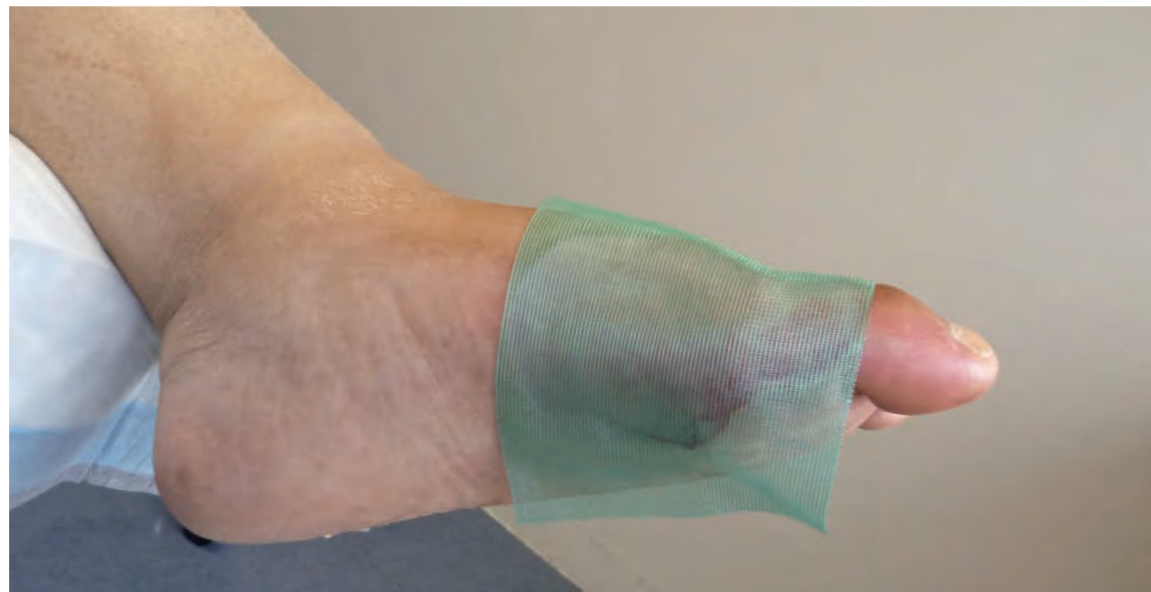


## **Treatment of severe burn wound using unique bacteria-binding dressing with a fatty acid contact layer**

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### Introduction

According to the American Burn Association, the number of burn injuries receiving medical treatment in 2010 totaled 450,000 cases, 45,000 hospitalizations and 3,500 deaths in the United States alone. Sixty-six percent of all burn wounds are sustained at home, 10% at work, 8% on the street/highway, and 16% in other locations. (Reference: American Burn Association 2011 fact sheet. [www.ameriburn.org](http://www.ameriburn.org))

In a wound care center, it is fairly common to see insensate (numb) foot wounds from diabetic peripheral neuropathy. Accidental burn injuries caused by bathing, cooking or using heating pads, are often encountered in our patient population with deeper or more severe burns often seen in diabetic patients with neuropathy, as these patients may not detect painful stimuli from the heat sources.

### Examples of burn wounds seen in our wound care center



#### Example 1

Third-degree burn from hot water while cooking



#### Example 2

Third-degree burn from hot shower



#### Example 3

Third-degree burn from a heating pad

Traditionally, burn wounds are categorized in four stages based on the depth of the injury, much like pressure ulcer staging:

1. First-degree burn: injury of the epidermis, presents with mild erythema and edema, commonly seen in sunburns. Self-limiting and requires little medical care.
2. Second-degree burn: injury of the dermis, presents with blistering of skin, and often associated with pain. Second-degree burns are sometimes divided into “superficial” and “deep” second-degree, based on the presentation of the wound base and the depth of injury within the dermis.
3. Third-degree burn: injury extending into the subcutaneous tissue, defined by blistering and loss of full-thickness skin, with the formation of pseudo-eschar (yellow-to-white rubbery or leather-like tissue). The wound is often painless due to the damage to the cutaneous nerves. Pseudo-eschar is a non-viable tissue, and it needs to be excised or debrided for the burn wound to heal appropriately. Third-degree burn wounds are often treated using autologous skin grafts to replace the loss of full-thickness skin after the surgical excision of damaged tissue (escharotomy).
4. Fourth-degree burn: injury into underlying muscle and bone, the most severe, often requiring extensive surgical intervention or amputation.

The American Burn Association has also devised a classification system to aid in decision-making and triage. The severe burn wounds described below should be immediately referred to a burn center.

#### Burn unit referral criteria

**A burn unit may treat adults or children or both. Burn injuries that should be referred to a burn unit include the following:**

1. Partial thickness burns greater than 10% total body surface area (TBSA)
2. Burns that involve the face, hands, feet, genitalia, perineum, or major joints
3. Third-degree burns in any age group
4. Electrical burns, including lightning injury
5. Chemical burns
6. Inhalation injury
7. Burn injury in patients with preexisting medical disorders that could complicate management, prolong recovery, or affect mortality
8. Any patients with burns and concomitant trauma (such as fractures) in which the burn injury poses the greatest risk of morbidity or mortality. In such cases, if the trauma poses the greater immediate risk, the patient may be initially stabilized in a trauma center before being transferred to a burn unit. Physician judgment will be necessary in such situations and should be in concert with the regional medical control plan and triage protocols.
9. Burned children in hospitals without qualified personnel or equipment for the care of children
10. Burn injury in patients who will require special social, emotional, or long-term rehabilitative intervention

*Excerpted from Guidelines for the Operations of Burn Units (pp. 55-62), Resources for Optimal Care of the Injured Patient: 1999, Committee on Trauma, American College of Surgeons.*

#### Case Presentation

Presented here is a severe burn wound case in a neuropathic diabetic patient, successfully treated on an outpatient basis during weekly local wound care visits, using a combination of Cutimed® Sorbact® WCL (Wound Contact Layer) and Comprifore multi-layer compression wraps. No skin grafts or skin substitutes were used in treating this case.

Cutimed® Sorbact® WCL is a unique bacteria-binding dressing coated with DACC (Dialkylcarbamoylechloride), a fatty acid derivative that is highly hydrophobic. When the outer membranes and cell walls of pathogenic microbes, which are also hydrophobic, come in contact with DACC, the microbes become physically bound to the dressing, unable to reproduce, and are removed with each dressing change, which helps reduce the risk of wound infection. As DACC is a fatty acid derivative, it is not an anti-septic, antibiotic, or silver-containing product, and has not been linked to any development of resistant bacteria strain or allergic reaction to a particular chemical or metal.

#### Patient history

Female, 48 years old, with long-standing history of diabetes mellitus type 2 and peripheral neuropathy, presented with large blisters to the left foot, after taking a hot shower that “may have been too hot.” Other co-morbidities include: Diabetic nephropathy, dyslipidemia, hypertension and recent history of CVA (stroke) two years prior, with foot drop and bilateral leg edema.

#### Physical exam

Well-developed, morbidly obese female. Lower extremity exam: +2 pitting edema of bilateral lower extremities, palpable popliteal pulses on both legs and Dopplerable posterior tibial and dorsalis pedis arteries, bilaterally. ABI was 0.9 with minimally obstructed tibial waveforms.

### Treatment history



#### Day 1 (initial visit)

The patient presented with a left foot burn wound with a large blister, filled with serosanguineous fluid. The blister was deroofed and debrided. The wound base was also sharply debrided with #10 scalpel, followed by saline irrigation using 35kHz ultrasound device (Quostic system by Arobella Medical) for 5 minutes. Once debrided, the wound base was observed as covered with moist pink-to-red granular tissue with a central area of yellow leathery tissue. This wound was diagnosed as a combination of deep second-degree and third-degree burns. The patient experienced no pain, as she is profoundly neuropathic from diabetes. The wound dressing at this visit consisted of Cutimed® Sorbact® WCL, followed by an ABD pad and Comprifore multi-layer compression wraps for edema reduction.



#### Day 6 and Day 11

The wound was sharply debrided with a #10 scalpel, followed by 35 kHz ultrasound saline irrigation treatment. The wound size diminished slightly around the edges, and a progressive demarcation of the central area with pseudo-eschar was observed. The wound dressing consisted of the same regimen: Cutimed® Sorbact® WCL, ABD pad, and Comprifore multi-layer compression wraps.



#### Day 15, 19 and 26

The wound was again debrided sharply and treated with 35 kHz ultrasound saline irrigation. The wound size had reduced dramatically as the second-degree burn wound in the peripheral area had healed completely by this time. Treatment with Cutimed® Sorbact® WCL, ABD pad, and Comprifore multi-layer compression wrap continued.



#### Day 29, 34 and 39

The pseudo-eschar was sharply debrided using a #10 blade and disposable 4mm curette. The wound was also irrigated and treated with 35 kHz ultrasound. Gradual reduction of wound size and depth was noted. The same treatment regimen was applied during each of these visits.



#### Day 46, 54 and 75

The foot wound continued to improve in size and depth under the same treatment regimen. The wound was completely healed on day 46 and treatment was discontinued. The patient was seen 3 weeks later for a follow-up visit, and the foot wound maintained skin integrity with minimal scar.



### Discussion

Despite this patient's multiple co-morbidities, we were able to treat this burn wound successfully in 8 weeks, without any incident of wound infection. Autologous skin grafts and skin substitutes were discussed with the patient, but the patient deferred skin grafting based on the fact that the wound was progressing nicely at each weekly visit.

This case study illustrates that the combination of Cutimed® Sorbact® WCL and Comprifore multi-layer compression wraps can be very effective in successfully treating some severe burn wounds.

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