fail because they do not promote patient adherence / coherence. The patient may be labeled "non-compliant" when the real problem is that the care plan has not been properly individualized to the person's specific needs/problems and he/she cannot possibly comply with the routine way. The road to wound care planning success is paved with careful attention to patient-centered concerns, including pain management, odor control, body image & psychosocial concerns and reimbursement/cost issues.

Common examples of patient centered concerns that impact dressing product selection include:

- Premedicating patients who experience dressing change pain prior to dressing changes and allowing adequate time for the premedication to take effect
- Selecting when appropriate non-adherent dressings to reduce pain and trauma at dressing change
- Addressing odor control issues by utilizing absorbent and/or charcoal dressings and adjusting dressing change frequency
- When possible selecting secondary dressing that enable patients to shower, bathe and perform other usual activities of daily living
- Choosing dressings that are easy to apply and that address the needs of the patient and the patient caregivers

Whenever possible, ordering dressings that are reimbursed by the patient's insurance and that are easily purchased/accessed.

CONCLUSION

When developing wound dressing product formularies and clinical practice guidelines, be sure to follow a formal process that includes a review of relevant existing clinical practice guidelines and regulatory requirements, such as those in the United States from the Centers for Medicare and Medicaid. For guidance on this process readers are referred to: SELECT: Evaluation and Implementation of Clinical Practice Guidelines . A Guidance Document from the American Professional Wound Care Association (11).

Two excellent online wound dressing product resources are available to help build a dressing formulary by generic category: Wound Source (Kestrel Health Information, Inc.) www.woundsource.com/product-category/dressings and World Wide Wounds (U.K.), www.worldwidewounds.com

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