

Wound Cleansing and Wound Hygiene as a Critical Component of Wound Bed Preparation

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**CHANCE
FAVORS
THE
PREPARED
~~MIND~~
WOUND**

Disclosures

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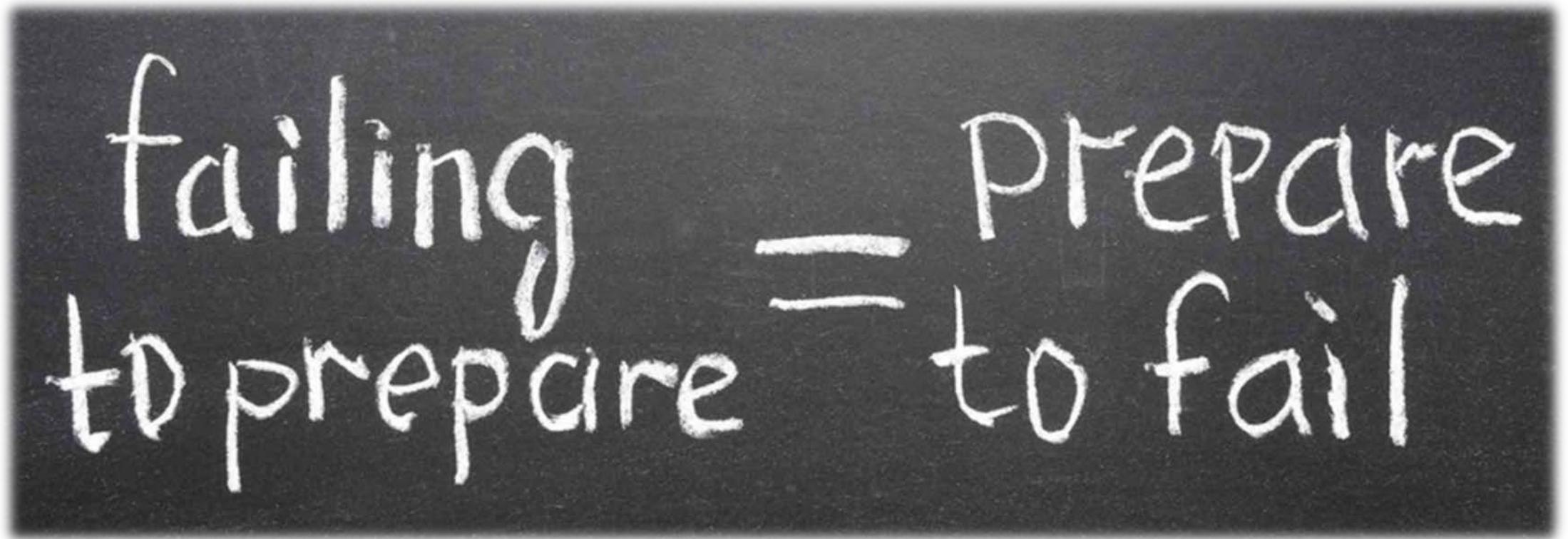
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Learning Objectives

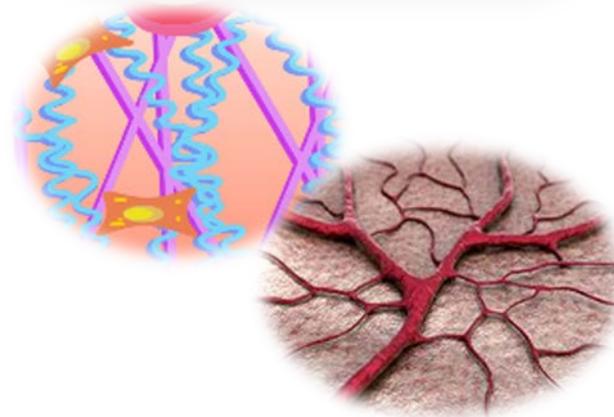
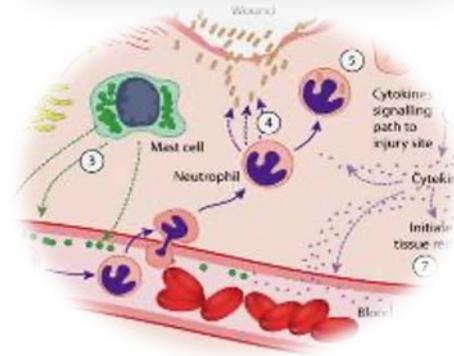
- Describe the role of wound bed preparation (WBP) in moving a wound into a state of readiness to heal
- List the critical components to effective wound bed preparation
- Understanding and mitigating the patient's pain

Wound Bed Preparation



failing = prepare
to prepare = to fail

Expected Wound Healing



Hemostasis

Inflammation

Proliferation

Remodeling

Unexpected...



Confirm the etiology and provide supportive care

- Venous
 - Compression
- Diabetic
 - Offloading
- Pressure
 - Pressure redistribution
- Arterial
 - Protection from injury
 - Possible vascular intervention
- Atypical
 - Low threshold for biopsy
 - Possible medical intervention



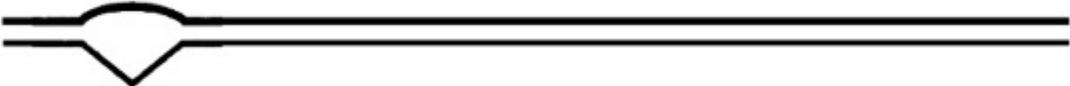
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Improve the Wound Bed

Wound Bed Preparation: The Science Behind the Removal of Barriers to Healing

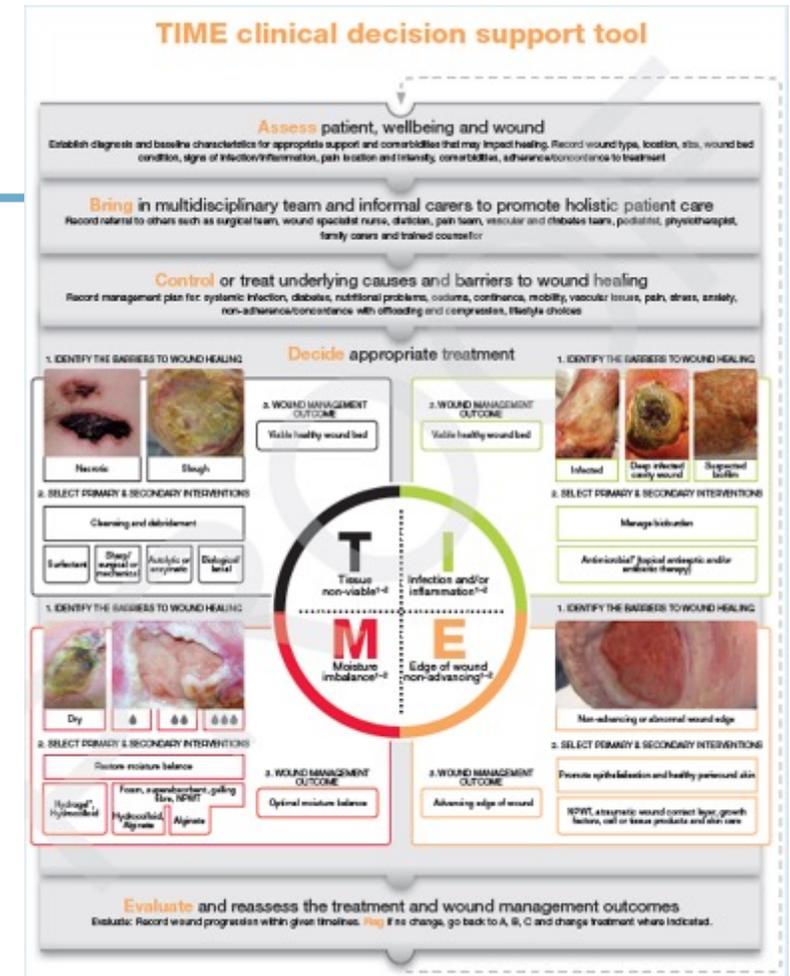
Stuart Enoch, MBBS, MRCSEd, MRCS (Eng), Keith Harding, MB ChB, MRCGP, FRCS
 Wounds. 2003;15(7)

WOUND REPAIR AND REGENERATION
 THE INTERNATIONAL JOURNAL OF TISSUE REPAIR AND REGENERATION



Wound bed preparation: a systematic approach to wound management

GREGORY S. SCHULTZ, PhD^{1,*}; R. GARY SIBBALD, MD^{2,*}; VINCENT FALANGA, MD^{3,*}; ELIZABETH A. AYELLO, PhD⁴;
 CAROLINE DOWSETT⁵; KEITH HARDING, MB, ChB⁶; MARCO ROMANELLI, MD, PhD⁷; MICHAEL C. STACEY, DS⁸;
 LUC TEOT, MD, PhD⁹; WOLFGANG VANSCHIEDT, MD¹⁰



Wound Bed Preparation: TIME

Tissue (debridement)



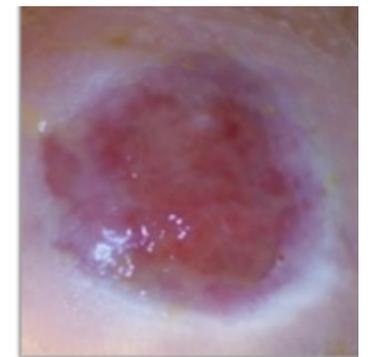
Infection/inflammation



Moisture balance

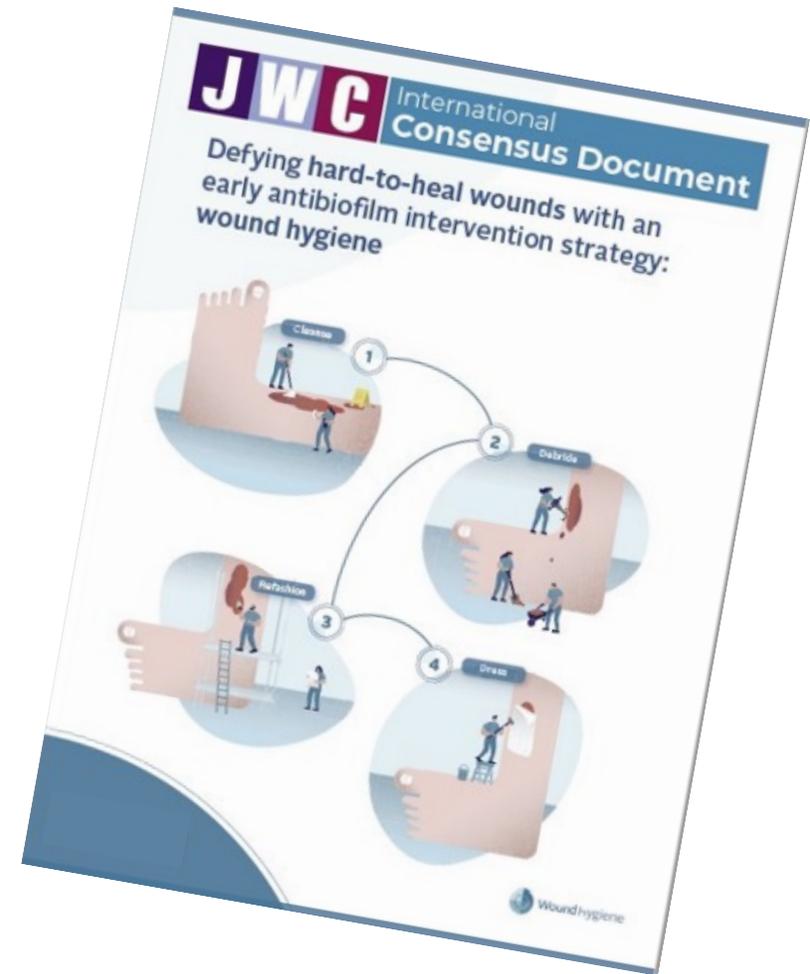


Edge of the wound

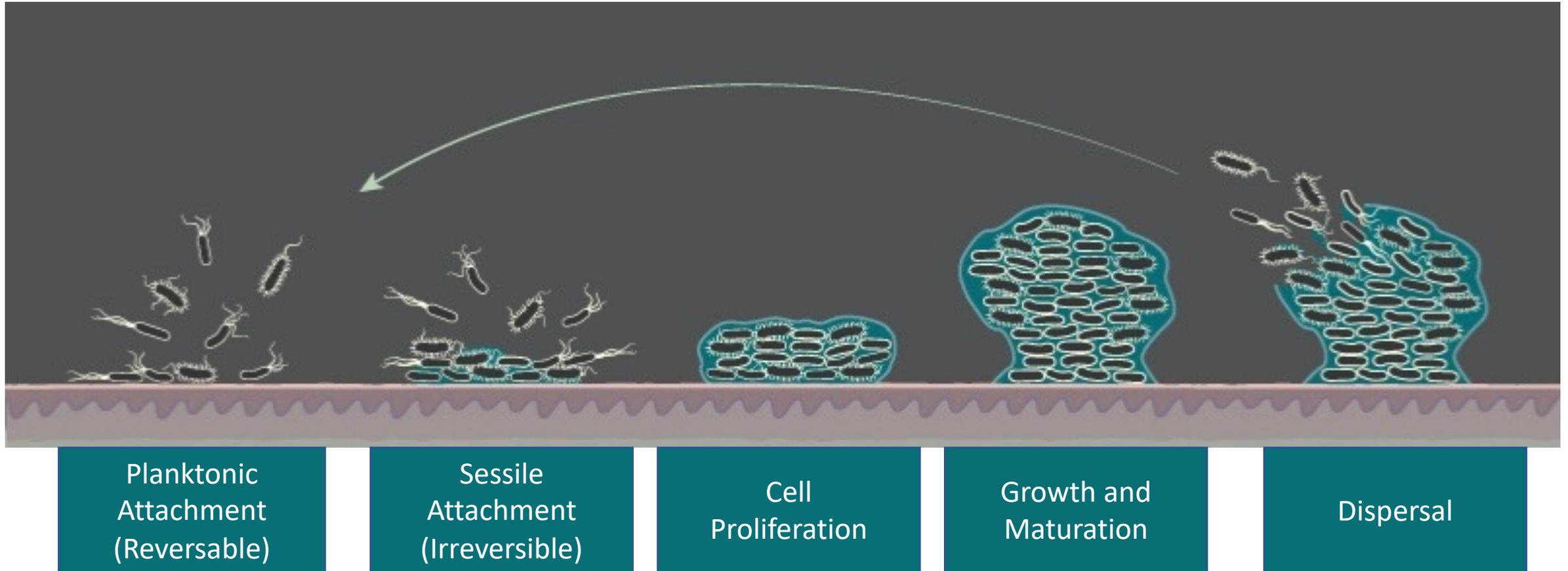


Wound Hygiene

- Wound hygiene is a fundamental aspect of care for all patients with an open wound.
- It should be assumed that all hard-to-heal wounds contain biofilm
- Non-healing should be regarded as a pathology that can be successfully addressed with the right tools, provided that the underlying etiology is managed with gold standard care.
- Wound hygiene should be performed at every dressing change.



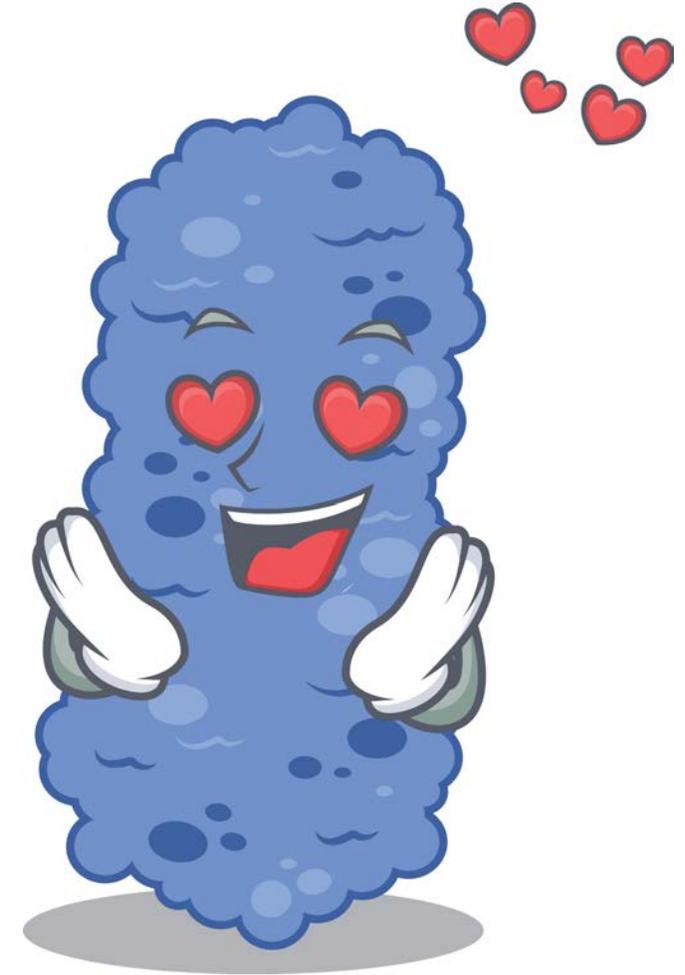
Respect the bacteria: The Mental Model of Biofilm

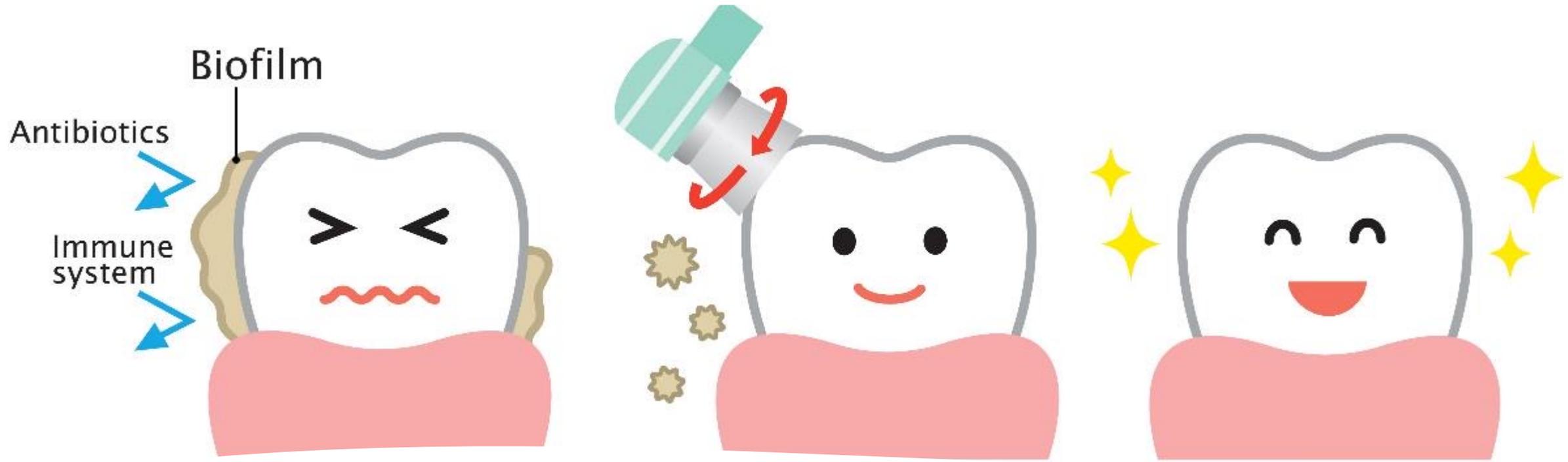


Bjarnsholt, T et al. The impact of mental models on the treatment and research of chronic infections due to biofilms. *APMIS*. 2021; 00: 1–9.
International Wound Infection Institute (IWII) Wound infection in clinical practice. *Wounds International* 2016

Respect the Bacteria

- Observe closely for subtle  dramatic changes
 - Exudate/Malodor
 - Change in tissue quality/quantity
 - Increase or new pain
 - Erythema
 - Purulence
 - Delay in healing
- Culture wisely with intent to treat
- Use topicals early practicing antimicrobial stewardship
- Practice wound hygiene





Wound Hygiene

The concept of wound hygiene is based on the premise that all hard-to-heal wounds contain biofilm

Familiarity with oral hygiene makes this concept make sense

The Four Activities of Wound Hygiene



Cleanse the
wound and
periwound
skin



Debride

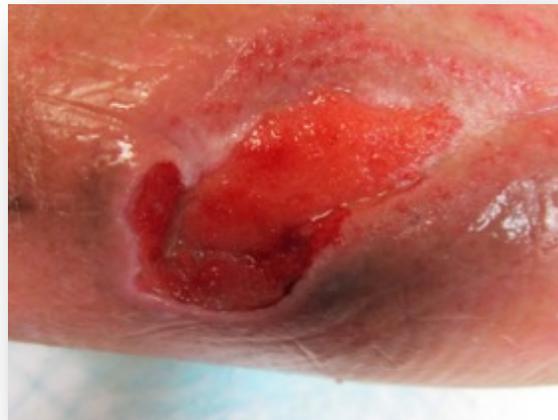


Refashion the
wound edges



Dress the
Wound





Cleanse the wound and periwound skin

A central dark blue rounded rectangle containing a photograph of a gloved hand cleaning a heel with a white gauze pad. The heel is red and swollen. The text "Cleanse the wound and periwound skin" is written in white below the photo. A small timestamp "08/15/2022" is visible in the bottom right of the photo.

Therapeutic Wound and Periwound Cleansing

Wound cleansing is the use of fluids and/or devices to remove loosely adherent contaminants and devitalized material from the wound surface and wound edges

Promotion of skin cleansing of the periwound is considered part of completing a dressing change

When cleansing the periwound skin, concentrate on the area that is 10–20 cm away from the wound edges, or that is covered by the dressing, whichever is larger

Use an antiseptic wash or surfactant for cleansing, if possible, and avoid cross-contamination

An example from real life....



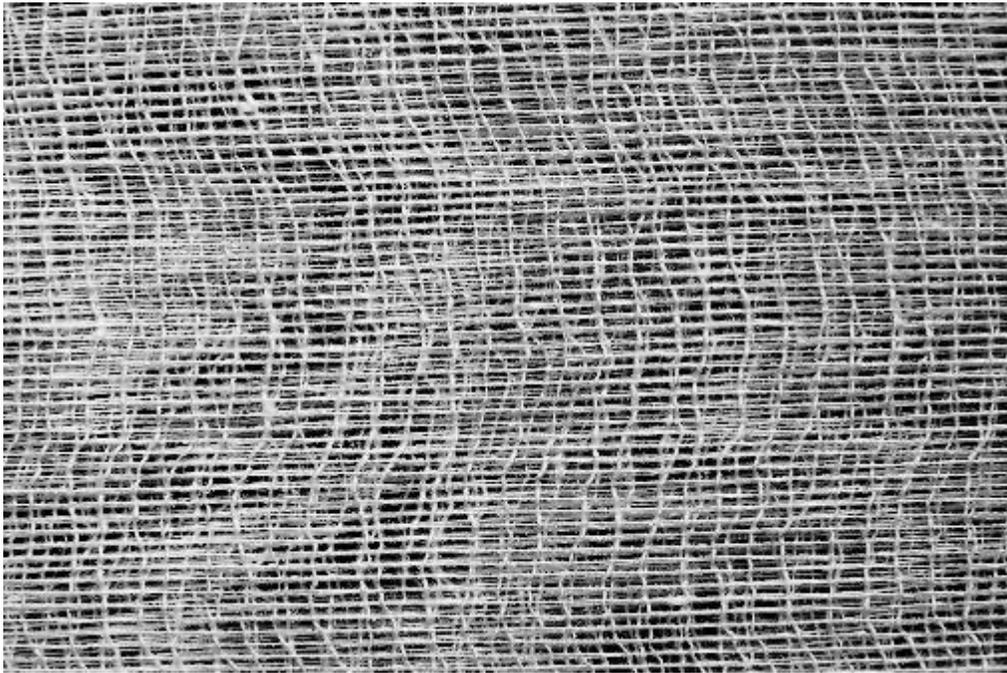
But there's more....



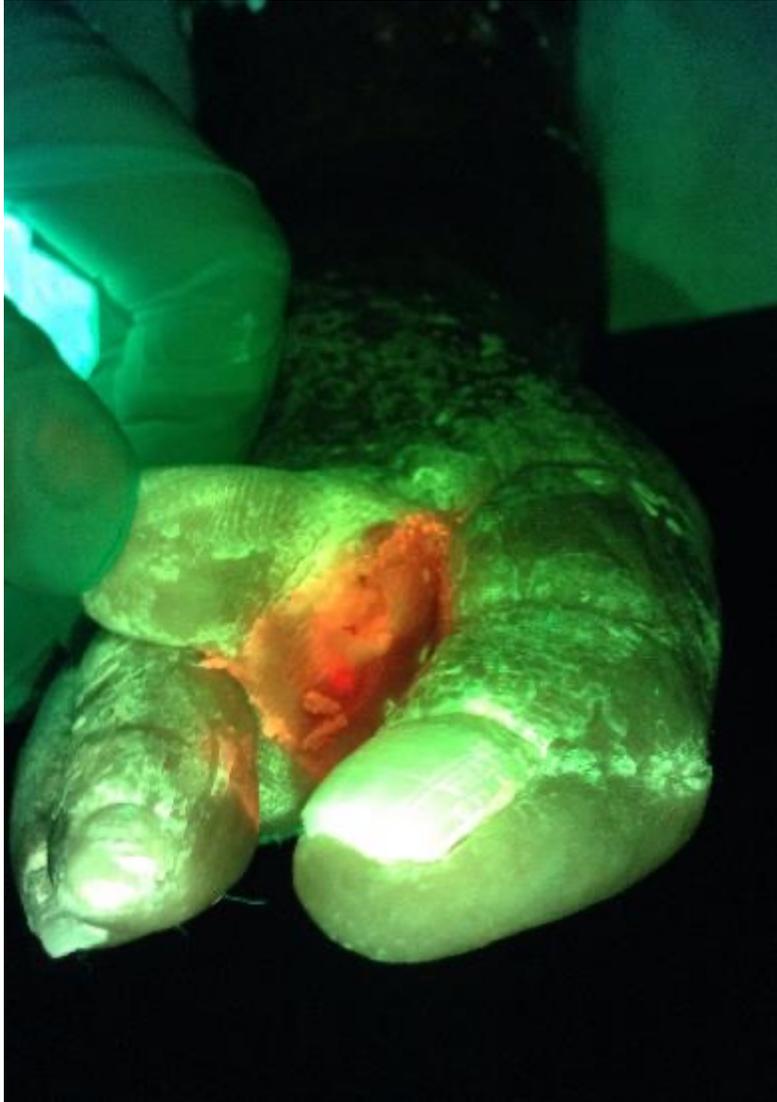
Mechanical Cleansing



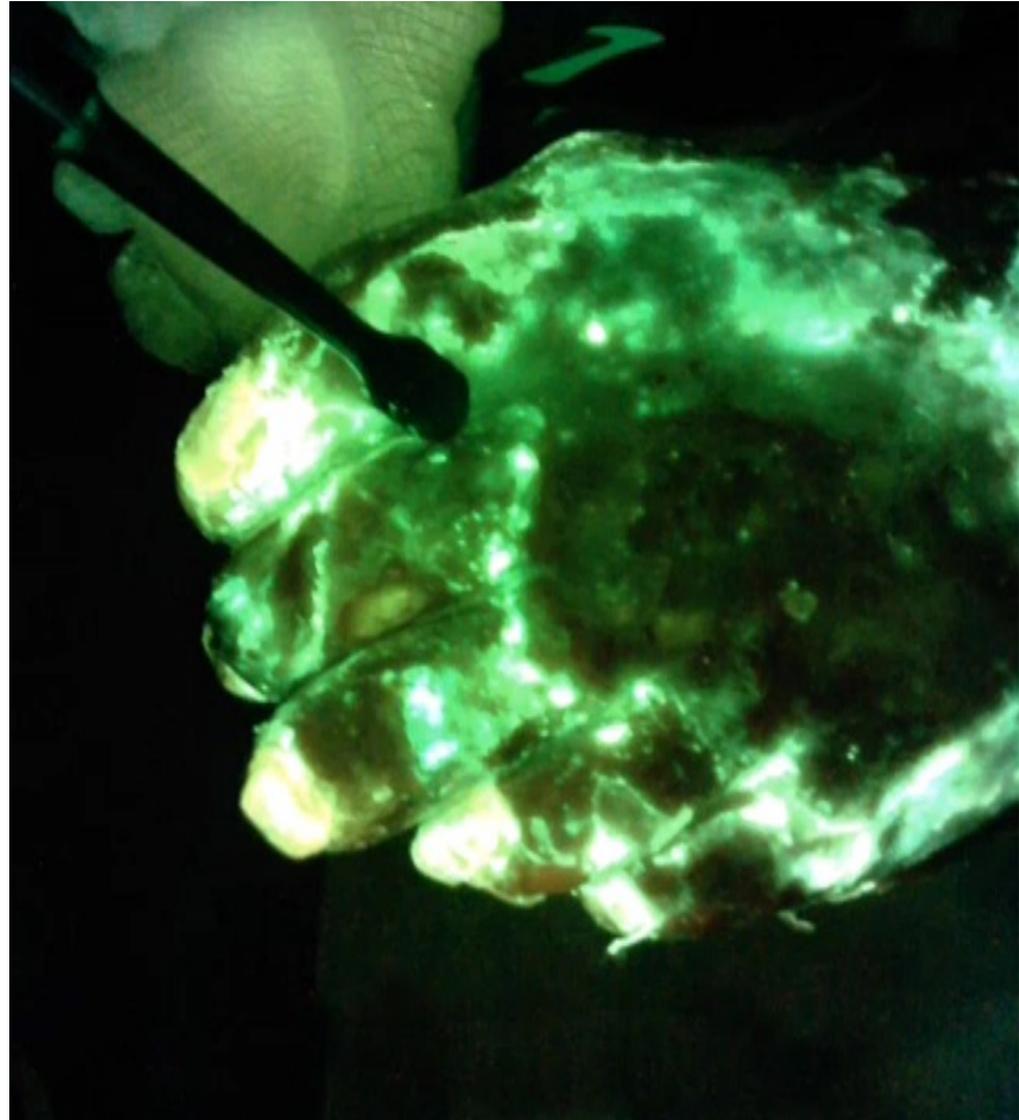
Using gauze...



Toe flossing viewed under fluorescence

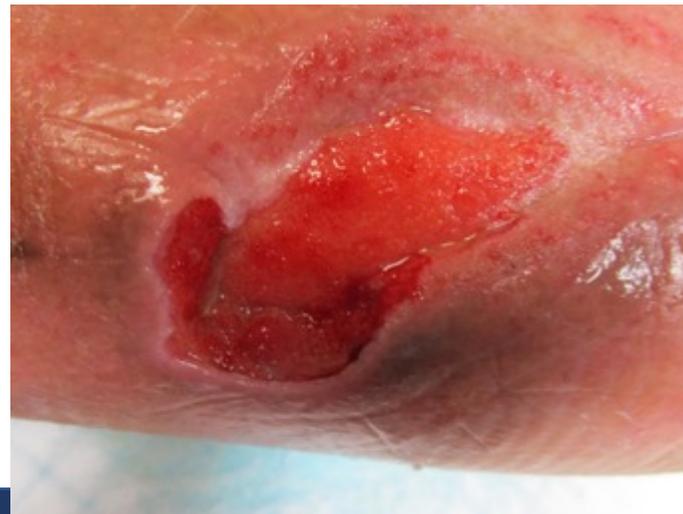


Foot debridement (gauze and ultrasonic) viewed under fluorescence



Monofilament Device

- Less traumatic
- More efficient due to fibers
- More costly



Pain and the Wound Care Patient

- It's going to happen
 - Patients start with their own pain, not just what we may cause them
- To assume we can provide care without causing some pain is unrealistic

BUT.....



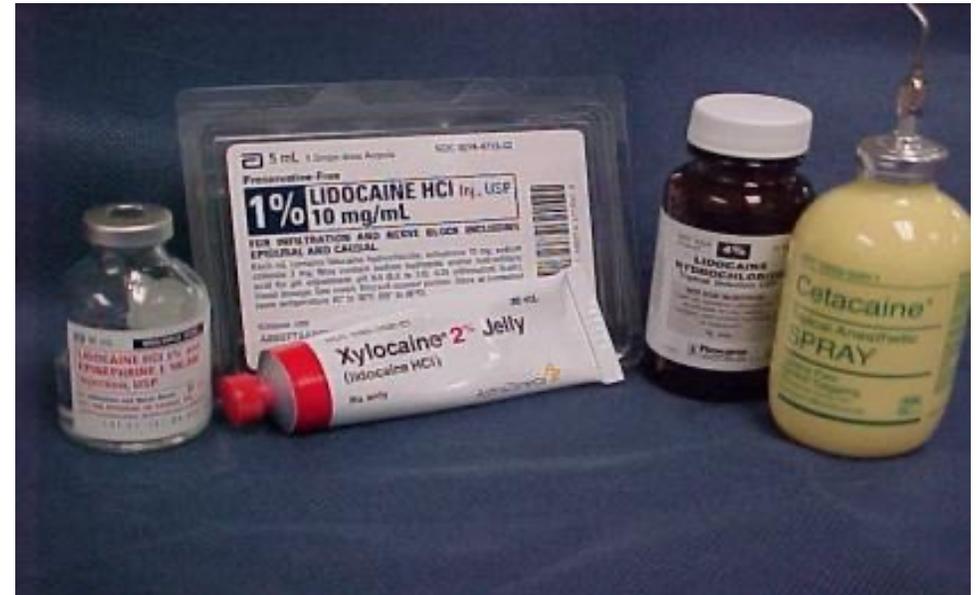
Pain and the Wound Care Patient

If clinicians remain cognizant of the potential for pain, we can mitigate it.



Plan for the Pain

- Inpatient pre-medicate patient
- Provide medication to patient
 - Take pain medication prior to leaving facility for procedure
- Topical anesthetics can work
 - Know the mechanism of action
 - Consider even for cleansing
 - Prescriptions for patients and home care/LTC nurses



Wound Cleansing



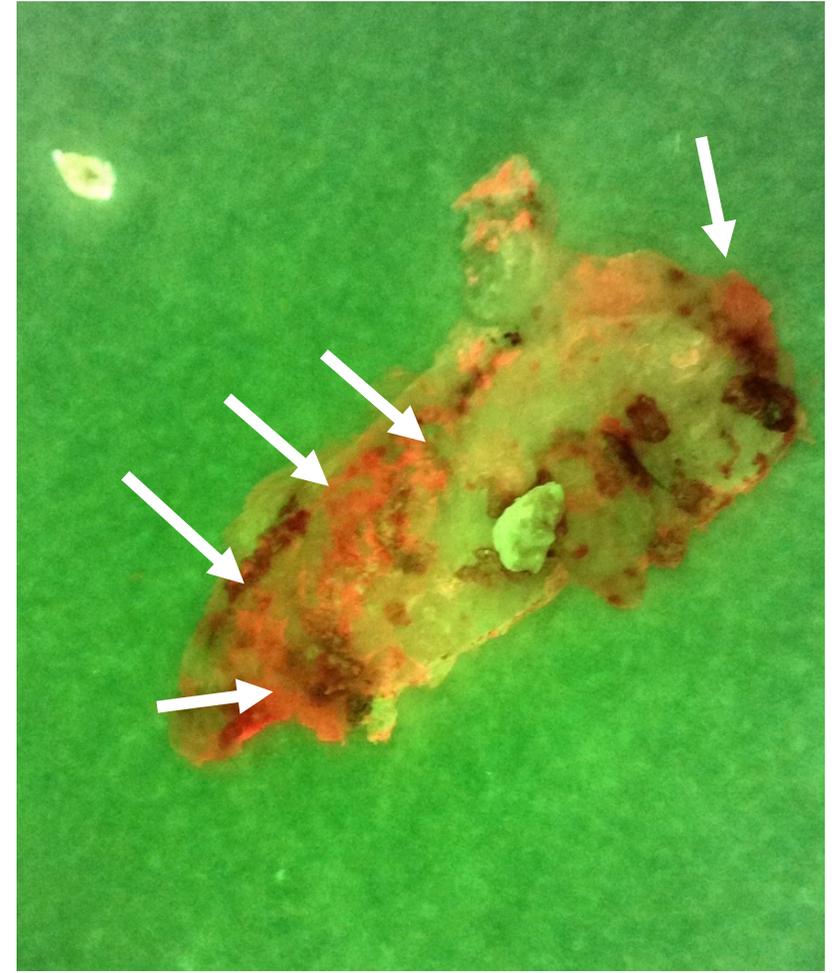
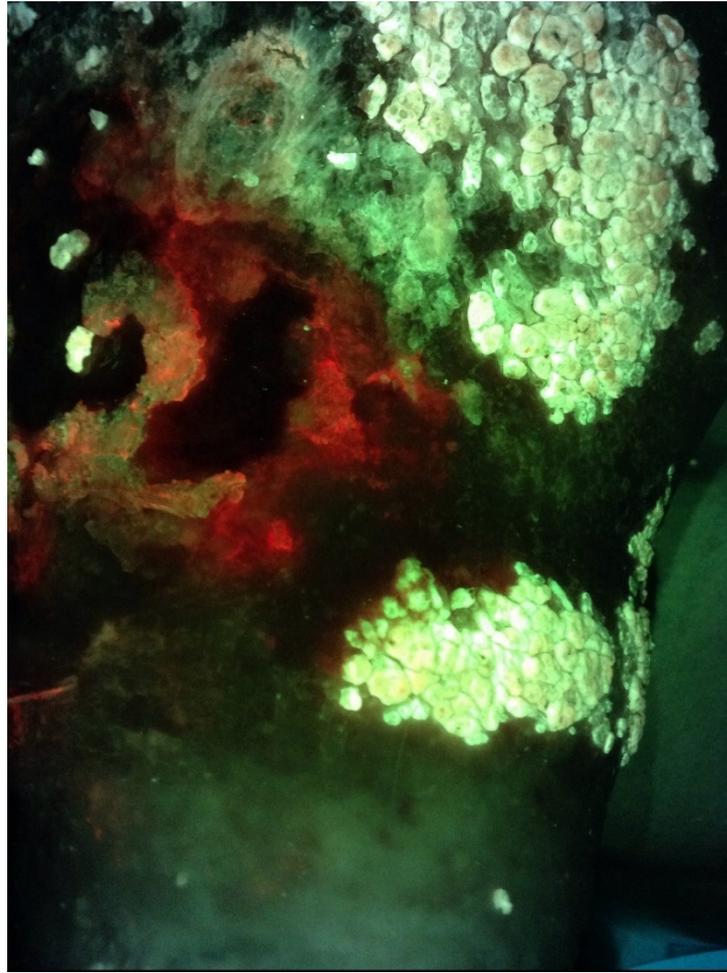
**Possibly, sometimes, maybe
Depending on technique**

Not a chance

Skin or Scales?



Scales



Diabetic Surgical Site: 96 y/o male with home care



Effective Wound Cleansing



What to clean with?

Ideal Fluid Agent

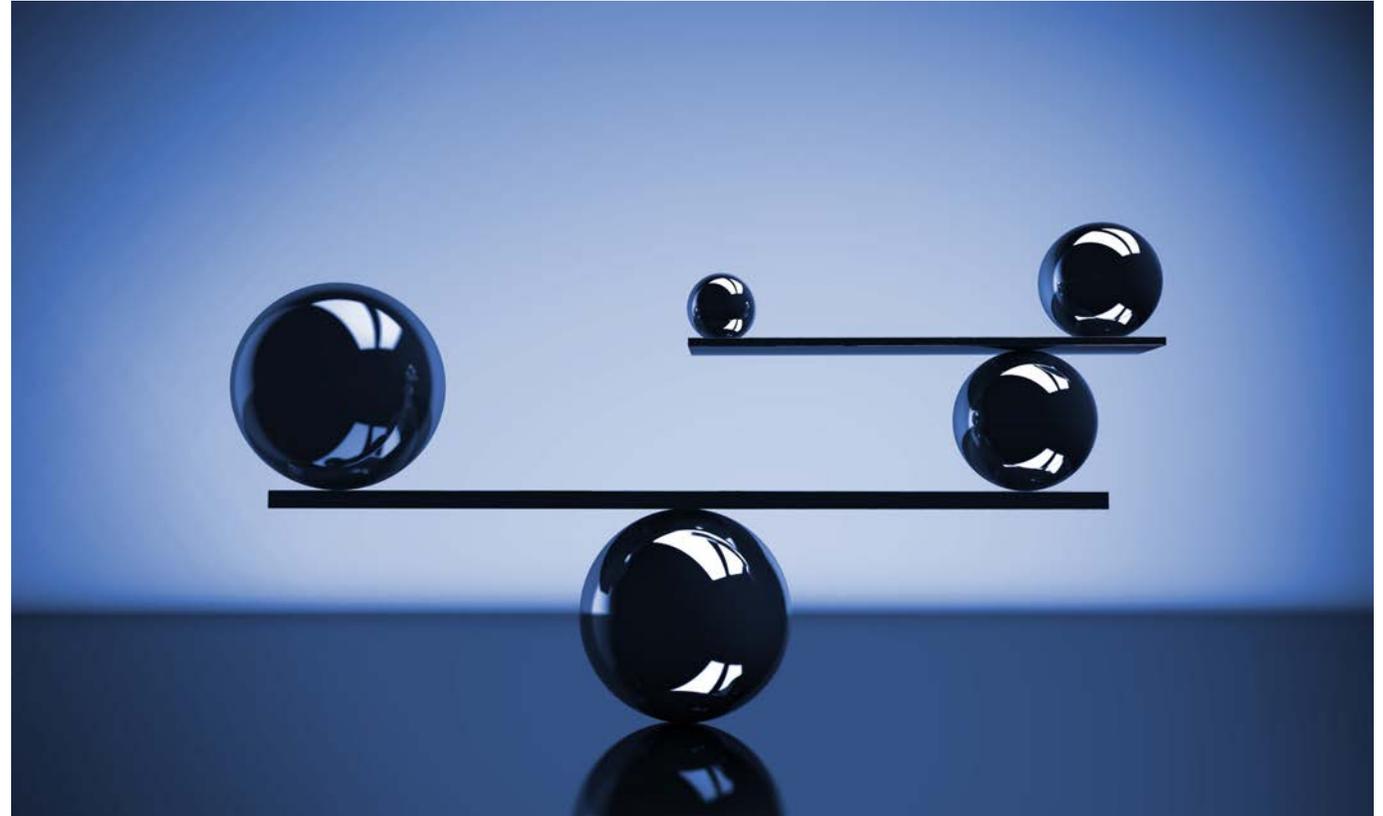
Non-irritating

Non-cytotoxic

pH neutral (5.5)

Effective

Controls Odor



What to Clean With?



Table 9: Wound cleansing solution options

Wound cleansing solution	Fluid type	Safety profile	Comments
Potable tap water	Hypotonic	<ul style="list-style-type: none"> No cytotoxicity Not sterile 	<ul style="list-style-type: none"> Generally inert solution that varies in content.¹ Effect achieved through mechanical detachment of contaminants.² Safe alternative when sterile solutions are not available or feasible (e.g., low resource settings or community settings).³ In low resource settings with non-potable water, boiled and cooled water is an alternative.⁴ When using potable tap water, run the tap to remove contaminants before using the water.⁵
Sterile normal 0.9% saline	Isotonic	No cytotoxicity	<ul style="list-style-type: none"> Inert, isotonic solution with no antimicrobial properties.¹ Effect achieved through mechanical detachment of contaminants.² Once opened, product is no longer sterile.⁶
Sterile water	Hypotonic	No cytotoxicity	<ul style="list-style-type: none"> Inert, hypotonic solution with no antimicrobial properties.¹ Effect achieved through mechanical detachment of contaminants.² Once opened, product is no longer sterile.⁶
Surfactant wound cleansers (e.g., Poloxamer 407, undecylenamido-propyl betaine and macrogolum)	Surfactant	Low cytotoxicity to fibroblasts and keratinocytes <i>in vitro</i> ⁷	<ul style="list-style-type: none"> Categorised based on type of chemical charge.⁸ Commonly combined with antimicrobial/antimicrobially-preserved agents including octenidine dihydrochloride (OCT) or polyhexamethylene biguanide (PHMB). Removes bacteria without damage to healing wound tissues.⁷
Super-oxidised solutions (hypochlorous acid and sodium hypochlorite are present as antimicrobial preservatives)	Hypotonic	Varies, see Table 11	<ul style="list-style-type: none"> Contain naturally occurring hypotonic, oxidising agents⁹ Antimicrobial and antibiofilm action varies, see Table 11
Povidone iodine	<ul style="list-style-type: none"> Antiseptic Iodophor 	Dose dependent cytotoxic effect on osteoblasts, myoblasts and fibroblasts. ^{10, 11}	<ul style="list-style-type: none"> Antiseptic solution Broad spectrum antimicrobial¹¹⁻¹⁵ and antibiofilm¹¹⁻¹³ action, see Table 11
Other agents containing antimicrobials and/or active preservatives	Varies	Varies, see Table 11	<ul style="list-style-type: none"> Range of antimicrobial/antimicrobially-preserved agents, less commonly used solely as a cleansing agent, see Table 11

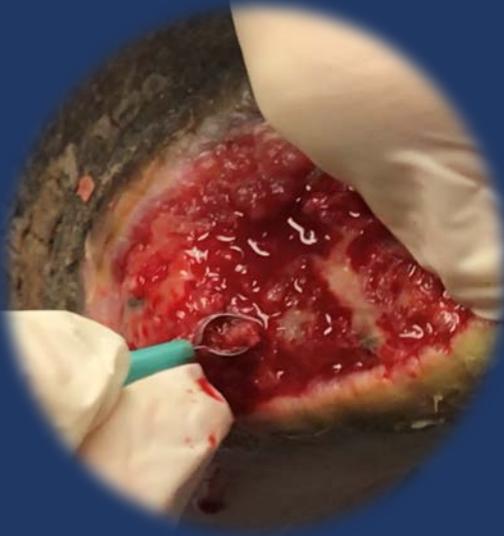
What about showering? Tap Water?

- Priority is getting the wound cleansed
- Literature very weak on recommendations related to tap water
 - Uncertainty in data review
- Used frequently in the community and lower resource settings
 - Rarely in acute care, LTC or outpatient settings



Cochrane Review 2022

- 13 trials, 2504 patients
- Studies looked at open fractures, surgical wounds, traumatic wounds, anal fissures and chronic wounds
 - Cleansing with tap water compared with no cleansing.
 - Cleansing with tap water compared with normal saline
 - Cleansing with distilled water compared with normal saline
 - Cleansing with cooled boiled water compared with normal saline
 - Cleansing with cooled boiled water compared with distilled water
- Results / Author's conclusions
 - All the evidence identified in the review was low or very low certainty
 - Data for other outcomes (infection, wound healing, pain, costs) are limited across all the comparisons considered and are either uncertain or suggest that there may be little or no difference in the outcome.



Debride



Debridement is an optimal form of cleansing: Know what you are trying to remove!



Types of Debridement

- Sharp / instrument / surgical



Types of Debridement

- Mechanical



Types of Debridement

- Biologic / Maggots



Types of Debridement

Enzymatic

- M** = Moist environment to activate enzyme
- E** = Entire wound surface should be covered
- N** = Nickel thick
- D** = Daily dressing changes
- S** = Santyl.com/hcp/compatibility



Types of Debridement

- Autolytic





Refashion the wound edges

A circular inset image showing a surgical procedure on a wound. A gloved hand is using a scalpel to make a vertical incision along one edge of the wound. The wound is on a patient's skin, and the surrounding tissue is red and inflamed. The text "Refashion the wound edges" is written in white on a dark blue background below the inset.

Don't Forget the Edges



Edge Debridement





Dress the wound

- Meet environmental needs
 - Exudate
 - Bacteria
 - Pain**



Wound Bed Preparation: Restoring the Balance

- The management of a wound in order to accelerate endogenous healing, or to facilitate the effectiveness of other therapeutic measures
- Integrates proven concepts to build a platform for the treatment of chronic wounds
- Organizes medical procedures into a holistic approach that can be used to evaluate and remove barriers to the wound healing process
- Manages all the critical components including cleansing, wound and edge debridement, and creating an environment for healing
- Ultimate aim of the formation of good quality granulation tissue leading to complete wound closure

Thank You!

