


**Dress for Success**  
Integrated therapies for wound healing in the lymphedema patient

Wound Lecture

May 2, 2019  
Wound Conference  
Denver

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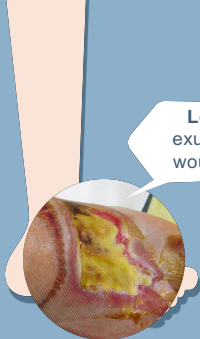
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- Wound tissues are visibly moist, but not wet

**Dressing choice priorities**

- Ability to absorb excess exudate
- Ability to donate moisture if necessary

Low exuding wounds




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- Wound tissues are saturated
- Moisture may or may not be evenly distributed in the wound

**Dressing choice priorities**

- Good ability to absorb and manage varying levels of exudate

Medium exuding wounds




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- Exudate is visibly leaking from tissue, and can be unevenly distributed

**Dressing choice priorities**

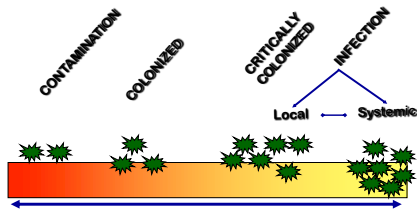
- High absorption
- High retention

Heavy exuding wounds



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## Bacterial Burden – The Infection Continuum

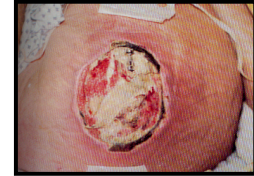


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## Bacterial Burden

- ❖ ↑ metabolic load
- ❖ Produces endotoxins and proteases
- ❖ Stimulates a pro-inflammatory wound environment
- ❖ Wounds don't heal



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## Signs of Infection

- ❖ All open wounds have bacterial on their surfaces
- ❖ The more virulent the bacteria, and the higher the bioburden the more likely the wound will not heal. Wound infection is believed to occur  $\sim 10^6$  bacteria /  $\text{mm}^3$
- ❖ Classic signs of infection
  - Calor - heat
  - Dolor - pain
  - Rubor - redness
  - Tumor - swelling

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## "Secondary Signs and Symptoms" of Bioburden

❖ **Most wounds that get infected show secondary signs prior to developing classic signs of infection. It is very important to identify these early.**

- ❖ Increased pain (very specific)
- ❖ Wound break down (very specific)
- ❖ Increased exudate
- ❖ Foul odor
- ❖ Discoloration of granulation tissue (or change of color)
- ❖ Friable granulation tissue (bleeds easily)
- ❖ Pocketing at the base of the wound (areas in the base of wound fail to granulate)
- ❖ Delayed healing

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### Clinical Pearls

- ❖ Use gentle cleansers (*saline preferred*).
- ❖ Hydrogen Peroxide is cytotoxic to fibroblasts but not bacteriostatic at 1:10 dilution
- ❖ Acetic acid: Fights pseudomonas, cytotoxic to fibroblasts.
- ❖ Betadine is bacteriotoxic but not cytotoxic to fibroblasts at 1:10
- ❖ **Wound Irrigation. Use syringe / blunt cannula -- provide 8-15mm pressure**

TOXICITY INDEX	(WBC, Phagocytosis)
H2O	1
Shur Clens	10
Ivory Soap	1,000
Betadine	10,000
HibacLens	10,000

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### Wound Debridement

#### Why Debride?

- Enhance wound assessment
- Decrease potential for infection
- Necrotic tissue delays formation of granulation and epithelial tissue



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### Wound Debridement Methods

#### Autolytic

- ❖ The process by which the wound bed utilizes phagocytic cells and proteolytic enzymes to remove debris
- ❖ Promoted / enhanced by moist wound environment

#### Clinical Pearl

- ❖ Normally produces white or tan fluids. This can be mistaken for mucopurulent fluid
- ❖ Hydroactive B facilitates autolytic debridement



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### Cutimed Sorbact Hydroactive B

#### Hydrate, Absorb, Debride + Sorbact

- Designed to both absorb exudate and hydrate tissues
- Supports autolytic debridement
- Binds bacteria with Sorbact as the WCL

#### Unique, Absorbent Polymers

- High concentration of salt
- Draws fluid into itself (Osmotic effect)
- Stimulates the body to perfuse fresh fluid into the wound bed
- Absorbs & locks in exudate



Great alternative to medical honey technology

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### Hydropolymer gel matrix

- ❖ All 3 give the combination of hydration and absorption
- ❖ The border is 98% the same as the gel matrix which allows hydration and skin conditioning

**WATER**      **SAP**  
Super-absorbent Polymer

**GLYCEROL**

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### Osmolarity – Wound Fluid vs. Gel Matrix & Honey

Substance	Osmolarity
Wound Fluid	~100
Honey	~3000
Gel Matrix	~4500

**How Does It Work?**

- When the dressing is on a wound, the SAPs act like a dry sponge and soaks up any spare water
- Honey works in a similar way

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### Indications for Hydroactive B

Cutimed Sorbact Hydroactive B is indicated for wounds with low to moderate exudate levels

Venous ulcers	Pressure ulcers
Arterial ulcers	Post-operative dehisced wounds
Diabetic foot ulcers	Traumatic wounds

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### Debridement

**What to Debride?**

- ❖ Slough – moist, yellow, tan or gray non-viable tissue
- ❖ Fibrin
- ❖ Eschar – dry, leathery

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### Wound Debridement Methods

**Sharp**  
Methods

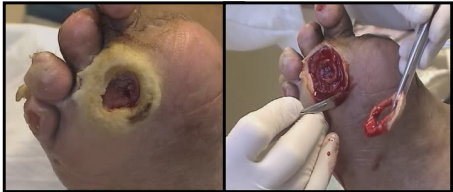
- Scalpel
- Scissor
- Curette

- ❖ Remove thick, adherent eschar
- ❖ Remove devitalized tissue in large ulcers

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### Wound Debridement Methods


**Sharp**



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### Wound Debridement Methods

**Sharp**



**Before**                      **After**

- ❖ Large Bullae should be debrided
- ❖ Smaller blisters can be padded and compressed and often reabsorb

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### Bacterial Biofilms

**Planktonic versus biofilm**

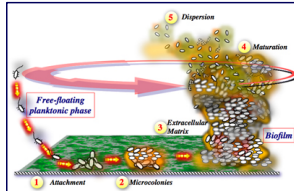
- ❖ Planktonic means single cell organisms
- ❖ All our cultures are set up to culture single cell organisms
- ❖ 99% of all bacteria in nature are in biofilms

**Examples of Biofilms**

- ❖ Plaque that forms on teeth
- ❖ Slime on a rock in a stream
- ❖ Endocarditis
- ❖ Catheter infections
- ❖ Infected mesh or implant
- ❖ Chronic sinusitis (denuded cilia / goblet cells)
- ❖ **Infected wounds!!!**

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## Bacterial Biofilms



- ❖ Collection of microorganisms that develop on surfaces of natural and artificial environments.
- ❖ Characterized by a high number of cells in an Extracellular Polymeric Substance (EPS)
- ❖ Grow on any surface in a aqueous environment
- ❖ Biofilms are thought to cause 50-80% of infections
- ❖ Treatment of biofilm infections costs ~\$1 billion annually

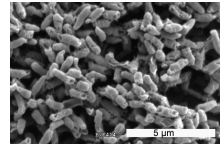
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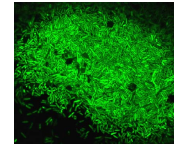
## Bacterial Biofilms

### Extracellular Polymeric Substance (EPS)

- ❖ Bacteria in biofilms can secrete things single cell bacteria cannot
- ❖ Some biofilms develop channels distribute nutrients and signaling molecules
- ❖ Biofilms can prevent macrophage attacks
- ❖ Can increase antibiotic resistance up to 1000 fold



Biofilm de *Pseudomonas fluorescens*  
(Y. Lequette)



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## Bacterial Biofilms

### Persister Cells

- ❖ Biofilms produce a small number of dormant persister cells
- ❖ Number of persisters varies, but can reach as many as 1%
- ❖ Persister cells can 'hibernate' and grow back later
- ❖ Persister cells are thought to contribute to multidrug resistance

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## Bacterial Biofilms

### Bacterial Communication within Biofilms

- ❖ Genetic exchange
- ❖ Electrical impulse exchange
- ❖ Chemical signal molecules (diffuse freely in and out of bacteria)
  - Autoinducers
  - Pheromones

### Quorum Sensing

The ability of a bacterial colony to sense its size and regulate its activity in response

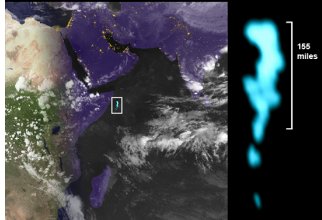
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## Bacterial Biofilms

### Quorum Sensing -- One Powerful Example

Biluminescent bacteria in ocean. This biofilm is slightly larger than the state of Connecticut



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## Bacterial Biofilms

### Quorum Sensing and Pseudomonas

- ❖ *P. Aeruginosa* in planktonic (non-colonized) form are non-toxic
- ❖ As a biofilm *Pseudomonas* is highly toxic and well protected by the polymer gel in which they reside
- ❖ *Pseudomonas* do not become toxic or begin to form polymer gel until the colony is of sufficient size to overwhelm the immune system
- ❖ Before this, *Pseudomonas* cannot be detected by the immune system

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## Bacterial Biofilms

### Treatment of Biofilms and the Future

- ❖ Biofilms start to regrow within as little as 24-48 hours
- ❖ Right now gold standard treatment of biofilms is removal with sharp debridement
- ❖ Research focuses on dispersing agents / compounds to break up the biofilm
- ❖ Bacteriophages may help disrupt biofilms

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## Follow Guidelines to Achieve Better Outcomes at a Lower Cost

- ❖ Strict implementation of a guideline for diagnosis and treatment of venous leg ulcers resulted in improvement in diagnosis, decrease in healing time, and an increase in healing rates, resulting in lower costs
- ❖ US patients were 6.5x more likely to heal if guideline is followed ( $p < 0.001$ )

#### Source

Mc Guire M, Walzman R, Brooker J. Validation of venous leg ulcer guidelines in the United States and United Kingdom. *Am J Surg* 193(2):120-7, 2002


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## The Therapeutic Continuum of Care for Every Patient Journey


**Cutimed®** **JOBST®**

**REMOVE**  
EXUDATE & BACTERIA




Cutimed® Sorbact® Sorbact®  
Superabsorbent Dressing

**REBUILD**  
TISSUE



Cutimed® Dermal®  
Skin Care for Chronic Wounds

**COMPRESS & REDUCE**  
EDEMA




JOBST® PneuMed 2  
Pneumatic Compression  
Dressings

JOBST® Dressing  
Made in USA - Patent Pending

✦ This Continuum of Care approach enhances outcomes by combining therapies and choosing patient-centered devices to optimize results

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Name of document




## Remove Exudate & Bacteria

Exudate and bacteria can impede healing and lead to infection and more serious complications

✦ Reduce bacteria and infection risk by safely and irreversibly binding bacteria, using Cutimed Sorbact®


- Binds bacteria and removes them intact
- Superbugs like MRSA and VRE are more attracted to Sorbact® because of the hydrophobic component
- Sorbion® superabsorber keeps wound bed moist but not wet

**REMOVE**  
EXUDATE & BACTERIA



Cutimed® Sorbact® Sorbact®  
Superabsorbent Dressing

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## Cutimed® Sorbact® is hydrophobic



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## Cutimed® Sorbact® Effectively Binds Bacteria

**Bacteria and fungi binding to Cutimed® Sorbact®**



Magnification x 2,000



Magnification x 15,000

✦ **Naturally safe & effective**

- No known cytotoxicity
- No systemic absorption
- Effective against fungi
- Reduces overall bioburden

✦ **Improves healing**

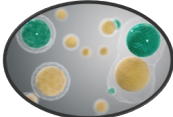
- 40% reduction in healing time

Staphylococcus aureus (yellow), Pseudomonas aeruginosa (purple), Enterococcus faecalis (blue), Klebsiella spec. (green), Candida albicans (orange)

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### Facts about Bacteria



Wound pathogenic bacteria and fungi express **cell surface hydrophobicity**

**Why bacteria need to be hydrophobic**

- ❖ For cell to cell communication (e.g. DNA exchange)
- ❖ To bind to molecules for nutrition
- ❖ To bind to surfaces to "rest"
- ❖ To adhere to host tissue (e.g. in the initial phase of wound infection)
- ❖ For protection against phagocytosis (being digested by cells)

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### Cutimed® Sorbact® Product Assortment

**Super Absorber**



**Foam**



**Supports Autolytic Debridement**



**Packing**



**Post-Op**



**Wound Contact Layers**

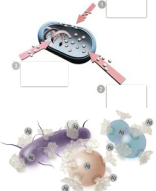


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### Silver vs. Sorbact® - Mode of Action

**Both reduce bioburden, but in different ways:**

- ❖ Sorbact® = Physical MOA
- ❖ Silver = Chemical MOA




**Silver Mode of Action (MOA):**

- ❖ Silver ions break through cell wall
- ❖ Disrupt the respiration of the microbe
- ❖ Attach to the DNA to stop cell replication

**Unlike silver, Sorbact® Technology avoids the risk of:**

- ❖ Cytotoxic reactions
- ❖ Systemic absorption
- ❖ Bacterial resistance


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### What happens to the bound bacteria?


They become **inactivated** = their metabolism slows down, they "take a rest"

They do not continue to replicate as shown in the publication of Ljungh et al.\*

The formation of bacterial toxins also slows or stops completely which supports the wound healing process



\*Using the principle of hydrophobic interaction to bind and remove wound bacteria. Ljungh, Yanagisawa, Wadström; Journal of Wound Care 15 (4), 2006

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### Sorbact vs. Silver – “the pool example”

**Cutimed® Sorbact®**  
Binds and In-activates

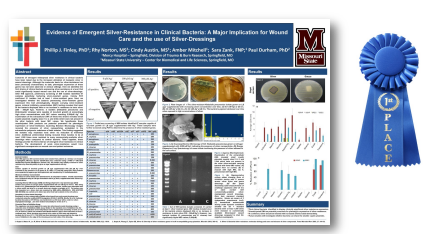
**Silver**  
Kills



**CATCH or KILL?**

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### Finley Silver Resistance Poster



Philip J. Finley, PhD; Paul Durham, PhD; et al. Evidence of Emergent Silver-Resistance in Clinical Bacteria: A Major Implication for Wound Care and the use of Silver Dressings. Presented at SAWC Fall Las Vegas, 2014

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### Finley Silver Resistance : Methods & Results

859 clinically significant bacteria stains were tested and 67 were able to grow in the petri dish supplemented with silver

Tested positive for silver resistant genes

Tested negative for silver resistant genes

	0 $\mu\text{M Ag}^+$	100 $\mu\text{M Ag}^+$	300 $\mu\text{M Ag}^+$
<i>slf</i> -positive			
<i>slf</i> -negative			

Figure 1

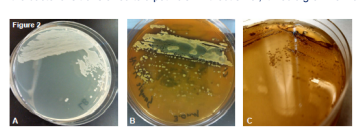
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### Finley Silver Resistance Poster: Methods & Results

**Figure 2A** - shows that the silver-resistant bacteria is growing normally

**Figure 2B** – introduced a high concentration of silver after 24 hours (note: changing color to silver metallic but not preventing growth or killing the bacteria)

**Figure 2C** – after 48 hours, the bacteria is stained to a dark black color but is still viable bacteria. (note: if the bacteria is transferred to a petri dish without silver, it would grow normally again)

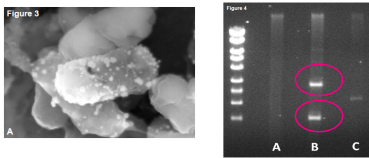


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### Finley Silver Resistance Poster: Methods & Results

**Figure 3A**– Microscopy (*the aha moment*) shows silver (*the white specs*) attached to the surface of the bacteria not inhibiting growth or killing it.  
**Figure 4**– cryptic genes found in the bacteria making them silver –resistant and small enough to be transferred from one bacteria to another



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### Proven Outcomes – Sorbact® Clinical Review

**Proof of Bacteria-Binding<sup>1</sup>**  
 In the first 30 seconds, 1 square centimeter of Cutimed® Sorbact® binds 10<sup>7</sup> wound bacteria - after 2 hours, the amount of bacteria bound are more than would normally be found in an infected wound.

**Even Binds the Superbugs, MRSA<sup>4</sup>**  
 DACCC-coated dressings are effective in the removal of bacteria from wound beds, including MRSA.

**Sorbact® Technology vs. Aquacel Ag<sup>5</sup>**  
 DACCC Technology showed a greater reduction in bacterial load at 73% versus Aquacel Ag with only a reduction of 41%.

**Sorbact® vs. Silver<sup>6</sup>**  
 No signs of infection and improve the healing by 40%.

**Reduces Incidence of SSI<sup>7</sup>**  
 Patients using DACCC coated dressings had a 71% reduction in incidence of surgical site infections.

**Prevents Infection<sup>8</sup>**  
 Equally effective to standard of care in preventing infections.

**Safe and Effective Wound Healing<sup>9</sup>**  
 93% of the wounds improved or healed completely in four weeks.

**Reduces Exudate, Odor and Pain<sup>10</sup>**

- 2 RCTs
- 10+ Peer-Reviewed Articles
- 45+ Case Studies & Posters

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### Cutimed® Sorbact® Uses



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### Cutimed® Sorbact® vs. Aquacel Ag



**Author:** G. Mosti, MD, et al.  
**Published:** Journal of Wound Care Vol 24, No 3, March 2015  
**Methods:** A randomized comparative single center study  
**Experimental:** 40 patients used an antimicrobial dressing for four days — 20 with Sorbact® & 20 with Aquacel® Ag. Then, all patients were taken for a skin grafting session  
**Results:**  
 > Sorbact® showed a greater reduction in bacterial load at 73.1% versus Aquacel® Ag with a reduction of 41.6%.  
 > P value 0.00001

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## Cutimed® Sorbact® vs. Silver Wound Healing



12 Days  
vs. 20 Days

**Author:** A. Corsi

**Published:** Poster presented at SAWC 2012

**Methods:** Case study; pts. observed until wound healed, or total time of 4 months

**Experimental:** 80 pts. - 40 chronic lesions/ 40 acute trauma

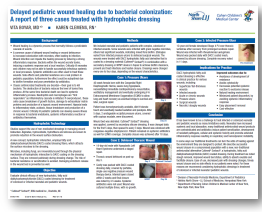
- ½ in silver group, ½ in Sorbact group

**Results:** Silver - 12 / 38 pts. (2 drop-outs) developed signs of infection

- Average healing time = 20 days
- Sorbact - 0 complications due to infection
- Average healing time = 12 days

Comparison of a novel non-medicated bacteria-binding dressing to silver dressings in the management of acute and chronic skin lesions. **Author:** Corsi, A. **Abstract:** Objectives: Comparison of Cutimed® Sorbact® (non-medicated bacteria-binding dressing) and silver dressings in the management of acute and chronic skin lesions. **Methods:** Case study; patients observed until wound healed, or total time of 4 months. **Experimental:** 80 patients (40 chronic lesions, 40 acute trauma). **Results:** Silver - 12/38 patients (2 drop-outs) developed signs of infection. **Conclusions:** Cutimed® Sorbact® showed a faster healing time (12 days) compared to silver dressings (20 days) and no complications due to infection. **Keywords:** Cutimed® Sorbact®, silver dressings, acute and chronic skin lesions, wound healing.

## Cutimed® Sorbact® – Safe on Newborns



2 neonates & 1 child – infected pressure ulcers and a dehisced thoracic wound

**Case 1: Infected Pressure Ulcer**

10-year-old female developed Stage 4 PU over thoracic vertebrae after recovery from prolonged scoliosis repair. Wound was infected with *Pseudomonas aeruginosa*. Wound was packed daily with DACC coated mesh, covered by silicone dressing. Complete recovery noted in 11 days.

**Case 2: Dehisced Thoracic Wound**

14-day-old male with Hypoplastic Left Heart Syndrome underwent a staged repair. Thoracic wound dehiscence on post-op day 3. Cavity was packed with DACC coated dressing daily, covered by portable, single-side negative pressure wound therapy device. Internal layers closed within 2 weeks and final closure was noted by 3.5 weeks. Systemic antibiotics were not used. Wound was cultured multiple times, with no growth.

Delayed pediatric wound healing due to bacterial colonization: A report of three cases treated with hydrophobic dressing. **Author:** Villa Reyes, S. **Abstract:** Objectives: To report on three cases of delayed pediatric wound healing due to bacterial colonization treated with hydrophobic dressing. **Methods:** Case study. **Results:** Two neonates and one child with infected pressure ulcers and a dehisced thoracic wound. **Conclusions:** Hydrophobic dressings are safe and effective for treating colonized or infected pediatric wounds. **Keywords:** Cutimed® Sorbact®, hydrophobic dressing, pediatric wounds, bacterial colonization.

## Cutimed® Sorbact® – Safe on Newborns




**Improved outcomes due to:**

- ❖ Avoidance of development of resistance
- ❖ Avoids cytotoxicity
- ❖ Decreases potential systemic reaction to exotoxins release
- ❖ Natural healing environment
- ❖ Minimized patient discomfort, by avoiding systemic inflammatory response
- ❖ Easy placement / removal

Delayed pediatric wound healing due to bacterial colonization: A report of three cases treated with hydrophobic dressing. **Author:** Villa Reyes, S. **Abstract:** Objectives: To report on three cases of delayed pediatric wound healing due to bacterial colonization treated with hydrophobic dressing. **Methods:** Case study. **Results:** Two neonates and one child with infected pressure ulcers and a dehisced thoracic wound. **Conclusions:** Hydrophobic dressings are safe and effective for treating colonized or infected pediatric wounds. **Keywords:** Cutimed® Sorbact®, hydrophobic dressing, pediatric wounds, bacterial colonization.

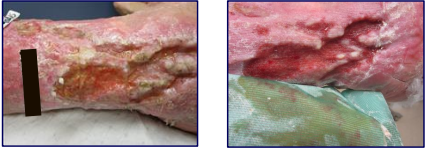
## Cutimed® Sorbact® – Safe on Newborns



**“During treatment, we noted slough removal, improved wound bed status, ability to absorb exudate and facilitate closure. Ease of use, decreased pain with dressing changes, timely wound closure and no side effects in our patients were noted”**

**“For these reasons we recommend considering hydrophobic dressings in treatment of colonized or infected neonatal / pediatric wounds”**


Delayed pediatric wound healing due to bacterial colonization: A report of three cases treated with hydrophobic dressing. **Author:** Villa Reyes, S. **Abstract:** Objectives: To report on three cases of delayed pediatric wound healing due to bacterial colonization treated with hydrophobic dressing. **Methods:** Case study. **Results:** Two neonates and one child with infected pressure ulcers and a dehisced thoracic wound. **Conclusions:** Hydrophobic dressings are safe and effective for treating colonized or infected pediatric wounds. **Keywords:** Cutimed® Sorbact®, hydrophobic dressing, pediatric wounds, bacterial colonization.



Wound the day Cutimed Siltec Sorbact applied

Removal...NO pooling all drainage in the dressing, and look How clean wounds are!!

\*Case courtesy of Dot Weir

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### Use of Sorbact® Technology



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Day 1

Day 7

\*Case courtesy of Dot Weir

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### Medial Left Leg 1- and 4-Week Follow-up

\*Case courtesy of Jim McGuire, DPM

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### Stem Cell Graft, Sorbact, Siltec Foam

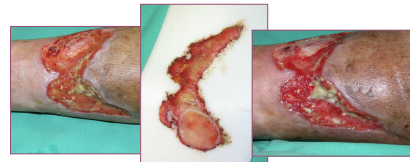


NOTE: Precise vertical absorption and protected margins!

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### Clinical Experience



**Vertical absorption:**  
exudate in the dressing  
follows the shape of the  
wound exactly

Improvement within 24hrs

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### Trauma Injury – 8 days and 2 dressing changes



Homeless diabetic patient with chronic ulcer from trauma, in extreme pain.

Almost complete resolution of pain with just two dressing changes.

\*Case courtesy of Julia Overstreet DPM

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### Surgical Complications Associated with Presence of Edema

- ❖ Mechanical forces pull wound edges apart
- ❖ Impaired wound healing
- ❖ Increased risk of infection
- ❖ Increased risk of deep venous thrombosis (DVT)

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### Cutimed® Sorbact® – Helps Reduce SSI's

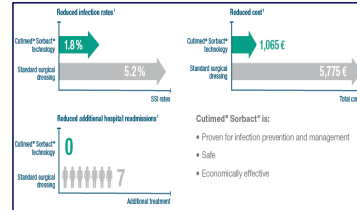


**Author:** Pawel Jan Stanirowski, et al.  
**Published:** SURGICAL INFECTIONS July 2016  
**Methods:** Single-center, Randomized Control Trial  
**Experimental:** 543 women undergoing elective or emergency cesarean section (CS) were enrolled and randomly allocated to receive either Sorbact® dressing or standard surgical dressing (SSD) following skin closure.

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### Stanirowski Results – Reduction of SSIs

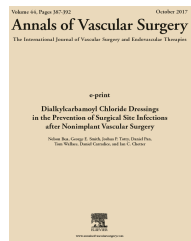


- ❖ Sorbact patients had a 65% reduction in incidence of surgical site infections
- ❖ P value = 0.04
- ❖ No additional readmissions (7 with standard dressing!)

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### Sorbact Technology and Prevention of SSI

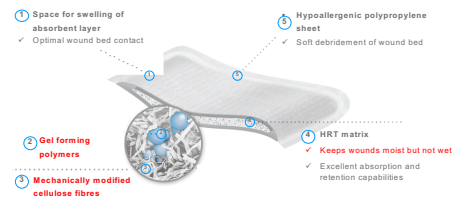


**Author:** Nelson Bua, et al.  
**Title:** Dialkylcarbamoyl Chloride Dressings in the Prevention of Surgical Site Infections after Nonimplant Vascular surgery  
**Published:** Annals of Vascular Surgery October 2017  
**Methods:** Non- Randomized Prospective Single Center Comparative Study  
**Experimental:** Two hundred patients undergoing nonimplant vascular surgery were recruited at a single vascular center. 100 patients received a SSD & 100 patients received Leukomed Sorbact. Wounds were assessed at day 5 and day 30 to determine the presence of an SSI  
**Results:** Leukomed Sorbact was associated with a significant reduction in SSI rates in the early postoperative period versus the SSD group: 1% vs.10% P<0.05

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### Cutimed Sorbion – Superabsorber

Hydration Response Technology (HRT) keeps wound bed moist but not wet:  
 • Dressing core consists of mechanically modified cellulose fibers and gel-forming, superabsorbent polymers



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### Cutimed Sorbion Comes in Many Useful Shapes

**CUTIMED® SORBION® SACHET XL**  
 Super-absorbent wound dressing for large difficult-to-dress wounds




**CUTIMED® SORBION® SACHET S DRAINAGE**  
 Super-absorbent wound dressing in a slit design




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### Cutimed Sorbion Comes in Many Useful Shapes

**CUTIMED® SORBION® SACHET MULTI STAR**  
 Super-absorbent wound dressing in a flexible form







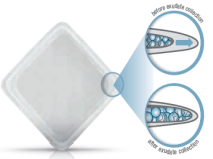


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### Cutimed Sorbion Performance Properties In Detail

#### Edge Expansion

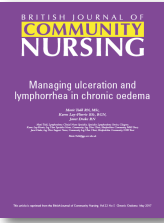
**CUTIMED® SORBION® EXPANSION EDGE**




- Cutimed® Sorbion® expands flatly thanks to the expansion edge
- No cushion formation
- Not bulky under clothing
- Excellent performance under compression
- Maximum contact with the wound bed
- Maintenance of a moist wound environment


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### JOBST® FarrowWrap® & Cutimed Sorbion Sachet



- 65 y/o w bilateral lymphedema, lymphorrhea, and large areas of excoriation. Unsuccessfully managed with bandaging and hosiery
- Changed to Sorbion superabsorber and FarrowWrap with 2-3x/wk dressing changes. Wounds healed in 1 month
- Able to adjust the FarrowWrap and manage himself independently with no leakage or slippage, and less pain

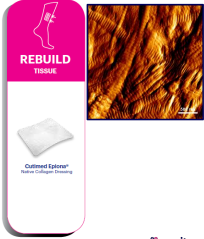


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### Rebuild Tissue

Epiona demonstrates 7x more pronounced fibroblast cell growth supporting the formation of new granulation tissue

- Cutimed® Epiona is a native bovine collagen 3D scaffold. Epiona is developed with the same microstructure as the intact collagen network of human skin, allowing it to capture and bind excessive proteases and MMPs to help protect the growth factors that stimulate healing
  - Better binding capacity of MMP2 and MMP9 over ovine ECM dressing
  - More pronounced fibroblast cell growth
  - Better protection of growth factors
  - Fenestrated



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### Cutimed Epiona – Product Overview

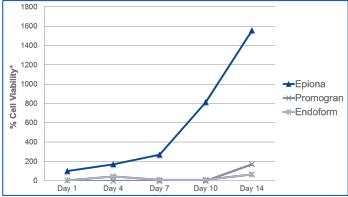
- Wound dressing for local interactive wound treatment
- 90% pure collagen (Collagen Type I, III and V), 10% calcium alginate
- Native collagen fibers, three-dimensional open porous matrix
- Bovine-derived collagen
- Fenestrated



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### Cutimed Epiona™ - Supports Fibroblast Cell Ingrowth

**Epiona showed faster, more pronounced fibroblast cell ingrowth.**




Day	Epiona	Promogran	Endoform
Day 1	~100	~100	~100
Day 4	~150	~100	~100
Day 7	~250	~100	~100
Day 10	~800	~100	~100
Day 14	~1500	~100	~100

\*As measured by MTT Assay. Cell viability on Cutimed® Epiona on Day 1 is considered 100%. Average value of 30000 Mean (Standard Deviation)

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### Non-Healing TMA → Complete healing in 30 days!!



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## Compress & Reduce Edema

◆ Treatment options:

- Multilayer bandaging
- 2-Layer ulcer stockings
- Circular-knit ready-to-wear (RTW) stockings
- Custom, circular-knit garments
- Custom, flat-knit garments
- Velcro wrap systems
- Night time garments

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## Our Ambition: Improving Outcomes

Essity combination wound care and compression therapy for VLU treatment demonstrated 85% improvement in 12 weeks, with 53% healed

\*Hobdell et al. 2009, Journal 2012, pages 10-22, Volume 17(6), October 2012.

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## Summary of Dressing Selection

	Dry	Hydroactive B, Hydrogel
	Light to Moderate	Siltec Foam
	Heavy	Sorbion

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## Summary of BSN Integrated Therapy Solutions

- 1. Phase I – CDT**
  - a. Comprilan
  - b. Compri2
  - c. FarrowWrap
- 2. Phase II Maintenance**
  - a. Circular Knit
  - b. Flat Knit
  - c. FarrowWrap
  - d. Jovi Pak or Relax for night time
- 3. Advanced Wound Care**
  - a. Sorbact dressing platform
  - b. Sorbion superabsorber
  - c. Full product line for wound care

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Decisive implementation is key!



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THANK YOU!

Questions?

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