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WOUNDS

A Compendium of Clinical Research and Practice

Clinical Experience with a New, Stable, Super-Oxidized Water in Wound Treatment

REPRODUCTION
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A look at the science and clinical results of a novel,
super-oxidized antiseptic solution
in the treatment of wounds



Advanced Wound Care with Stable, Super-Oxidized Water

A look at how combination therapy can optimize wound healing

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The author became interested in a new, super-oxidized water after reading an article in *Forbes* magazine.¹ Microcyn® Technology, now available in the United States under the brand of Dermacyn Wound Care (Oculus Innovative Sciences, Petaluma, Calif), is a super-oxidized, non-toxic, non-irritating, no rinse, dermal wound irrigant. The author published the first US article on the VAC Instill System (KCI, San Antonio, Tex), a system that combines negative pressure wound therapy with the controlled, intermittent delivery of topical wound solutions and suspensions over the wound bed,² and had been searching for an ideal solution to use with the System. Thus, a study was conducted to determine the clinical results of using Dermacyn not only with the VAC Instill System, but also in treating a variety of patients in an advanced wound care practice. This article will review the results of this study and discuss wound irrigation.

Study Results

The author began using Dermacyn in June 2005 to treat 26 patients with 30 various wound types, which fall into the following categories:

- Postoperative wounds (9 patients): perforated appendix; open abdominal wound after surgery for a perforated colon; open abdominal wound after closure of a jejunostomy; skin graft wounds; below-the-knee amputation incision line wounds; abdominal wall wound post application of bilayered cell therapy (Apligraf, Organogenesis Inc., Canton, Mass); saphenous vein donor site wound; and groin wound
- Traumatic wounds (3 patients): dog bite; abrasion contusions of the leg; and lacerations of the leg
- Decubitus ulcers (2 patients)

- Diabetic foot wounds (5 patients)
- Dehisced abdominal wall wounds with exposed abdominal wall mesh (5 patients)
- Patients with Integra (Integra Lifesciences Corporation, Plainsboro, NJ) placed in their wounds (2 patients).

Postoperative wounds. One wound from this category was a groin wound in a 61-year-old woman who underwent coronary bypass grafting. The patient had an invasive line and bled into her groin and, consequently, had surgery to address the problem. She became septic in a nursing facility and was transferred to the author's hospital. Figure 1A shows her wound on admission (right groin crease, lower abdominal wall and right leg). She was started on traditional VAC Therapy (KCI) and was subsequently switched to the VAC Instill System. The wound improved (Figure 1B) and was skin grafted (Figure 1C). Vacuum-assisted closure therapy was used to bolster the split-thickness skin graft. Postoperatively, the patient healed most of her wound except for an area in the center. She was started on Dermacyn dressing changes twice a day. The wound was irrigated with full-strength Dermacyn and then twice daily, a gauze moistened with Dermacyn was placed in the wound. This patient's wound progressed to complete healing (Figure 1D).

Traumatic wounds. Dermacyn appears to have a role in the wound-healing continuum. A 77-year-old woman with diabetes presented with a traumatic wound of the right lower leg (Figure 2A). Eschar over the wound was completely excised, and the wound was treated daily with the enzymatic debrider Accuzyme (Healthpoint, Ltd., Fort Worth, Tex). After 2 weeks, the patient was experiencing some burning, and the area around the wound was red. Her wound care was switched to Dermacyn dressing changes. Figure 2B shows the wound after



Figures 1A–D: Patient’s wound at presentation (A), after VAC Instill therapy, (B), after placement of split-thickness graft (C), and the wound once it healed (D).

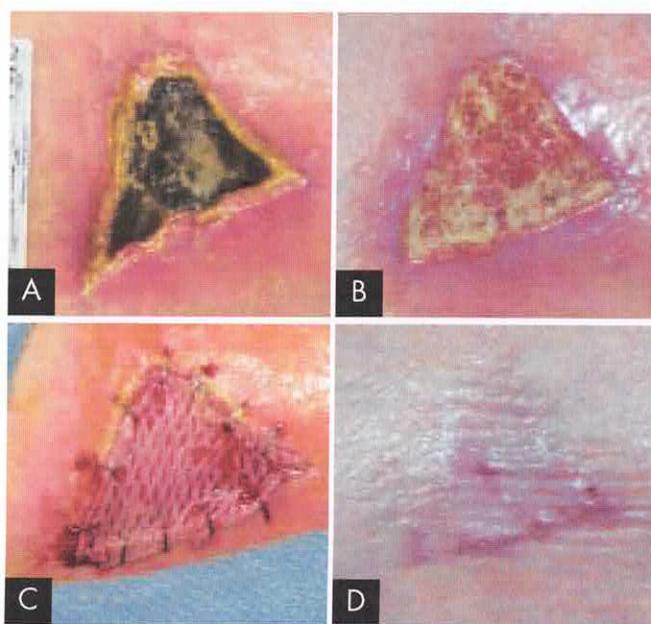
using Dermacyn for 2 weeks. Vacuum-assisted closure was started pre-op in preparation for a skin graft. Figure 2C shows the operative picture of the split-thickness skin graft. The patient was discharged the day of her skin graft surgery using VAC Therapy to bolster the graft. Figure 2D shows the healed wound at a post-op visit.

Decubitus ulcers. Dermacyn appears to have a role as the topical agent for wound irrigations and to moisten dressings in patients with decubitus ulcers. It should be considered for treating a decubitus ulcer that is too large for an enzymatic agent but too small for VAC Therapy.

Diabetic foot ulcers. A 59-year-old man with a diabetic foot wound was treated with the VAC Instill System using Dermacyn as the irrigation solution. In addition, the patient received hyperbaric oxygen treatments, surgical debridement, and bilayered cell therapy. Figure 3A shows this patient’s wound before treatment. Figure 3B shows the wound with the VAC Instill dressing in place (at this time, he was receiving intermittent, full-strength Dermacyn irrigations with the VAC Instill System), and Figure 3C shows the contracted wound completely covered with healthy granulation tissue.

Exposed abdominal wall mesh. The VAC Instill was used with Dermacyn as the irrigation solution in a series of patients who had dehiscenced abdominal wounds with exposed AlloDerm mesh (LifeCell Corporation, Branchburg, NJ) and Permacol surgical implant (Tissue Science Laboratories, PLC, Aldershot, Hampshire, UK). These wounds became covered with healthy granulation tissue and were able to be skin grafted, which led to complete healing.

Patients with Integra placed in their wounds. Integra Bilayer Matrix Wound Dressing acts as a dermal matrix to help form the dermal layer of skin. It can become ineffective if it becomes infected. In 2 patients, the author soaked Integra in Dermacyn in the operating room prior to placement on the patient. Soaking Integra in Dermacyn may decrease the incidence of infection of Integra in the post-op period.

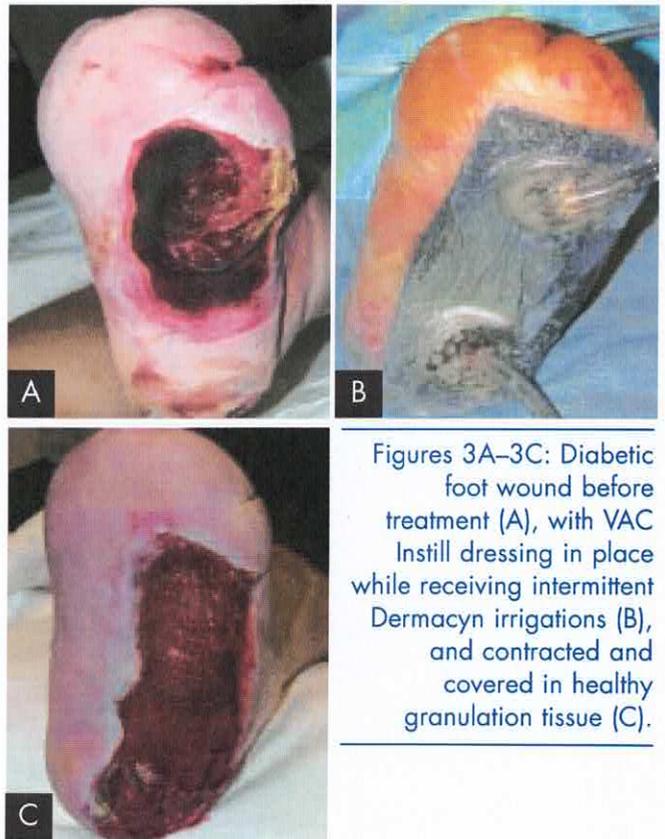


Figures 2A–2D: Leg wound at presentation (A), 2 weeks after Dermacyn use (B), after skin graft (C), and once it completely healed (D).

The Concept of Wound Irrigation

The goal of wound irrigation is to remove debris and bacteria from the wound while minimizing injury to the normal tissue around the wound. At dressing changes, it is tempting to remove the old dressing and apply a new dressing without dealing with the wound itself. Wound irrigation can help improve wound healing. The delivery pressure of wound irrigation appears to play an important factor in promoting wound healing. A delivery pressure of 5–10 psi has been an accepted range for removing debris and bacteria from a wound while minimizing the damage to the surrounding normal tissues.³

It is common to see fluid from a bottle being poured directly into a wound or to see a bulb syringe or an asepto syringe used to irrigate a wound at dressing changes. Virtually no pressure (0–1 psi) is delivered to a wound when a pour-bottle technique or bulb or asepto syringe is used. On the other hand, a 35-cc piston syringe with a 19-gauge needle delivers a psi of about 8.⁴ When comparing gross infection, induration, and bacterial counts with a low-pressure asepto syringe versus the higher pressure achieved with a 35-cc syringe and 19-gauge needle, the results showed that there is a clinical advantage of using the higher pressure system (35-cc syringe/19-gauge needle).⁴ Some studies suggest that an antiseptic solution is more effective than just saline alone when used as a wound cleanser to promote wound healing.⁵



Figures 3A–3C: Diabetic foot wound before treatment (A), with VAC Instill dressing in place while receiving intermittent Dermacyn irrigations (B), and contracted and covered in healthy granulation tissue (C).

Discussion

There have been no reported cases of toxicity or side effects with Dermacyn. Dermacyn appears to only attack single-celled organisms while sparing multicellular organisms.

In this series of patients, Dermacyn appears to be an effective solution for moistening and debriding wounds. In the past, super-oxidized waters have been shown to have antiseptic properties.⁶ In the patients studied in this series, Dermacyn also appears to be an effective wound antiseptic.

Dermacyn can be used to treat a variety of wounds from simple to extremely complex. It can be used as the wound irrigation solution at simple dressing changes, and it can serve as the solution with which to moisten the gauze used to dress the wound.

Dermacyn is complimentary to a wide variety of advanced wound-healing products and methods. For example, it can be used as an irrigant at traditional VAC Therapy dressing changes and as the irrigation solution with the VAC Instill. It can also be used for pressurized wound irrigation either with a simple system (a 35-cc syringe and a 19-gauge needle) or with more formal wound irrigation products, such as the Versajet Hydrosurgery system (Smith & Nephew, Largo, Fla) or jet lavage wound cleansing and debridement system (JetOx-ND, DeRoyal, Powell, Tenn).

Dermacyn also appears to be safe to use with tissue-engineered products and dermal substitutes. Further clinical studies will help confirm the effectiveness and compatibility of Dermacyn in the field of advanced wound care. ■

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