SAWC Spring

WHS

April 8–12, 2026

Charlotte, NC

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The Art and Science of Debridement: A Multidisciplinary Approach

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Faculty

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  Miami, FL

- Susie Seaman, NP, MSN, CWCN, CWS
  San Diego Wound Care Consulting
  San Diego, CA

- Michael Desvigne, MD, FACS, CWS, FACCWS, MAPWCA
  Plastic and Reconstructive Surgery, Wound Care and Hyperbaric Medicine
  Abrazo Arrowhead Hospital and Wound Clinic
  Glendale, AZ

Faculty Disclosures

- Marjana Tomic-Canic, PhD
  Advisory Board: Flen Health; Research: Organogenesis; Tisue Repair Solutions
- Susie Seaman, NP, MSN, CWCN, CWS
  Advisory Board: Lynch Regenerative Medicine; Speakers Bureau: Urgo Medical North America
- Michael Desvigne, MD, FACS, CWS, FACCWS, MAPWCA
  Advisory Board: Solventum, Medical Surgical Business; Sanara MedTech; Consultant: MTF Biologics; Solventum, Medical Surgical Business; Smith+Nephew; Aroa Biosurgery; Sanara MedTech; Urgo Medical North America; Integra LifeSciences; MolecuLight, Inc.; Tides Medical; Acera Surgical; Speakers Bureau: MTF Biologics; Solventum, Medical Surgical Business; Smith+Nephew; Aroa Biosurgery; Sanara MedTech; Urgo Medical North America; Integra LifeSciences; MolecuLight, Inc.; Tides Medical; Acera Surgical

Disclosures

The faculty have been informed of their responsibility to disclose to the audience if they will be discussing off-label or investigational use(s) of drugs, products, and/or devices (any use not approved by the US Food and Drug Administration).

- Applicable CME staff have no relationships to disclose relating to the subject matter of this activity
- This activity has been independently reviewed for balance

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Debridement

- The removal of viable and non-viable wound components, including necrotic tissue, slough, microorganisms, biofilm, periwound callus, and foreign materials
- Its primary goal is to reduce these components using the most effective methods with the fewest side effects
- Should be safely executed by clinicians with the knowledge, training, and capability to do so at the site of care and within their scope of practice

Mayer DO, Tettelbach WH, Ciprandi G, et al. *J Wound Care*. 2024;33(Sup6b):S1-S32.

Learning Objectives

- Discuss the scientific rationale for debridement
- Review different types of debridement and when they are used
- Identify indications and contraindications for wound debridement

Biological Basis of Debridement

Marjana Tomic-Canic, PhD

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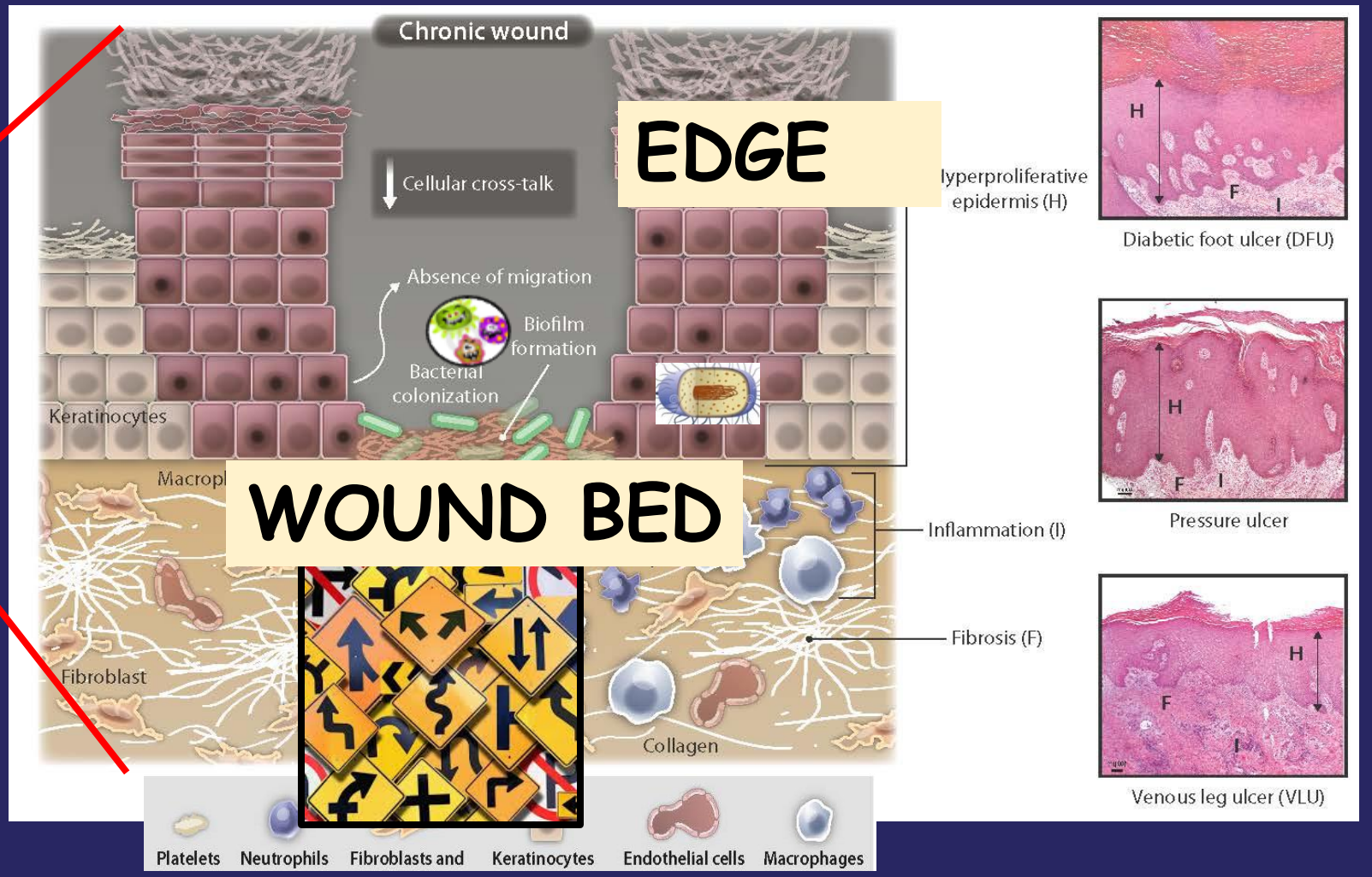
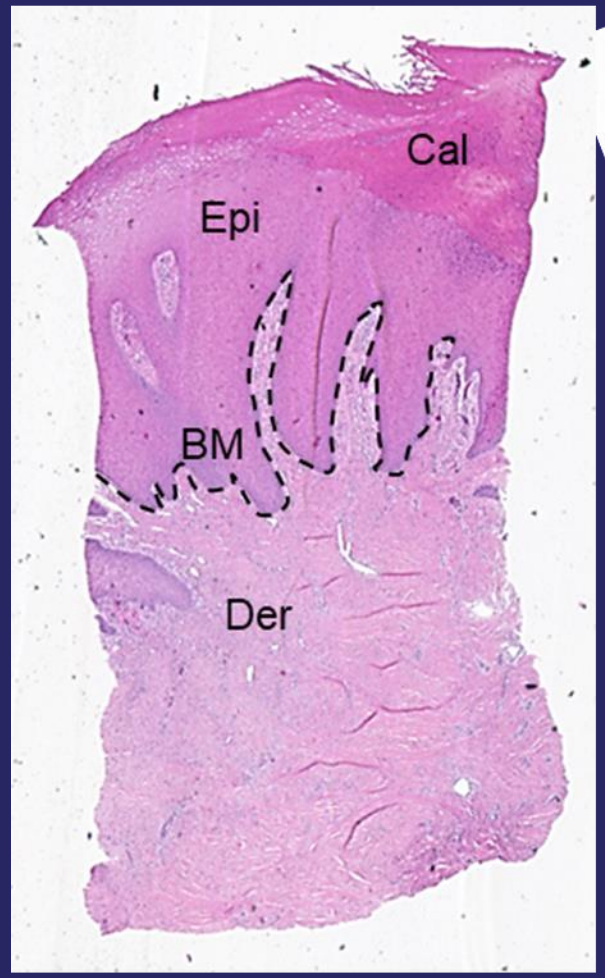
Chronic wound histology reveals common characteristics that contribute to non-healing

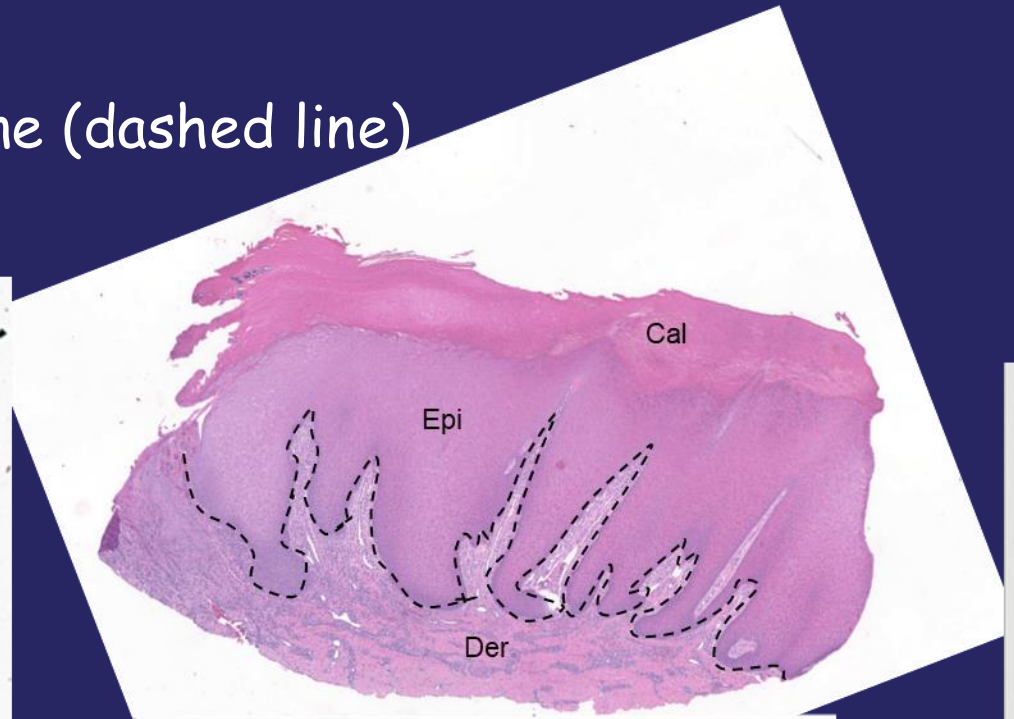


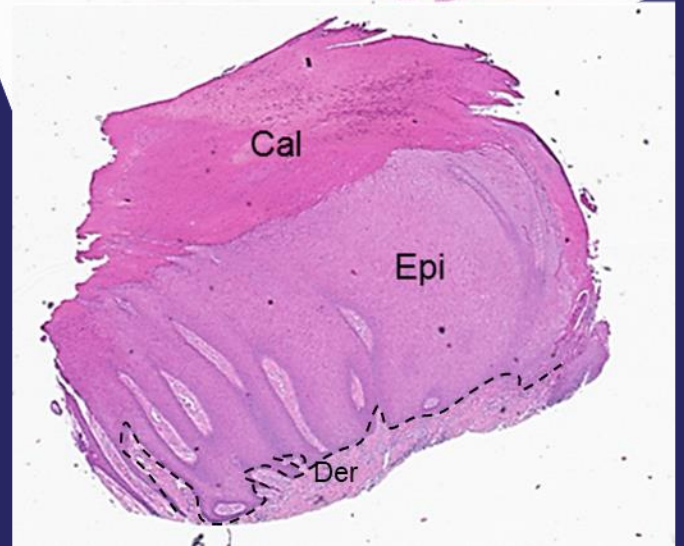
Eming SA, Tomic-Canic M, et al. *Sci Transl Med*. 2014;6(265):265sr6. Brem H, Tomic-Canic M. *J Clin Invest*. 2007;117(5):1219-1222.

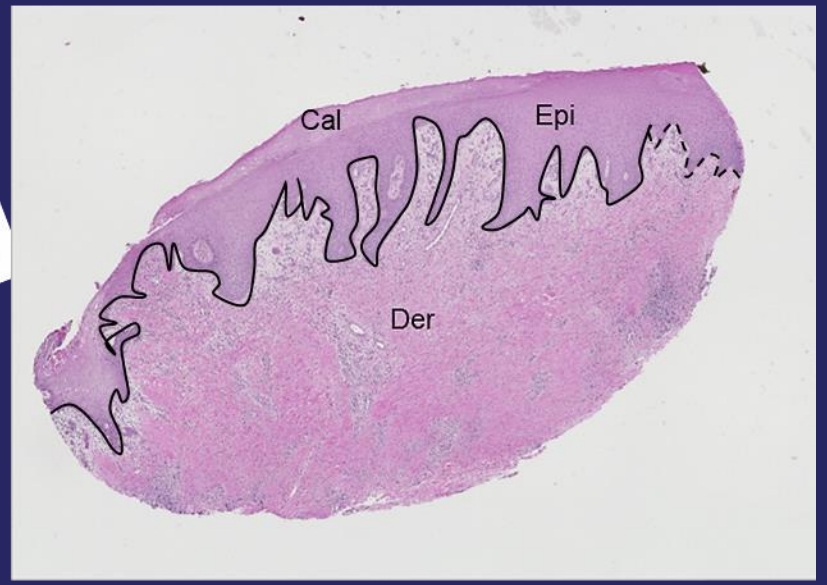
Representative histology shows presence of all structures

- Callus (Cal)
- Epidermis (Epi)
- Basement Membrane (dashed line)
- Dermis (Der)





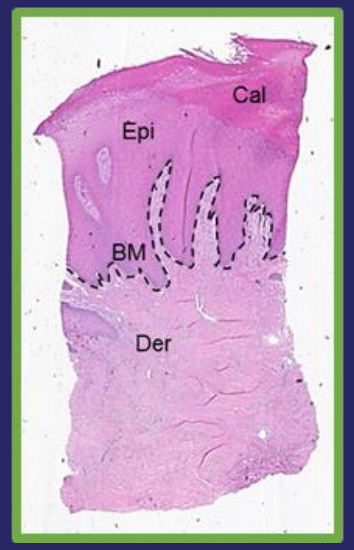


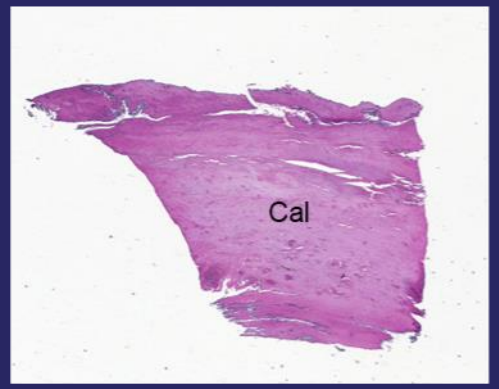


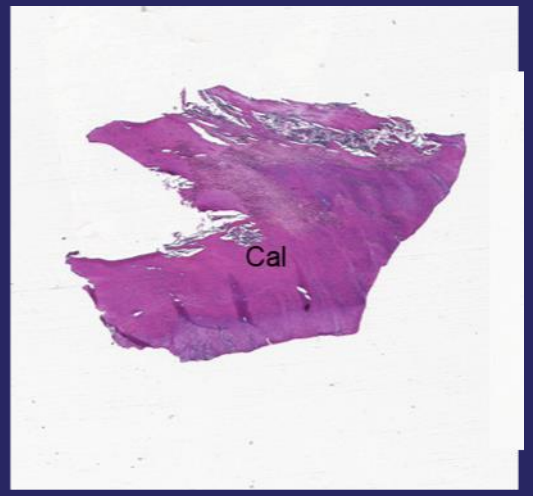
Histology indicates inadequate debridement

No Go

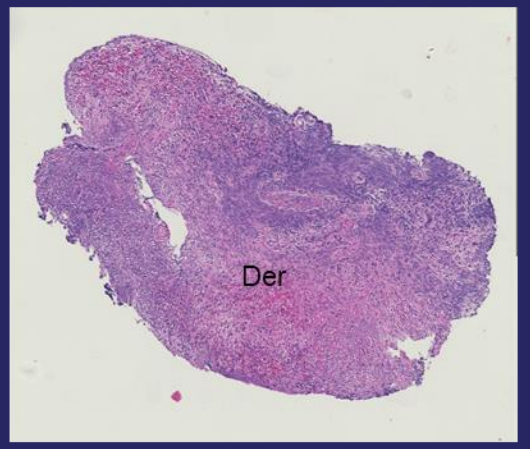
Quality control



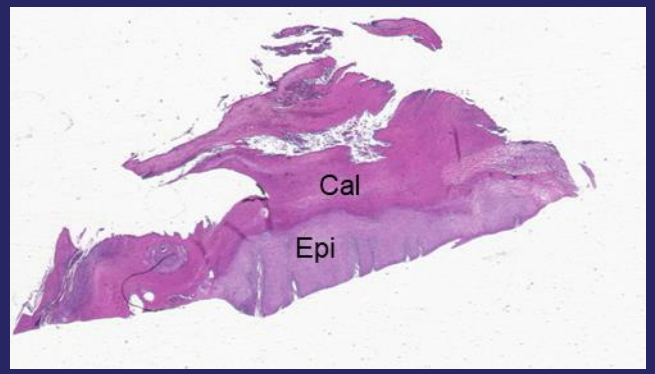




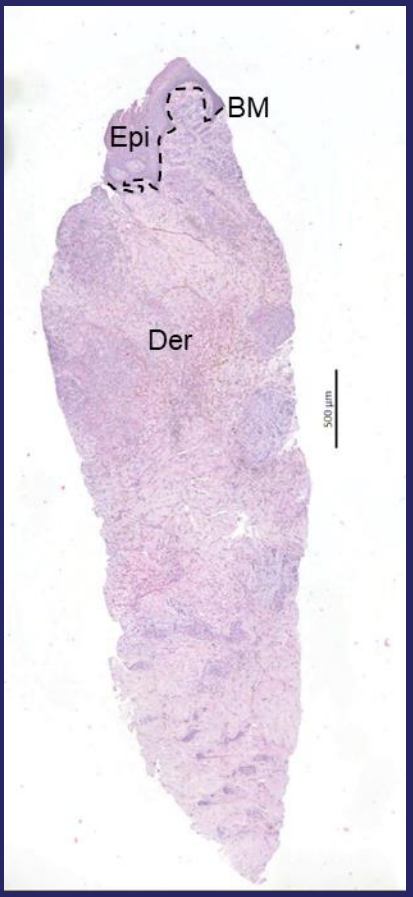
Callus only: very superficial



Dermis only (ie, edge was not debrided)



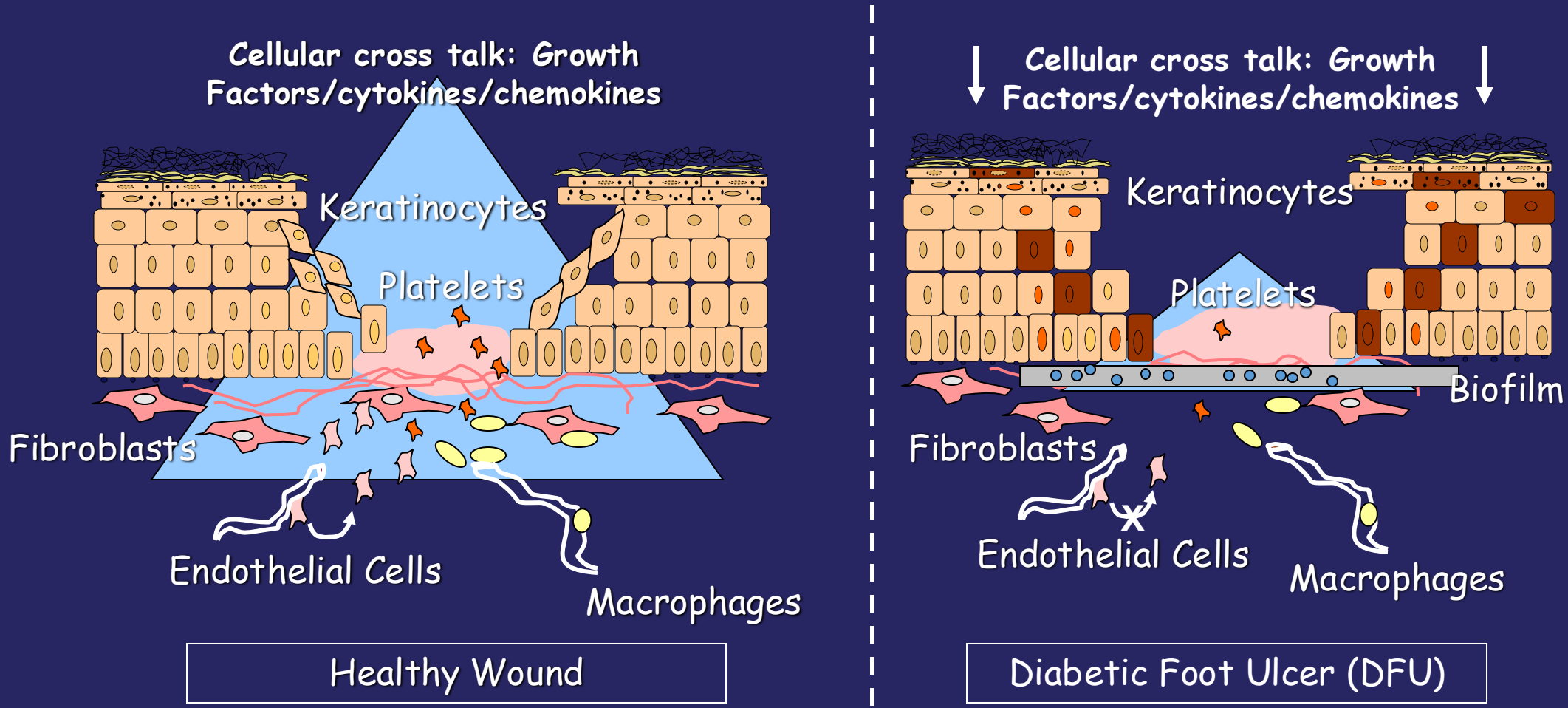
Callus+ partial epidermis; no basement membrane – not deep enough



Insufficient epidermis
Indicates limited edge debridement (if any)

Q: What is experimental evidence (biological basis) that supports the debridement?

Cellular Response in Wound Healing

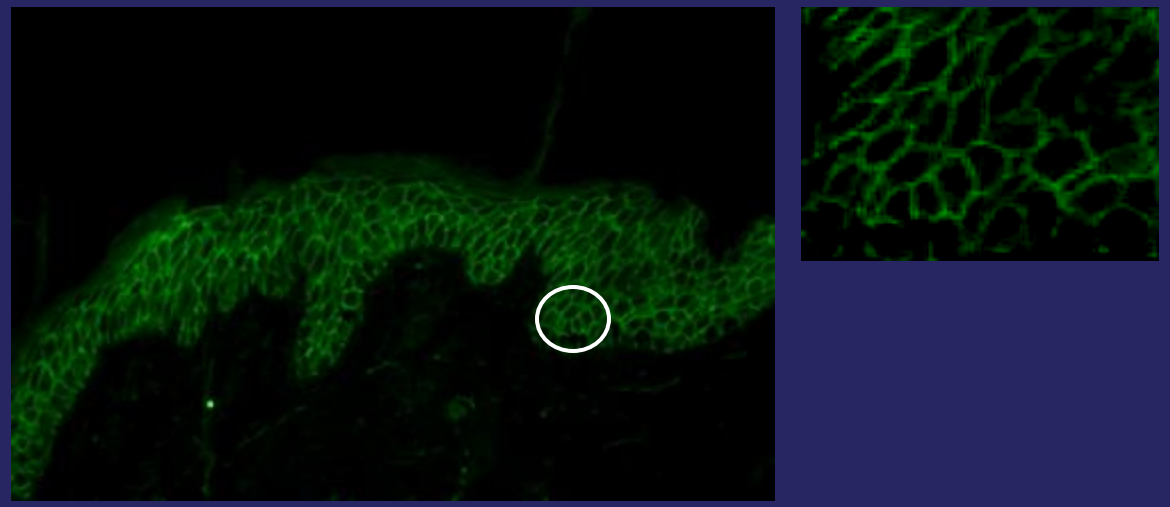


DFU = diabetic foot ulcer.

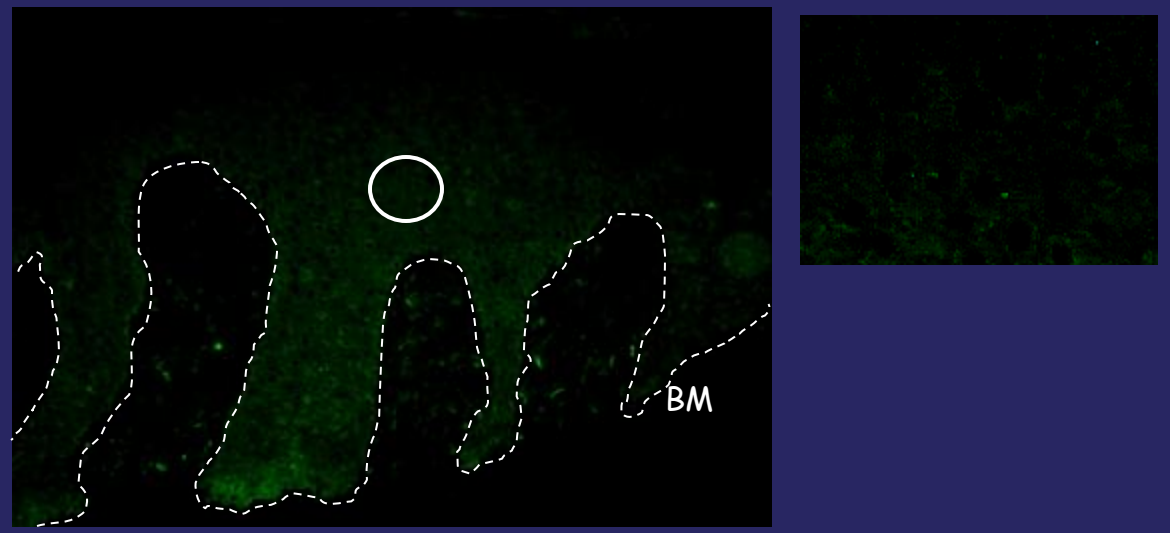
Brem H, Tomic-Canic M. *J Clin Invest.* 2007;117(5):1219-1222.

Keratinocytes from the non-healing edge are not responsive to Epidermal Growth Factor (EGF) because they do not express properly the EGF-Receptor

EGFR



Normal skin

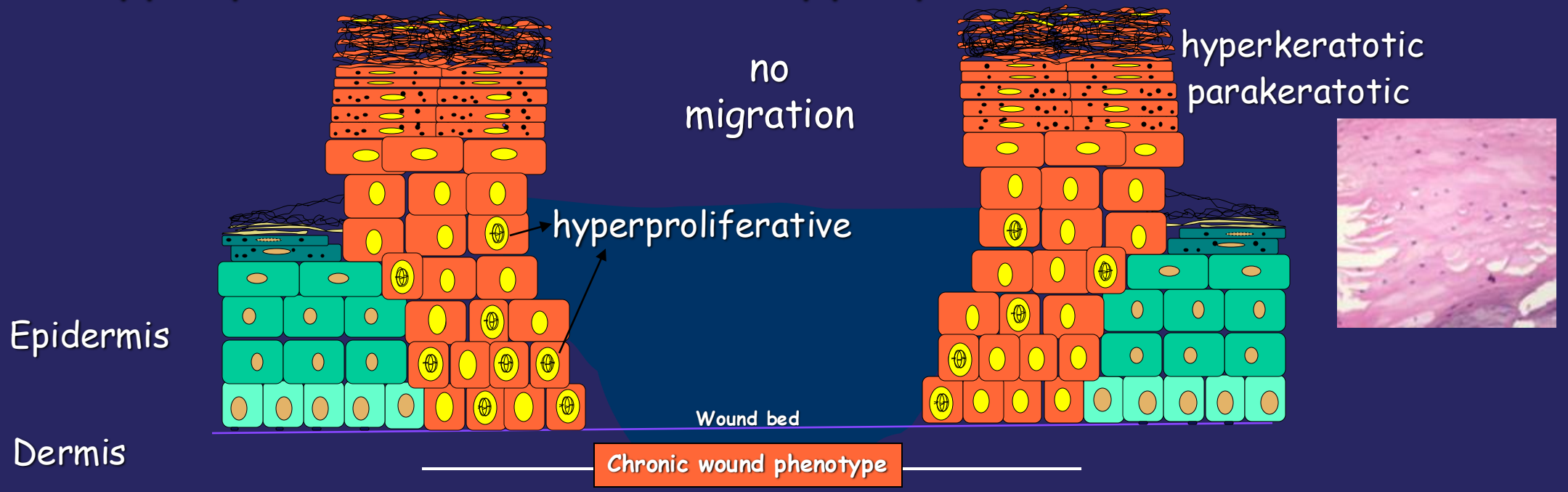


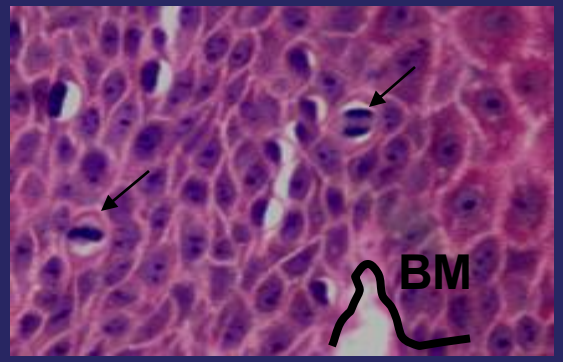
Non-healing edge

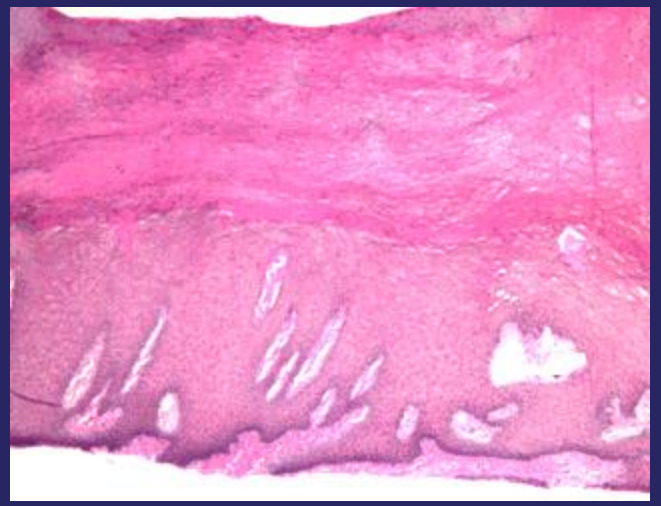
EGF = epidermal growth factor.

Barrientos S, et al. *Wound Repair Regen.* 2008;16(5):585-601. Pastar I, Stojadinovic O, Tomic-Canic M. *Surg Technol Int.* 2008;17:105-112.

Histopathology of a chronic wound: Loss of migration; hyperproliferation; lack of appropriate differentiation





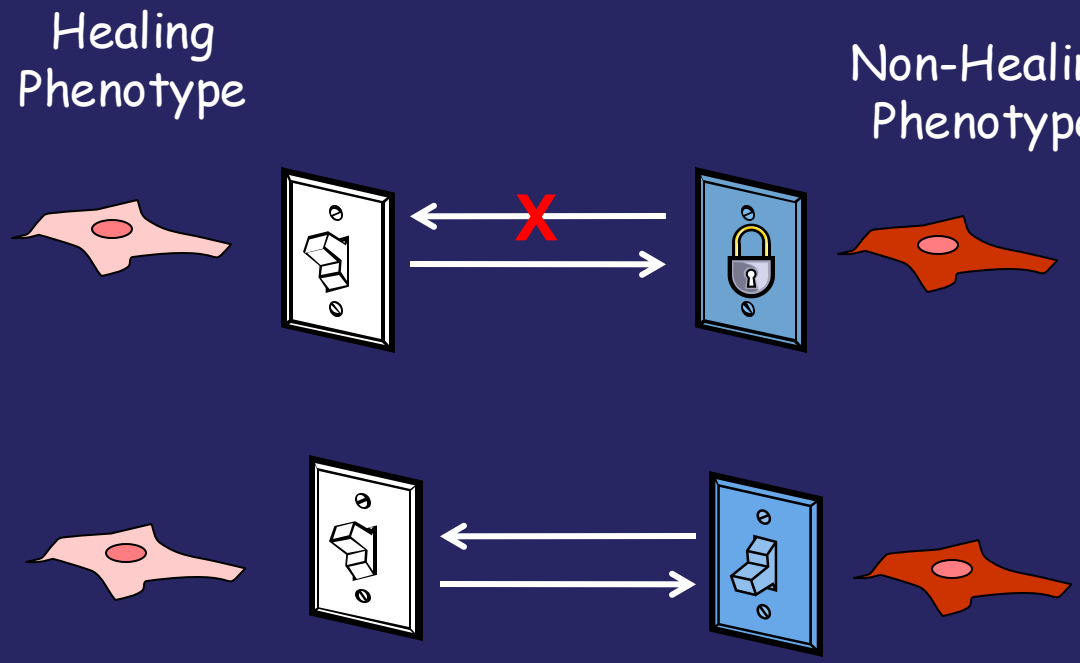


EPIDERMIS OF A CHRONIC WOUND

Stojadinovic O, et al. *Am J Pathol*. 2005;167(1):59-69.

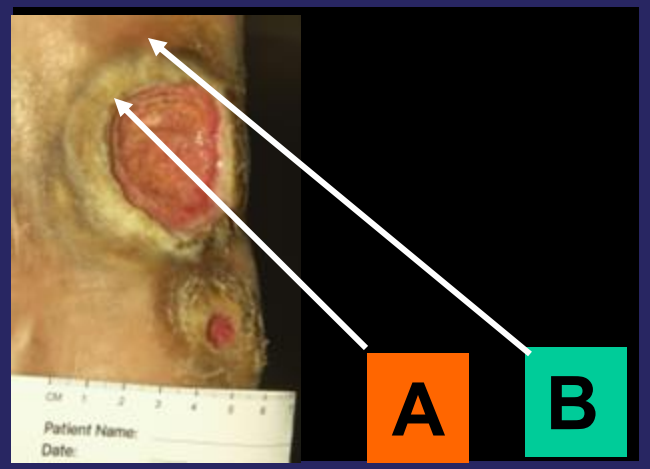
Q: Can we use debridement procedure to restore pro-healing cellular phenotype?

Remove Non-Healing Cells



Reverse Their Fortune

How does wound tissue differ pre- and post-debridement?



?

Presence of nuclei in stratum corneum

no migration

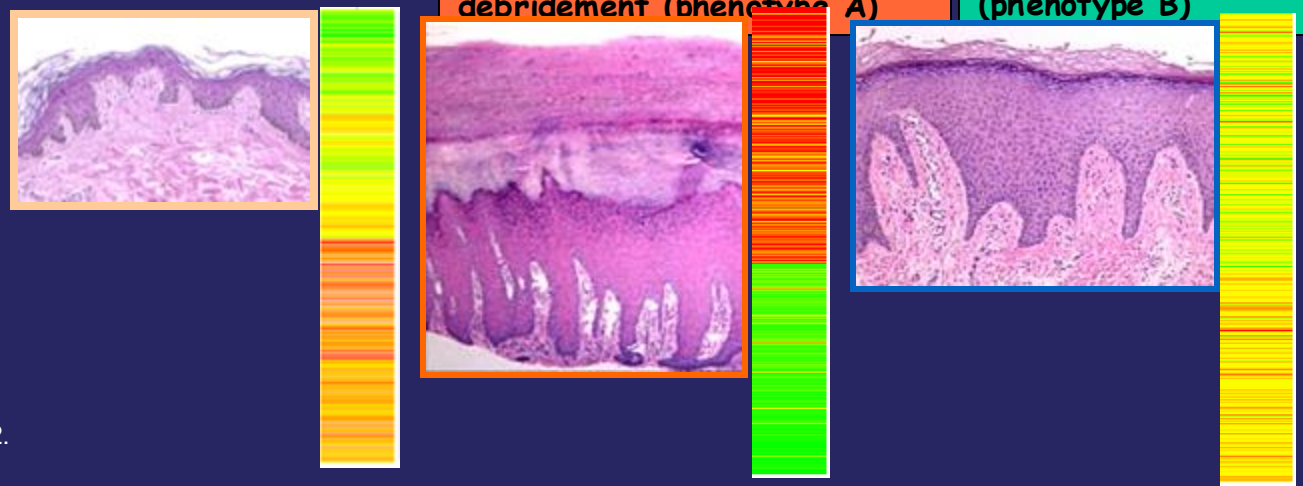
Suprabasal cell division

Wound bed

Healthy skin

Chronic wound pre-debridement (phenotype A)

Chronic wound post-debridement (phenotype B)



Tomic-Canic M, et al. *Adv Skin Wound Care*. 2008 21(10):487-492.

How does wound tissue differ pre- and post-debridement?

Pre-debridement
Healing-incompetent
(Location A) Tissue

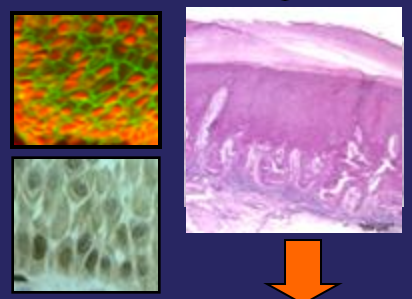
A

B

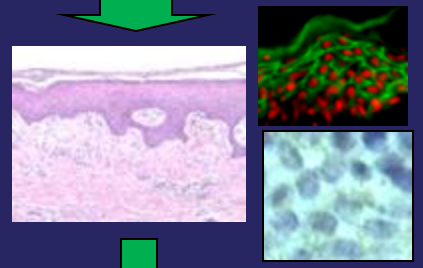
Post-debridement
Healing-competent
(Location B) Tissue

Location A

Location B

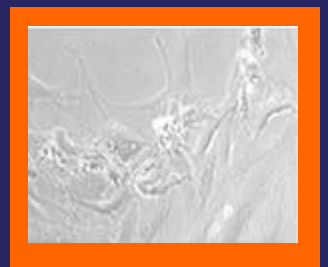


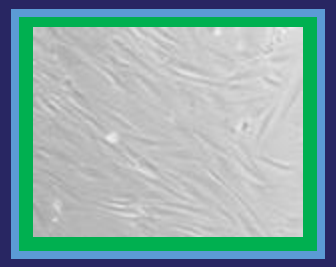
Evaluation by Histology &
Immunohistochemistry



Primary cells

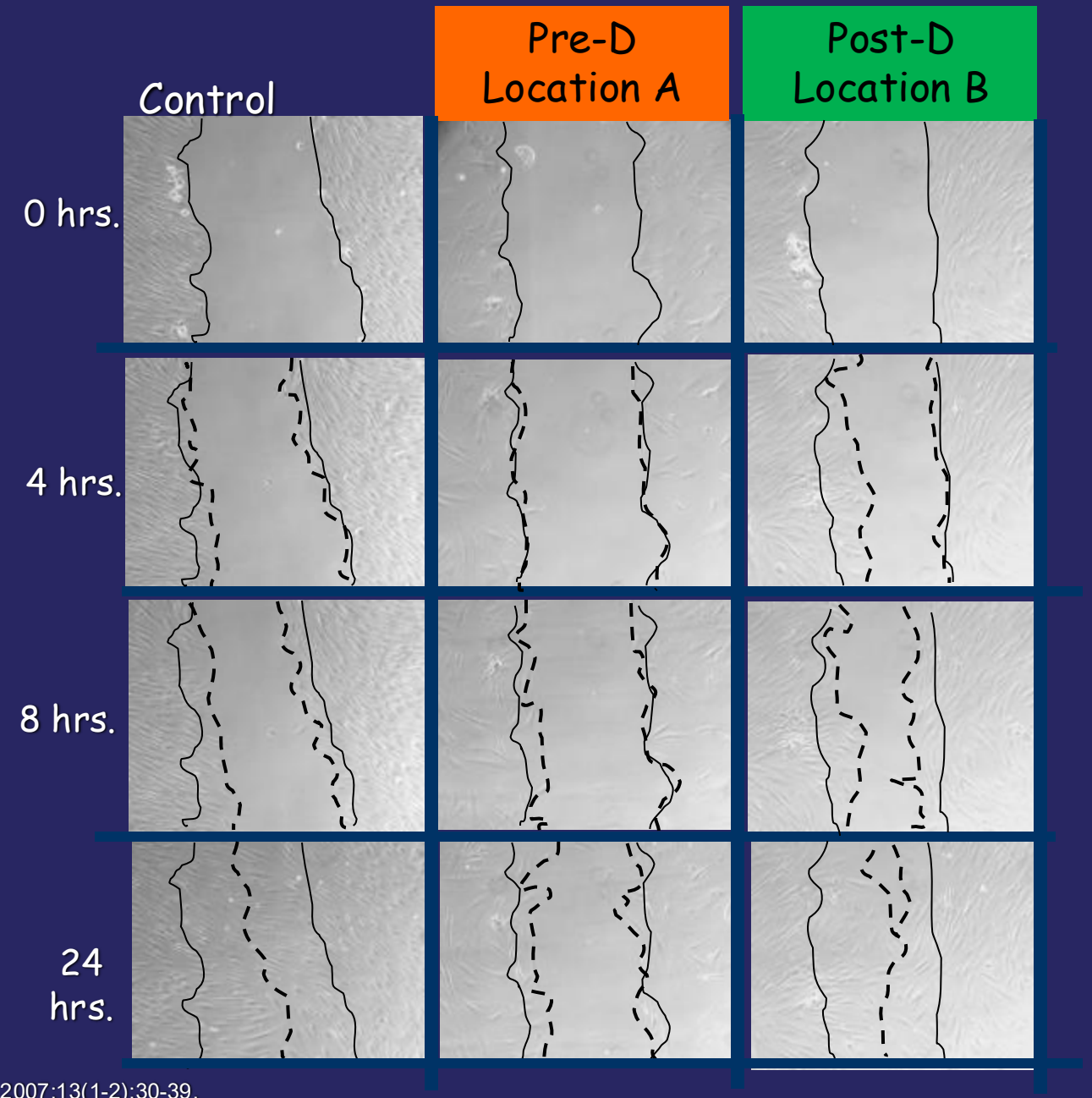
Primary cells

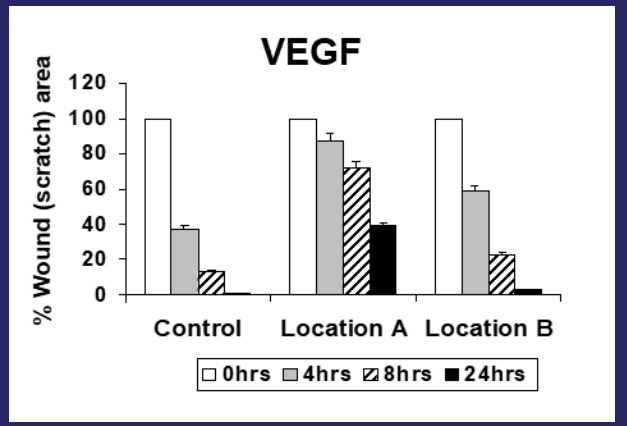




Control

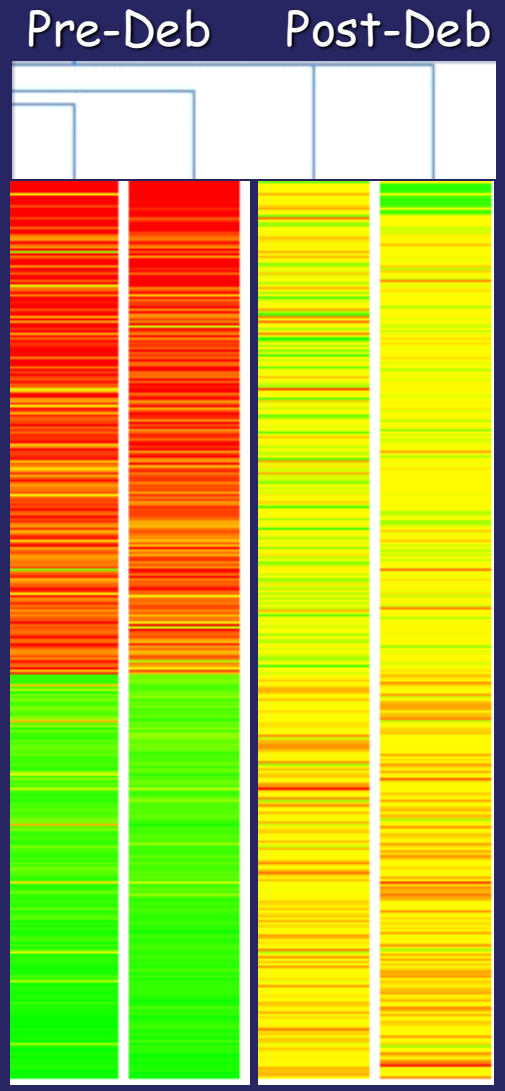
Cells from Pre-debridement (Location A) do not migrate or respond to WH Stimuli





Brem H, et al. *Mol Med*. 2007;13(1-2);30-39.

Cellular and Molecular Basis of Debridement



Gene Expression Profiles

Pre-D Location A

Post-D Location B

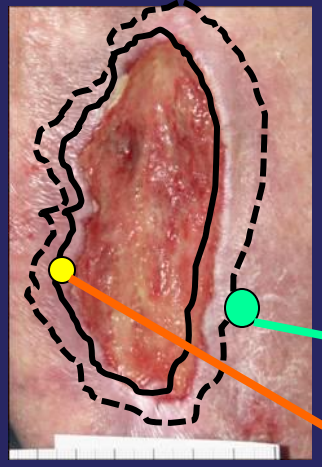
Normal skin

H&E

Procollagen staining

Polarized Light

Improving Tissue Responses to Wound Healing Stimuli



Tissue from the non-healing edge (prior to debridement) shows loss of growth factor receptors and absence of epidermal stem cells.

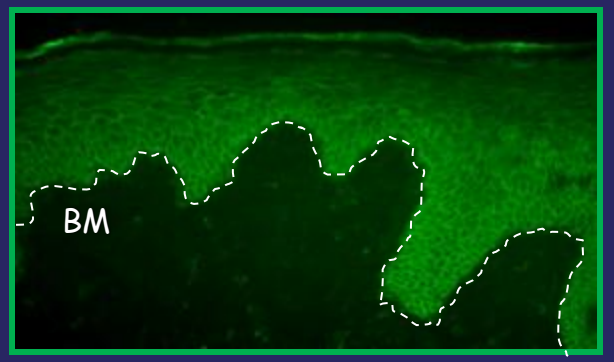
Tissue from post-debridement area shows restoration of growth factor receptor and stem cell markers.

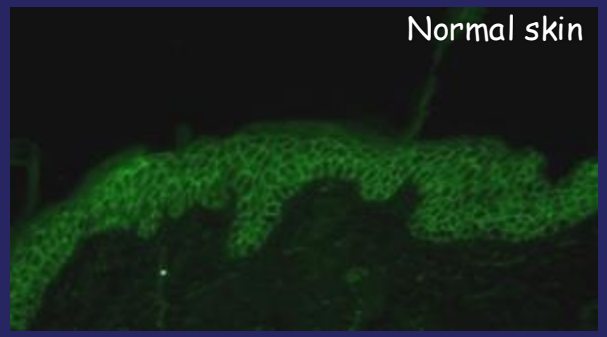
Location A (non-healing)

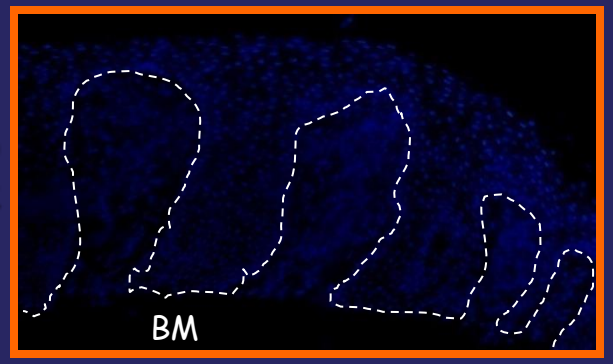
Location B (healing)

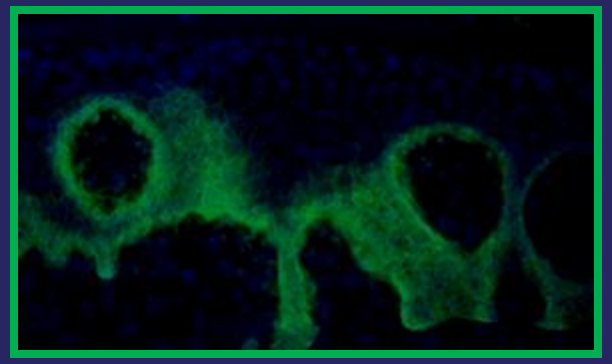
EGF -R

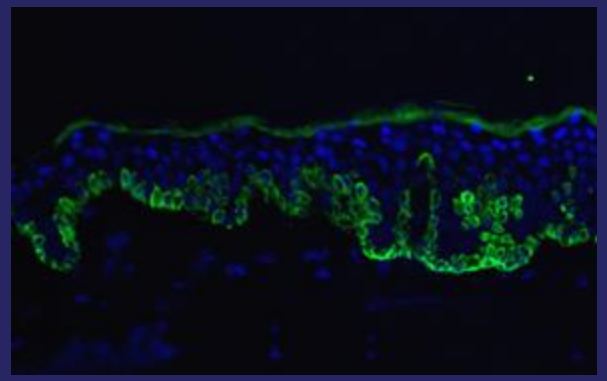
K15









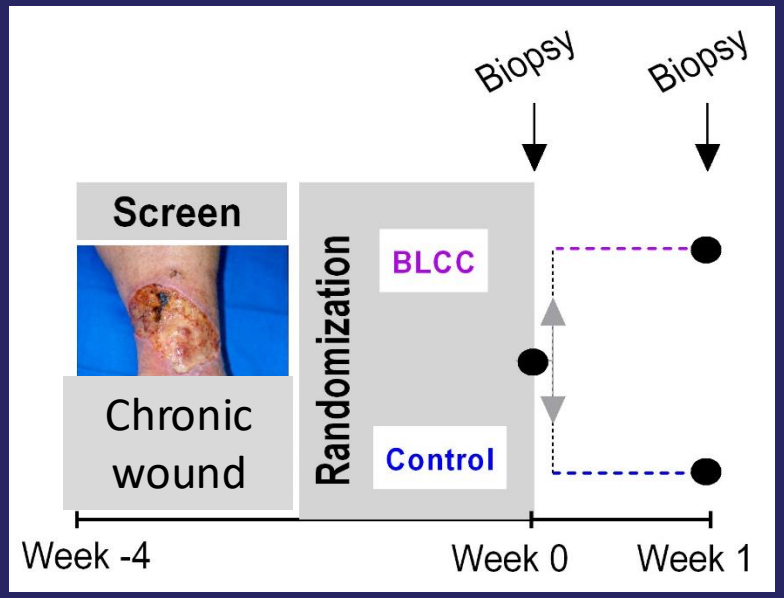


Brem H, et al. *Mol Med*. 2007;13(1-2);30-39.

Q: Does debridement work in synergy with other treatments?

Genomic Approach to Study BLCC Mechanism of Action:

ClinicalTrials.gov NCT01327937



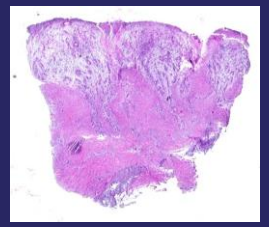
Identify wounds not predicted to heal

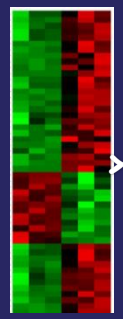
Treat with compression therapy +/- BLCC

Biopsy ulcer edge and ulcer bed

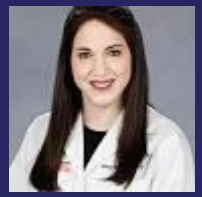
Examine cellular transcriptomes after treatment

Histology and Genotyping



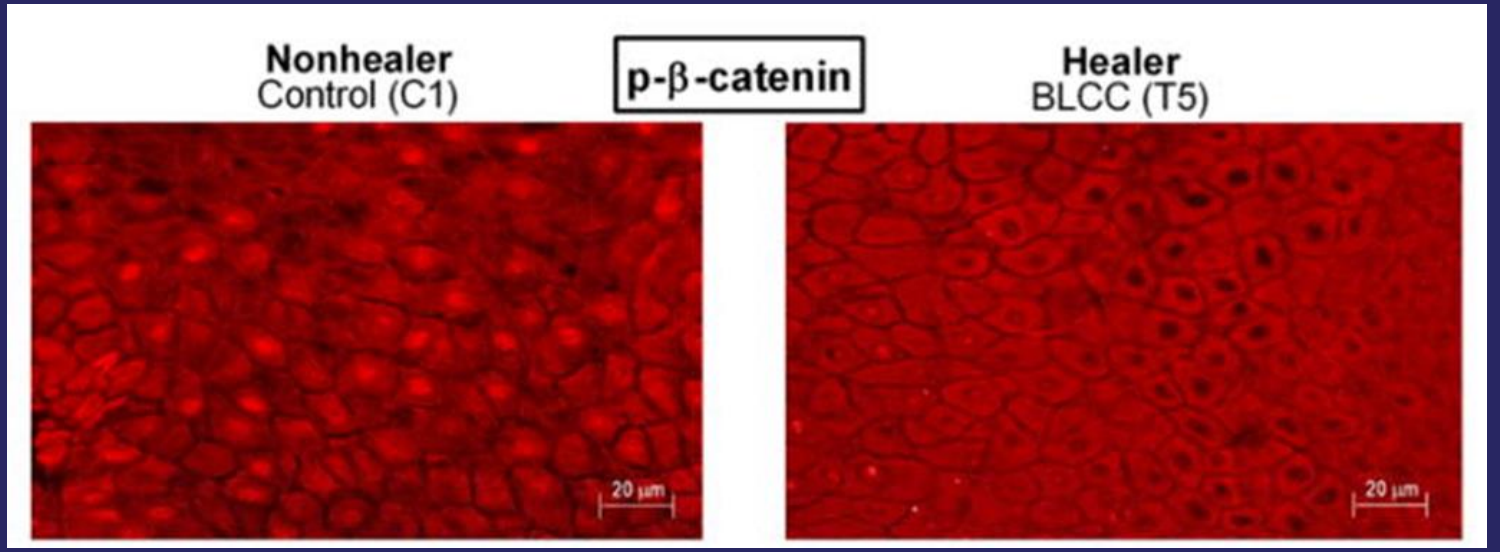


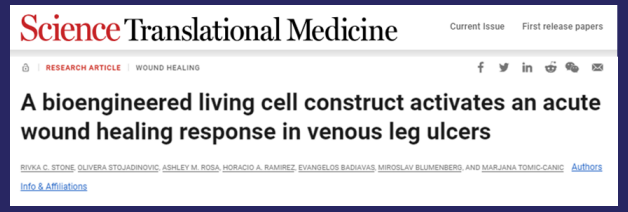
Microarray 30,000 genes



Stone RC, et al. *Sci Transl Med*. 2017;9(371):eaaf8611.

Debridement restores responsiveness to therapy




Science Translational Medicine
Current Issue
First release papers
RESEARCH ARTICLE | WOUND HEALING
A bioengineered living cell construct activates an acute wound healing response in venous leg ulcers
RIVKA C. STONE, OLIVERA STOJADINOVIC, ASHLEY M. ROSA, HORACIO A. RAMIREZ, EVANGELOS BADIAVAS, MIROSLAV BLUMENBERG, AND MARJANA TOMIC-CANIC
Authors Info & Affiliations

Changing wound microbiome by debridement is associated with improved healing outcomes

Wound Repair Regen. 2016 Jan-Feb;24(1):163-74. doi: 10.1111/wrr.12370. Epub 2015 Dec 10.

Analysis of the chronic wound microbiota of 2,963 patients by 16S rDNA pyrosequencing.

Wolcott RD[1], Hanson JD[2], Rees EJ[2], Koenig LD[2], Phillips CD[2], Wolcott RA[2,3], Cox SB[2], White JS[3].

Author information

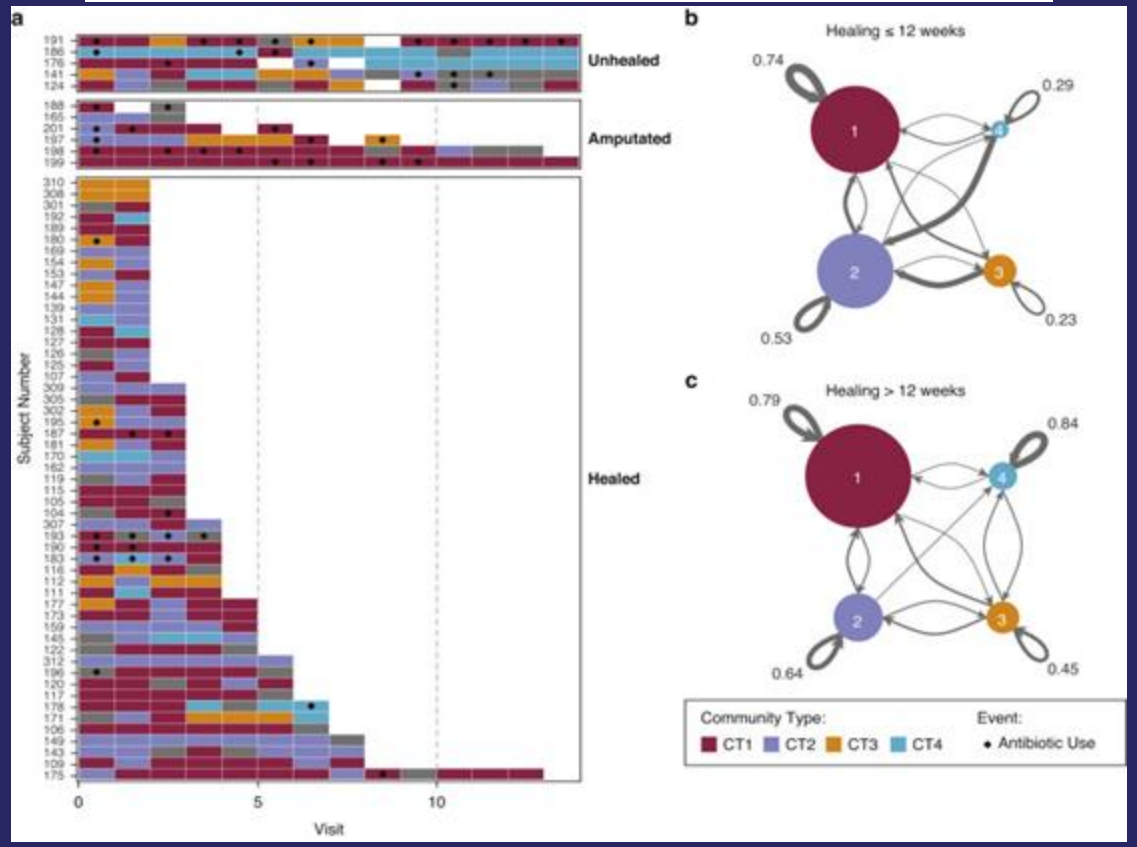
1 Southwest Regional Wound Care Center, Lubbock, Texas.
2 Research and Testing Laboratory, Lubbock, Texas, and.
3 PathoGenius Laboratory, Lubbock, Texas.

Wound microbiome is very personalized to the wound/patient; no specific composition identified that associates with clinical outcome

ORIGINAL ARTICLE

Temporal Stability in Chronic Wound Microbiota Is Associated With Poor Healing

Michael Loesche[1,8], Sue E. Gardner[2,8], Lindsay Kalan[1], Joseph Horwinski[1], Qi Zheng[1], Brendan P. Hodkinson[1], Amanda S. Tyldsley[1], Carrie L. Franciscus[1], Stephen L. Hillis[4], Samir Mehta[5], David J. Margolis[1,6] and Elizabeth A. Grice[1,7]



Rhoads DD, et al. *Int J Mol Sci*. 2012;13(3):2535-2550. Misic AM, et al. *Adv Wound Care.* 2014;3(7):502-510. Min KR, et al. *PLoS One.* 2020;15(1):e02227006.

Loesche M, et al. *J Investigative Dermatol.* 2017;137(1):237-244.

SUMMARY

Excisional debridement

- Changes the biology of the wound cells (restores signaling receptors, activates migratory features…)
- Exposes more responsive cells to factors that stimulate healing
- Reduces fibrotic response
- Dynamically changes microbial composition that facilitates healing response

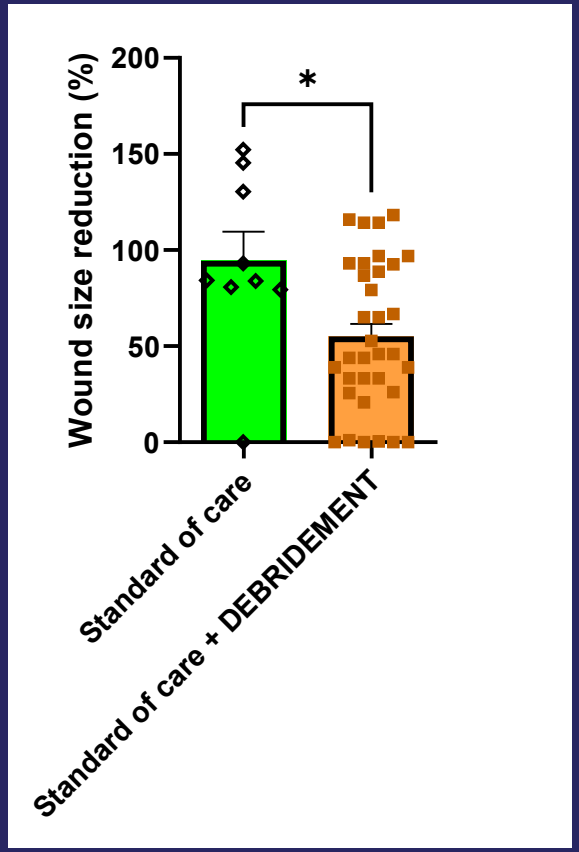
Q: Is debridement sufficient to promote healing?

A: In DFUs, it has been shown in RCTs that debridement promotes healing.

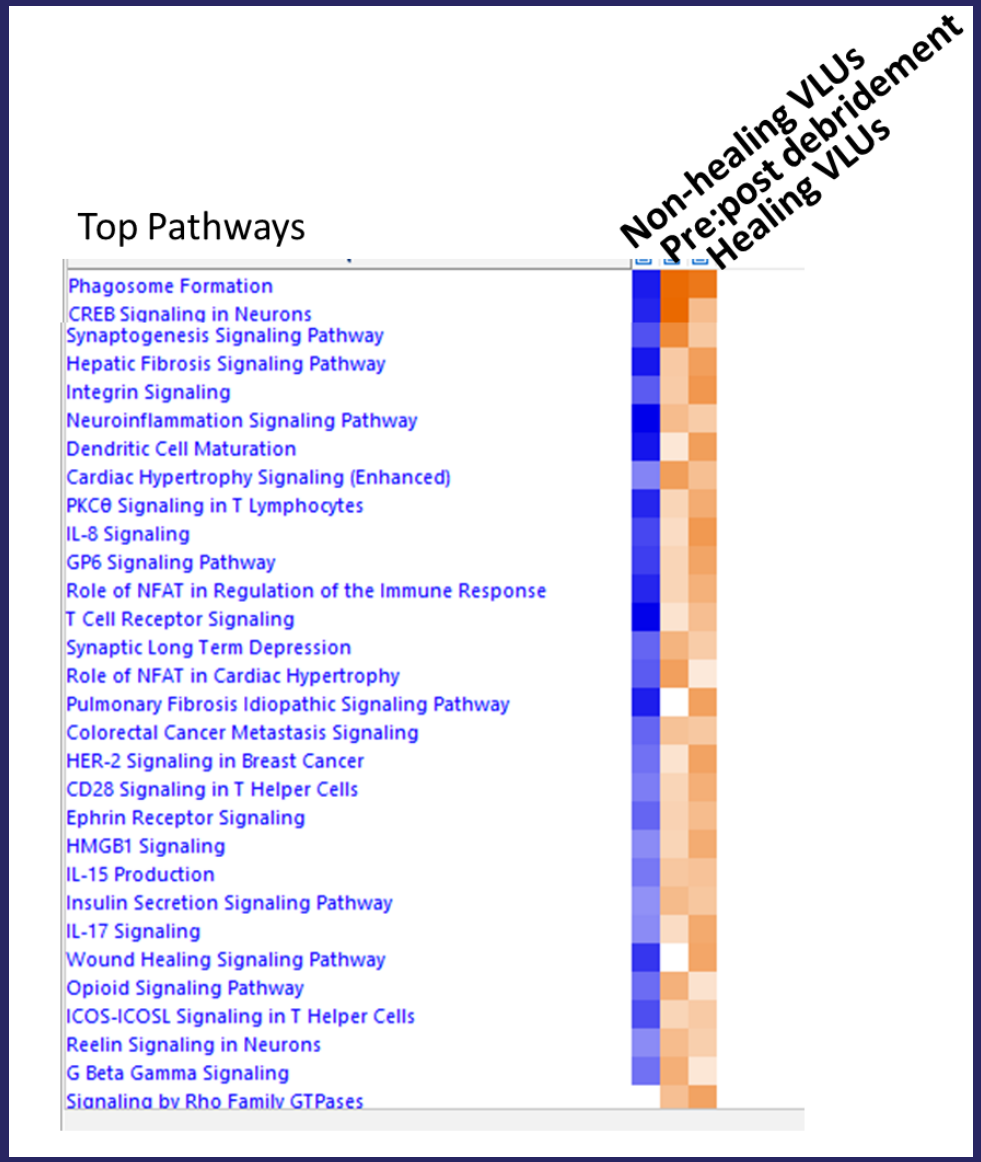
Steed DL, et al. *J Am Coll Surg*. 1996;183(1):61-64.

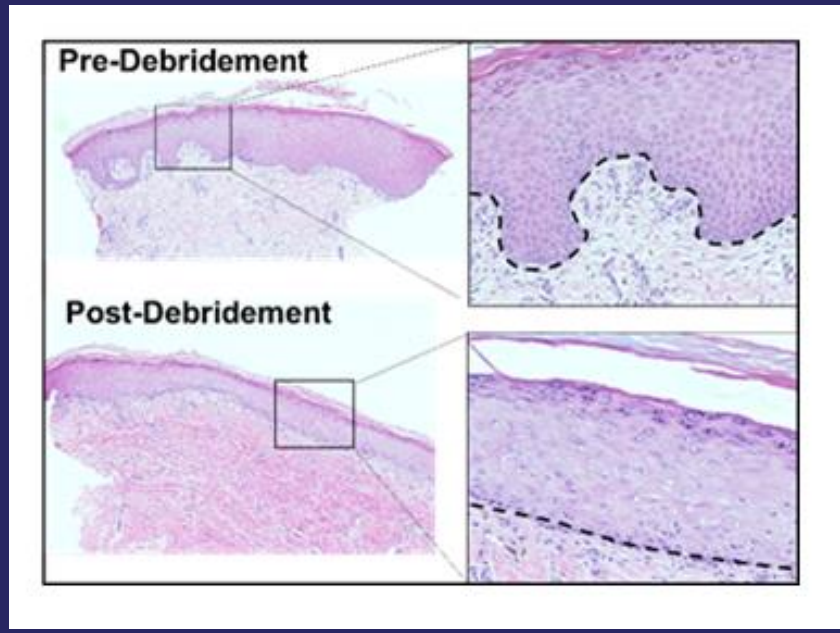
Q: What about VLUs?

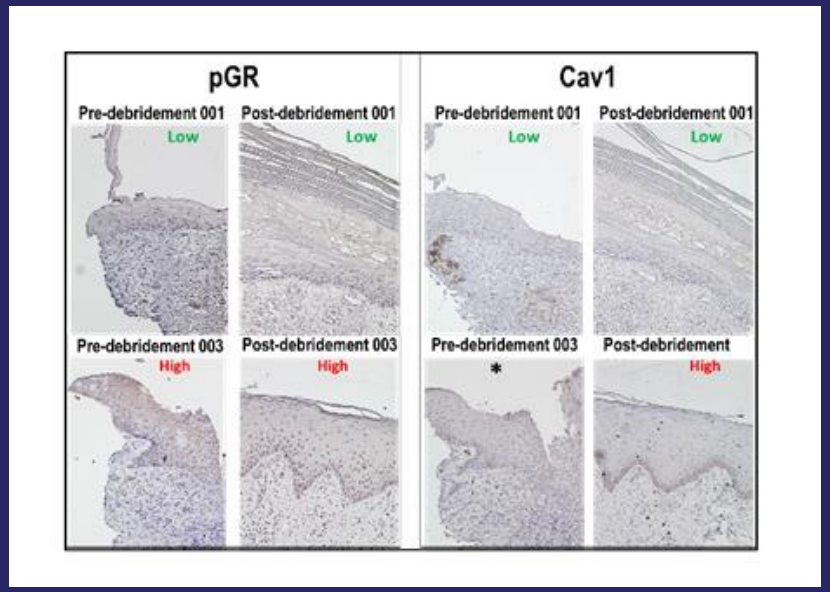
VLU size reduction rates in patients receiving standard of care or standard of care + debridement shows significant reduction of wound size in debridement group



Genomic analyses (RNAseq) revealed that debridement shifts the cellular phenotype to become similar to that of healing VLUs







Clinical Pearls

Debridement: Optimizing ***Wound Bed*** and ***Wound Edge***

- Wound bed and edge preparation facilitates ordered restoration and regeneration of damaged tissue and provides enhanced function of new therapies
- The goal of debridement is to eliminate non-healing tissue and expose biologically active cells to therapeutic modalities

QUESTIONS?

Email me: **MTCANIC@MIAMI.EDU**

Less Invasive Forms of Debridement

Susie Seaman, NP, MSN, CWCN, CWS

Integral Debridement: A Recent Concept

- Emphasizes the importance of tailoring debridement methods to individual patient needs, preferences, and environments, as well as to local resources and available skill levels
- Involves the combined use of different but complementary methods of debridement on the same wound, if necessary
  - E.g., combining sharp or surgical debridement with autolytic or enzymatic debridement, depending on setting and patient presentation and needs

Mayer DO, Tettelbach WH, Ciprandi G, et al. *J Wound Care.* 2024;33(Sup6b):S1-S32.

Indications for Debridement

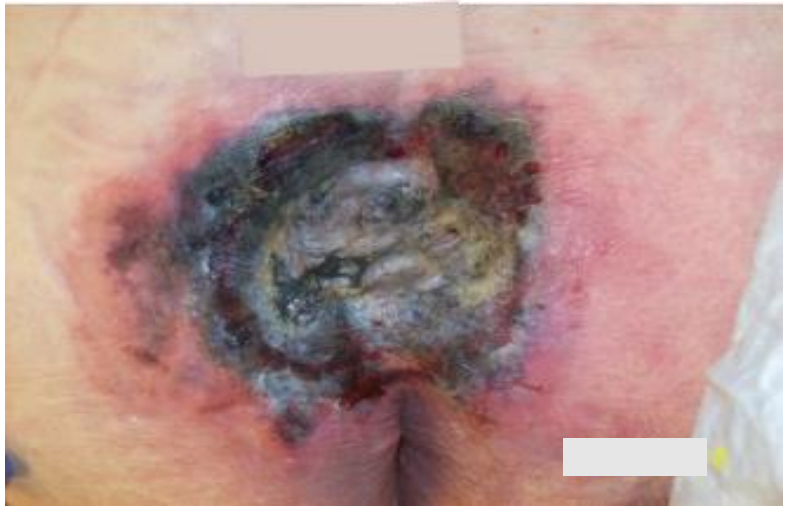
- Necrotic tissue in wound
  - Avoid debridement of dry eschar on ischemic limb, as well as in stable heel pressure injuries
- High bioburden in wound
- Senescent cells in wound
- Periwound callus
- Prior to sampling tissue for culture

Anghel EL, DeFazio MV, et al. *Plast Reconstr Surg*. 2016;138(3 Suppl):82S-93S. Hingorani A, LaMuraglia GM, et al. *J Vasc Surg*. 2016;63:3S-21S.

Practice Issues

- Any clinician performing sharp debridement should have appropriate education, training, and competency
- Scope of practice for RNs and PTs should be verified with individual state licensing boards
  - Follow state and facility rules regarding need for policies and procedures
  - LVNs may not perform sharp debridement in most states; some do allow under RN supervision – check state board
  - PT assistants may be able to perform sharp debridement under PT supervision – check state board
- For sharp debridement, ensure adequate equipment, as well as support for control of bleeding

What Types of Tissue Need to Be Debrided?



What About Other “Yellow Stuff”?

Nonadherent Proteinaceous, Gelatinous, or Coagulum

Unhealthy Wound Bed

- Viable, but unhealthy tissue
- Friable, bleeding
- Exuberant; “hypergranulation”
- May indicate high bioburden

International Wound Infection Institute (IWII) Wound infection in Clinical Practice. Wounds International. 2022.

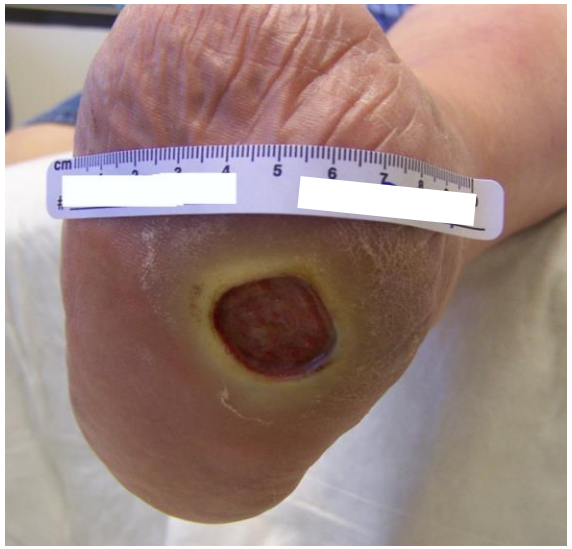
Nonproliferative Wound Edges

AKA:

- Epibole
- Rolled edges

Healthy wound edges

Callused Wound Edge



Methods of Debridement

Overview

- Autolytic
- Osmotic
- Enzymatic
- Chemical, chemo-mechanical, and surfactant
- Biological
- Mechanical
- Technical
- Selective sharp
- Surgical

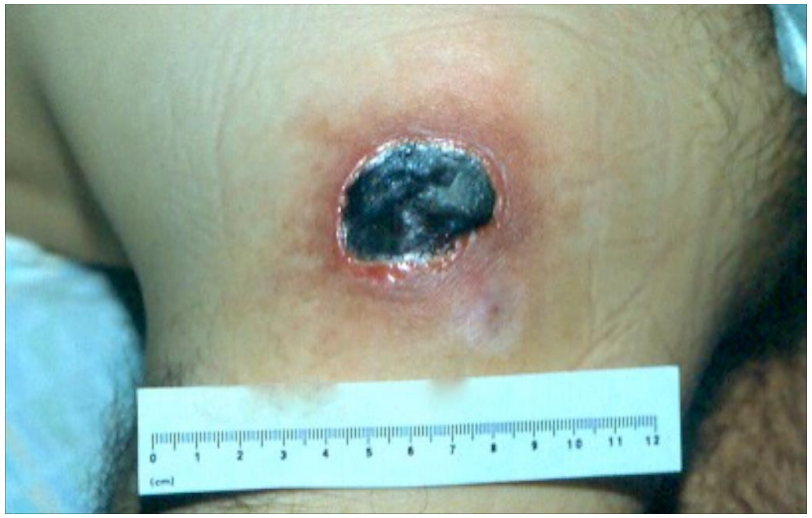
Classified from less invasive to more invasive

Mayer DO, Tettelbach WH, Ciprandi G, et al. *J Wound Care*. 2024;33(Sup6b):S1-S32.

Autolytic Debridement

- The breakdown and removal of necrotic tissue by phagocytic cells and proteolytic enzymes naturally present in wound fluid
- Requires a moist wound environment and a functional immune system
  - Utilizes dressings that maintain a controlled moist wound bed
- Provides selective debridement; is painless
- Slow with moist wound healing alone
- *Do not moisten dry eschars on ischemic limbs!*

Manna B, et al. Wound Debridement. [Updated 2023 Apr 19]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-.

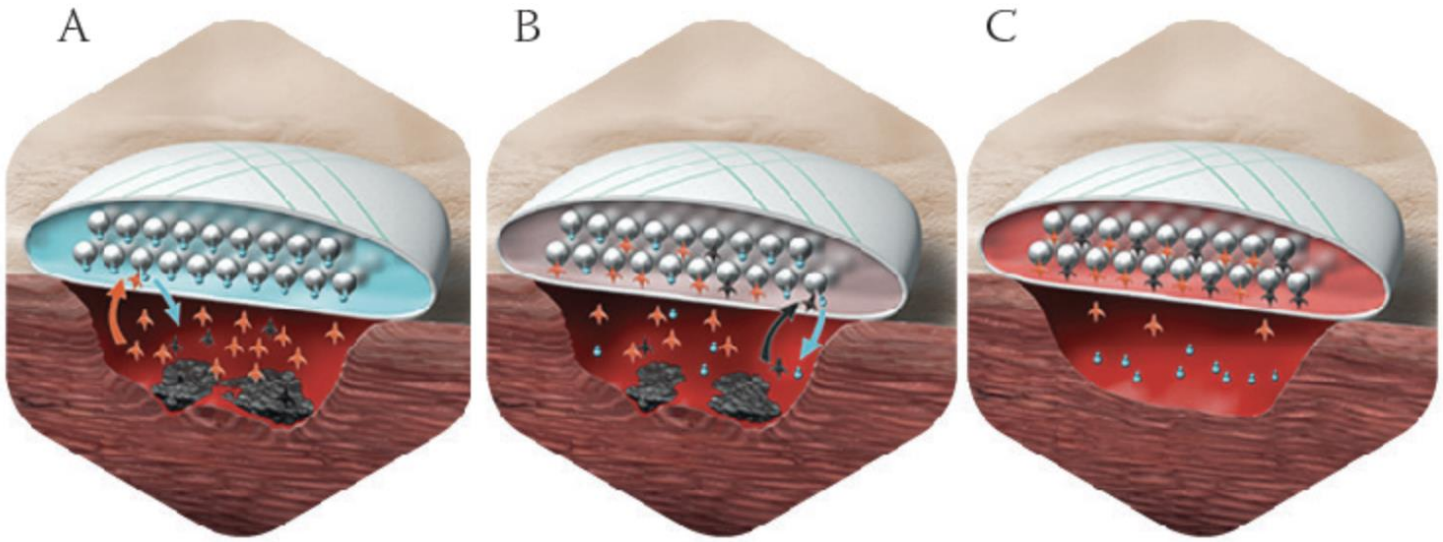


6 weeks

4 weeks

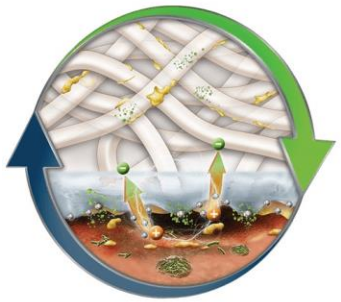
Autolytic with Distinctive Properties

- Hydro-responsive wound dressings (HydroClean®)
  - Release Ringer's solution into wound and then highly absorbent material reabsorbs this along with wound exudate, debris, microbes, etc.
  - "Rinsing" action supports more rapid debridement



Autolytic with Distinctive Properties

- Charged fiber de-sloughing dressing (UrgoClean Ag®)
  - Negatively-charged fibers in alginate-based dressing bind, trap, and remove slough, exudate, microbial residue, and other debris to speed debridement
  - Forms gel
  - Contains silver as antimicrobial



2 weeks

Osmotic Debridement

- Using hyperosmotic products to pull wound fluid into wound site, creating moist environment to soften and liquefy necrotic tissue
  - Medical-grade honey (Medihoney®; Manuka Honey Sterile Wound Dressing; TheraHoney®)
    - Can be used on dry or low exudate wounds; some have added ingredients for moderate absorption
    - Some products currently off market
  - Hypertonic sodium chloride dressings
    - Contraindicated on dry or low draining wounds; are absorptive

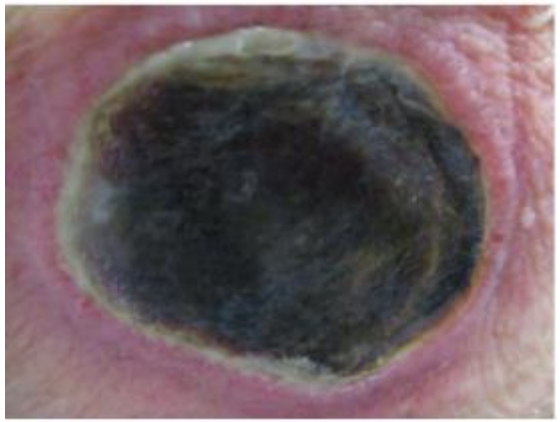
Enzymatic Debridement

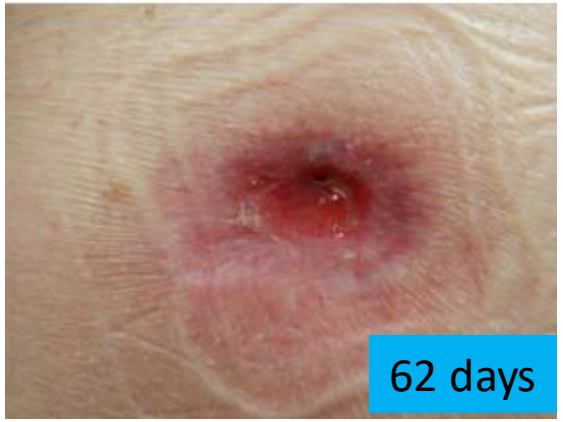
- The use of specific enzymes, applied to the wound bed, to break down devitalized tissue
  - Collagenase (Santyl® Ointment)
  - Bromelain-based (NexoBrid® approved in burns; EscharEx® wound product in clinical trials)
  - Tarumase (Aurase® Wound Gel, in clinical trials)

Collagenase

- Derived from Clostridium histolyticum
- Method of action:
  - Cleaves necrotic tissue at 7 specific sites along denatured collagen strand
- Collagen fragments found to stimulate migration and proliferation of cells *in vitro* and *in vivo*
- How to use:
  - Apply once daily to the entire wound, the thickness of a nickel
  - Cover with dressing geared at maintaining moist wound bed
- Compatibility considerations (some products can inactivate it)

Shi L, et al. *Int Wound J*. 2010;7(2):87-95. Sheets AR, et al. *PLoS One*. 2016;11(7):e0159598.




62 days


34 days

Bromelain-Based Debridement (BBD)

- A mixture of proteolytic enzymes enriched in bromelain from pineapple stem
- Developed for rapid-acting non-surgical debridement
- Provides selective debridement
  - Lyses denatured collagen, elastin, and fibrin
- Burn product FDA-approved: indicated for eschar removal in adults and pediatric patients with deep partial-thickness and/or full-thickness thermal burns
  - 8.8% concentration applied to burns x 4 hrs daily for 1-2 days
- Chronic wound care product in clinical trials now
  - 5% concentration left in place for 24 hrs; reapplied daily for limited time

BBD = bromelain-based debridement.

Dove CR, Snyder RJ, et al. *Wounds.* 2025:37(4):166-173. Pavan R, Jain S, et al. *Biotechnol Res Int*. 2012. Shoham Y, Gasteratos K, et al. *Int Wound J*. 2023;20:4364-4383. Shoham Y, Krieger Y, et al. *Int Wound J*. 2018;15:769-775.

BBD 5%

- Phase 2 trial in VLU: 119 pts randomized to BBD (n=46), vehicle gel (n=43), or SOC (n=30)
  - 8 applications over 2 wks; all in 2-layer compression
  - Complete debridement 63% BBD vs. 30.2% vehicle (*p*=.004), vs. 13.3% in SOC (*p*<.001)
  - Post Hoc analysis of BBD vs 8 pts in SOC group treated with collagenase
    - No wounds treated with collagenase were completely debrided within 2 wks (*p*=.001)
- Phase 3 in VLU ongoing
- Phase 2 trial in DFU done; more studies planned

VLU = venous leg ulcer; DFU = diabetic foot ulcer.

Dove CR, Snyder RJ, et al. *Wounds.* 2025;37(4):166-173. Shoham Y, Snyder RJ, et al. *EClinicalMedicine*. 2024 Jul 27;75:102705.

Tarumase

- Recombinant DNA technology used to make clone of trypsin serine protease enzyme found in maggot saliva
- Delivered in a hydrogel
- Selective activity against fibrin, collagen, and elastin in non-viable tissue
- Active in narrow pH range of 7-9
- Evidence of improved effectiveness of debridement in dose escalation trial
- Well-tolerated in early trials
  - Recent Phase 2 trial completed in VLU: At 26 days, showed 65% debridement vs. 9% in control hydrogel (p=0.005) and 58% wound area reduction vs. 15% in control (p=0.022)

VLU – Venous leg ulcer

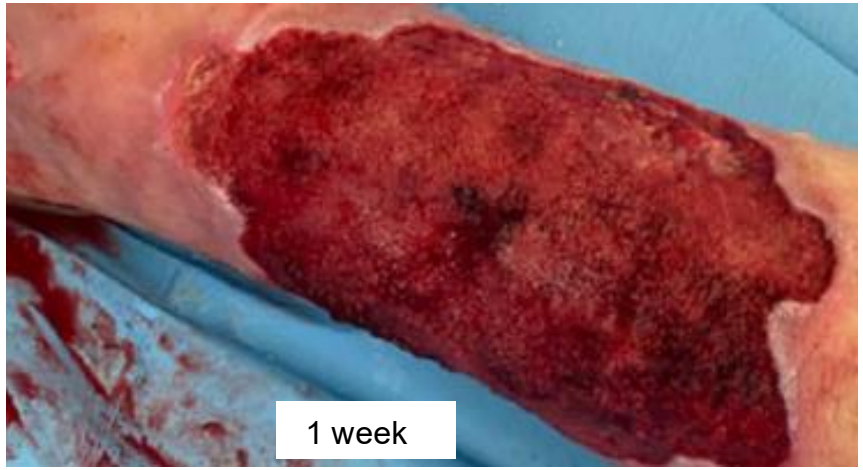
Fairlamb DM, Szepeshazi K, et al. *Int Wound J*. 2025;22(6):e14805. Goldsmith D, Fairlamb DM. *Int Wound J*. 2025;22(6):e70702. https://www.news-medical.net/news/20260224/SolasCure-completes-Phase-II-clinical-trial-demonstrating-accelerated-healing-with-Aurase-Wound-Gel.aspx (Accessed 3-25-26).

Chemical Debridement (Debrichem®)

- Use of a single-use topical gel containing methanesulfonic acid
- Withdraws water from wound to rapidly desiccate moist dead tissue, biofilm, and bacteria within 1 minute application time, then product wiped away
- Non-viable tissue desiccates and separates from underlying tissue in 1-3 days
- Severe burning pain (10/10) that dissipates
- Multiple contraindications
- Used in many countries; not yet approved in U.S.
- RCT currently underway in tx of DFU; goal 242 subjects

RCT = randomized controlled trial.

Bhatt, P, Sharpe A, et al. *J Wound Care*. 2024;33(Sup5B):S4-S11. Hermans M. *J Wound Care*. 2023;32(Sup3):S11-S12.



Hermans MHE. *Ann Case Report.* 2022;7:1101.

Poloxamer 188 Surfactant Gel (PluroGel®)

- Softens, loosens, and traps devitalized tissue and debris, which is rinsed away with dressing changes
- Some evidence of activity against biofilm
- Gel thickens as it warms up in wound

Percival SL, Chen R, et al. *Int Wound J*. 2018;15:749-755. Salisbury AM, Mayer D, et al. *Adv Wound Care* (New Rochelle). 2018;7:315-322.

Surfactant Gel Debridement – Pyoderma Gangrenosum

10/04

10/22

11/20 Surfactant gel initiated

12/04/18

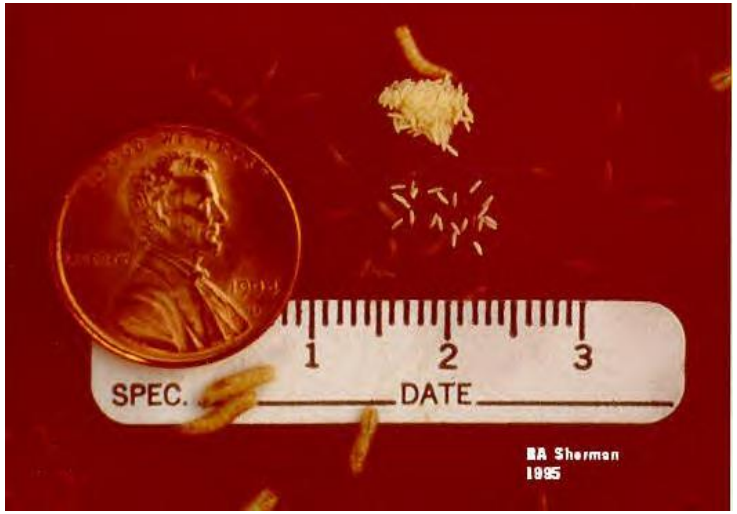
12/14/18

1/04/19

Courtesy of Dot Weir, RN

Biological Debridement

- The application of sterile, medical-grade larvae (maggots) to the wound, which secrete proteolytic enzymes that break down devitalized tissue while leaving healthy tissue intact
- Devitalized tissue and bacteria are consumed by the maggots
  - Bacteria are destroyed in the alimentary tract by natural antimicrobial substances
- Applied every 3-4 days until wound is clean
- Skin protection is required to avoid irritation


1
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Medical Maggots™

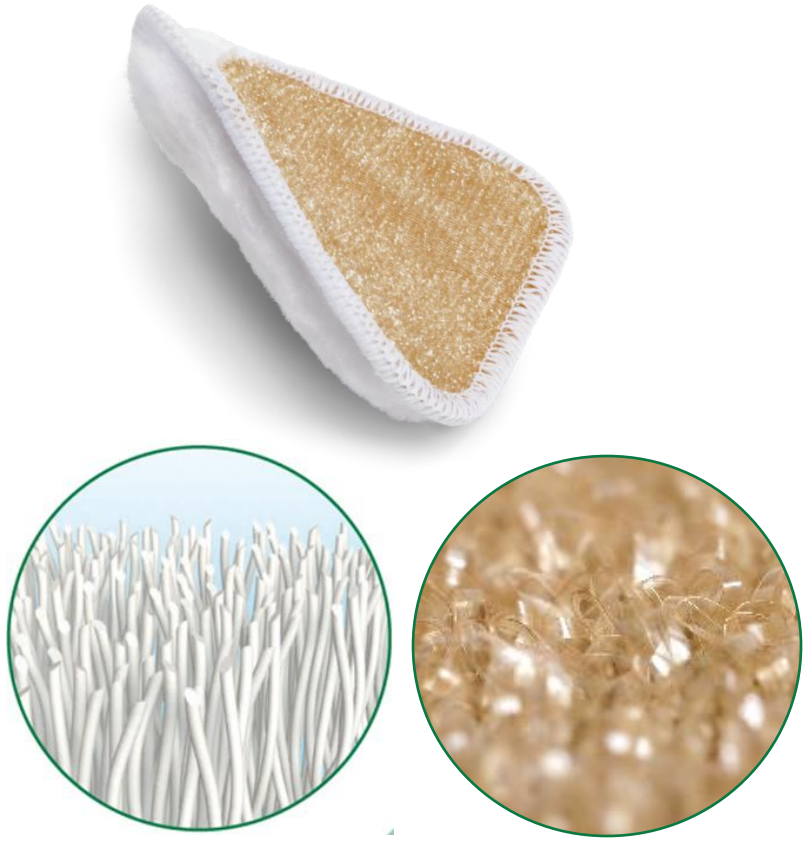
Mechanical Debridement

- The use of physical forces to remove devitalized tissue and debris from a wound
- Debridement pads, AKA monofilament pads
- Gauze scrubbing – use only when no other method available
- Wet to dry gauze – should never be used

International Wound Infection Institute (IWII). Therapeutic wound and skin cleansing. *Wounds International*. 2025.

Debridement Pad/Monofilament Pad (Debrisoft®)

- More than 18 million monofilament fibers
  - New double-sided pad: Launched Feb 2025
    - Textured polyester pocket for loosening firmly adherent slough and keratoses
    - Original soft polyester with bevel-angled tips for lifting debris into pad
  - Ability to use either or both sides in same case
  - Always saturate with wound cleanser before use
- Out-of-pocket cost, not reimbursed
  - Mechanical debridement option for superficial wounds when other options not available



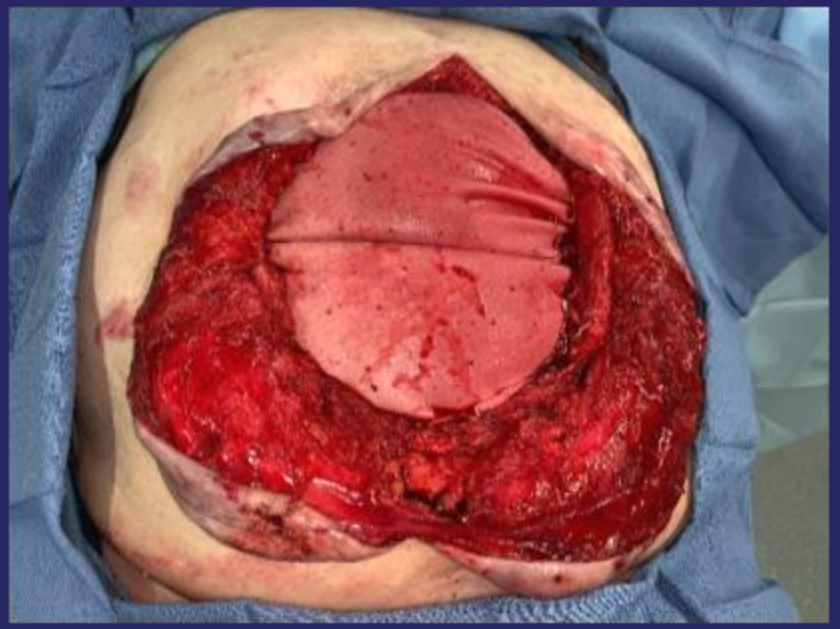
Monofilament Pad

More Invasive Forms of Debridement: Technical and Surgical Debridement Cases

Michael N. Desvigne, MD, FACS, CWS, FACCWS, MAPWCA

Plastic & Reconstructive Surgery, Wound Care & Hyperbaric Medicine
Abrazo Arrowhead Hospital & Wound Clinic
Glendale, AZ








TYPES OF DEBRIDEMENT

Selective Sharp / Surgical Debridement

- Selective sharp debridement, by definition, is limited to the removal of devitalized tissue only
  - May involve use of scalpel, scissors, curette, forceps
  - Done at bedside or in outpatient settings
  - May still require local anesthesia

Surgical Debridement

- Performed by surgeon or trained wound care provider, depending on the complexity of needed debridement and on local policies
  - Depending on complexity, may be performed in the operating room or a procedure room
  - Involves incision into viable tissue
  - Important for high-risk patients with a heavy load of necrotic tissue and/or bioburden
  - Depending on the severity of the wound, it may require either local or general anesthesia

Decision Making for Where to Perform Sharp Debridement: Bedside, Clinic, or OR

- Need for anesthesia beyond local
- Need for bleeding control
- Excision into deep spaces, hardware, viscera
- Need for immediate reconstruction (flaps, grafts)

Pain Management

- Topical anesthetics work well for uncomplicated, in-clinic debridement as long as you leave it on long enough
- Locally injected anesthesia works, but is not always realistic for huge wounds
  - Is a must for tissue biopsies

Considering When Not to Debride
(Especially for Non-Surgeons)

- Dry *stable* eschar on ischemic limb in patient with severe PAD
  - Priority is vascular surgery evaluation
  - Leave stable eschar dry! No form of debridement
  - Debridement may become necessary with advancing infection; consult surgeon before proceeding

Considering When Not to Debride
(Especially for Non-Surgeons)

- Pain control cannot be assured
- Patient is very anxious (education and support are key here)
- Excessive bleeding may result
- Diagnosis of lesion may be uncertain
- Unidentifiable structures/risk of structure exposure
- Terminally ill – depends on goals of care
- Wound needs are greater than you are trained to handle
  - Be aware of your state's Scope of Practice laws

Sharp Debridement

- If in doubt, refer to a surgeon who is experienced and interested in chronic wound care!

Case Summary:
Sacral Ulcer, Stage 4

- 36y Female with incomplete paraplegia from MVA; presents with sacral ulcer, stage 4
- Medical history: Urostomy, lupus anticoagulant
- Social history: Lives with family

- Treatment:
  - Taken to OR for surgical closure
  - Excision ulcer with partial ostectomy performed
  - Intraoperatively, Vashe® pHA was utilized as 10-min soak performed prior to flap closure
  - Placental allograft placed to optimize healing
  - NPWT initiated for incisional management immediately following closure

MVA = motor vehicle accident; pHA = pure hypochlorous acid; NPWT = negative pressure wound therapy.

Sacral Ulcer, Stage 4 (Day 1)

Sacral Ulcer, Stage 4 (Day 1)

Sacral Ulcer, Stage 4 (Day 1)

Sacral Ulcer, Stage 4 (Day 1)

#SAWCSpringWHS2026

Sacral Ulcer, Stage 4 (Day 1)

#SAWCSpringWHS2026

Sacral Ulcer, Stage 4 (3 Months)

Micro Waterjet Technology

(HydroPrep™ Therapy is the new name for Microjet)

- Optimizes wound bed preparation to advance healing
- Allows for precision and control to remove non-viable tissue while leaving healthy tissue intact
- Reduces the incidence of infection — and subsequent hospitalization — resulting in lower total cost of care
- Minimizes reliance on general anesthesia

Reber M, Nussbaumer P. *Wound Medicine.* 2018;20:35-42. Armstrong, D, et al. *Diabetes*. 2023;72(Supplement_1). Probst S, Saini C. *J Wound Care*. 2024;33(5):357-364.
HydroPrep™ Therapy is formerly referenced as debritom+ and Microjet in prior literature.

FDA Breakthrough Device Designation

(HydroPrep™ Therapy is the new name for Microjet)

- Optimizes wound bed preparation to advance healing
- Allows for precision and control to remove non-viable tissue while leaving healthy tissue intact
- Reduces the incidence of infection — and subsequent hospitalization — resulting in lower total cost of care
- Minimizes reliance on general anesthesia

FDA Breakthrough Device Designation is based on

- No approved or cleared alternatives for the condition
- Clinically significant advantages over existing treatment options
- Potential to improve outcomes for life-threatening or irreversibly debilitating conditions
- Determination that early access is in the best interest of patients

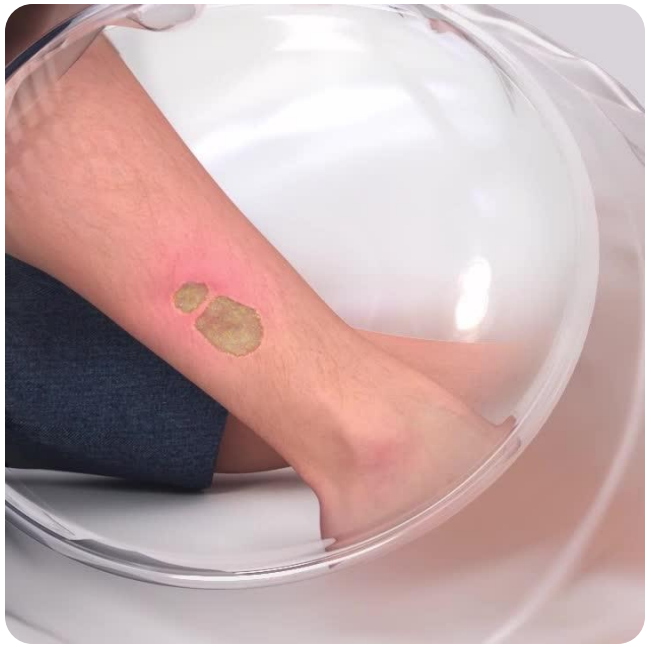
Breakthrough Device Designation ID: Q222416

HydroPrep™ Therapy

Reber M, Nussbaumer P. *Wound Medicine.* 2018;20:35-42. Armstrong, D, et al. *Diabetes*. 2023;72(Supplement_1). Probst S, Saini C. *J Wound Care*. 2024;33(5):357-364.
HydroPrep™ Therapy is formerly referenced as debritom+ and Microjet in prior literature.

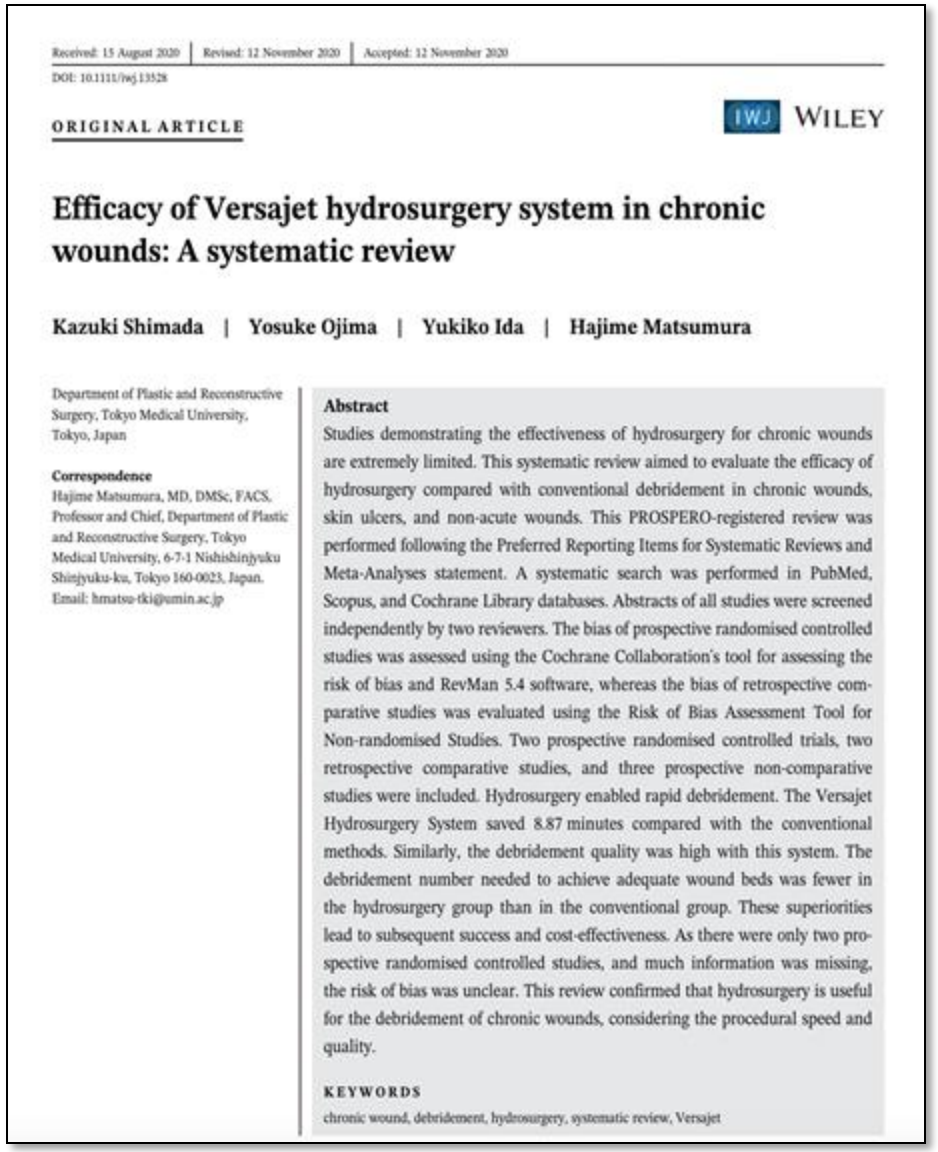
Acute and Non-Acute Care Settings

- Point and flat jet hand pieces
- Range of intensity levels
- Saline or topical solution of choice
- Intuitive to use



VERSAJET™ (Hydrosurgery)

- Time-saving
- High-quality debridement
- Potential need for fewer debridements
- Cost-effective
- 2 prospective RCTs
- Bias consideration



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DOI: 10.1111/iwj.13528

ORIGINAL ARTICLE

IWJ WILEY

Efficacy of Versajet hydrosurgery system in chronic wounds: A systematic review

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Correspondence
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Email: hmatsu-tki@umin.ac.jp

Abstract

Studies demonstrating the effectiveness of hydrosurgery for chronic wounds are extremely limited. This systematic review aimed to evaluate the efficacy of hydrosurgery compared with conventional debridement in chronic wounds, skin ulcers, and non-acute wounds. This PROSPERO-registered review was performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement. A systematic search was performed in PubMed, Scopus, and Cochrane Library databases. Abstracts of all studies were screened independently by two reviewers. The bias of prospective randomised controlled studies was assessed using the Cochrane Collaboration's tool for assessing the risk of bias and RevMan 5.4 software, whereas the bias of retrospective comparative studies was evaluated using the Risk of Bias Assessment Tool for Non-randomised Studies. Two prospective randomised controlled trials, two retrospective comparative studies, and three prospective non-comparative studies were included. Hydrosurgery enabled rapid debridement. The Versajet Hydrosurgery System saved 8.87 minutes compared with the conventional methods. Similarly, the debridement quality was high with this system. The debridement number needed to achieve adequate wound beds was fewer in the hydrosurgery group than in the conventional group. These superiorities lead to subsequent success and cost-effectiveness. As there were only two prospective randomised controlled studies, and much information was missing, the risk of bias was unclear. This review confirmed that hydrosurgery is useful for the debridement of chronic wounds, considering the procedural speed and quality.

KEYWORDS
chronic wound, debridement, hydrosurgery, systematic review, Versajet

Shimada K, et al. *Int Wound J*. 2021;18(3):269-278.

Case Summary:
Gangrenous Foot Wound RLE

- 59y Male admitted with gangrenous foot; underwent emergent debridement and TMA, consulted for reconstruction
- Medical history: DM, CRI
- Treatment:
  - Underwent serial debridements in OR
  - Definitive closure performed with SEFM
  - Split-thickness skin graft performed
  - 3M™ Veraflo™ Cleanse Choice™ Dressing (NPWT) dressing to assist graft take and optimize healing

RLE = right lower extremity; TMA = transmetatarsal amputation; DM = diabetes mellitus; CRI = chronic renal insufficiency; SEFM = synthetic electrospun fiber matrix; STSG = split-thickness skin graft.

Gangrenous Foot Wound RLE (Day 0)

Gangrenous Foot Wound RLE (Day 0)

Gangrenous Foot Wound RLE (Day 1)

Gangrenous Foot Wound RLE (Day 1)

Gangrenous Foot Wound RLE (Day 1)

SAWC Spring | WHS

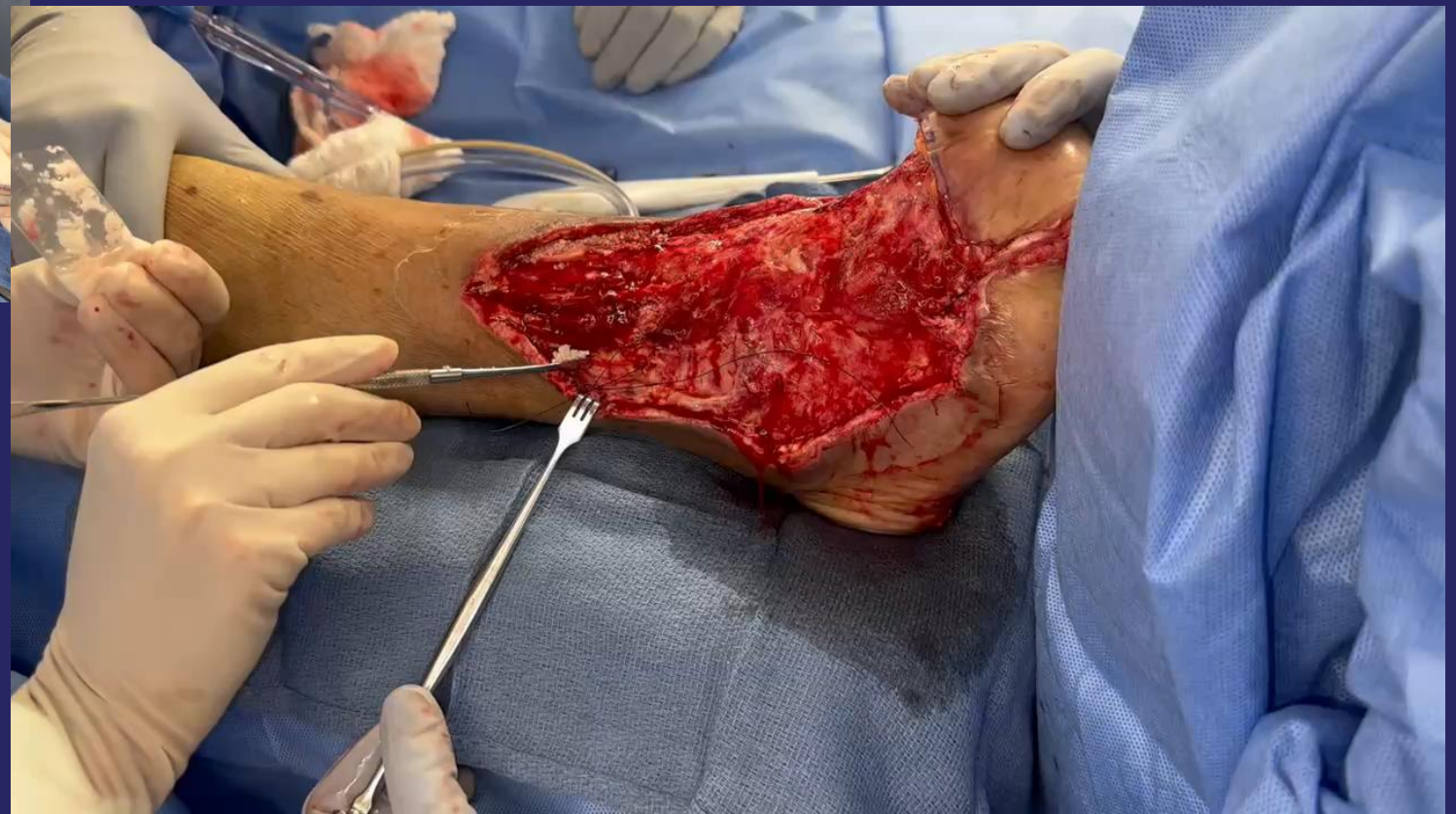
Gangrenous Foot Wound RLE (Day 1)

Gangrenous Foot Wound RLE (Day 1)

Gangrenous Foot Wound RLE (Day 1)

SAWC Spring | WHS

Gangrenous Foot Wound RLE (Day 1)



SAWC Spring | WHS

Gangrenous Foot Wound RLE (Day 1)

Gangrenous Foot Wound RLE (Day 1)

Gangrenous Foot Wound RLE (1 Wk)

Gangrenous Foot Wound RLE (4 Wks)

Gangrenous Foot Wound RLE (6 Wks)

XSONX® Vibrational Debridement Technology

- Sonic frequency: >500 vibrations/sec
- Multiple heads available
- Planar control of debridement depth controlled by index finger pressure to the top front end of the handpiece
- Plastic teeth along the outside edges carve and refashion wound edges
- Helps remove exudate, devitalized tissue, bacterial biofilm, slough, fibrin, and excised or fragmented tissue

Vibrational Debridement Technology

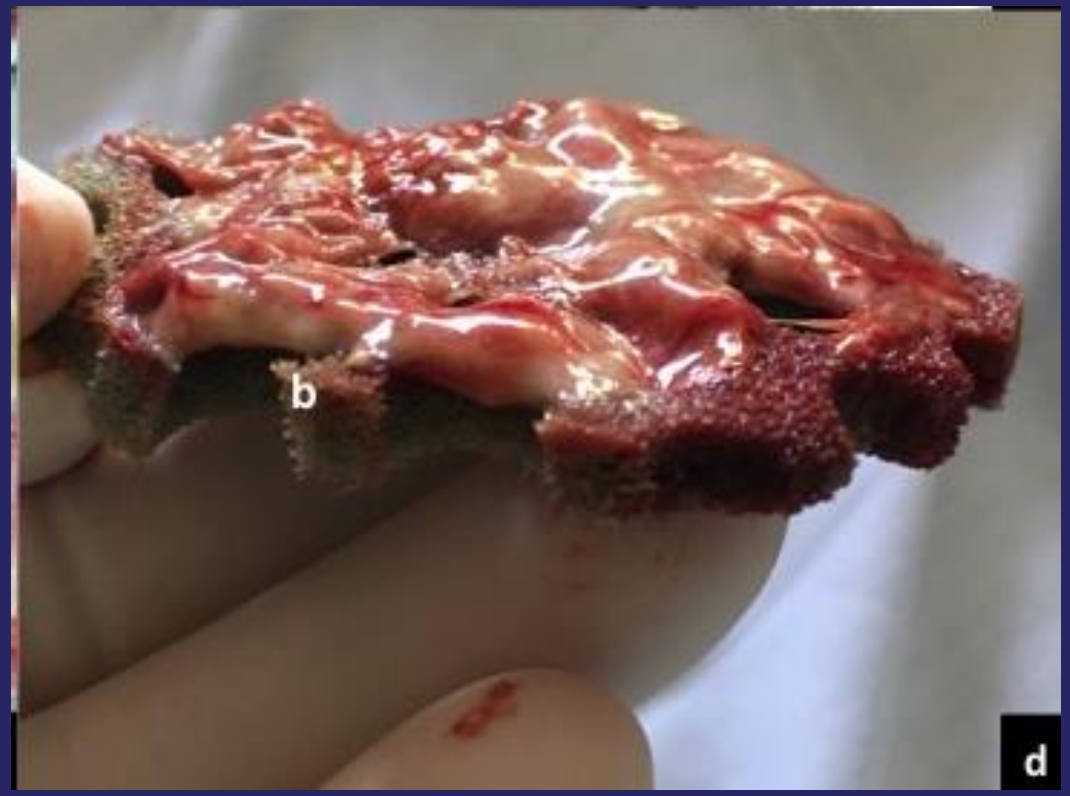
Ultrasonic wound debridement with pHA solution

- Uses low-frequency ultrasound to selectively fragment and remove non-viable tissue with minimal damage to healthy structures
- The concurrent use of pHA provides antimicrobial irrigation during the debridement process

Video courtesy of Abigail Chaffin, MD, FACS, FAAPWC.

Debridement and Negative Pressure Wound Therapy

At instillation cycle, topical wound solution can now get under non-viable tissue to help soften, solubilize, and separate from viable tissue



Case Summary: Full-Thickness Necrosis Groin

- 79y Female s/p percutaneous aortic valve repair complicated by bleed and hematoma right groin resulting in full-thickness necrosis
- Medical history: Aortic valve stenosis, CHF, HTN, obesity

- Treatment:
  - NPWTi-d initiated with pHA at bedside
  - To OR for staged debridements
  - Definitive closure performed with reticular dermal matrix placed as tissue scaffolding for soft tissue replacement
  - Placental allograft placed to optimize healing
  - Incisional NPWT initiated following closure
  - Additional pHA utilized as an irrigant prior to secondary closure

CHF = congestive heart failure; HTN = hypertension; NPWTi-d = negative pressure wound therapy with instillation and dwell.

Full-Thickness Necrosis Groin (Day 1)

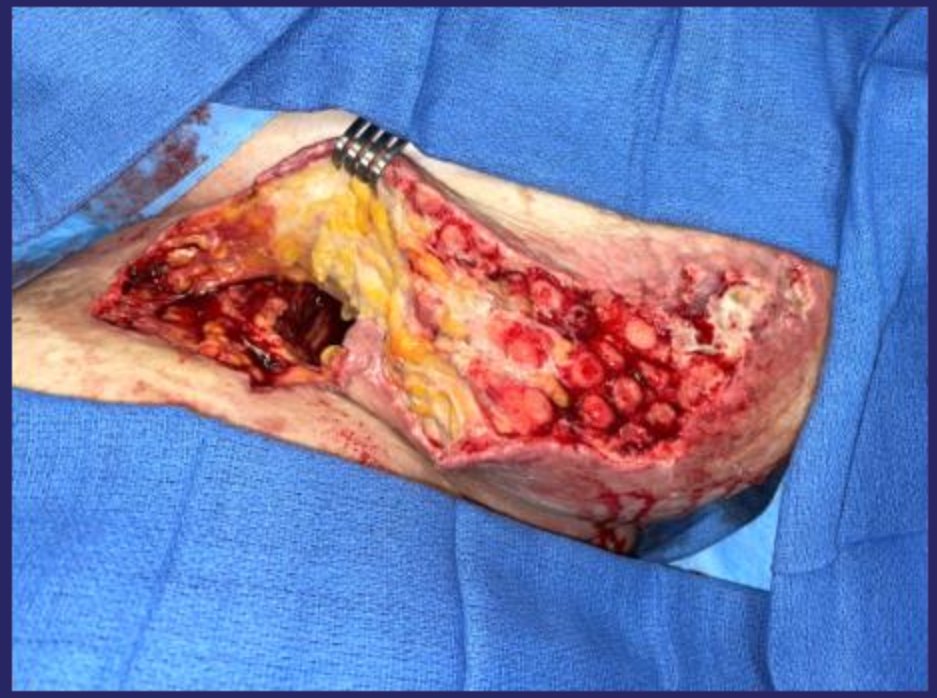
Full-Thickness Necrosis Groin (Day 1)

NPWTi-d initiated with pHA to loosen eschar and necrotic tissue

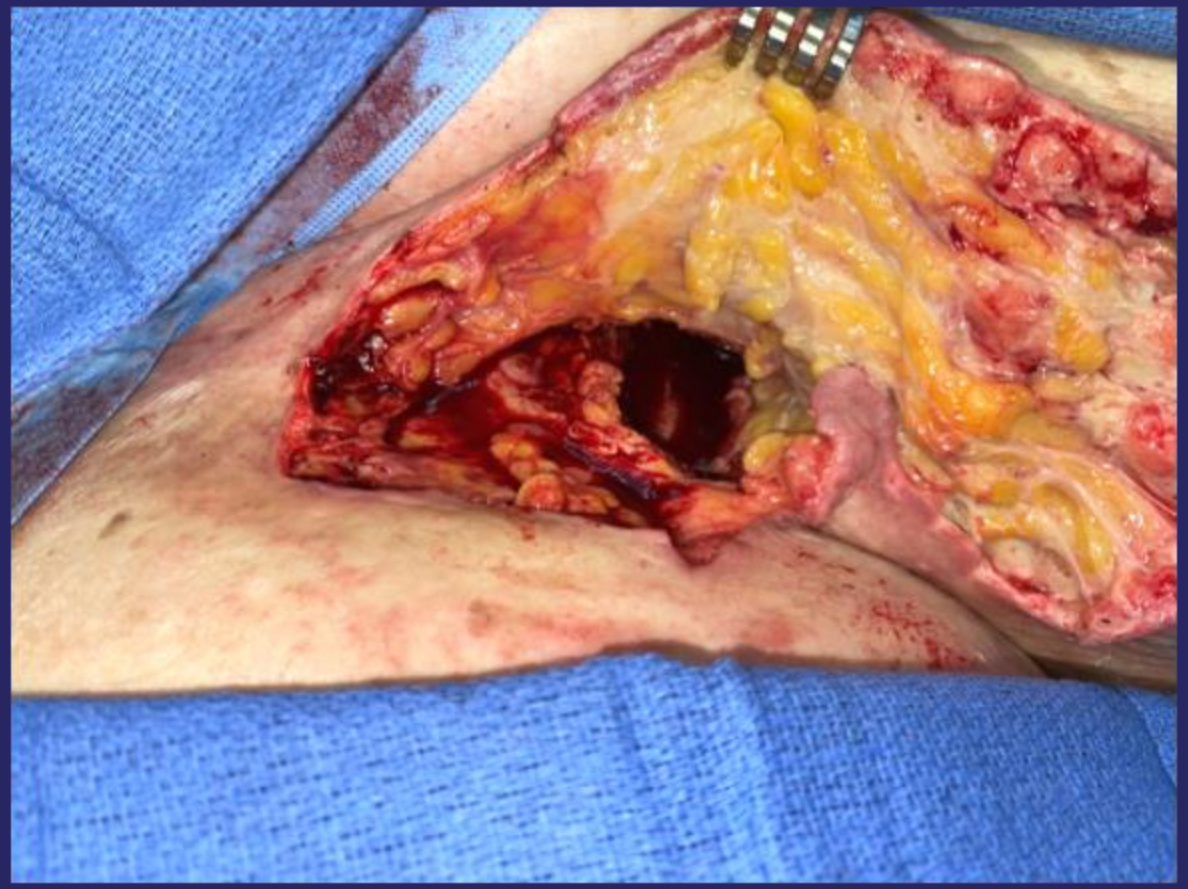
Full-Thickness Necrosis Groin (Day 3)

Eschar loosened and NPWTi-d with pHA continued

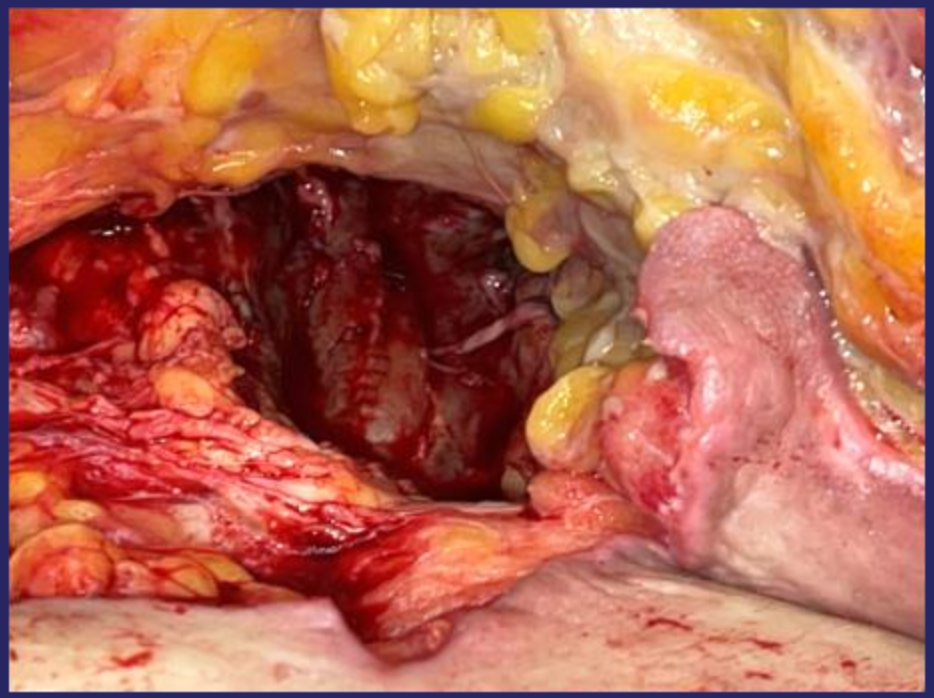
Full-Thickness Necrosis Groin (Day 5)



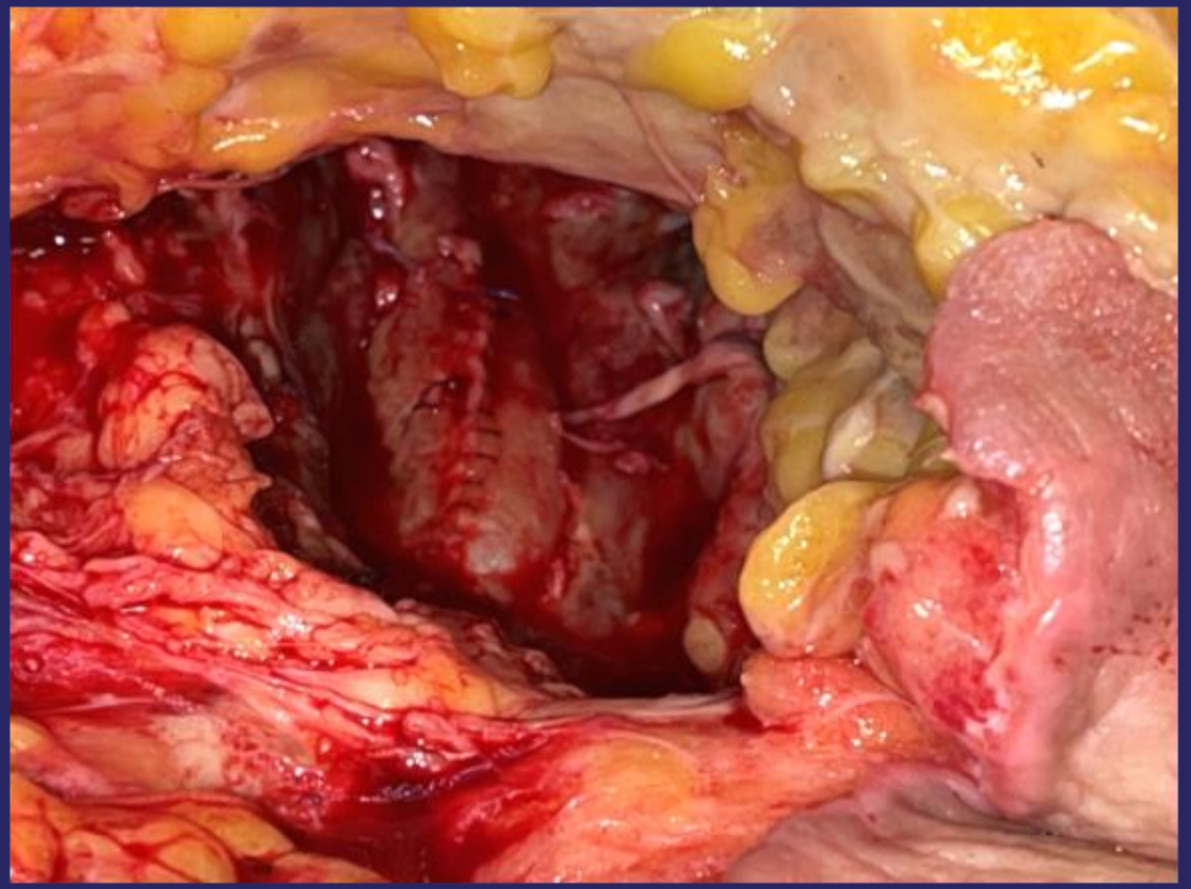
Necrotic tissue removed; soft-tissue deficit present with exposed femoral vessels



Full-Thickness Necrosis Groin (Day 5)



Necrotic tissue removed; soft-tissue deficit present with exposed femoral vessels

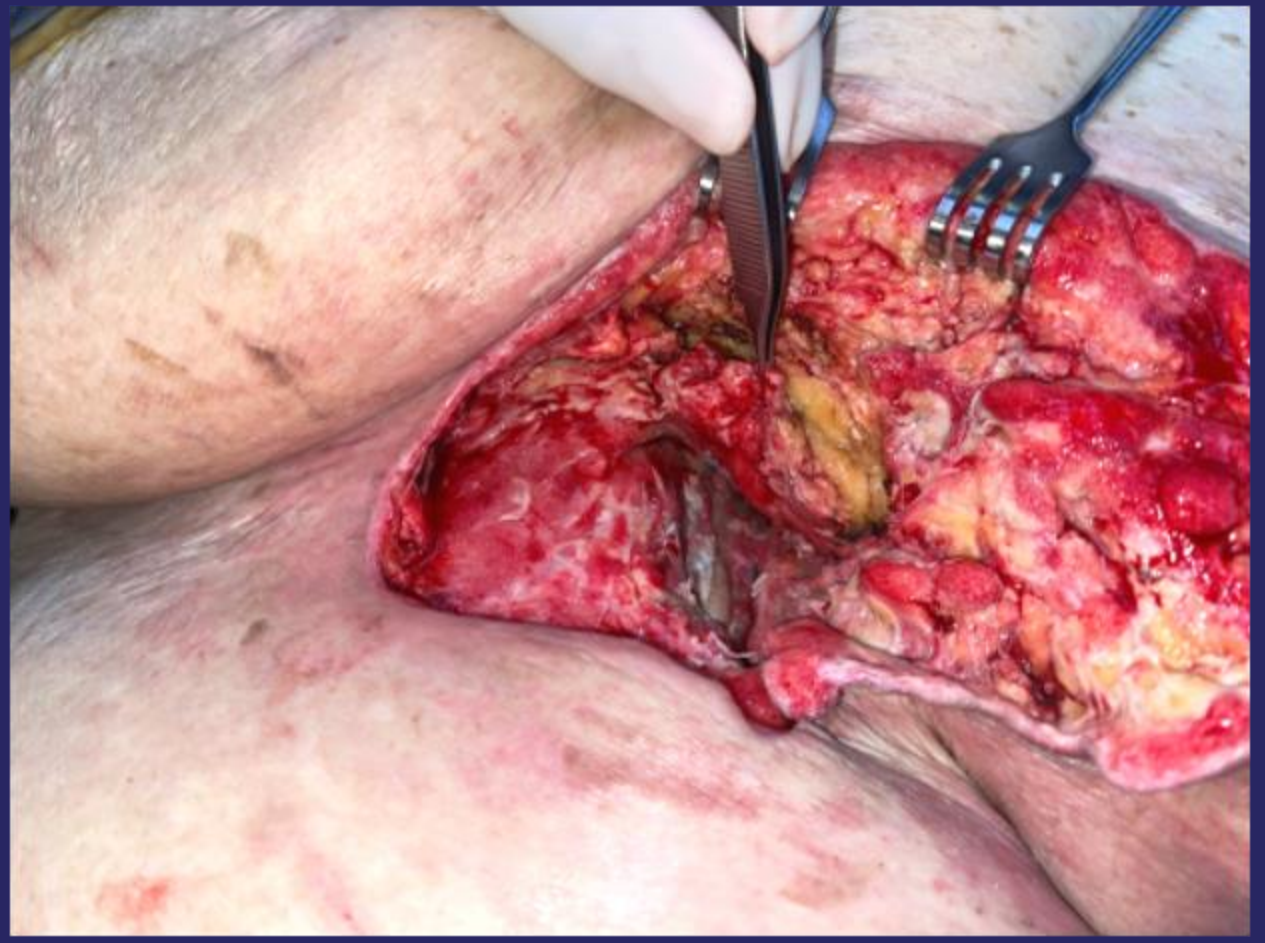


Full-Thickness Necrosis Groin (Day 7)

NPWTi-d with pHA continued to reduce bioburden

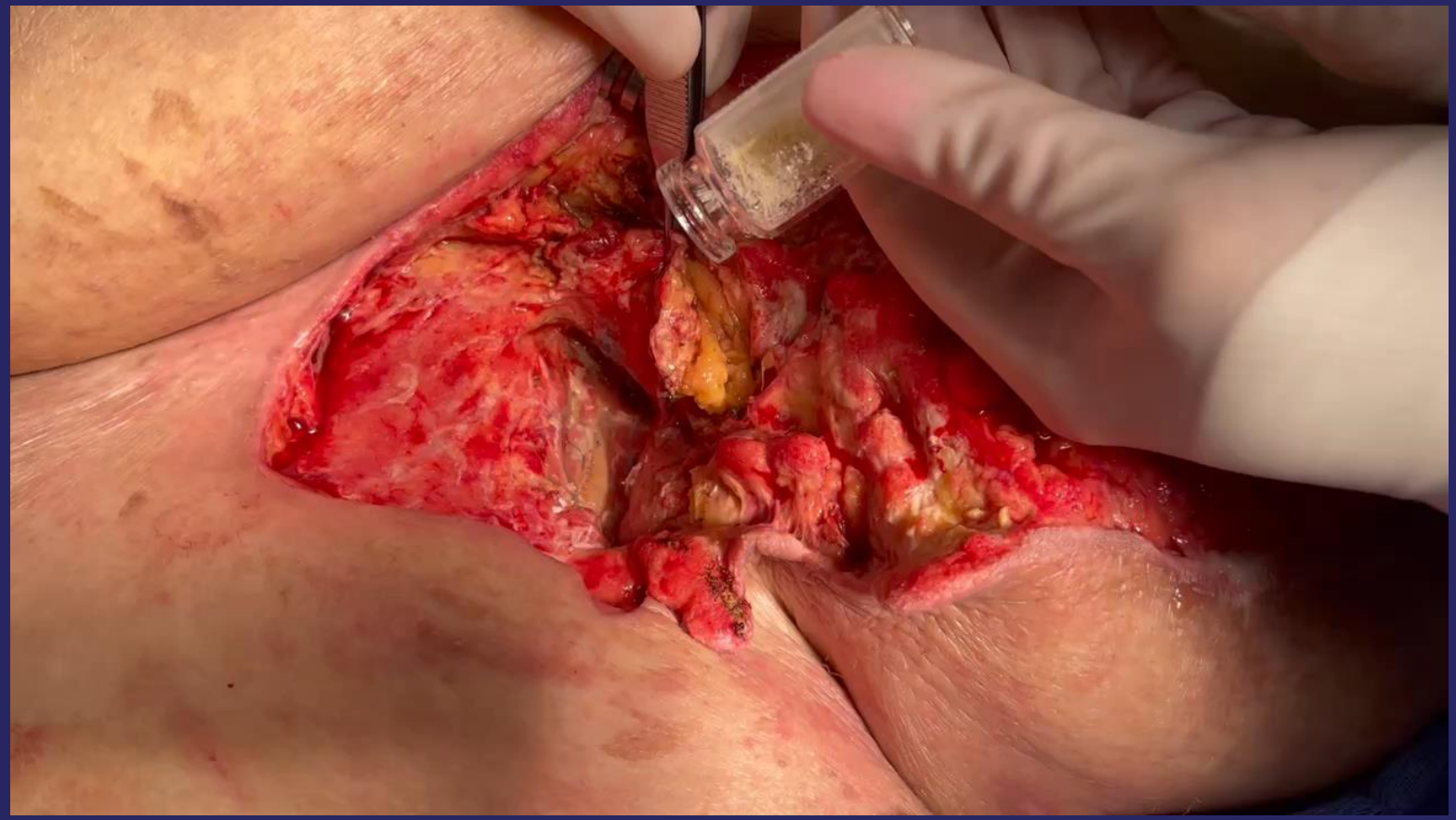
Full-Thickness Necrosis Groin (Day 14)

Flap mobilized for coverage of vessels



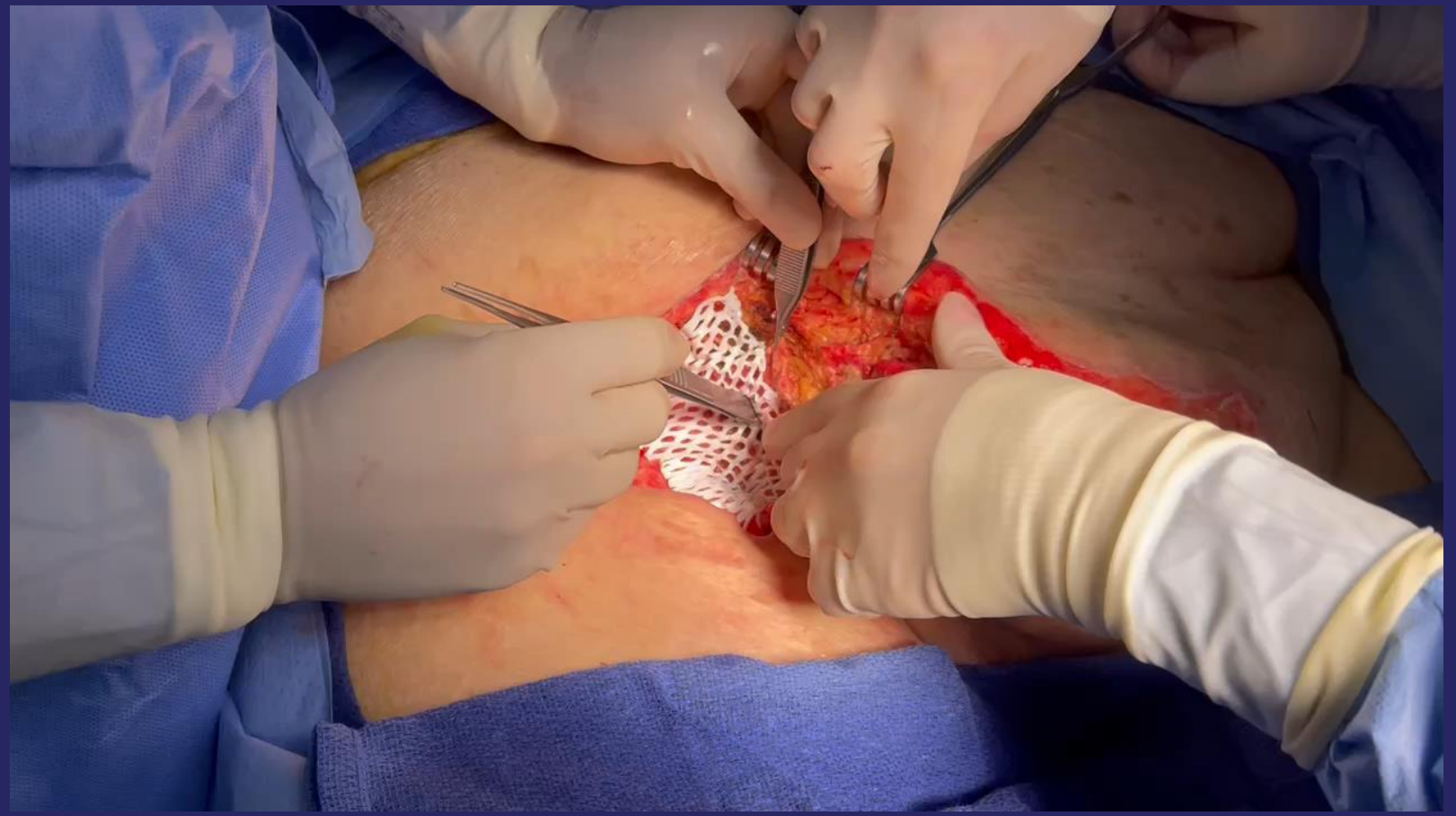
Full-Thickness Necrosis Groin (Day 14)

Placental allograft utilized to optimize wound bed

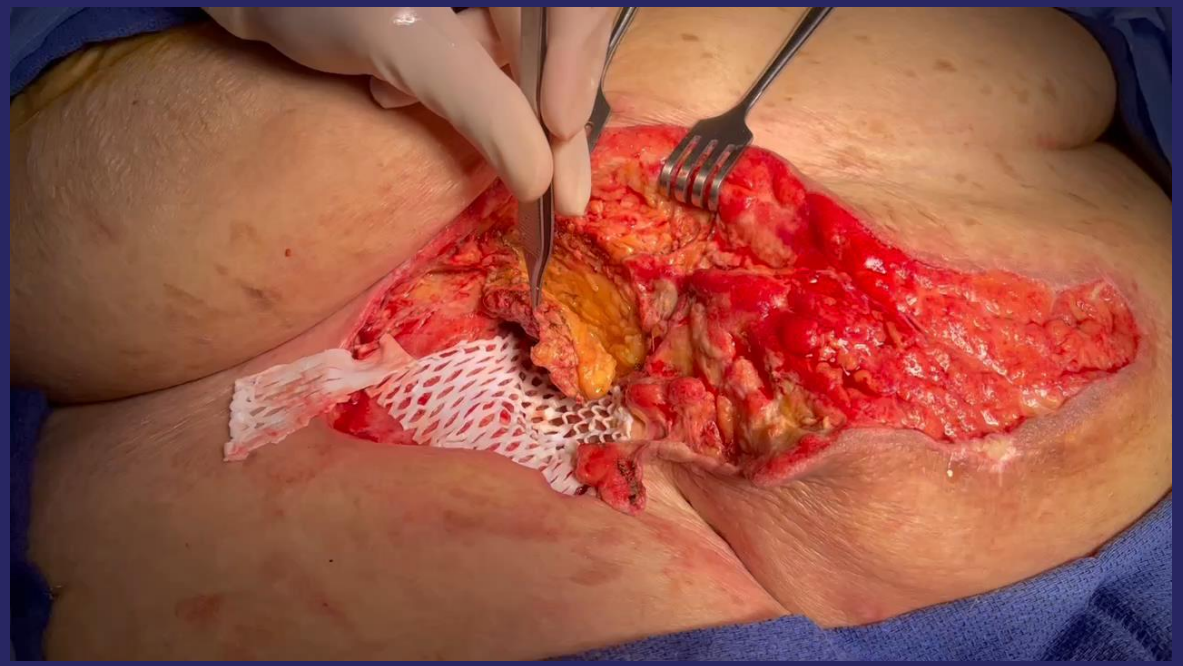


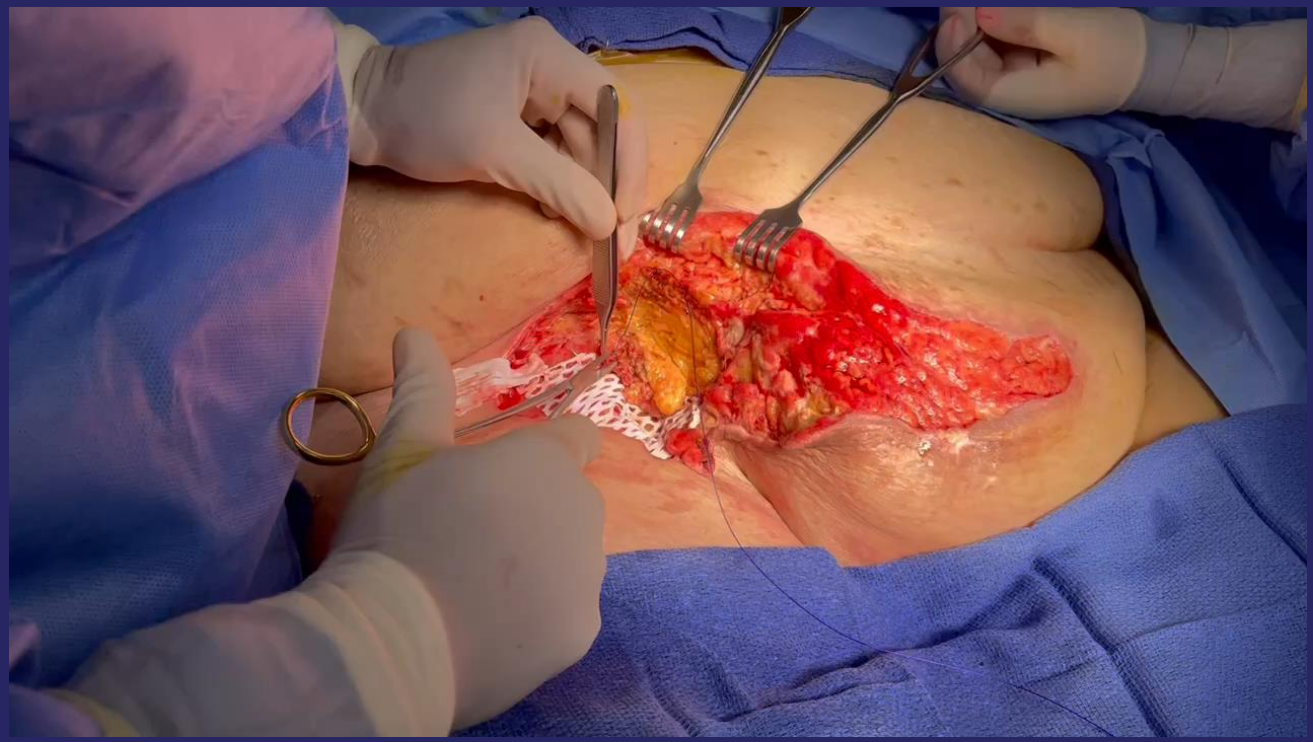
Full-Thickness Necrosis Groin (Day 14)

Reticular dermal matrix utilized as soft-tissue scaffolding



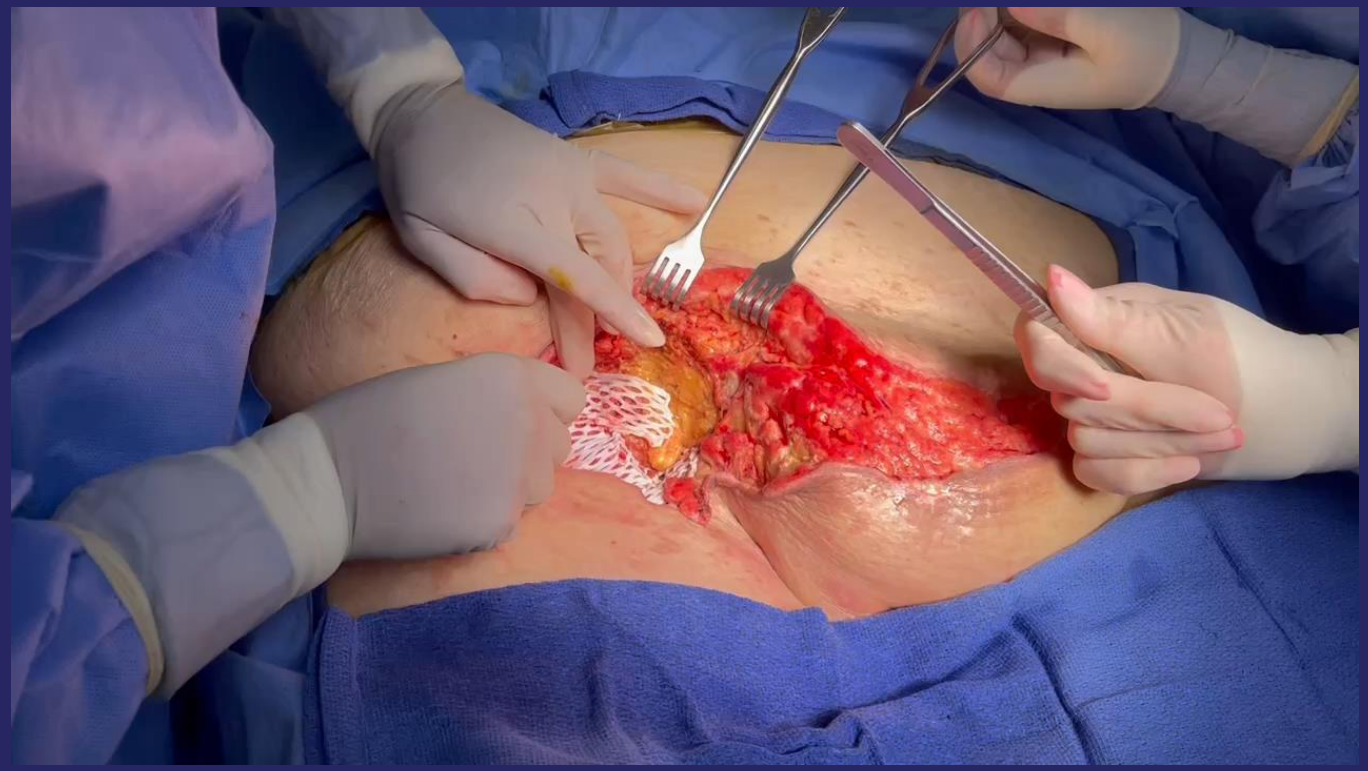
Full-Thickness Necrosis Groin (Day 14)

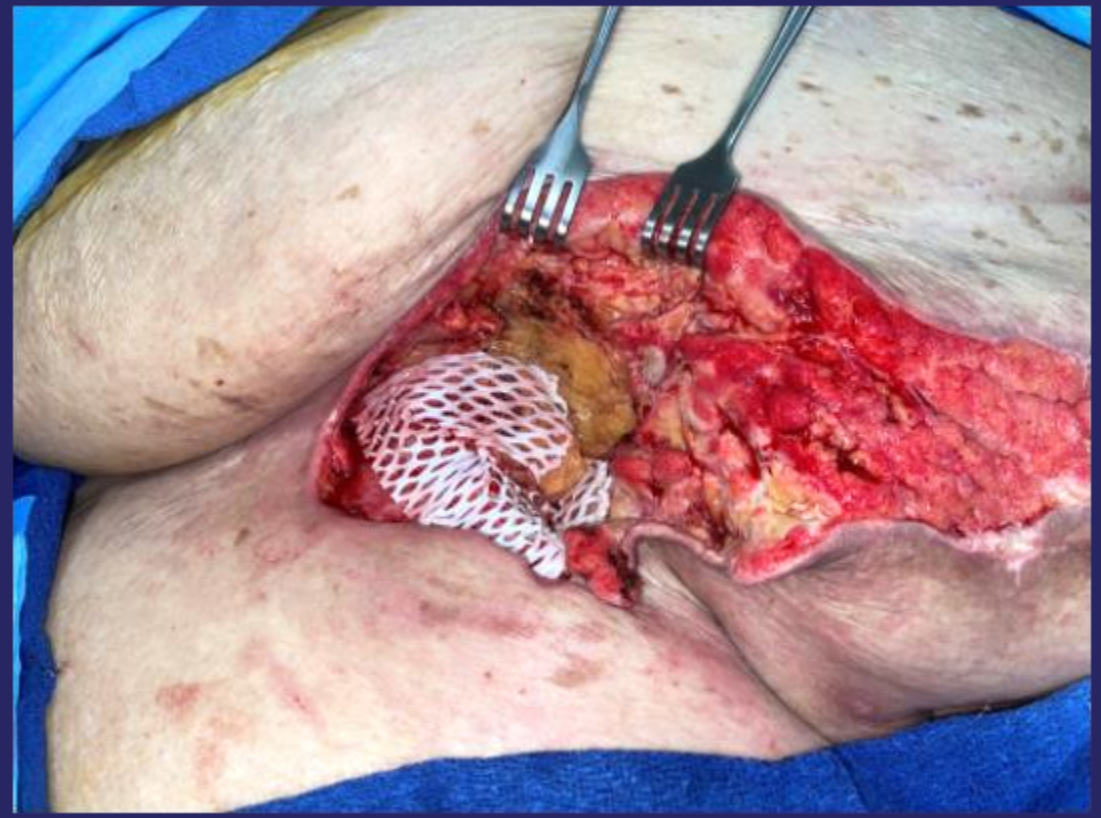




Layered support with reticular dermal matrix and native flap tissue

Full-Thickness Necrosis Groin (Day 14)





Layered support with reticular dermal matrix and native flap tissue

Full-Thickness Necrosis Groin (Day 14)

Closure performed and NPWT placed

Full-Thickness Necrosis Groin (Day 24)

NPWT dressing and drains removed. Patient returned to care facility and started PT.

Full-Thickness Necrosis Groin (3 Months)

Healed. No further surgical intervention needed.

Considerations for Sharp/Surgical Debridement

- Anticoagulation
- Credentials and experience
- Care setting
  - Office
  - HOPD
  - Hospital bedside
  - Operating room
  - LTAC/SNF/rehab
  - Home

ABSOLUTE CONTRAINDICATION
for sharp/surgical debridement:

When in doubt, just don’t.

Clinical Pearls

- Wound debridement is essential to promote a clean wound bed and wound healing
- Debridement is often not a one-time event; it may be ongoing, as needed
- The choice of debridement type is based on assessment of the patient and the wound, and the trajectory of healing
- There is no “one size fits all”
- Ensure adequate clinical education, training, and expertise when recommending and performing different types of debridement

“The price of greatness
is responsibility.”

— Winston Churchill

SAWC Spring

WHS

Thank You

making a **difference** together