

# Hypochlorous Acid: Its Multiple Uses for Wound Care

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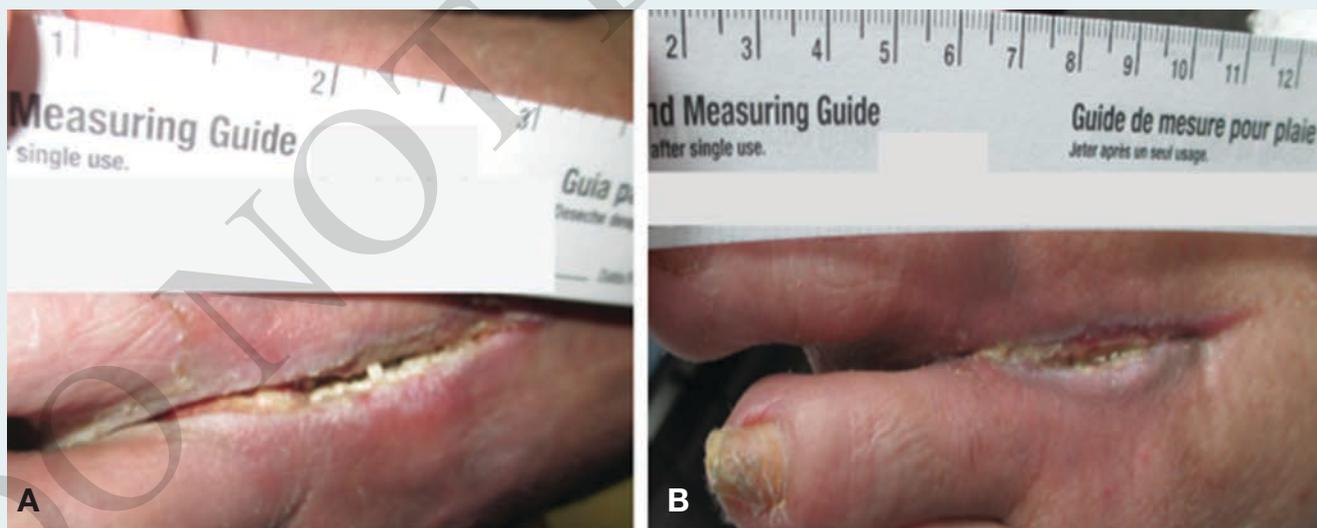
In today's medical environment, it is necessary to get the most out of the products we have at hand. When we can find a tool that can be utilized in many ways and still be cost effective, we need to take advantage of it. One such product is hypochlorous acid (HOCl). Although basically a wound cleanser, we have utilized it in our practice for much broader indications.

Hypochlorous acid is a naturally occurring small molecule generated by white blood cells during the oxidative burst to kill pathogens.<sup>1</sup> It has been shown in independently published *in vitro* studies<sup>2</sup> to be highly effective in killing drug-resistant bacteria and essentially all human pathogens. *In vitro* analysis<sup>3,4</sup> of cell toxicity testing showed no negative effects on keratinocytes or fibroblasts. As such, it should be useful in the treatment of chronic wounds.

The HOCl used in our practice (Vashe Wound Therapy Solution, SteadMed Medical LLC, Ft. Worth, TX) is intended for cleaning, irrigating, and debriding acute and chronic dermal lesions by the mechanical action of removing foreign

materials, including micro-organisms and biofilms, from wounds. The solution has been shown to be active against a range of micro-organisms in *in vitro* testing.<sup>2</sup> When used as a soak on wounds followed by gentle wiping with gauze, it has been demonstrated to effect a "soft" debridement.<sup>5</sup> In addition, it is not painful to the patient and tends to remove odor from the wounds.<sup>6,7</sup>

In a large series of cases, HOCl has been used in a wide variety of indications within our wound population. HOCl has been effective as a wound cleanser with both sharp debridement and ultrasonic debriding equipment. It has proven effective at soaking infected wounds to decrease the use of systemic antibiotics and for keeping skin grafts and dermal matrices hydrated. When used on primarily closed surgical incisions, it appears to reduce surgical site infections. Similarly, when used in negative pressure wound therapy (NPWT) systems, it appears to lower the bioburden. All of these benefits are attained while dramatically reducing wound odor and reducing wound discomfort by providing a cooling sensation.



**Figure 1. A:** Abscess of left foot following incision and debridement and institution of negative pressure wound therapy with hypochlorous acid. **B:** Four weeks after incision and debridement and 2 weeks after switching from negative pressure wound therapy to dressings with collagen dermal matrix and hypochlorous acid irrigation and soaks.

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**Figure 2. A:** Following dehiscence of transmetatarsal amputation stump treated with hypochlorous acid (HOCl) soaks and collagen dermal matrix dressings hydrated with HOCl. **B:** Three weeks following the treatment regimen, the wound was closing and the exposed tendon was covered with healthy granulation tissue.



**Figure 3. A:** Dog bite wound of the foot following incision and debridement. **B:** Three weeks following irrigation and soaks with hypochlorous acid (HOCl) and dressing changes with collagen dermal matrices hydrated with HOCl.

Examples of cases that demonstrate the effectiveness of HOCl in a wound care practice include a 53-year-old obese man with diabetes mellitus, gout, and peripheral vascular disease who developed an abscess in his left foot at the 3rd to 4th interspace. Following incision and drainage (I&D) of the abscess, he was treated with NPWT with HOCl irrigation (see Figure 1a). Within 2 weeks, he was switched to collagen dermal matrix dressings once a week with HOCl irrigation and soaks at the time of dressing changes. By 4 weeks, following I&D, the wound was on a positive healing trajectory and approaching closure (see Figure 1b).

A second example is a 45-year-old man with a diabetic foot ulcer and peripheral neuropathy who sustained an injury to the right foot requiring a transmetatarsal amputation. Wound dehiscence was treated with HOCl irrigation and soaks and dressing with a collagen dermal matrix dressing (see Figure 2a). In this case, the HOCl also was used to hydrate the dermal matrix dressing. After 3 weeks of this treatment, the wound closed and the exposed tendon was covered with healthy granulation tissue (see Figure 2b).

A third example involves a 68-year-old obese man with diabetes mellitus, congestive heart failure, and asthma who sustained a dog bite to his left foot. Following I&D, the wound was irrigated and soaked with HOCl and dressed with a collagen dermal matrix dressing that was kept hydrated with HOCl (see Figure 3a). Within 3 weeks, the wound was on a positive healing trajectory (see Figure 3b). The treatment was continued, and the wound healed completely without further intervention.

We conclude from our experience that HOCl can be used effectively for many indications in a wound care practice. Expanding use of wound products is prudent in an environment of decreasing resource availability. ■

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