REMOVING DETERRENTS WITHOUT ADDING POTENTIALLY HARMFUL AGENTS: A NEW PARADIGM FOR EFFECTIVE WOUND HEALING

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Surgical incisions and traumatic lacerations are closed through wound approximation. Chronic wounds and large-surface burn wounds cannot be closed by primary intention. Many advanced wound dressings, skin substitutes, and peptide growth factors have been used with varying success to assist wound healing by secondary intention. Tertiary closure by pedicled or free flaps, or by split-thickness skin grafts, fulfills the "gold standard" for wound closure (ie, closure with autologous skin). To accomplish the goal of increasing function while decreasing the rate of disabilities and hospital stays,[1] many different medicants, drugs, and dressings have been introduced into today's market and onto wounds. However, not all of these products have been innocuous to wound tissue. The Hippocratic injunction to "not harm the patient" is enunciated by Thomas Sydenham in the Latin expression, "primum non nocere."[2] Based on these principles, a new paradigm for effective wound healing is presented by simplifying the overall approach to wound care.

This new paradigm is designed around meticulous wound bed preparation to allow the wound to proceed to endogenous healing or to set the stage for successful wound closure with autologous tissue.[3] This approach is accomplished by removing deterrents to normal healing without adding any agents that might interrupt the normal cellular or humoral processes of the wound healing scheme.

This article will discuss the methodology and provide a clinical case file behind this new paradigm.

WOUND BED PREPARATION

Three products in particular have been added to the wound clinician's armamentarium to accomplish this mode to healing. Following debridement of all necrotic and nonviable tissue, the wound can be cleansed with Vashe® Wound Therapy (SteadMed Medical LLC), a solution of hypochlorous acid (the body's natural material for eliminating invading pathogens via the oxidative burst within neutrophils.)[4] Vashe cleanses the wound by soaking and further debrides the wound by wiping the excess Vashe from the wound. Application of Drawtex® Hydroconductive Dressing (SteadMed Medical LLC) can then be used to draw off any remaining debris, slough, bacteria, and deleterious cytokines.[5] Drawtex functions by a unique combination of three physical actions: capillary action, hydroconductive action, and electrostatic action.[6,7] This approach does not introduce any substances into the wound that may have a degree of cytotoxicity, such as silver or antimicrobials.

Using the combination of Vashe and Drawtex, wound bed preparation is optimized for those wounds healing by secondary intention. For wounds that are not proceeding rapidly to closure, an Xpansion® Micro-autografting Kit (SteadMed Medical LLC) can be used to allow a method of grafting epidermis and dermis to the wound as an outpatient procedure without using an operating theater and with a minimal donor site.

This technique allows a small split-thickness autograft to be expanded up to 100 times in order to minimize the donor site.[8] These microautografts allow the wound to be closed with autologous epidermis and dermis.

PATIENT CASE FILE

A clinical example of using the three products described in this novel paradigm occurred with a 77-year-old female who presented to the wound clinic nearly four weeks after dropping a frozen turkey onto her leg while removing it from the freezer. A large pretibial hematoma with necrotic overlying skin resulted and complicating factors included the patient being a "very heavy" smoker living with venous insufficiency in the injured leg. The area of injury was cleansed and soaked with Vashe to soften the eschar to facilitate debridement **(Figure 1)**. Following removal of the eschar, the area was treated with Drawtex dressings changed weekly **(Figure 2).** Seven days after the Vashe cleansing and Drawtex dressing, the wound was beginning to granulate satisfactorily with little nonviable tissue remaining **(Figure 3)**. At each weekly clinic visit, the wound was soaked with Vashe and wiped free of debris. After three weeks, wound bed preparation was considered adequate for wound closure. Using Xpansion, a small split-thickness skin graft was obtained under local anesthesia

in an outpatient wound clinic and the minced graft was applied to the wound **(Figure 4)**. One week after grafting, the minced graft segments were beginning to spread in the wound **(Figure 5)**. By two weeks, the grafts had almost closed the wound **(Figure 6)**. Total closure was achieved three weeks after grafting and six weeks after the beginning of treatment **(Figure 7)**. To maintain compression to the wounded leg, EdemaWear® (Compression Dynamics LLC) compression stockinette was used over the specific wound dressings throughout the treatment course.

The three products discussed in this paradigm and used in the clinical case are synergistic and designed to aid the wound in healing without outside interference and without doing any extra undue harm to the healing tissues. n

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Figure 1. Use of hypochlorous acid soaks, cleanses, and softens eschar to facilitate debridement of necrotic tissue.

Figure 2. Following debridement, hydroconductive dressing changed weekly to remove remaining debris, slough, bacteria, and excess exudate.

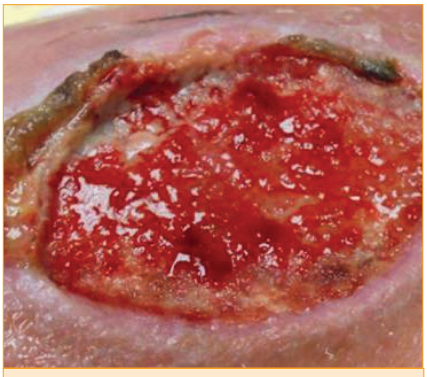

Figure 3. Wound following dressing removal at one week. Remaining nonviable tissue debrided and Drawtex reapplied to complete wound bed preparation.

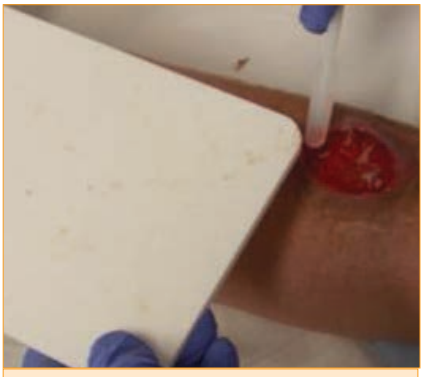

Figure 4. Three weeks following presentation, wound bed prep is complete and microautografting performed.

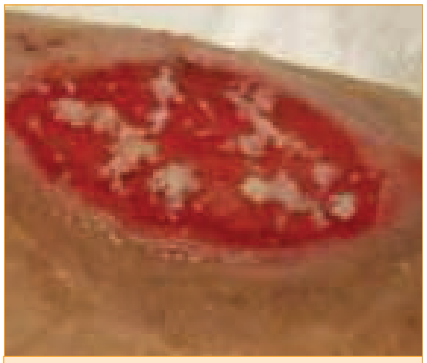

Figure 5. At first postgraft dressing change, graft fragments begin to spread onto wound surface.

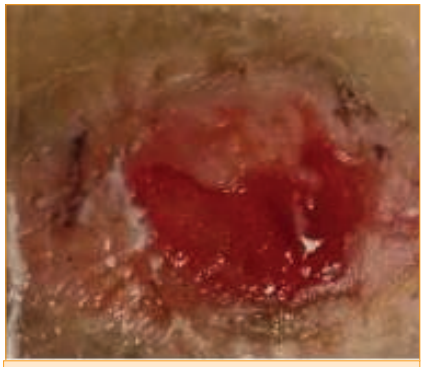

Figure 6. By two weeks post-graft, fragments are coalescing and most of wound surface is closed.

Figure 7. Three weeks post-graft and six weeks from presentation, wound is successfully closed.