

The use of novel hypochlorous acid preserved antimicrobial gel* and the highly (negatively charged) fiber dressing** to support debridement in complex wounds

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BACKGROUND

Control of bioburden, as well as debridement of wounds, are important in the management of chronic wounds. For control of germs in the wound, a newly introduced product preserved with 500 ppm of pure, hypochlorite free hypochlorous acid (HOCl)* is of interest. This product is known to autolytically debride slough, which has been empirically established in our clinical practice in a way unique to the formulation.

The HOCl preserved antimicrobial wound gel can be used synergistically with a related hypochlorite free, pure Hypochlorous Acid (pHA) preserved liquid wound cleanser***, by pre cleansing the wound with the liquid HOCl cleanser (via soaking for 5-10 minutes with wetted gauze). The gel can be subsequently applied to the wound, and this is the recommended method of using the HOCl preserved antimicrobial gel.

Both the products have a pH of between 3 to 6 which is very conducive to wound healing.

Post the application of the gel, a cover dressing obviously needs to be used. In this context, of obvious interest is another new affordable, easy to use technology that supports debridement of slough via the use of Highly Charged Fibers (HCF). These fibers, presented in the form of a nonwoven dressing*, with a gently adherent surface that contains silver ions as an antimicrobial barrier, are negatively charged. There is theoretical synergy between these technologies based on an understanding of their respective chemistries.

The combination of the HOCl cleanser, the more prolonged action HOCl gel and the Highly Charged Fiber Dressings may allow for ongoing, supportive debridement and assist in better control of bacterial burden.

Figures 1 to 4 describe the features of the technologies that are the subject of this presentation.

METHODS

This retrospective case series evaluates use of the combination of HOCl Gel and negatively charged dressing fibers in complex wounds.

Patients were treated with the combination of HOCl Gel and HCF dressings.

The combination method that uses two new, affordable, and evidence-based technologies on both surgical and nonsurgical wound.

- At total of 6 patients were included in this case series.
- All patients were treated with the combination of HOCl Gel and (negatively) Highly Charged Fiber dressings.
- All patients were noted to improve with reduction of slough and peri wound epidermolysis.
- Five of six patients tolerated the combination of products without incident.

One patient reported "burning" and the HOCl gel was discontinued after 2 weeks. Despite this transient patient discomfort this patient also had wound improvement with reduction of slough and wound size.

WOUND ETIOLOGIES:

Non healing surgical wounds: n=2
 Venous Leg Ulcers: n=2
 Spider bite: n=1
 Dog scratch: n=1

Figure 1: Features of HOCl preserved antimicrobial Wound gel

- Addresses Bioburden
- Supports Debridement
- Bactericidal, virucidal, sporicidal, fungicidal
- Delivers Moisture
- Mildly acidic pH conducive to wound healing
- Has no known contraindications
- HOCl has no known clinical resistance
- Reduces odor

FIGURE 2: HIGHLY CHARGED FIBER (HCF) TECHNOLOGY

- Absorbent fiber dressing with gentle adhesion with Ag matrix
- Features: Continuous Cleaning action plus antimicrobial barrier protection
- Opposites attract (Dressings and slough can have opposite charges)
- Works by electrostatic interactions

FIGURE 3: HIGHLY (NEGATIVELY) CHARGED MATRIX DRESSING CHEMICAL STRUCTURE

- Negative charges closer together / densely packed
- More negative charges per square inch of the dressing compared to other dressings

FIGURE 4: How do Highly charged fibers uniquely work? Biomaterials behave in predictable ways within complex tissue environments

- The following properties are features of all dressings and help remove some slough:
 - Silver Ions
 - Hydrophobic Interactions
 - Hydrogen Bonds
- Additionally, Highly Charged Fibers are uniquely engineered to have a high attraction to positively charged necrotic debris particularly after treatment of slough with HOCl cleanser and/or gel.
- Electrostatic Interactions are uniquely high in HCF dressings

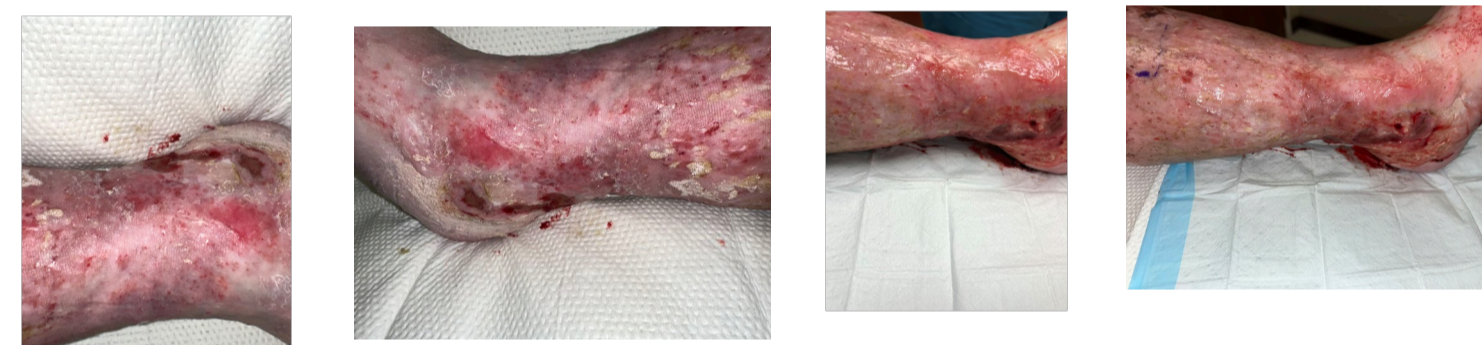
RESULTS

Cases 1-6 show wound progression for each wound, with detailed history provided.



Venous Leg Ulcers (Day 1)

Venous Leg Ulcers (2 Weeks)



Venous Stasis Ulcers (Day 1)

Venous Stasis Ulcers (2 Weeks)



Venous Stasis Ulcers (4 Weeks)



Spider Bite (Day 1)

Spider Bite (Day 14)



Dog Scratch(Day 1)

Dog Scratch(Day 21)

Case Summary 1: venous stasis ulcers
 60yo male with long standing venous stasis ulcers and peripheral vascular disease required continuous debridement to allow for wound progression prior to advanced therapies
 Medical history: PVD, DM, HTN
 Treatment:
 • Excisional debridement in office.
 • HOCl preserved Gel and Highly Charged Fibers initiated to expedite debridement and wound progression
 • HOCl Gel discontinued after 2 weeks secondary to some discomfort, advanced therapies with CAMPs (Skin Substitutes) placed
 • Treatment is ongoing

Case Summary 2 : venous stasis ulcers
 59 yo male with long standing venous stasis ulcers declined surgical intervention requires continuous debridement to allow for wound progression.
 Medical history: Obesity, HTN
 Treatment:
 • Excisional debridement in office
 • HOCl Gel and Negatively Charged Dense fibers initiated to expedite debridement and wound progression
 Treatment is ongoing

Case Summary 3 : Spider bite
 59 yo male referred for h/o spider bites lower extremity. Seen in ER 2 weeks ago. Referred for treatment.
 Medical history: Obesity, HTN, Asthma, Sleep apnea
 Treatment:
 • Excisional debridement in office.
 • HOCl Gel and Negatively Charged Dense fibers initiated to expedite debridement and wound progression
 • Outcome: Treatment is ongoing. 3/5 wounds now healed

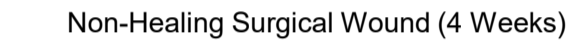
Case Summary 4: Dog scratch
 72 yo female referred by ER for "dog scratch" that occurred 2 weeks ago. Placed on oral antibiotics. Referred for wound care.
 Medical history: Breast ca, Lung ca, HTN, Thyroid disease
 Treatment:
 • Excisional debridement in office.
 • HOCl Gel and Negatively Charged Dense fibers initiated to expedite debridement and wound progression
 • Outcome: healed



Non-Healing Surgical Wound (Day 1)

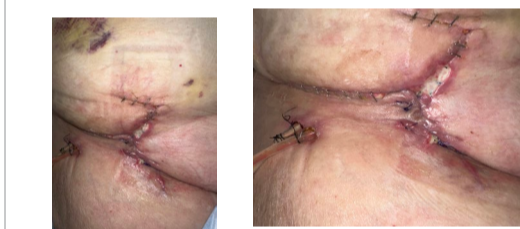
Non-Healing Surgical Wound (1 Week)

Non-Healing Surgical Wound (2 Weeks)

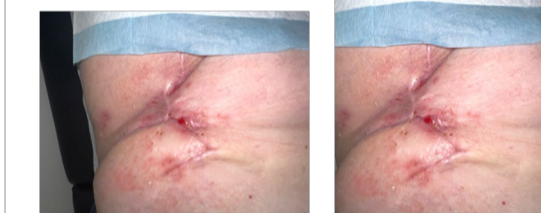


Non-Healing Surgical Wound (4 Weeks)

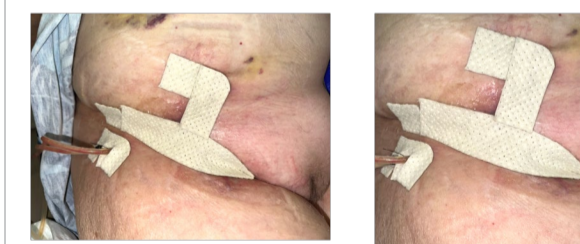
Case Summary 5: non healing surgical wound
 48 yo male with long standing scarring from previous surgery excision congenital nevus. Presented for surgical intervention.
 Medical history: Obesity, HTN
 Treatment:
 • Taken to OR for excisional debridement and synthetic matrix placement and STSG.
 • Partial loss of STSG.
 • HOCl Gel and Negatively Charged Dense fibers initiated to expedite debridement and wound progression
 Outcome: healed



Complex Wound Groin (Day 1)



Complex Wound Groin (2 Weeks)



Complex Wound Groin (Day 1)

Case Summary 6 Complex Wound Groin
 70 yo female with failed femoral bypass with chronic infection and failed graft requiring ligation. Multiple procedures performed by vascular surgeon. Presents with complex wound groin with femoral vessels exposed.
 Medical history : CAD, COPD, HTN. Previous smoker
 Treatment:
 • Admitted to hospital for acute infection and failed vascular graft
 • Graft removed and femoral vessels ligated
 • Taken to OR for coverage femoral vessels and flap closure
 • Placental Allograft placed to optimize healing
 • SEFM Synthetic allograft placed in contaminated ulcer with flap closure
 • NPT initiated for incisional management immediately following closure
 • Small dehiscence occurred
 • HOCl Gel and Negatively Charged Dense fibers initiated to expedite debridement and wound progression
 Outcome: Healed

CONCLUSION

- Debridement is the corner stone for wound bed preparation and wound healing.
- Negatively charged fibers may assist in the removal of slough, bioburden, and necrotic tissue, and associated debris that may assist in the management of highly complex wounds/patients.
- Basic science research has already demonstrated efficacy of pure hypochlorous acid (pHA*) cleanser against microbes and complex colonies, as well as favorable effects on keratinocyte and fibroblast migration.
- Based on the same ingredient, pure Hypochlorous Acid (pHA) containing HOCl Gel which will obviously prolong the benefit of the HOCl based formulation in the wound, combined with frequently changed negatively charged fibers may support wound debridement and lead to faster wound bed preparation in anticipation of surgical closure and or expedited healing by the use, for example, advanced modalities such as skin substitutes (CAMPs products).

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