

**Bridging Science and Patient Care
Across Care Transitions:**

Driving Healing through NPWT

Supported by an educational grant from Solventum, Medical Surgical Business

Faculty

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Faculty Disclosures

- **Karen Bauer, DNP, APRN-FNP, CWS, FAAWC**

Advisory Board: Urgo Medical NA; Consultant: Solventum, Medical Surgical Business; Urgo Medical NA; Speakers Bureau: Solventum, Medical Surgical Business; Urgo Medical NA

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Consultant, Speakers Bureau: Integra LifeSciences; Organogenesis Inc; Reaplix; Solventum, Medical Surgical Business; Urgo Medical NA

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Disclosures

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Learning Objectives

- Explain how the negative pressure wound therapy with instillation (NPWT-i) family of dressings integrates negative pressure wound therapy (NPWT) with instillation therapy and differentiate between the key dressing types to identify appropriate clinical applications for complex or contaminated wounds
- Analyze the science and clinical applications of novel peel-and-place dressings, and evaluate which wound types are best suited for this technology
- Evaluate the clinical evidence on the combined use of oxidized regenerated cellulose (ORC)/collagen and NPWT, and determine how this integrated approach may improve healing outcomes compared with NPWT alone
- Navigate clinical case outcomes involving applications of NPWT-i with instillation dressings, peel-and-place dressings, and the combined use of ORC/collagen and NPWT

Q&A

Questions are welcomed

Submit your questions anytime
via the question box

NPWT-i Dressing Selection: How They Work and When to Use Them

Karen Bauer, DNP, APRN-FNP, CWS, FAAWC

Emory Healthcare Heart & Vascular, Limb Preservation Coordinator
Atlanta, GA

Immediate Past President, Society for Vascular Nursing (SVN)
Board Member, Association for the Advancement of Wound Care (AAWC)

V.A.C.[®] (NPWT) Peel and Place Dressing



Integrated design
Eliminates arts and crafts



Application time
On average, 2 min*¹

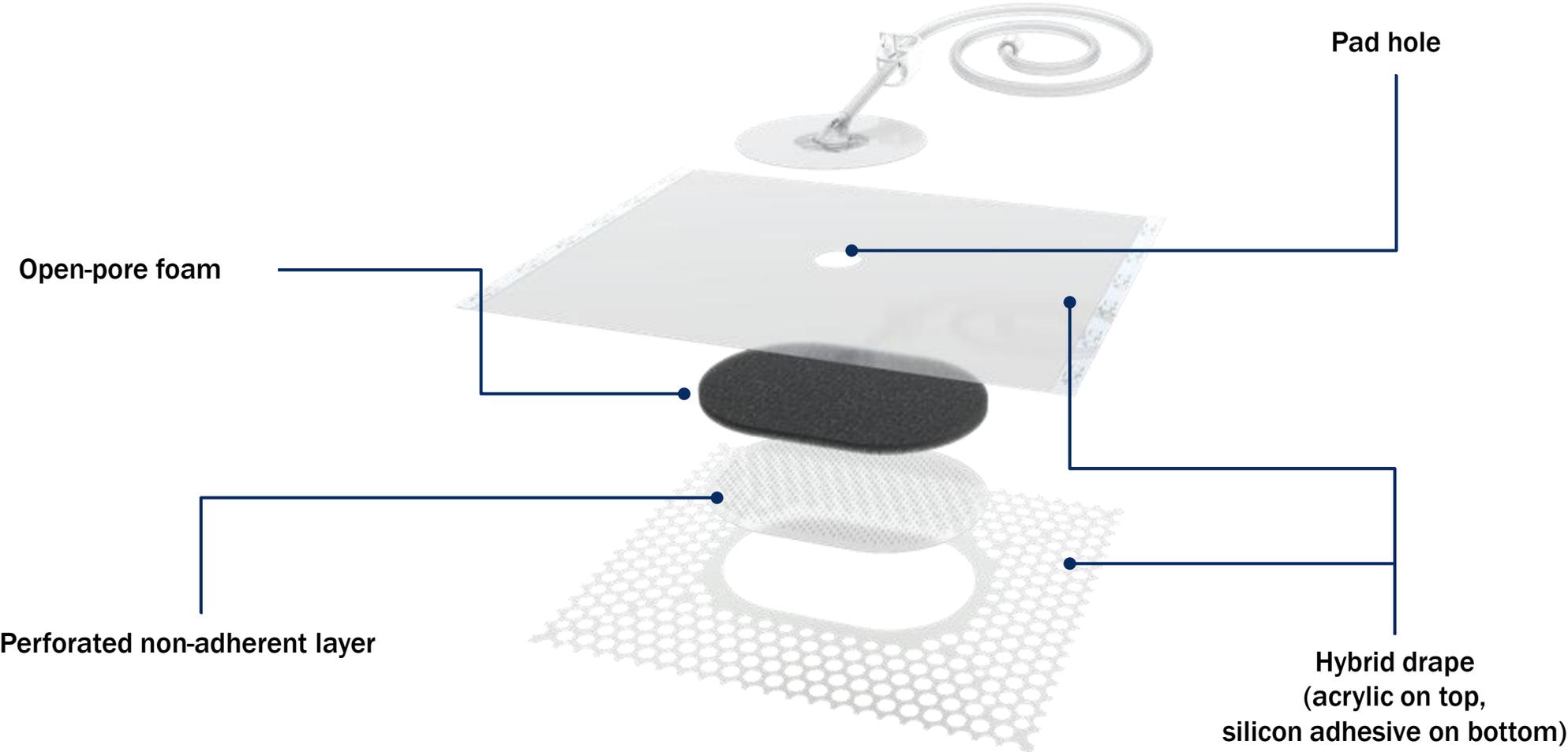


Wear time
Up to 7 days



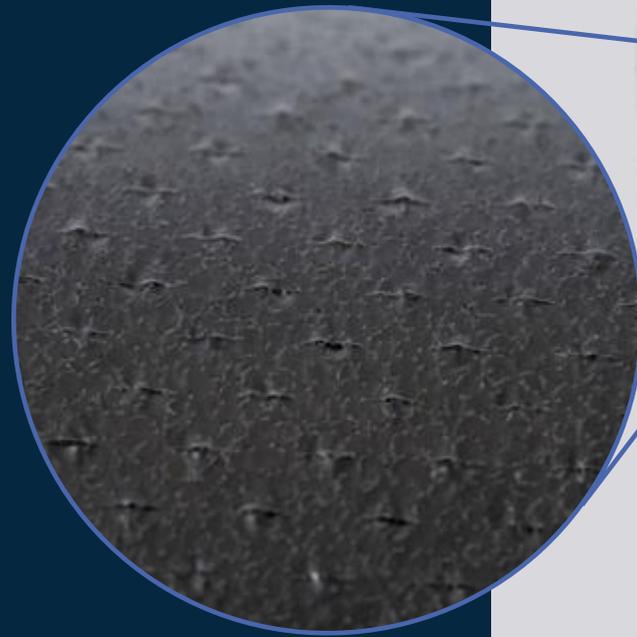
*In a simulated use test with 12 nurses and surgeon users. Average dressing application time of 01:48

All-in-One Design



The Bottom of the Dressing

Perforated, non-adherent bottom layer allows up to 7 days of wear by mitigating tissue ingrowth and reducing foam adhesion to the wound and pain upon removal.



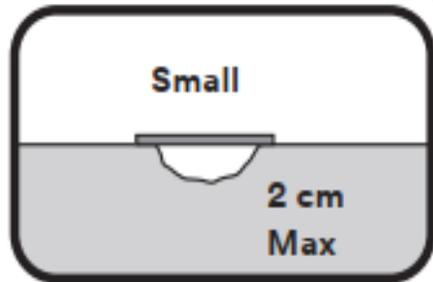
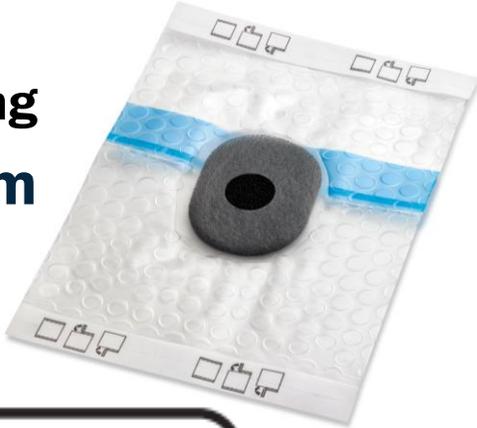
NPWT Peel and Place Dressing

- Available in 3 sizes
- Healthcare provider may opt to change more frequently if
 - Not comfortable with 7-day wear time
 - Concerns over pressure, bony prominence, or offloading
 - Wound condition concerns

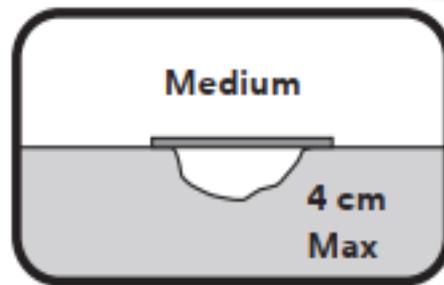
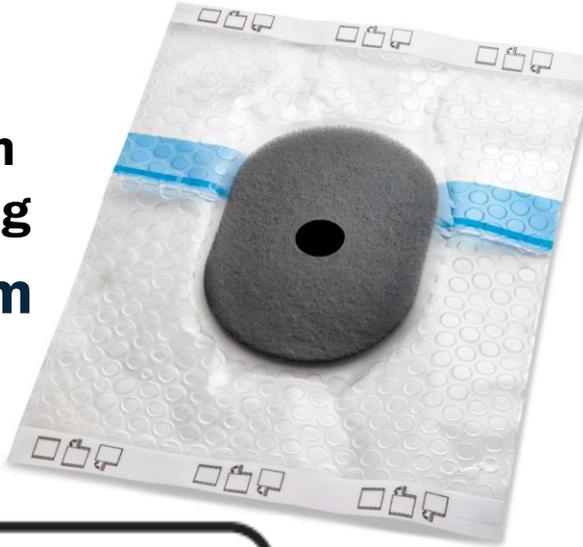


NPWT Peel and Place Dressing Sizes

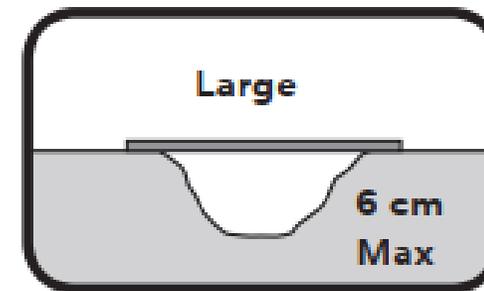
**Small
Dressing
2 cm**



**Medium
Dressing
4 cm**



**Large
Dressing
6 cm**

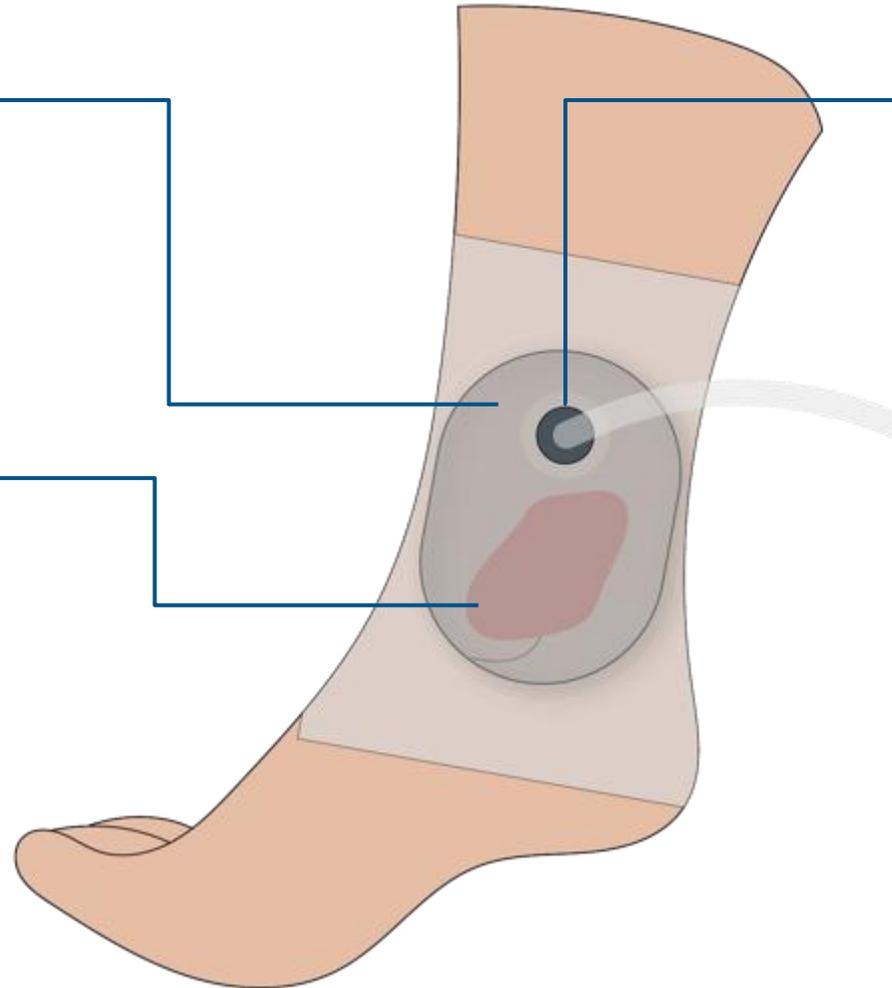


The integrated NPWT Granufoam™ (open-pore foam) dressing oval has a thickness of 0.6cm

Considerations

1. Foam should extend beyond wound and touch periwound skin

3. Undermining must be $\leq 2\text{cm}$; no tunneling can be present

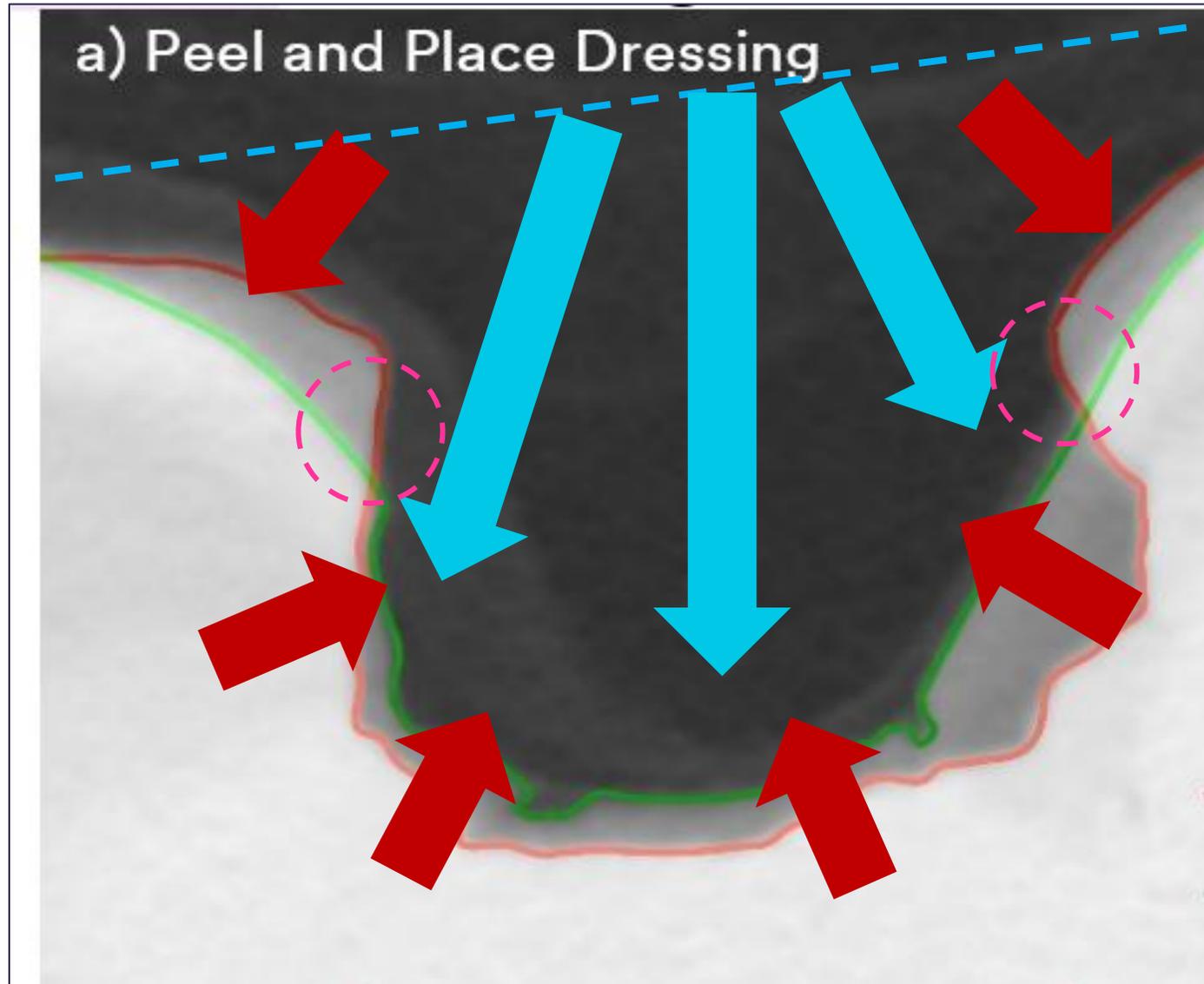


2. To offload, select the Large dressing size

4. Don't mix with other dressings; the use of additional foam fillers is prohibited

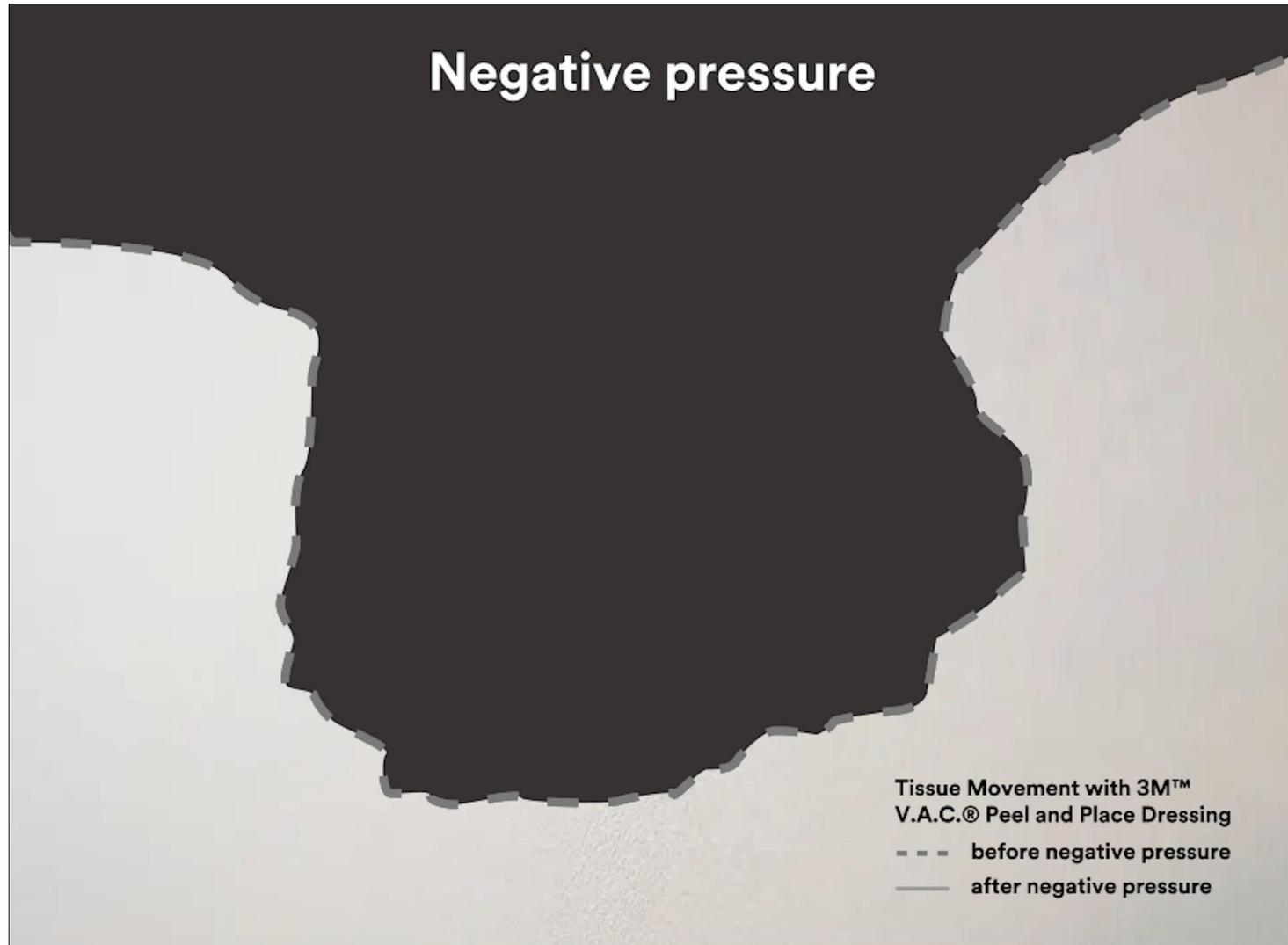


NPWT Peel and Place Dressing Draw Down

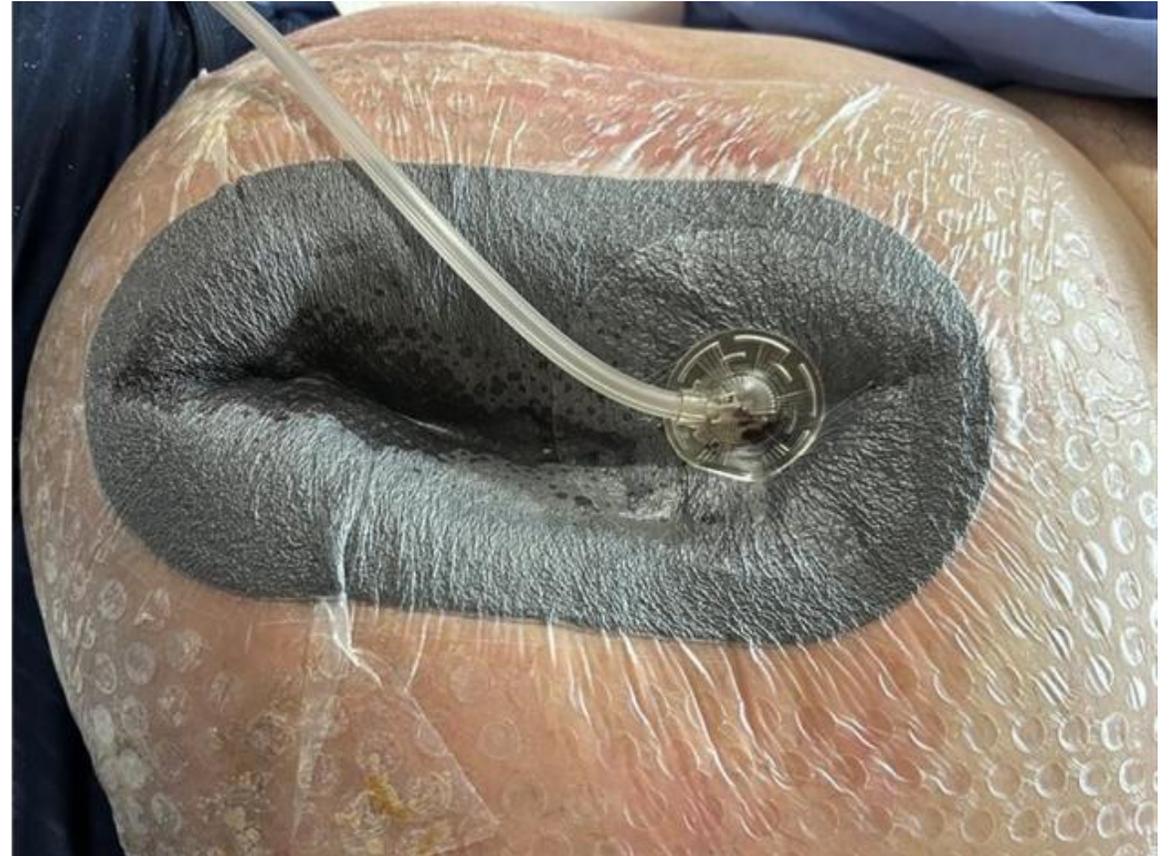


- Superficial tissue under 0 mmHg
- Superficial tissue under -125 mmHg

NPWT Peel and Place Dressing Draw Down



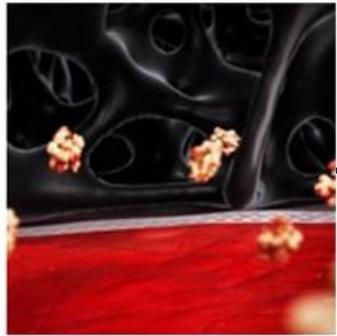
Traditional Application vs NPWT Peel and Place



Images courtesy of Britney Butt MCISc-Wh, CWOCN
University of Southern CA, Keck School of Medicine

NPWT Peel and Place Dressing MOA

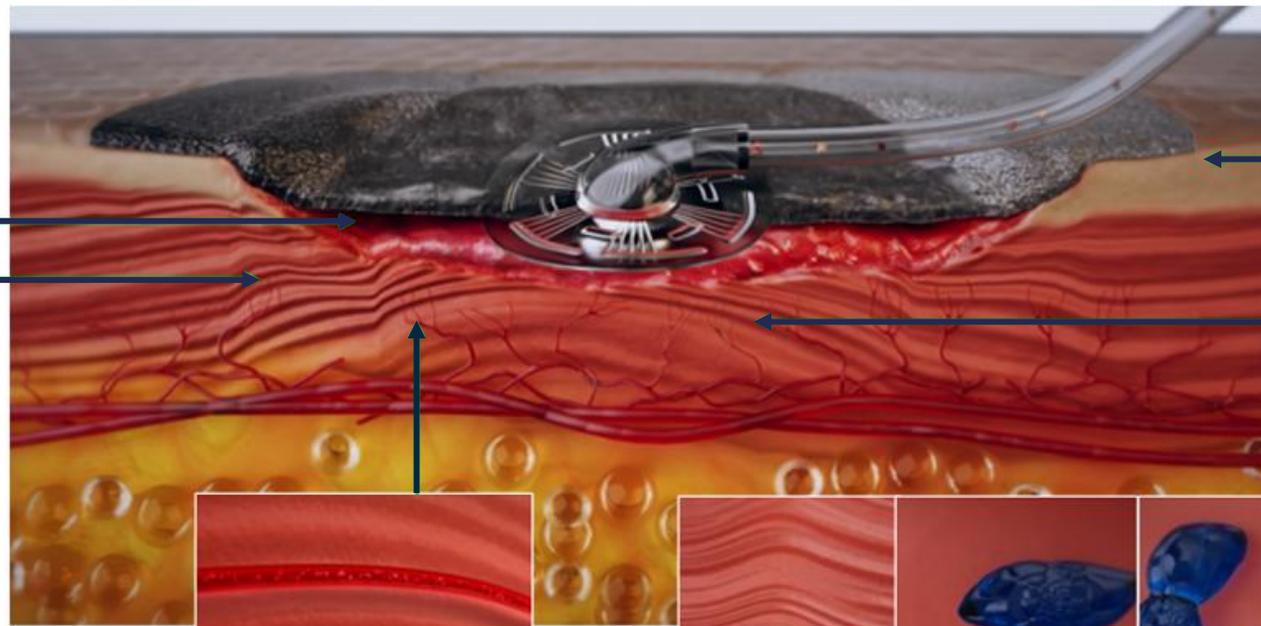
Macrostrain



Removes exudate and infectious material

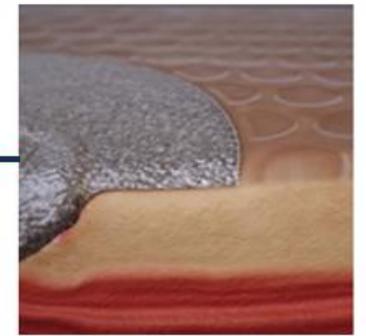


Reduces edema



Promotes perfusion

Microstrain



Mechanical forces extend beyond the wound bed



Deep-tissue micro-deformation

Stimulates cellular activity

Increases biomarkers indicative of pro-wound healing

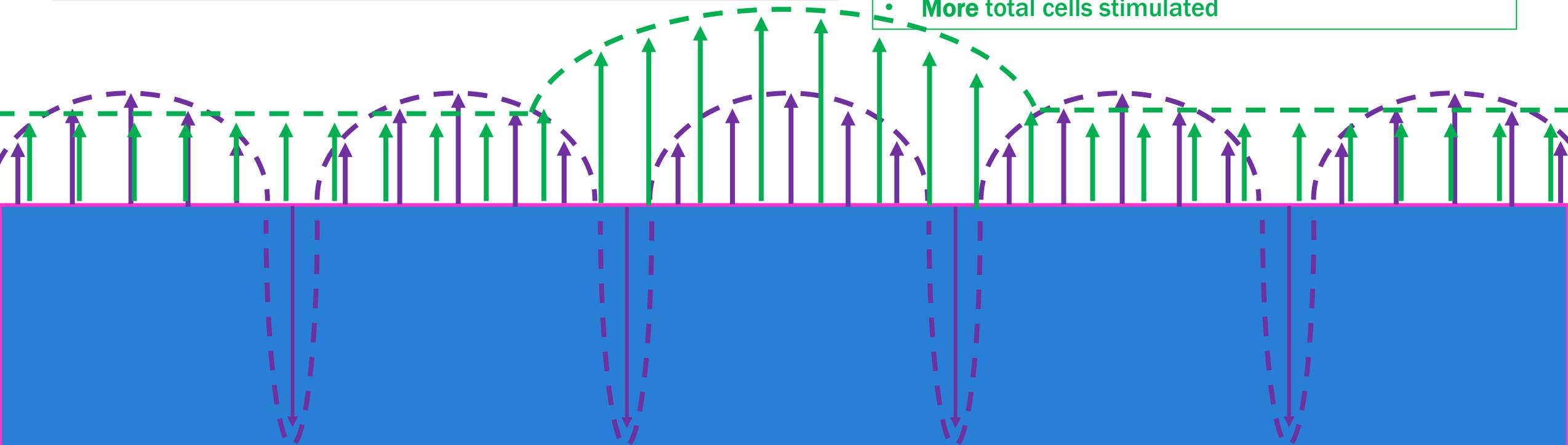
Hypothesized/Predicted Vertical Tissue Displacement Illustration

Tissue Surface Displacement w/ROCF

- Heterogeneous with tensile and compressive strain zones

Tissue Surface Displacement w/Peel and Place

- Homogenous with predominantly tensile strain field
- More total cells stimulated



Tissue Before Deformation

Disclaimer: Peel and Place vertical tissue displacement values are derived from FEA macro-model

Comparable or Elevated Pro-Wound Healing Biomarkers in Wound Beds Treated with NPWT Peel and Place Dressing vs Traditional NPWT Foam

Biomarker Classification	Biomarker	Effect on Healing	Prevalence Compared to ROCF
Growth Factor Proteins	Fibroblast growth factor-2 (FGF-2)	Promotes good tissue quality wound fill with its role in granulation tissue formation and angiogenesis	●
	Platelet-derived growth factor-AB/BB (PDGF-AA/BB)	Promotes deposition of granulation tissue by inducing fibroblast proliferation and collagen production	●
Immune System-Related Proteins	Interleukin-1 receptor antagonist (IL-1ra)	Helps ensure wound healing progression as an anti-inflammatory protein	●

● Elevated

● Comparable

Wound Types that Benefit From NPWT Peel and Place Dressing



Most ideal wounds for initial dressing placement



Grafts

Why:

Time savings, including reduced OR time and fewer supplies needed



Dehisced Surgical Wounds

Why:

If only part of the wound is dehisced, easily cover and treat the whole incision



Less Complex Wounds

Why:

Help ensure success, not your train wrecks or super complicated placements



Multiple Wounds

Why:

Even greater efficiency – dressing can be placed over intact skin between wounds



Wound Patients Who Can't Get Home Health

Why:

Patients can follow up in wound clinic weekly



Irregular Shapes

Why:

Can be placed over intact skin; no need to cut; big savings

Less than ideal wounds for initial dressing placement



High Exudate in Dependent Position

Why:

Exudate sometimes pools and may cause maceration on the skin



Skinny and Deep

Why:

Dressing is unable to conform to the bottom of the wound bed and can result in exudate pooling



Active Bleeding

Why:

All VAC dressings require hemostasis to be achieved; and may cause blockage



DFU with Inadequate Offloading

Why:

Exudate squeezed out of the tissue may over-wet or macerate periwound skin (eg, bedrest, scooters, etc)



PI with Inadequate Offloading

Why:

Source of the injury is not addressed, so wound is not likely to progress (eg, turning, positioning, padding, etc)



Wounds Receiving Compression

Why:

Not indicated together; compression may lead to reduced exudate removal and maceration or a pressure point

Application Tips

No longer need to —

- Cut foam to fit wound
- Count and document number of foam pieces
- Pre-drape or windowpane to protect intact skin
- Cut holes

Do NOT —

- Use skin barriers/protectants as this may reduce adhesive properties
- Use with other NPWT dressing kits or foams, as they have a shorter wear time
- Push foam portion of the dressing down. Allow the dressing to draw down and conform to the wound bed as negative pressure is applied
- Stretch dressing

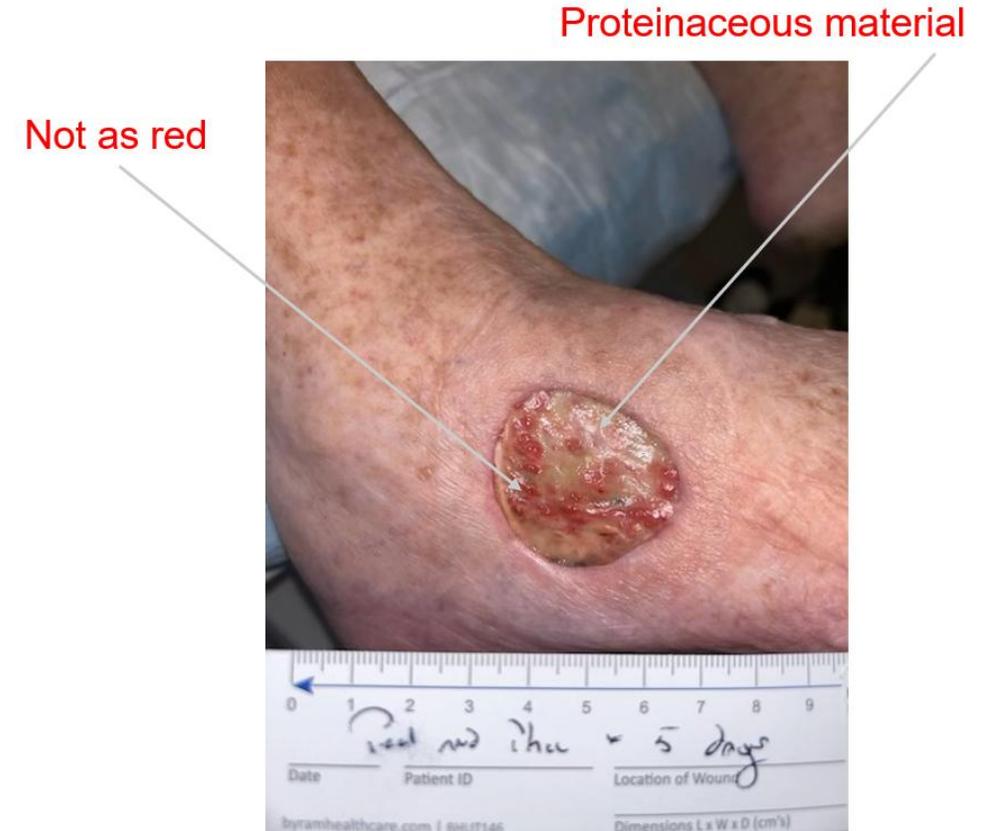
Drape tips —

- Apply loosely over the wound area
- Leave at least 5cm border of drape whenever possible
- For curved anatomy, slits may be cut in the drape portion of the dressing to help reduce overlap, drape folds, or remove wrinkles

- **The dressing can stay in place when switching between approved NPWT units**
- **Never leave an NPWT dressing in place for more than 2hrs without active NPWT**

Redefining Expectations

- Granulation tissue
 - Color not as red, texture will be smoother
- Proteinaceous material on wound surface
- Odor
 - Dressing may exhibit moderate odor after longer wear time



NPWT Peel and Place Dressing

Value in Acute Care

- **Up to 7-day wear time** allows critical staffing and resource flexibility while effectively maintaining NPWT
- **All-in-one design** streamlines application and reduces staff training; staff across skill levels can perform dressing changes
- Covers entire wound and surrounding tissue for **less than 2-min application** on average, saving time in the OR
- Faster dressing applications may **reduce costs** for procedures taking place in the OR



Traditional NPWT to NPWT Peel and Place — Acute Care



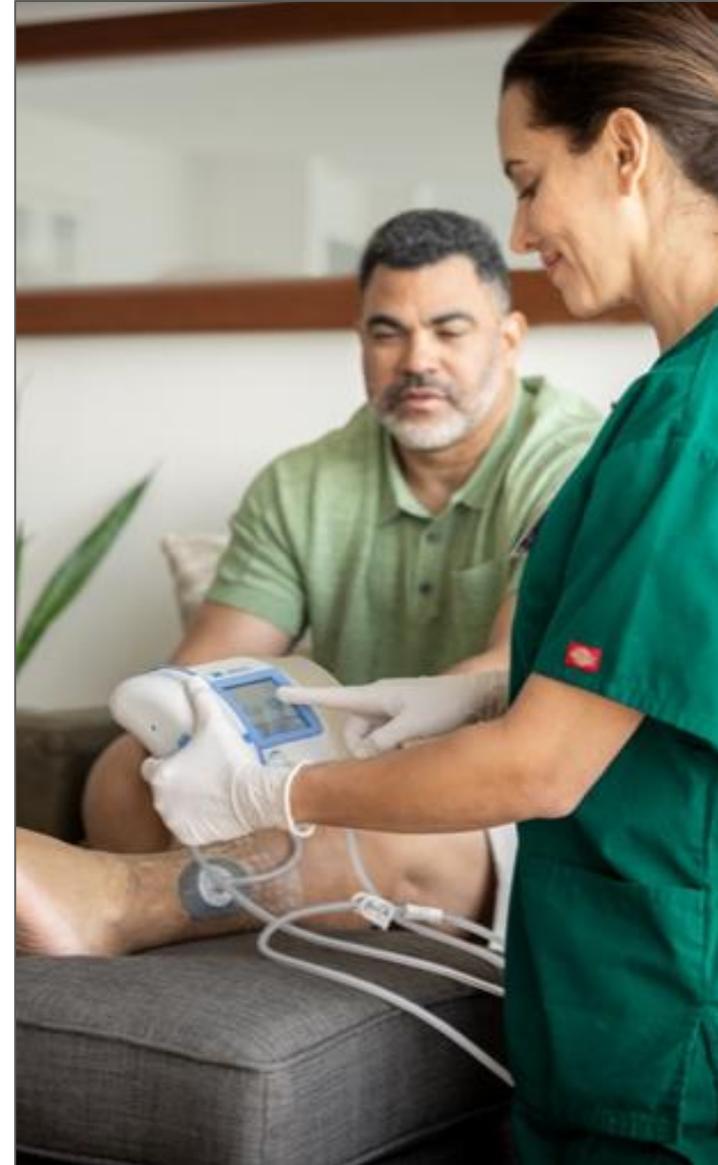
NPWT Peel and Place Dressing Value in Wound Clinics

- **Up to 7-day wear time** provides opportunity for wound clinic patients who are not eligible for home health visits to benefit from NPWT
- **Nurses** surveyed rated the dressing as **easy to use**
- Less than 2-min average application time is significantly faster
- Available at **no additional cost for at-home patients**; billed to patient's insurance under same code as other NPWT dressings



NPWT Peel and Place Dressing Value in Home Health Setting

- 3x the wear time; 1/3 the nursing visits
- Can reduce number of nursing visits
- Fewer dressing changes mean home health agencies could **manage more patients per month** who require NPWT
- **Easier application** for clinicians who may not have experience or confidence applying NPWT on more complex wounds
- Available at **no additional cost for at-home patients**; billed to patient's insurance under same code as other NPWT dressings



Recommendations to the Team

Is home health involved?

Does clinic staff know how to use NPWT peel and place dressing?

Monitor for challenging cases

What's the backup plan?

Does your ED know about NPWT peel and place dressing?

Case 1: Traumatic Hematoma

Case 1: Traumatic Hematoma, VLU

- 73y Male
- CAD s/p CABG
- Sees rheumatology for RA, recently stopped Enbrel® (etanercept) and low-dose steroids
- No significant/multi-level or proximal superficial reflux
- ABI .9, TBI .65



Case 1: Traumatic Hematoma, VLU



Case 1: Traumatic Hematoma, VLU



4/16: Debridement, CTP



Case 1: Traumatic Hematoma

Now Closed!

NPWT peel and place dressing

- Increased mobility
- Fewer dressing changes
- Less social stigma
 - Drainage contained/improved
- Comfortable



Case 2: Meet Your Patient Where They Are!

Large Abdominal Wound Post Renal Transplant

- 65y Female, T2DM, diabetic retinopathy, h/o DFUs
- HTN, CAD s/p old MI (2016), CABG x2 (9/21/21, LIMA to LAD and reverse SVG to OM)
- HFpEF, h/o paroxysmal atrial fibrillation
- Carotid artery stenosis s/p right carotid endarterectomy (12/13/18)
- Secondary hyperparathyroidism and anemia of CKD
- Stage 4 oropharyngeal cancer (left tonsil)
- COPD, HPL, GERD, gout, hypothyroidism, skin melanoma s/p excision
- OA s/p right knee replacement (2017)
- h/o right rotator cuff tear
- Anxiety, obesity, OSA (on CPAP), h/o colon polyps, diverticulosis, h/o MRSA infection, hearing loss (left ear)
- Anesthesia problems, difficult IV access
- Dermatitis, chronic sinusitis, headaches, dental disease, h/o fecal incontinence

Surgical Progression

NPWT: The Power of Wound Specialist Persuasion
(Getting other services to buy in)

Deceased donor
kidney transplant:
June 28

Incisional infection
washout: July 9, 25

Consulted July 10



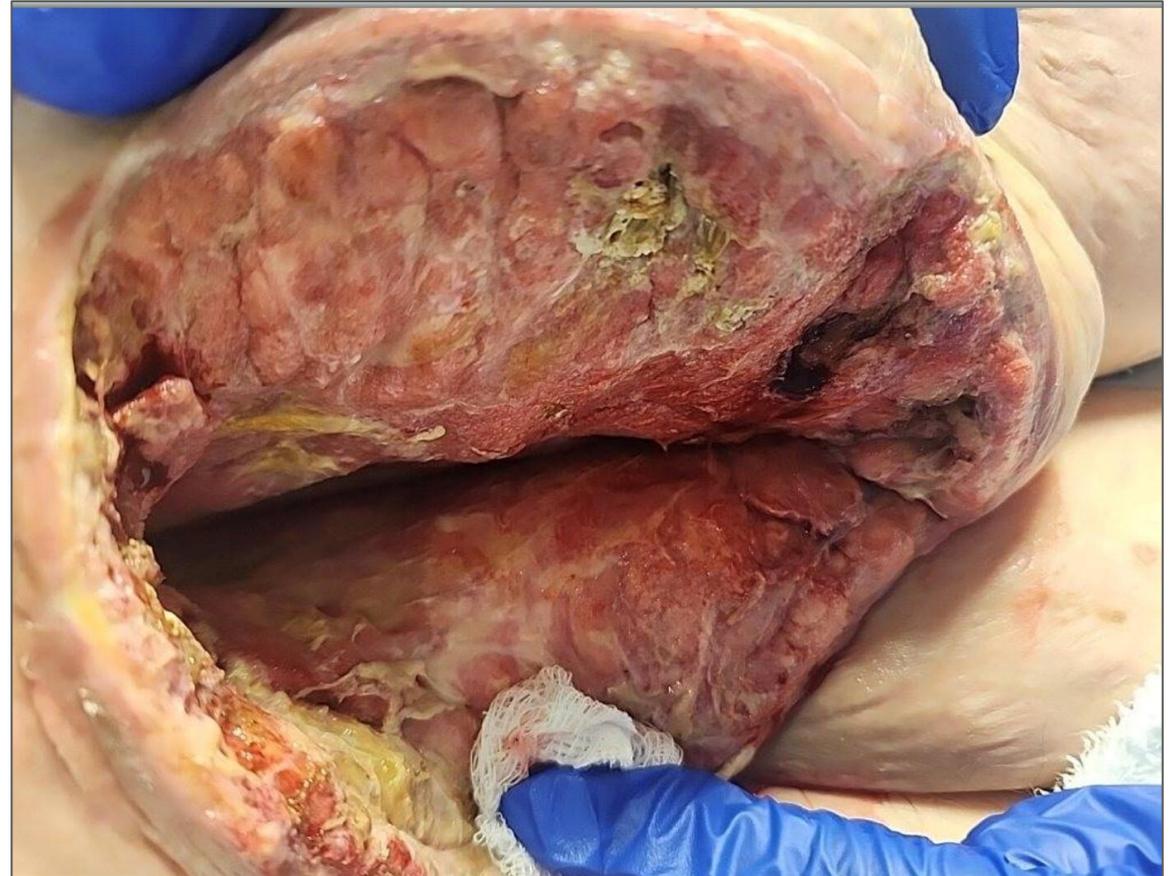
July 10



July 18

Postoperative

- S/P 7/25 wash-out
- NPWT-i initiated
 - NPWTi-d dressing, 10min dwell time q2hrs with hypochlorous acid (HOCl), -125 mm Hg
- Multidisciplinary care: ID, Transplant APP, Wound/Vascular, **Patient and Family**



POD 1: 2nd I&D

ECF Transition

Discharge to SNF: Aug. 4



Portable NPWT, black foam, -125 mm Hg

Clinic follow-up Aug. 14



Keys: Multi-morbid, immunosuppressed
Goals: Meticulous wound hygiene, HOCl, nutrition

Clinic follow-up Aug. 30



Pain at wound edge
Intervention: Hydrocolloid



Transition to Home

- Discharged to home with Home Health
- Clinic follow-up Sept. 2
- Still having pain at edges; improved
- NPWT peel and place dressing
- Focused on diet
- **Patient frustrated: Goal is to swim**



Multiple conversations
with home health nurses



Novel NPWT

- **October** clinic follow-up
 - NPWT peel and place dressing
 - HOCl, collagen



Reminders for NPWT with Peel and Place Dressing

Indications

V.A.C.® Peel and Place Dressing can be used on:

- Chronic wounds
- Acute wounds
- Traumatic wounds
- Subacute wounds
- Dehisced wounds
- Partial-thickness burns
- Ulcers (such as diabetic, pressure or venous insufficiency)
- Flaps
- Grafts

Warnings

Do not use on wounds with:

- Undermining greater than 2 cm
- Tunneling
- Depth greater than 6 cm

Find the right size

	Small - EZ5SML	Medium - EZ5MED	Large - EZ5LRG
Max wound size:	6.1 cm x 8.6 cm	11.1 cm x 16.6 cm	13.6 cm x 24.2 cm
Max Depth:	2 cm	4 cm	6 cm

Dressing should cover the entire wound bed and extend onto intact skin.

! Always read and follow the detailed Instructions for Use along with important safety information provided in the packaging.

Application Tips for NPWT with Peel and Place Dressing

Wear time

Dressing can remain in place for **up to 7 days**.¹

Device settings

Set the device to **-75 to -150 mmHg** on **continuous mode**.

Do not

- Cut foam.
- If skin barrier/protectant is used under the adhesive portion of the dressing, do not reposition the dressing as adhesive properties may be reduced.
- Use with other V.A.C.® Therapy Dressing Kits or foams, as they have a shorter wear time.
- Push foam portion of the dressing down. Allow the dressing to draw down and conform the wound bed as negative pressure is applied.
- Stretch dressing.

Drape Tips

- Apply loosely over the wound area.
- Leave at least a 5 cm border of drape wherever possible.
- Can reposition within 20 minutes of initial application.
- For curved anatomy, slits may be cut in the drape portion of the dressing to help reduce overlap, drape folds or remove wrinkles.

Watch how-to-apply video

→

Customer service:
800-275-4524

Clinical support:
800-275-4524 x 56650

Technical support:
800-275-4524 x 3

NOTE: Specific indications, contraindications, warnings, precautions, and safety information exist for these products and therapies. Please consult a clinician and product Instructions for Use prior to application. Rx only.

¹ SAT-BSER-05-869347 VAC Peel and Place (Ganymede) BSER. 510(k) K222859.

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Coordination



Nov: NPWT peel and place dressing



Dec: Collagen



Ulcer reportedly closed ➡ pt contracted COVID ➡ Collagen re-initiated via telemed

Closed



1/29/2025

Clinical Pearls

NPWT peel and place dressing is a great option for many wound types

- Still new and exciting — use clinical judgment
- Doesn't detract from or negate the need for ALL NPWT options
- Can be used with ORC
- Consider care setting
- Educate ALL teams involved
- Patient first!

Integrating NPWT with Instillation Therapy: Mechanisms, Dressing Selection, and Clinical Applications

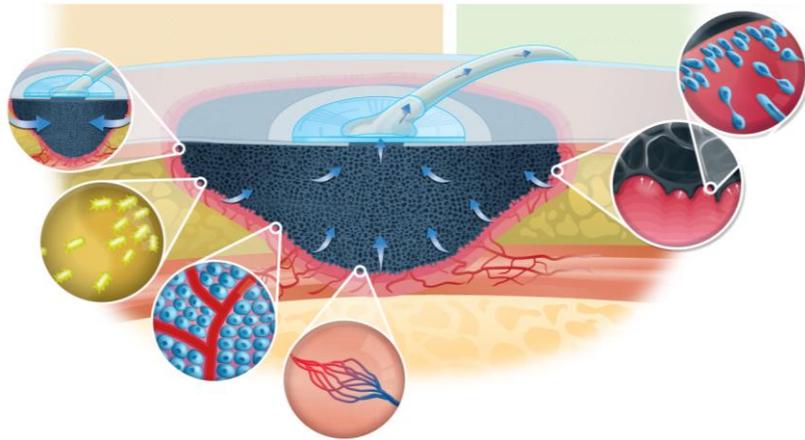
Kara Couch, MS, CRNP, CWCN-AP, FAWWC

Director, Wound Care Services; Associate Research Professor of Surgery
George Washington University Hospital
Washington, D.C.

It Starts with the Wound Healing Basics

Macrostrain

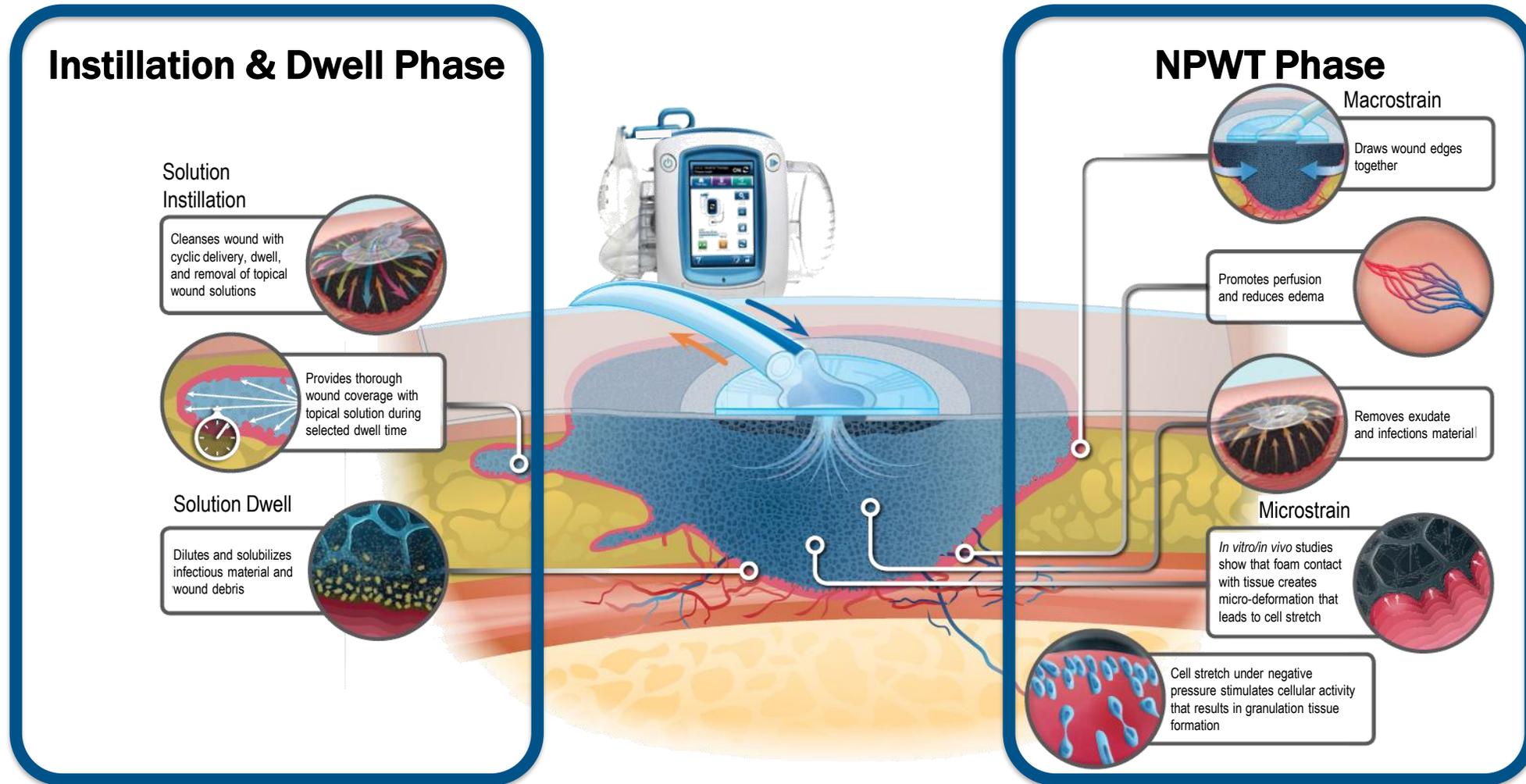
- Draws wound edges together
- Removes infectious material
- Reduces edema
- Promotes perfusion



Microstrain

- *In vitro/in vivo* studies show that foam contact with tissue under negative pressure creates tissue micro-deformation that leads to cell stretch
- *In vitro* studies show that cell stretch under negative pressure stimulates cellular activity that results in granulation tissue formation

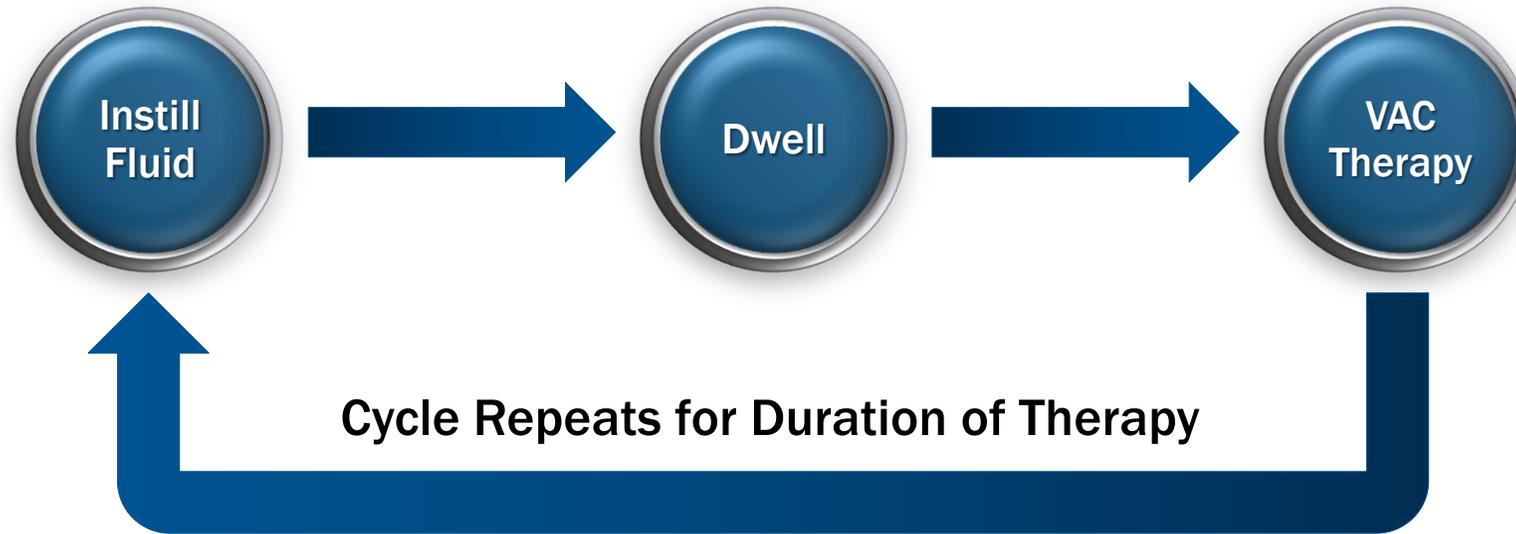
Veraflo™ (NPWTi-d)



NPWTi-d = negative pressure wound therapy with instillation and dwell.

Rycerz AM, et al. *Int Wound J.* 2013;10(2):214-220. Saxena V, et al. *Plast Reconstr Surg.* 2004;114(5):1086-1096. McNulty AK, et al. *Wound Repair Regen.* 2009;17(2):192-199. McNulty AK, et al. *Wound Repair Regen.* 2007;15(6):838-846.

Cleanse, Manage, and Prepare the Wound



Fluorescence Imaging and NPWT

Standard NPWT device under dressing

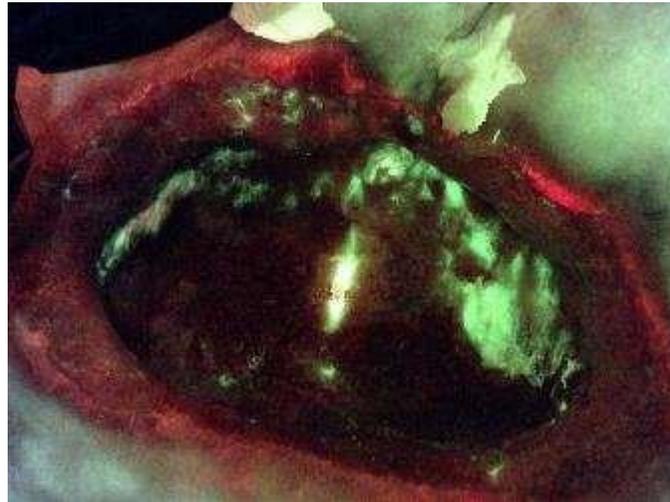


Wound bed



Sacrum pressure ulcer

Detection of red bacterial fluorescence after 2 days prompted earlier dressing change and switch to instillation NPWT device

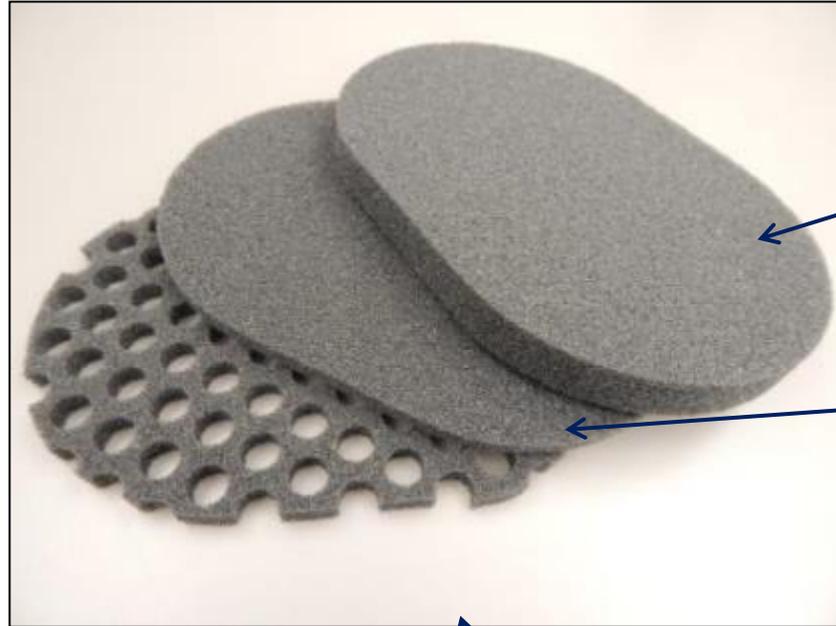


Images courtesy of Kara Couch.

Updated Indication for Use (U.S. Only)

NPWTi-d with NPWTi-d dressing provides hydromechanical removal of infectious materials, non-viable tissue, and wound debris, which reduces the number of surgical debridements required while promoting granulation tissue formation, creating an environment that promotes wound healing

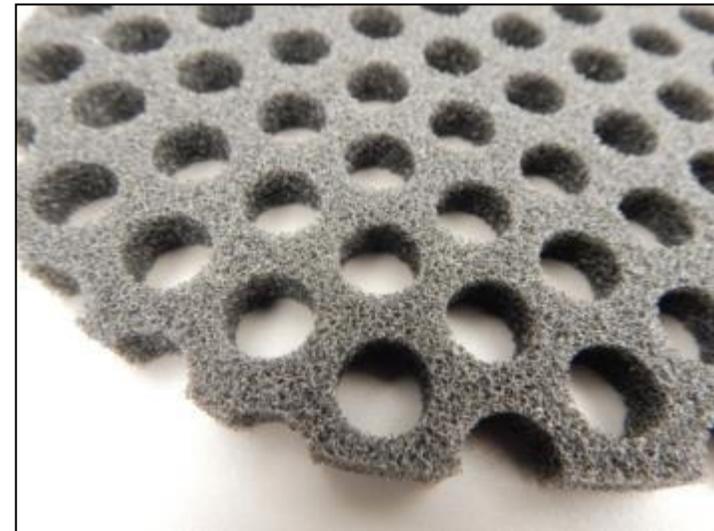
NPWTi-d Dressing



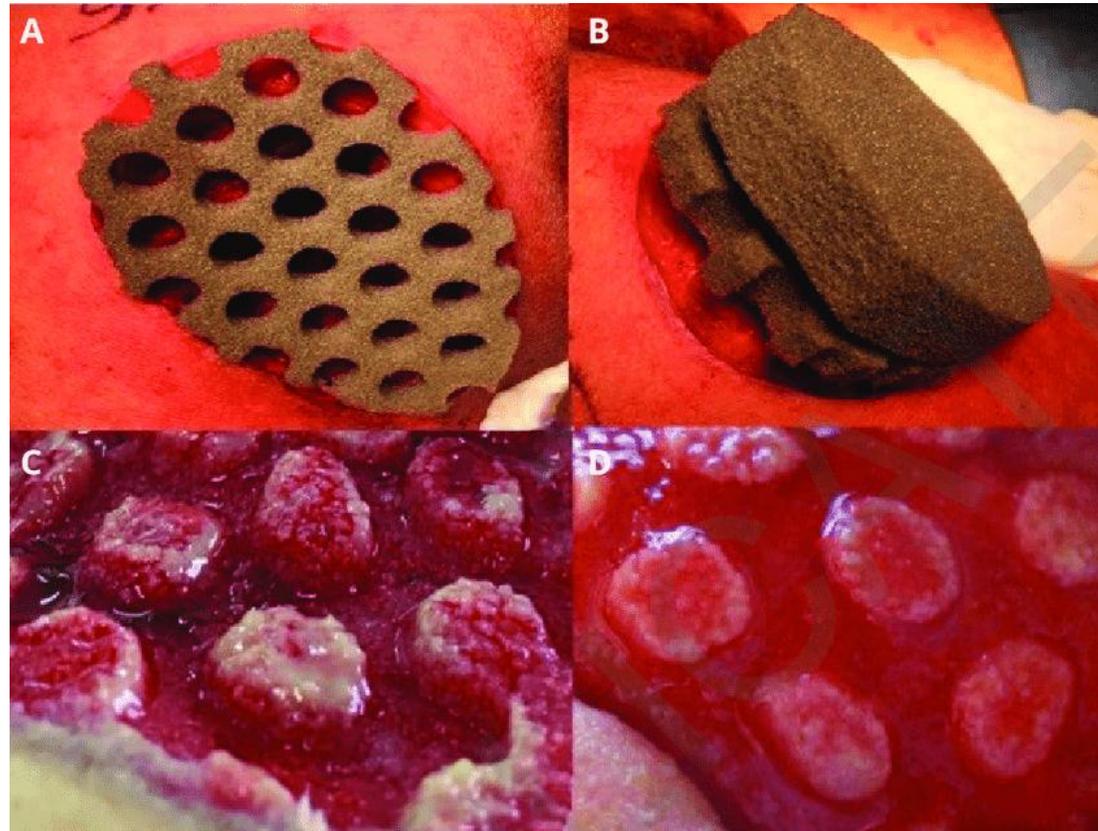
Thick cover layer
(1.6 cm thickness)

Thin cover layer
(0.8 cm thickness)

Contact layer
- 0.8 cm thickness
- 1.0 cm circular holes
- 5 mm spacing



Mechanism of Action



Reticulated open-cell foam dressing with through holes (ROCF-CC) and development of macro-columns. (A) The ROCF-CC contact layer in wound; (B) cover layer applied over contact layer; (C) side view of macrocolumns formed within the holes of the dressing; and (D) top view of macrocolumns.

How Does This Dressing Differ From Previous NPWTi-d Dressings?



Single-piece foam application

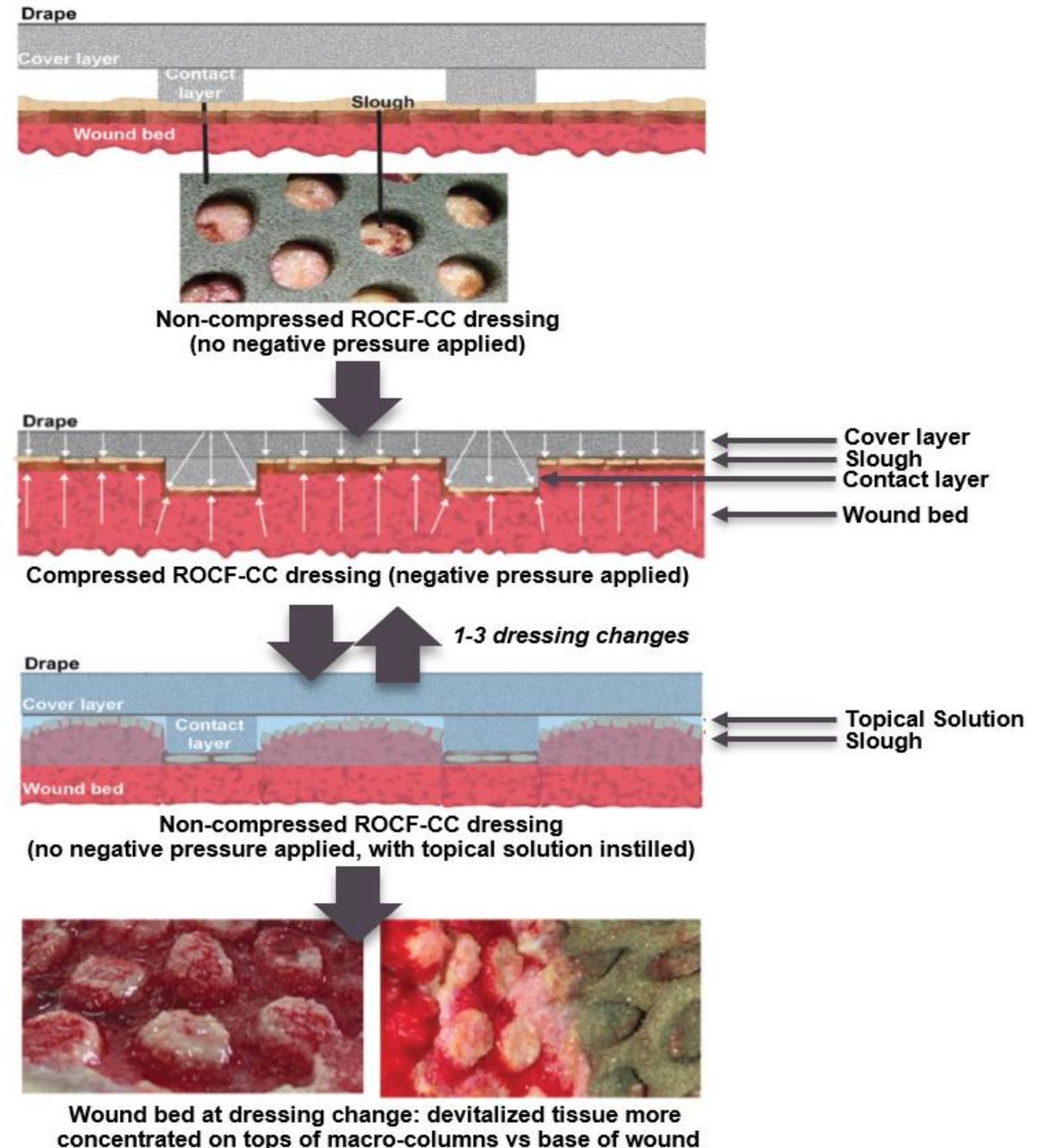
Silicone-acrylic hybrid drape

Blue color for quick product identification

No-sting barrier film is not included in the dressing kit due to the skin-friendly adhesive properties of the silicone-acrylic hybrid drape

Proposed Mechanism of Wound Cleansing with ROCF-CC

“Cyclic delivery of the topical solution, as well as dwell time and removal of the solution, is hypothesized to produce a mechanical hydrodynamic force on the stressed wound bed, disrupting and helping to soften and solubilize thick exudate and loosen wound debris for removal during NPWT. The presence of larger openings or through holes in the dressing may then accommodate easier passage of thick, fibrinous materials away from the wound bed.”



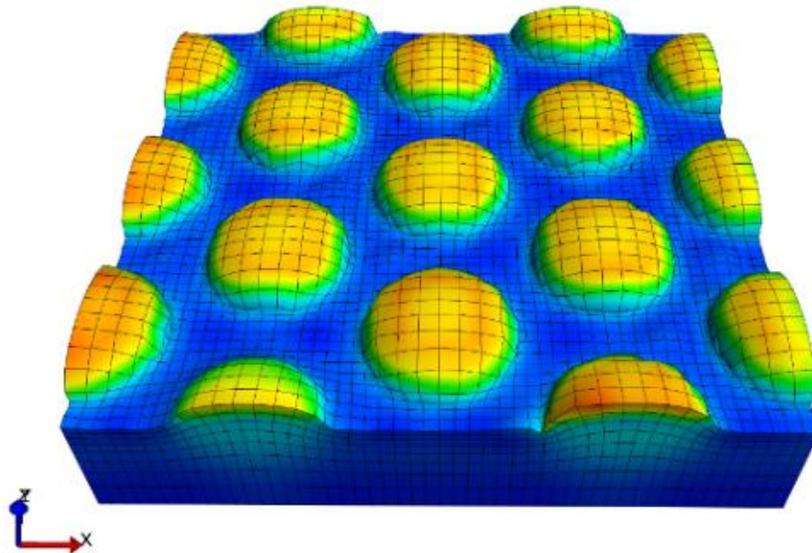
Equivalency Testing

Finite Element Analysis

- The updated version of the ROCF-CC has been studied and shows the **foam-tissue interaction is the same** as the original option

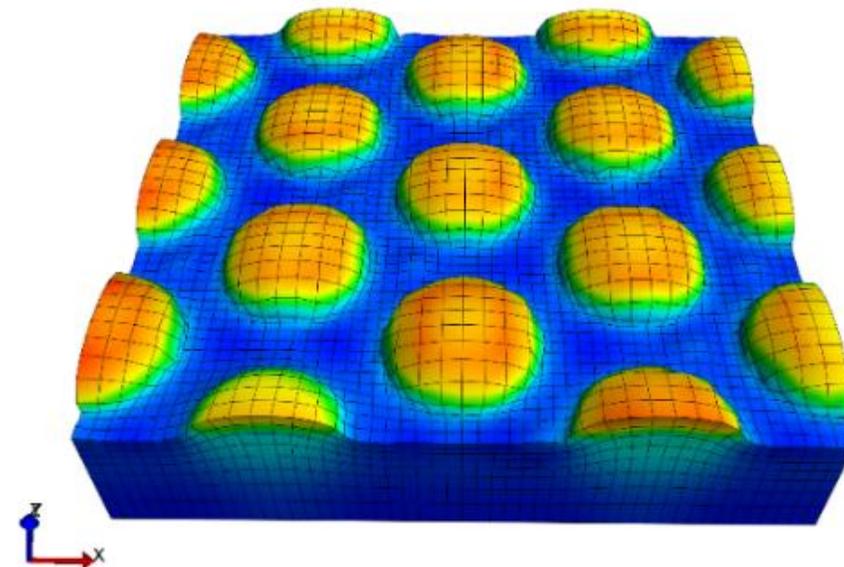
20210301 a3

Effective Lagrange strain
Time = 0.9878



20210303 a1

Effective Lagrange strain
Time = 0.9867



Don't be that guy...



Cases



Case: Gas Gangrene

- 49y Male was admitted with gas gangrene from a diabetic foot ulcer (DFU)
- Went urgently to the OR and had a guillotine above-knee amputation (AKA)
- He went back to the OR several times and ultimately had a hip disarticulation
- During attempt at closure, additional pockets of purulence and necrotic tissue were found
- NPWTi-d was initiated, and he had several rounds of therapy over ≈ 10 days prior to closure



Images courtesy of Kara Couch. Used with permission.



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Case: Crush Injury

- 61y Male was struck by a car and pinned to the vehicle; his legs were amputated at the scene of the accident
- Underwent bilateral AKA closure but developed further tissue damage from the crush injury
- HBO was initiated, and he had surgical debridement of the wounds to prep for eventual skin grafting
- He had 2 rounds of NPWTi-d, and then was grafted using standard NPWT



Images courtesy of Kara Couch. Used with permission.



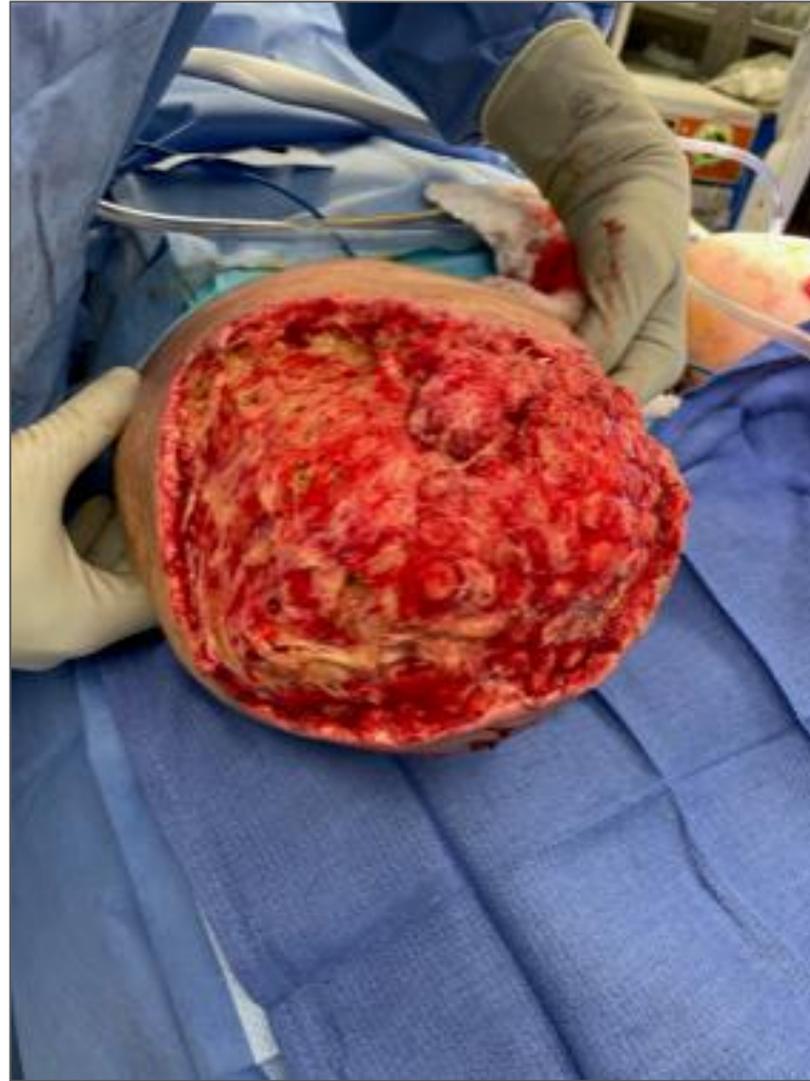


Images courtesy of Kara Couch. Used with permission.





Images courtesy of Kara Couch. Used with permission.



Images courtesy of Kara Couch. Used with permission.



Images courtesy of Kara Couch. Used with permission.

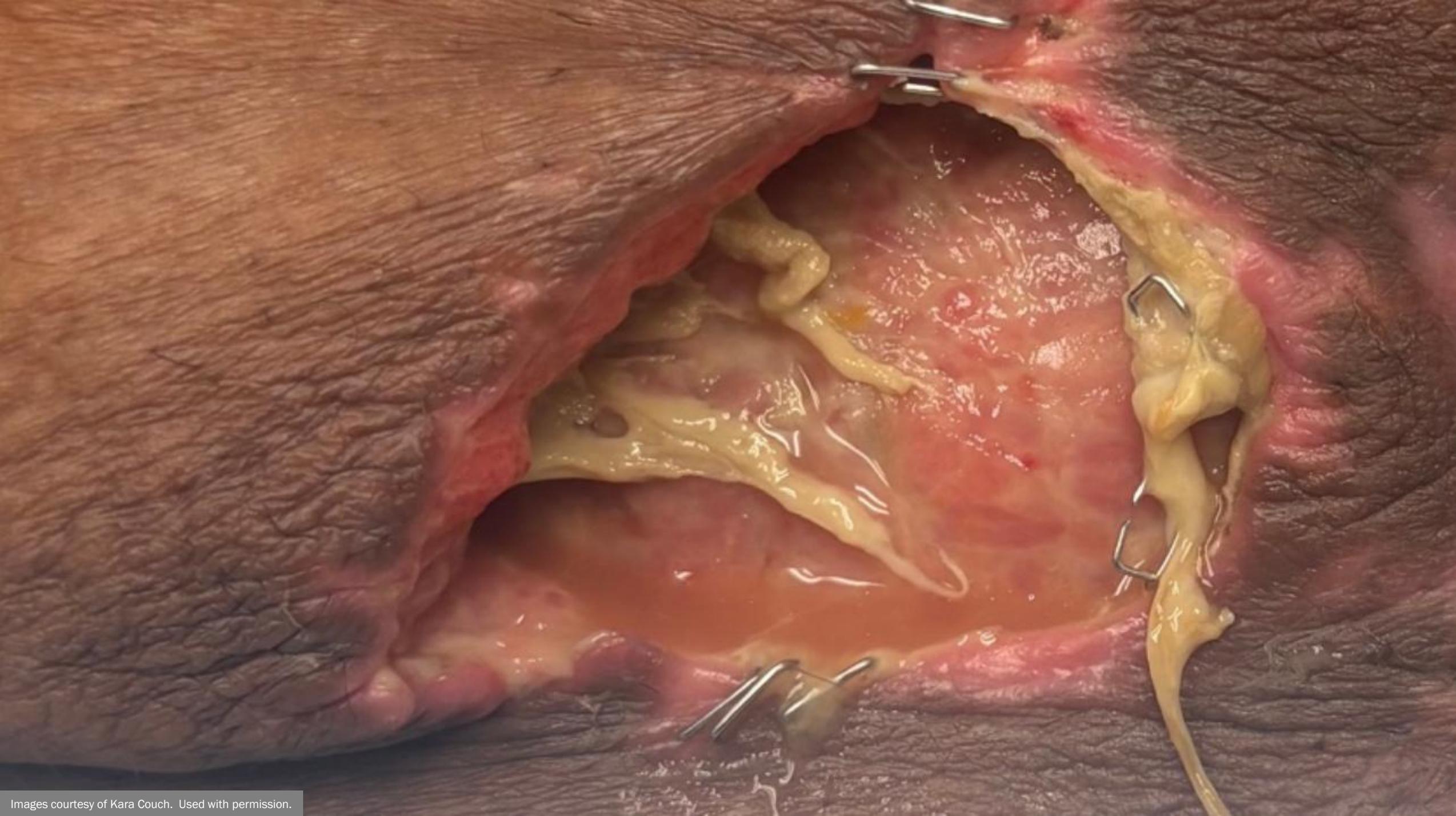




Video courtesy of Kara Couch

Case: Abdominal Wound s/p Kidney Transplant

- 61y Female s/p kidney transplant 4 wks prior
- Wound opened in surgeon's office
- Delay of several days to be admitted
- CT scan showed no deep abscess



Abdominal Wound s/p Kidney Transplant



Images courtesy of Kara Couch. Used with permission.

- 3 days of NPWTi-d
- Transitioned to NWPT (open-pore black foam) for home
- Once undermined area lessened, transitioned to NPWT peel and place dressing

- 3 days of ROCF
- Home using portable device
- Significant undermining remains



Case: Traumatic Hematoma after a Fall

- 88y Female
- Had multiple medical issues during hospitalization
- Hematoma was monitored while in ICU
- Once ready for evacuation, was done at bedside









7/16/23

3 Poles

Blue team

1st

1st

* Border

wide

some



Smart Software



Automatically determines volume to instill

Automatically instills solution after clinician confirmation

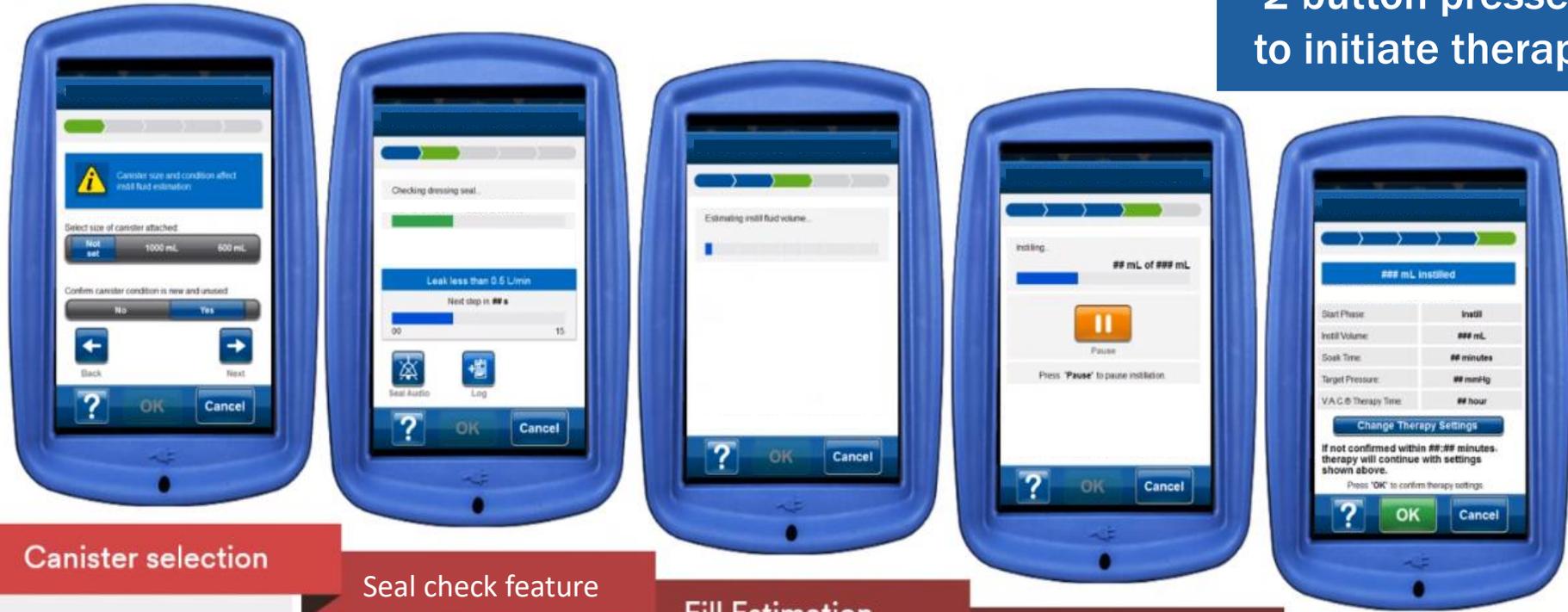
Helps prevent or reduce over/under filling of dressing

Default therapy cycle recommended by global advisory panel

Feature for manual customization

Therapy Initiation Steps

1 decision,
2 button presses
to initiate therapy



Therapy Initiation Step

Canister selection

Seal check feature

Fill Estimation

Instillation

Confirmation

HCP Decision

1. Choose canister (500ml or 1000ml)

HCP Action

1. Select canister size
2. Confirm canister is new

Clinical Pearls

Let's Talk Ports for Fluid and Exudate Removal

Negative Pressure
Single-Lumen Port



Negative Pressure
Dual Port



Don't be that guy...



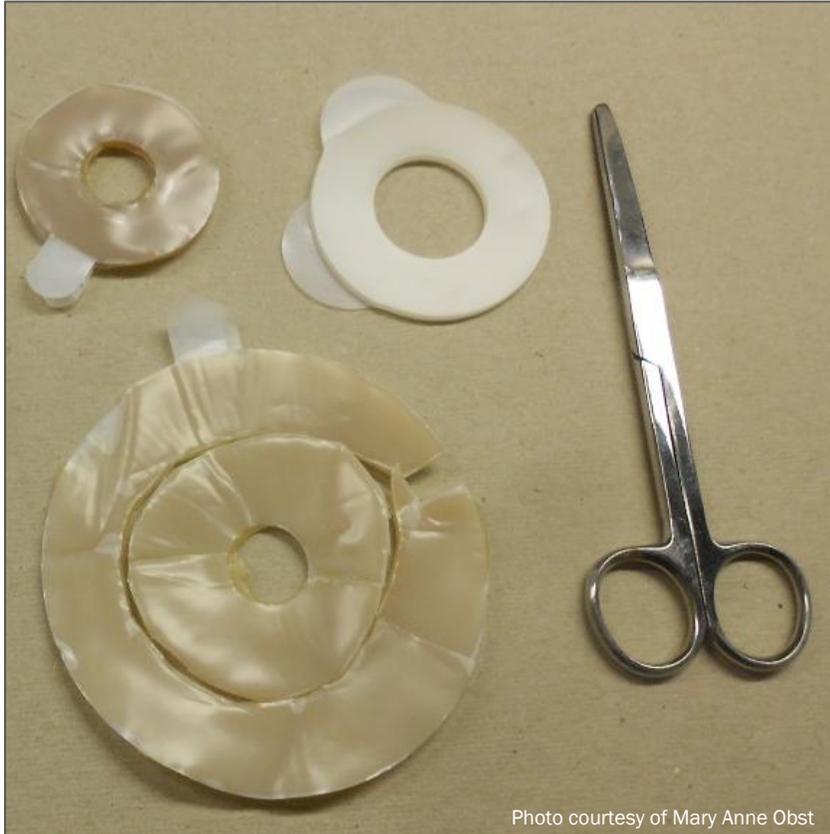
Use Your Toolbox



Pastes and Barrier Products	
Eakin Cohesive [®] Skin Barrier	Eakin Cohesive [®] Seal
Stomahesive [®] Strips and Paste	Adapt Barrier Ring and Strips
Flextend Skin Barrier	Adapt and Karaya Paste
Brava [®] Moldable Rings and Strip Paste	Brava [®] Elastic Barrier Strips
Coloplast Skin Barrier Rings	Brava [®] Paste
Securi-T [®] Conformable Seal and Skin Barrier	TRIO SILKEN [®] Silicone Stoma Gel

Cohesive is a trademark of T.G. Eakin Limited. Stomahesive is a trademark of E.R. Squibb & Sons, Inc. Flextend and Adapt are trademarks of Hollister Incorporated. Brava is a trademark of Coloplast A/S Corporation. Securi-T is a trademark of Genairex, Inc. Trio Silken is a trademark of Trio Ostomy Care US.

Skin Protection



- Ostomy barrier rings
- Polymer-cyanoacrylate
- **Good scissors!**



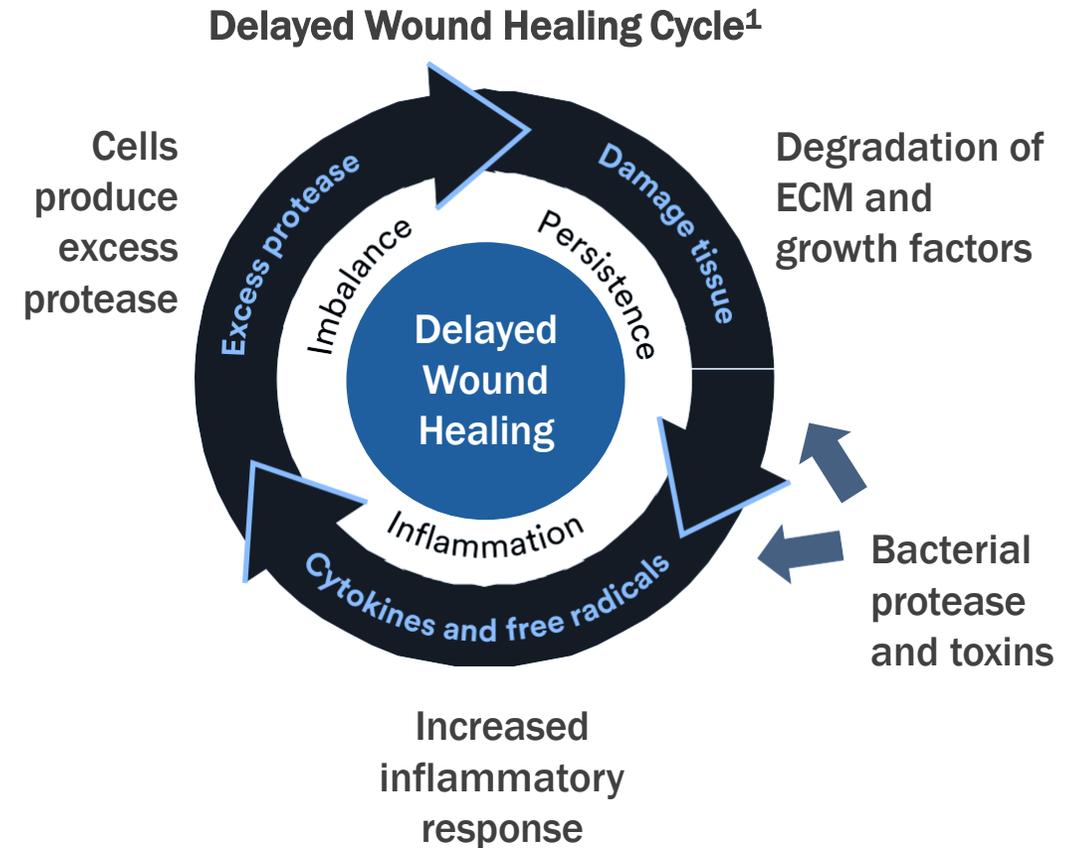
Combinations for Improving Outcomes: NPWT-i, Collagen with ORC and Silver, Peel and Place Dressing

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

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

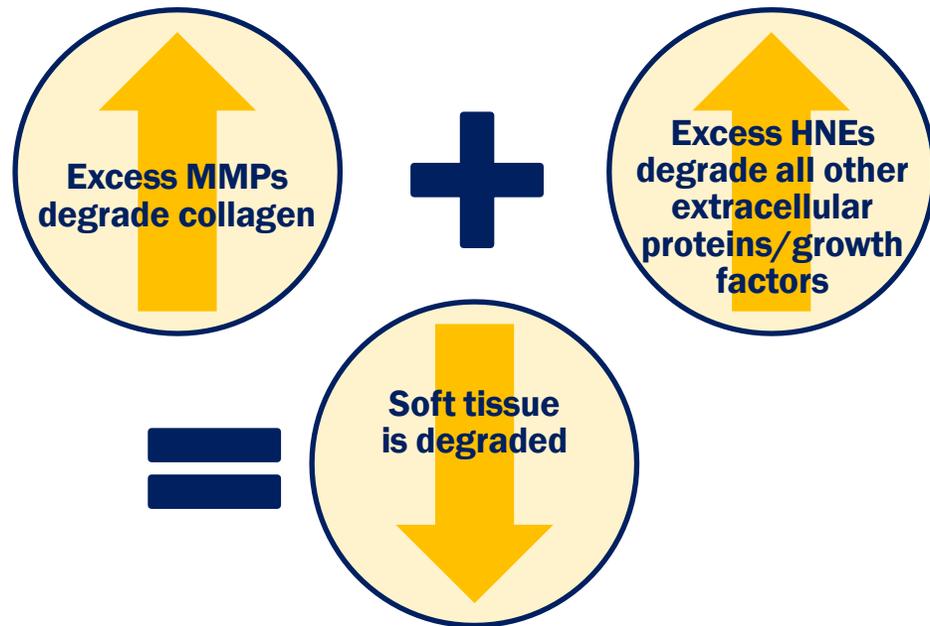
The Wound Environment

- The wound environment plays an important role in the healing process. Exudate, inflammation, protease activity, and bacterial bioburden/biofilms all contribute to non-healing wounds
- Wounds often get stuck in the inflammatory phase due to the underlying health of the patient. Prolonged inflammation can have a profound effect on the wound healing process.
- **Non-healing, stalled, infected wounds may exhibit:**
 - **High levels** of inflammatory cytokines, proteases matrix metalloproteinases (MMPs) and elastase, bioburden/infection
 - **Low levels** of growth factors and cell proliferation

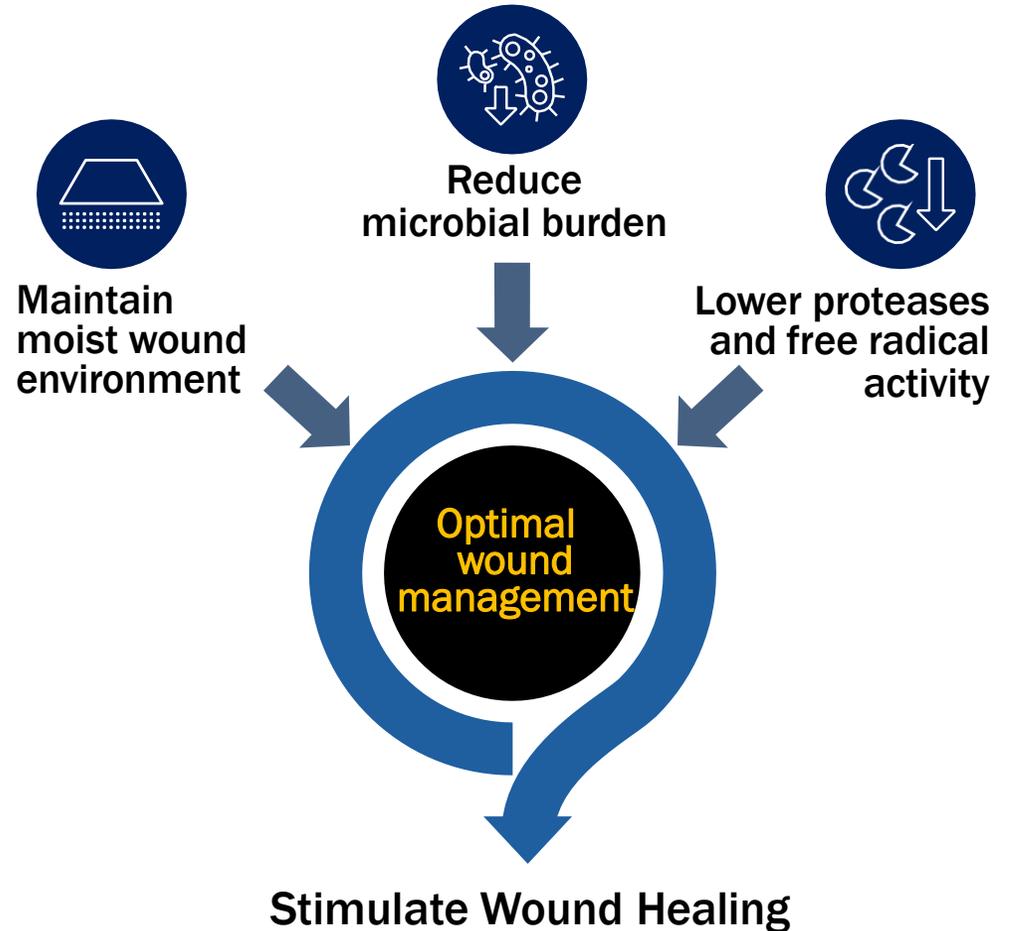


Proteases Prevent Wound Healing

When in balance, proteases contribute to optimal wound healing. In chronic wounds, the activity of MMPs and human neutrophil elastase (HNE) is found to be elevated.



The Best Way to Stimulate Wound Healing



HNE = human neutrophil elastase.

Serena T, Cullen B, Bayliff S, et al. Protease activity levels associated with healing status of chronic wounds. Poster presented at: Wounds UK, Harrogate, 2011.

Why Use Collagen in a Dressing?

Collagen is one of the most abundant proteins in the human body and is a major constituent of skin, bone, tendon, muscle, and cartilage. Collagen has a high tensile strength and plays an important role in tissue repair. Research has shown that collagen has the following properties:

- 1. Can act as a sacrificial substrate for excessive MMPs¹**
Stalled wounds have a high level of MMPs which attack natural collagen and delay healing. Promogran Prisma™ Collagen Matrix with ORC and Silver (collagen with ORC and silver) dressings act as an alternative collagen source, which allows the body's natural collagen to continue normal wound healing.
- 2. Low inflammatory and antigenic response^{2,3}**
Collagen is recognized by the body's own cells and is resistant to bacteria.
- 3. Enhances deposition of new collagen fibers⁴**
Ideal for the deposition of cells (ie, osteoblasts and fibroblasts), a collagen wound dressing can help to guide the orientation of new collagen fibers and capillary growth.
- 4. Substrate for cellular adhesion and migration^{5,6}**
Collagen binds with fibronectin, which stimulates the cells that play a critical role in healing.
- 5. Bioresorbable/biodegradable⁷**
Collagen gets resorbed/ degraded into amino acids, which can be reused by cells to make new proteins.
- 6. Collagen proteins and peptides stimulate cells⁶**
This helps form a network that can support cell adhesion and tissue integrity.
- 7. Chemotactic for neutrophils, macrophages, and fibroblasts⁵**
Collagen encourages important cells to move in the right direction and facilitates healing.

¹Schultz GS, et al. World Wide Wounds. Published Aug. 2005. Accessed Oct. 21, 2025. <http://www.worldwidewounds.com/2005/august/Schultz/Extrace-Matric-Acute-Chronic-Wounds.html> ²Shoshan S. Wound healing. In: Hall DA, Jackson DS, eds. International Review of Connective Tissue Research. 9th ed. New York: Academic Press;1981;1-25. ³Chvapil M, et al. *Int Rev Connect Tissue Res.* 1973;6:1-61. ⁴Pachence JM. *J Biomed Mater Res.* 1996;33(1):35-40. ⁵Postlewaite AE, et al. *Proc Natl Acad Sci USA.* 1978;75(2):871-875. ⁶Mian M, et al. *Int J Tissue React.* 1992;14 Suppl:1-9. ⁷Wagermaier W, Fratzl P. Collagen. In: Moeller M, Matyjaszewski K, eds. *Polymer Science: A Comprehensive Reference.* 1st ed. Elsevier Focal Press Science and Tech. 2012:35-55.

Why Add Oxidized Regenerated Cellulose?

While collagen has been shown in *in vitro* studies to be effective against MMP proteases, it has a limited effect on elastase activity. These studies have demonstrated that the combination of oxidized regenerated cellulose (ORC) and collagen has a greater effect in reducing both MMP and elastase activity than collagen alone.^{1,2}

Cellulose is a major component of all plants. Once oxidized, ORC is completely bioresorbable and readily degrades through fluid absorption and subsequent gelling.³

In vitro studies have demonstrated the potential benefits of ORC¹



Degrades to glucose and glucuronic acid, lowering the pH

- Helps control bacteria
- Bacteriostatic properties



Stimulates cell migration and growth



Scavenges free radicals and bound excess metal ions



Protects growth factors from degradation

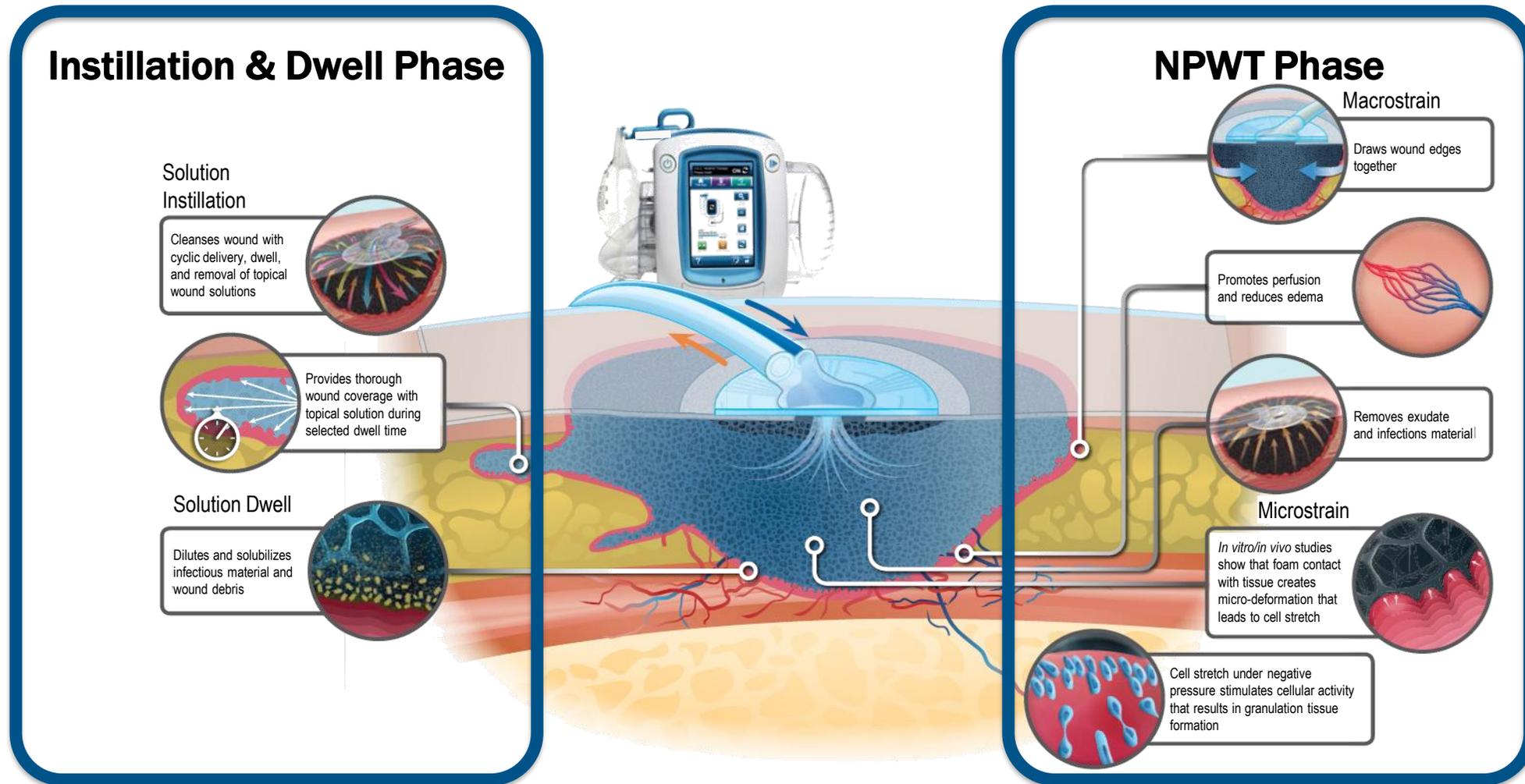


Reduces protease activity levels, specifically elastase

¹Cullen B, et al. *Int J Biochem Cell Biol.* 2002;34(12):1544–1556. ²Gibson M, Cullen B. Can natural materials be adapted to optimize their efficacy in wound care? Poster presented at: SAWC October 16, 2014; Las Vegas, USA.

³Cullen B. Underlying biochemistry in non-healing wounds perpetuates chronicity. *Wounds International.* 2016;7(4):18–24.

NPWTi-d Mechanism of Action



New indication:

Collagen with ORC and silver can now be used in combination with
ActiV.A.C.™ Therapy System (portable NPWT) and its associated foam dressings



Case Summary: Sacral Ulcer

- 70y Male presents with non-healing sacral wound s/p previous flap closure
- Medical history: Paraplegia, multiple sclerosis, HTN
- Treatment
 - Receiving NPWT for wound bed preparation
 - ORC, collagen, and silver dressing initiated with NPWT to assist with healing

Sacral Ulcer (Day 0)



Wound bed prepared with
NPWT



Sacral Ulcer (Day 1)



Collagen with ORC and silver initiated



Sacral Ulcer (Day 3)



Collagen with ORC and silver continued with NPWT

Sacral Ulcer (Day 3)



Collagen with ORC and silver continued with NPWT

Sacral Ulcer (Day 7)



Wound reduced in size
and depth



Case Summary: Diabetic Foot Ulcer

- 48y Male presents with diabetic foot ulcer (DFU) s/p debridement and metatarsal amputation left foot
- Medical history: DM, neuropathy, smoker
- Treatment
 - Receiving NPWT for wound bed preparation
 - Collagen with ORC and silver initiated with NPWT to assist with healing
 - Split-thickness skin graft (STSG) performed after 2 wks of therapy

Diabetic Foot Ulcer (Day 0)



Wound bed prepared with
NPWT



Diabetic Foot Ulcer (Day 7)



Collagen with ORC and silver initiated with NPWT



Diabetic Foot Ulcer (Day 14)



Wound reduced in size
and depth



Diabetic Foot Ulcer (Day 14)



STSG performed with
placental allograft
placement



Diabetic Foot Ulcer (Day 14)



Collagen with ORC and
silver continued with
NPWT



Diabetic Foot Ulcer (4 Wks)



STSG with partial loss.
Wound reduced in size
and depth



Diabetic Foot Ulcer (Day 1, 4 Wks)



Collagen with ORC and
silver continued with NPWT



Case Summary: Multiple Pressure Ulcers

- 49y Male with paraplegia admitted to hospital for multiple pressure ulcers worsening despite wound management and offloading
- Medical history: Paraplegia
- Treatment
 - NPWTi-d initiated with V.A.C. Veraflo Cleanse Choice™ (NPWTi-d dressing)
 - Taken to OR for staged debridement
 - NPWTi-d initiated with NPWTi-d dressing
 - Taken to OR for flap closure with reticular dermal matrix placed as tissue scaffolding for soft tissue replacement
 - Placental allograft placed to optimize healing
 - Incisional NPWT (iNPWT) initiated with a Prevena™ Customizable Dressing (ciNPT) immediately following closure

Case Summary: Multiple Pressure Ulcers

- 49y Male with paraplegia admitted to hospital for multiple pressure ulcers worsening despite wound management and offloading
- Medical history: Paraplegia, worsening nutritional status*
- Treatment
 - Returned to clinic with failed flaps
 - NPWT for wound bed preparation
 - Collagen with ORC and silver initiated with NPWT to assist with healing
 - No additional surgery performed!

Multiple Pressure Ulcers (Day 0)



Left hip ulcer, stage 4 with necrotic debris

Multiple Pressure Ulcers (Day 0)



Right hip ulcer, stage 4

Multiple Pressure Ulcers (Day 0)



Right ischial ulcer, stage 4, treated with NPWTi-d

Multiple Pressure Ulcers (Day 4)



Right ischial ulcer, stage 4



Multiple Pressure Ulcers (Day 4)



Left hip ulcer, stage 4 with necrotic debris reduced

Multiple Pressure Ulcers (Day 4)



Right hip ulcer , stage 4

Multiple Pressure Ulcers (Day 4)



Right ischial ulcer, excised and partial osteotomy performed



Multiple Pressure Ulcers (Day 0)



Left hip ulcer, excised and partial osteotomy performed



Multiple Pressure Ulcers (Day 4)



NPWTi-d continued to reduce bacterial burden

Multiple Pressure Ulcers (Day 7)



Left hip ulcer prepared for flap closure

Multiple Pressure Ulcers (Day 7)



Right ischial ulcer prepared for flap closure

Multiple Pressure Ulcers (Day 7)



Flap mobilized from posterior lateral thigh

Multiple Pressure Ulcers (Day 7)



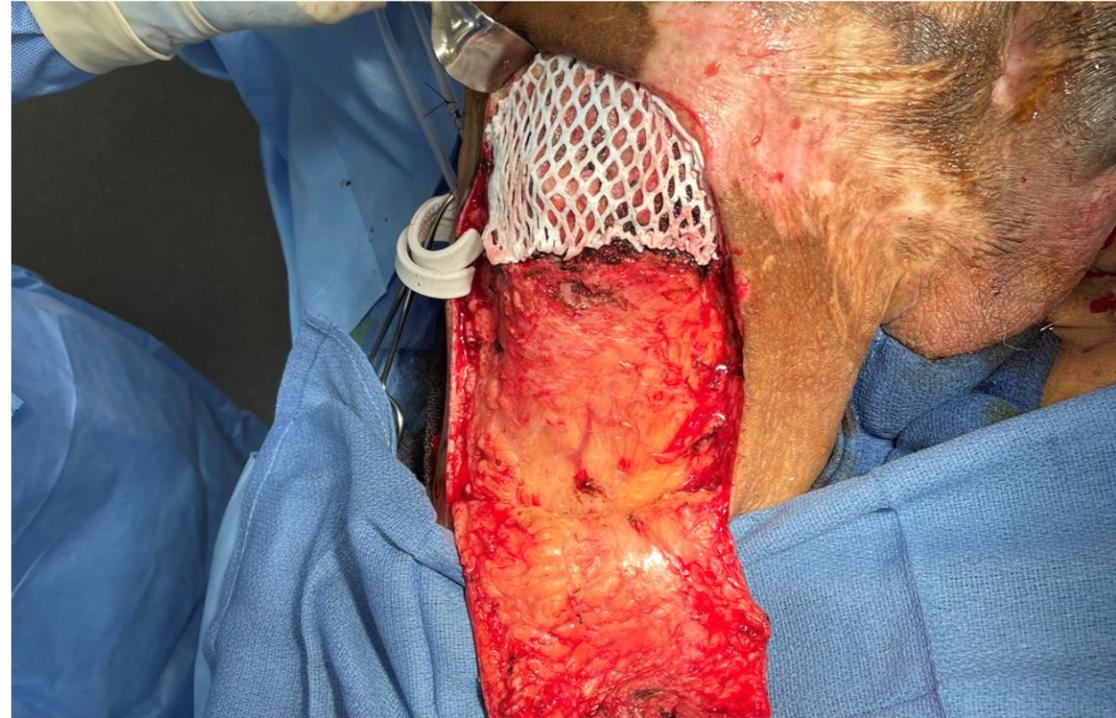
Placental allograft placed over exposed bone

Multiple Pressure Ulcers (Day 7)



Reticular dermal matrix placed as soft tissue scaffolding

Multiple Pressure Ulcers (Day 7)



Reticular dermal matrix placed as soft tissue scaffolding

Multiple Pressure Ulcers (Day 7)



Flaps inset and closure

Multiple Pressure Ulcers (Day 7)



NPWT initiated for incisional management

Multiple Pressure Ulcers (6 Wks, Day 1)



Incisional dehiscence postoperatively treated with NPWT

Multiple Pressure Ulcers (6 Wks, Day 1)



Collagen with ORC and silver initiated

Multiple Pressure Ulcers (6 Wks, Day 1)



Collagen with ORC and silver initiated with NPWT

Multiple Pressure Ulcers (7 Wks, Day 7)



Collagen with ORC and silver continued with NPWT

Multiple Pressure Ulcers (7 Wks, Day 7)



Collagen with ORC and silver continued with NPWT

Multiple Pressure Ulcers (8 Wks, Day 14)



Wound reduced in size and depth

Multiple Pressure Ulcers (8 Wks, Day 14)



Collagen with ORC and silver continued with NPWT

Multiple Pressure Ulcers (12 Wks)



Wound reduced in size and depth

Multiple Pressure Ulcers (16 Wks)



Wound reduced in size and depth

Multiple Pressure Ulcers (16 Wks)



Collagen with ORC and silver with “seven slit” fenestrations

Multiple Pressure Ulcers (17 Wks)



Wound reduced in size and depth

Multiple Pressure Ulcers (17 Wks)

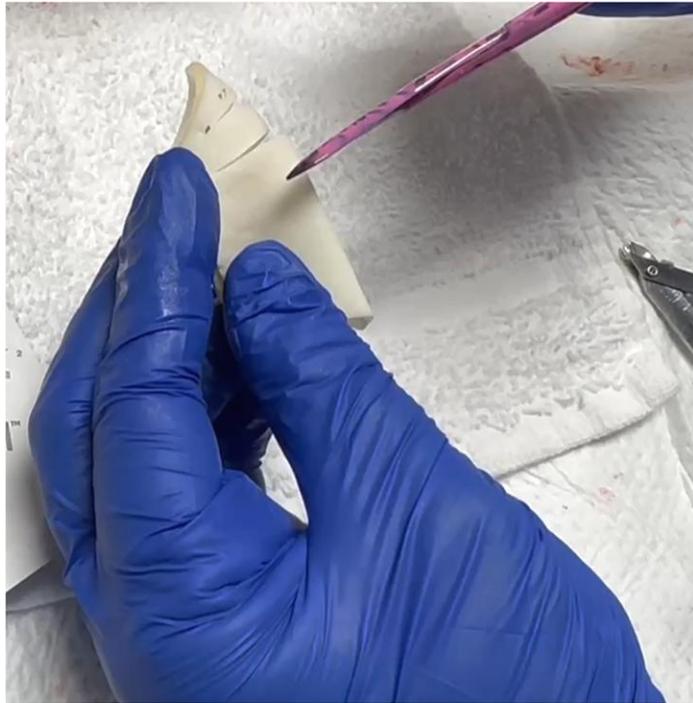


Wound reduced in size and depth



Placental allograft placed to expedite healing

Multiple Pressure Ulcers (17 Wks)



Creating collagen with ORC and silver with “seven slit” fenestrations

Multiple Pressure Ulcers (17 Wks)



Collagen with ORC and silver with “seven slit” fenestrations

Multiple Pressure Ulcers (17 Wks)



Collagen with ORC and silver continued with NPWT

Case Summary: Non-Healing Surgical Wound

- 54y Female s/p laminectomy with postoperative abscess requiring operative debridement and hardware placement. Had recurring infection requiring operative drainage with wound left to heal secondarily.
- Medical history: HTN, RA
- Treatment:
 - Received NPWT for wound bed preparation
 - NPWT continued with peel and place dressing
 - Surgical closure planned, but wound healed without need for surgical intervention

Non-Healing Surgical Wound (Day 1)



Non-Healing Surgical Wound (Day 1)



Non-Healing Surgical Wound (Day 1)



Non-Healing Surgical Wound (Day 1)



Non-Healing Surgical Wound (Day 1)



Non-Healing Surgical Wound (Day 7)



Non-Healing Surgical Wound (Day 14)



Non-Healing Surgical Wound (4 Wks)



Non-Healing Surgical Wound (5 Wks)



$$1+1=10$$

“The price of greatness is responsibility.”

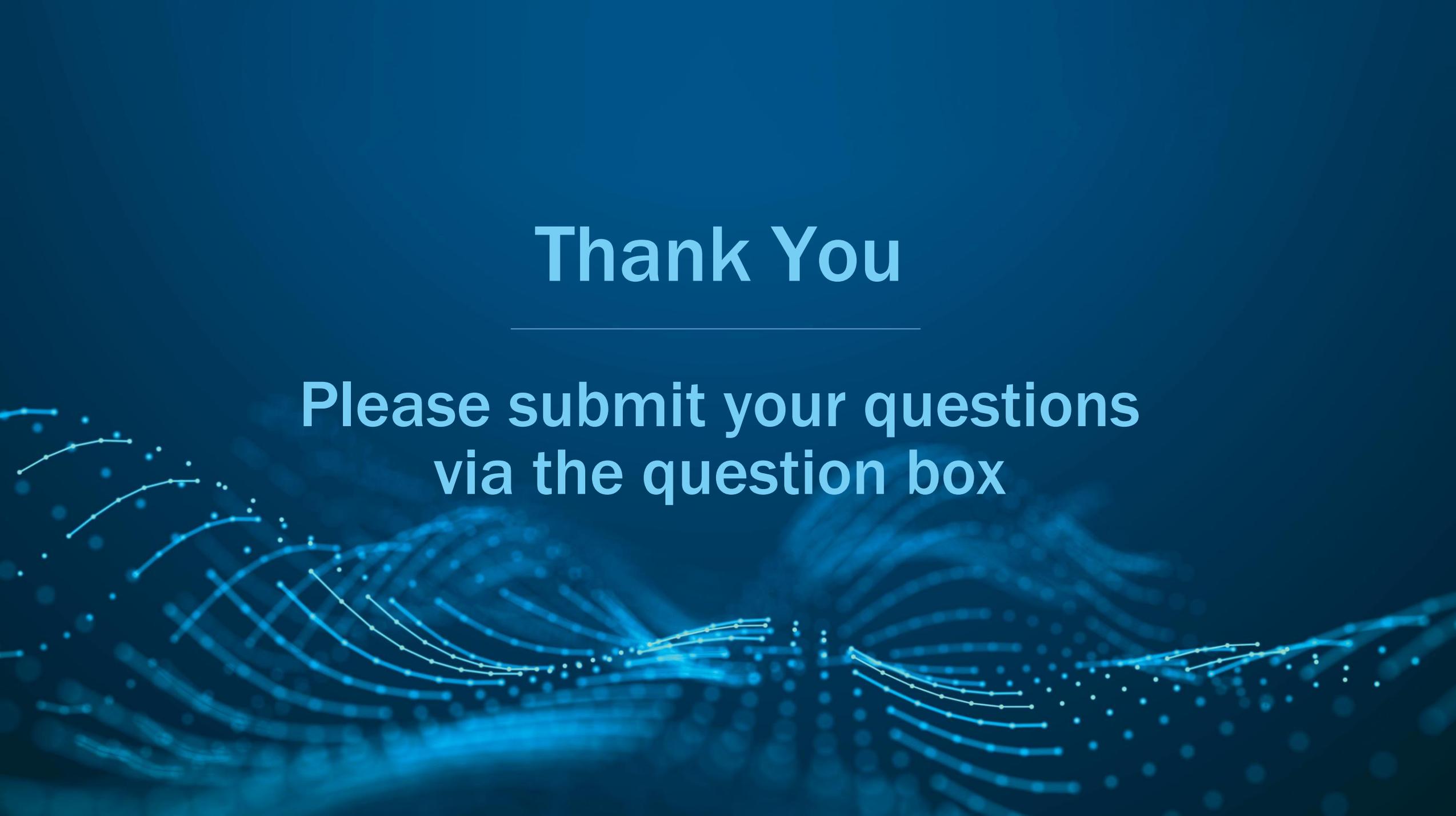
—Winston Churchill

Clinical Pearls

- NPWT is useful for wound bed preparation
- Transitioning to next level of care may include NPWT
- NPWT utilized with ORC collagen and silver may have additional benefits to allow for wound progression
- Bridging therapies across the continuum of care with NPWT may be beneficial and should be considered
- NPWT peel and place dressing may make it easier to provide NPWT to more patients across more care settings, because of the ease of use

Thank You

Please submit your questions
via the question box

The background is a deep blue gradient with abstract, glowing particle trails and lines that create a sense of motion and depth. The lines are composed of small dots connected by thin lines, forming a complex, organic pattern that resembles a network or a data visualization. The overall effect is futuristic and high-tech.