

**CARING FOR WOUNDS E-BOOK SERIES:**

# **Creating an Ideal Microenvironment with Wound Cleansing**

**WC**

# Is Your Wound Cleansing Practice Up to Date?

With so much focus on dressing choices, it's easy to forget the importance of wound cleansing. Wound cleansing can help achieve the goals of **wound bed preparation** by removing microorganisms, biological and environmental debris to create an environment beneficial to healing as well as facilitating wound assessment by allowing clear visualization of the wound.

A wound should be cleansed every time the dressing is changed, unless it's contraindicated.

There are several broad categories of solutions that can be used. The ideal wound cleanser is nontoxic to viable tissue, cost effective, and stable.

- **Saline** does not generally contain a preservative, so bacterial growth can occur once exposed to opportunistic microorganisms.
- **Tap water** can become colonized with viable microbes. In particular, *Pseudomonas* is well-documented in the plumbing systems of healthcare facilities.<sup>1</sup>
- **Commercial cleansers** ingredients may include povidone iodine, polyhexanide, and hypochlorous acid. **Hypochlorous acid** is produced by the body's immune cells in response to invading pathogens. When used as wound cleanser ingredient, it acts as a preservative by inhibiting the growth of microorganisms within the solution.<sup>1</sup>

1. Randall Wolcott, Jacqui Fletcher: *The role of wound cleansing in the management of wounds. Wounds International 2014, Vol 5 (3): 25-31.*



# Chronic Wounds Deserve the Ideal Microenvironment

**Nexodyn™ AOS Wound Care Solution** is a clear, liquid wound care solution that helps cleanse and moisten the wound environment.

The solution contains hypochlorous acid (HClO) acting as a preservative by inhibiting the growth of microorganisms within the solution.

The mechanism of action of Nexodyn AOS Wound Care Solution is based on the mechanical action of the fluid flowing across the lesion and removing biologic and inert materials such as microorganisms, biological debris, and environmental dirt.



## Features

- Acidic pH (2.5 – 3.0)
- High purity (>95% HClO of free chlorine species)
- Long stability (24 months unopened; 30 days from first opening)

## The Science

Nexodyn®, an FDA-cleared hypochlorous acid-based wound cleanser that aids the physiological healing process, has been developed based on APR's proprietary technology TEHCLO. This technology enables the production of an acidic solution (pH 2.5-3.0), with a high oxidation-reduction potential (ORP >1000 mV), containing free chlorine species, of which stabilized hypochlorous acid (HClO) in high concentration (> 95%), acting as an effective formula preservative.

# In Vitro Antimicrobial Activity

Hypochlorous acid inhibits microbial contamination within the solution. Antimicrobial preservative effectiveness has been demonstrated against the organisms in the table below in in vitro testing.

## Organisms

STAPHYLOCOCCUS AUREUS

PSEUDOMONAS AERUGINOSA

PROPIONIBACTERIUM ACNES

STAPHYLOCOCCUS PYOGENES

STAPHYLOCOCCUS EPIDERMIDIS

EXTENDED-SPECTRUM BETA-LACTAMASE (ESBL)  
PRODUCING ENTEROBACTERIACIAE

MULTI-DRUG RESISTANT (MDR)  
STAPHYLOCOCCUS AUREUS

VANCOMYCIN INTERMEDIATE RESISTANT  
STAPHYLOCOCCUS AUREUS (VISA)

VANCOMYCIN RESISTANT (VR)  
ENTEROCOCCUS FAECALIS

MULTI-DRUG RESISTANT (MDR) AND OXA-48  
PRODUCING KLEBSIELLA PNEUMONIAE

EXTENDED-SPECTRUM BETA-LACTAMASE (ESBL)  
PRODUCING PROTEUS MIRABILIS

MULTI-DRUG RESISTANT (MDR) ESCHERICHIA COLI

TRICHOPHYTON MENTAGROPHYTES

VITRO-SKIN (Ex-vivo) Model  
TRICHOPHYTON RUBRUM

CANDIDA ALBICANS

HUMAN IMMUNODEFICIENCY VIRUS TYPE 1

HERPES SIMPLEX VIRUS TYPE 1

HERPES SIMPLEX VIRUS TYPE 2

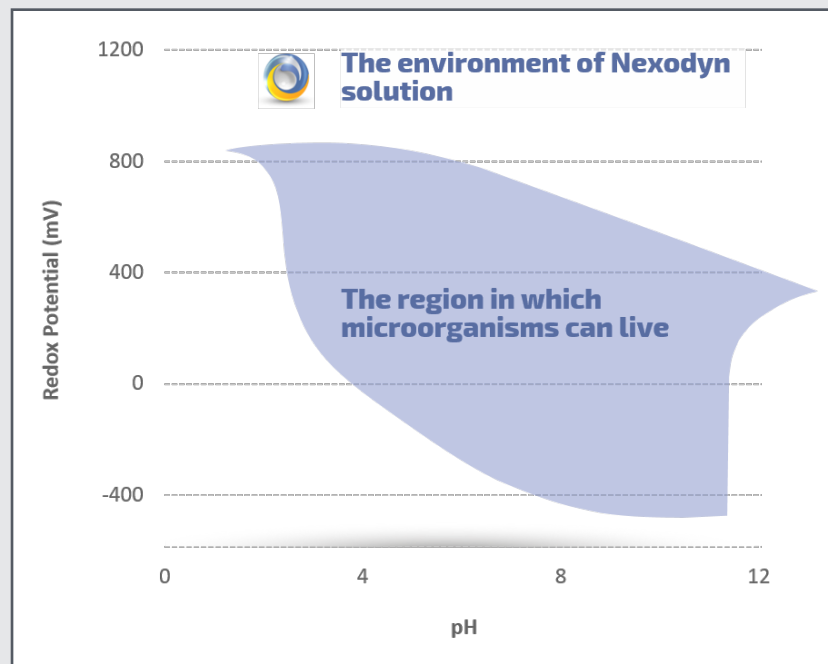




# Factors that Promote Healing

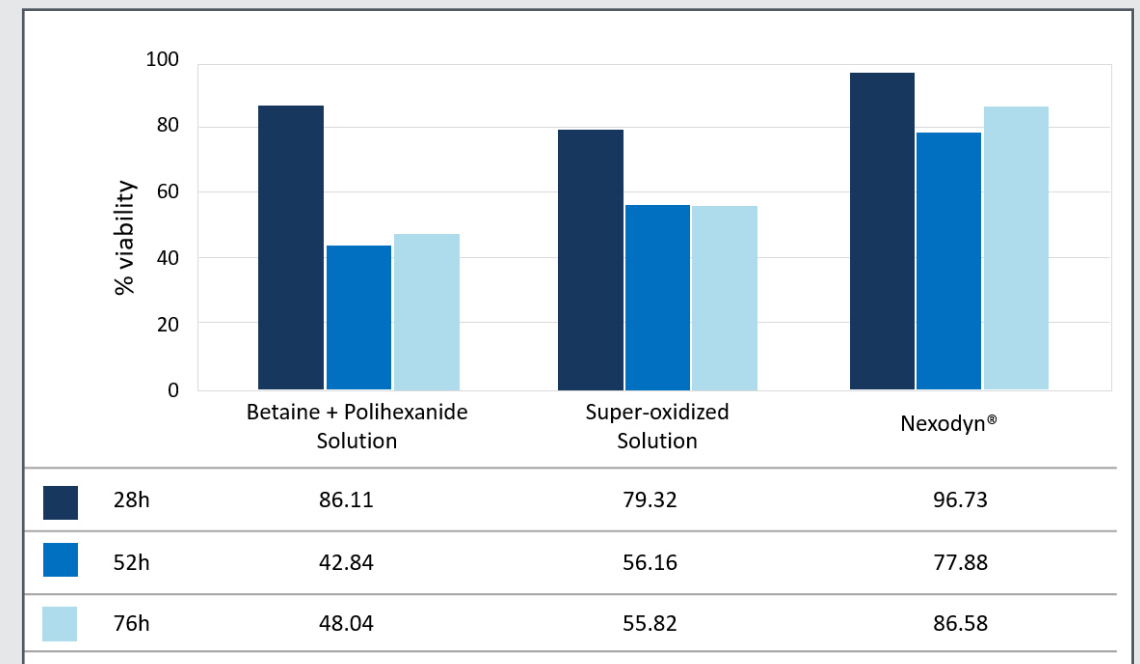
## Acidic pH

An acidic pH reduces the activity of proteases and inhibits the penetration into healthy cells of toxic ammonia produced by bacteria. It also improves tissue oxygenation and promotes epithelization.<sup>2</sup>



## Wound Cell Viability

In chronic wounds, the preservation of cell viability is essential to allow required reconstructive activity of wound repair.<sup>3</sup>

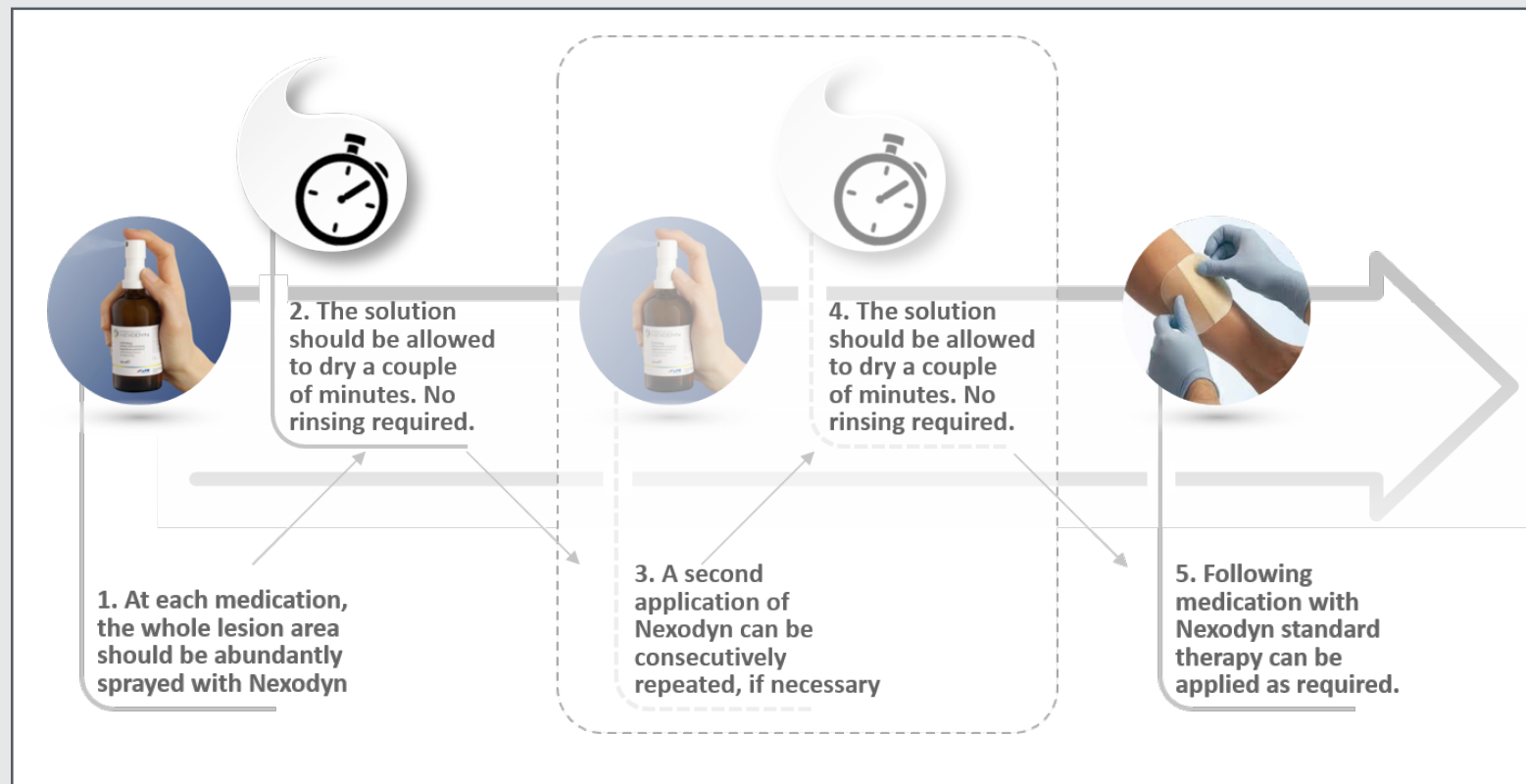


2. Basavraj S. Nagoba et al. "Acidic Environment and Wound Healing: A Review" *Wounds*. 2015;27(1): 5-11.

3. D'Atanasio et al. "A New Acid-oxidizing Solution: Assessment of Its Role on Methicillin-resistant *Staphylococcus aureus* (MRSA) Biofilm Morphological Changes." *Wounds*. 2015;27(10):265273.

# Wound Cleansing: Both Effective and Efficient

Applying Nexodyn on wounds requiring cleansing to aid physiological healing is fast and simple



*The role of wound cleansing in the management of wounds*



## Indications

Nexodyn AOS Wound Care Solution is intended for use under the supervision of health care professionals for cleansing, irrigating, moistening, and debriding, to remove organic and inorganic debris from partial- or full-thickness acute and chronic dermal lesions, such as leg ulcers, stasis ulcers, diabetic ulcers, stage I-IV pressure ulcers, post-surgical wounds, grafted and donor sites, and first- and second-degree burns. Can also be used for cleansing and moistening minor cuts, minor burns, superficial abrasions and minor skin irritations.

## Contraindications

Do not use in case of hypersensitivity to any component of the product (hypochlorous acid, chlorine and hypochlorite ion.)

# International Results with TECHLO Technology

## **The management of chronic ulcers with an acidoxidising solution**

*Journal of Wound Care, Vol 25, No 8, August 2016*

Encouraging initial results in a population refractory to standard management provide evidence that this new product may make a helpful contribution to the care of chronic ulcers. The integration of this cleansing solution into standard care contributes to the modulation of local microenvironmental responses that inhibit physiological healing processes while also contributing to the reduction of bacterial load.

## **Effect of an acid-oxidizing water solution in a biofilm formation and eradication model**

*IWWT, Paris, Jan 2015*

Nexodyn is capable of inducing a morphological change in the extracellular matrix of the biofilm structure making bacteria more accessible to cleansing.

## **The insertion of a novel superoxidized solution on top of standard treatment in the home care management of post-surgical lesions of the diabetic foot reduces re-infections and shortens healing times**

*EWMA, London, May 2015*

In a population of DFU outpatients with postsurgical, non-infected, non-ischemic wounds the addition of Nexodyn on top of standard care showed – with respect to the same treatment but with saline

as wound cleanser – a significantly reduced number of infections (3 infections with Nexodyn vs 12 infections with saline) and debridement procedures (1 debridement procedures with Nexodyn vs 10 debridement procedures with saline) and a faster healing time (56% faster with Nexodyn than with saline).

## **The management of critically colonized and locally infected leg ulcers with the acidOxidizing solution Nexodyn®: A pilot study**

*WUWHS Congress, Florence (It), Sept 2016*

Study in 30 patients with locally infected or critically colonized lower leg ulcers treated for 5 weeks with Nexodyn and non-adherent gauze and an absorbent gauze. The tolerability profile resulted very favorable with no adverse events reported and high levels of comfort at application.

The modulation of the wound microenvironment as well as the contribution to the control of local infection has been shown by measuring wound size reduction and complete healing, local infection scores, presence of bioburden on the wound surface, wound bed pH and wound-associated pain.



# About the Sponsor



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Angelini Pharma supports the medical community through education and innovative skin cleansers, disinfectants, hand sanitizers and medical devices. Our core products are chlorine-based solutions and a 100% pure native equine type I collagen wound dressing for hard-to-heal wounds.



[Visit the Wound Care Advisor site](#)