

SAWC POSTER COMPENDIUM: AQUACEL[®] EXTRA[™] HYDROFIBER[®] DRESSING, A NOVEL CMC DRESSING



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Advanced wound dressings have been around since the last mid-century, yet many clinicians continue to select the same dressings that have been used for hundreds of years. Educating clinicians about factors such as the importance of moisture balance and the control of bacterial bioburden are essential if they are to make good choices for their patients. Modern dressings are sophisticated biomaterials designed to perform specific (sometimes multiple) functions of wound bed preparation to actually *facilitate healing*. The key to finding the right dressing is not determined by whether the wound is of a particular TYPE (e.g., stasis ulcer versus pressure ulcer) but the characteristics of that particular wound at any given time. We ask ourselves, “What does this wound need?” and then we ask, “What product can provide that?”

Today’s clinicians are looking for data that not only show the safety and efficacy of a product, but its effectiveness among real world patients. There is increasing pressure to understand whether a product is also *cost-effective* when treating even the hardest to heal wounds.

ConvaTec, maker of the leading primary wound dressing* in the United States, AQUACEL[®], has taken the company’s 15 years of evidence and experience in the wound care market, partnered with industry leaders, and developed the latest innovation in its AQUACEL[®] family of products — AQUACEL[®] EXTRA[™] wound dressing.

For those of us who trust and use AQUACEL[®] dressings that incorporate the only Hydrofiber[®] Technology on the market today, the performance and outcomes of these wound dressings will confirm what we have already learned from experience. This supplement is full of information about the latest addition to the product line, AQUACEL[®] EXTRA[™] dressing. In a time of increased pricing pressure, it is good to know that companies such as ConvaTec are working to improve product efficiency to help us better care for patients.

Read on to learn more about the clinical results achieved with AQUACEL[®] EXTRA[™] wound dressing.

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*Based on HPIS Q1 2012 data on alginate market.

The compendium is a selection of seven posters that were presented at the Symposium on Advanced Wound Care and Wound Healing Society (SAWC/WHS) Spring 2012. These posters focused on the AQUACEL® EXTRA™ dressing were first introduced at this meeting. This novel CMC dressing builds on the 15-year clinical heritage and evidence behind the AQUACEL® family of wound dressings.

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Design and Development of a New Carboxymethylcellulose Dressing

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Introduction

A new Carboxymethylcellulose dressing* has been designed to improve key performance parameters of an established CMC dressing†, specifically fluid absorption and retention levels, and hydrated tensile strength.¹

Dressing Design

The dressing comprises two layers of optimized Hydrofiber® material for increased fluid management stitch-bonded with Tencel™ regenerated cellulose yarns for increased hydrated tensile strength.

Materials and Methods

Fluid absorption was tested *in vitro* by hydrating the dressing and calculating the fluid absorbed (Figure 3).

Hydrated tensile strength was measured *in vitro* using a Zwick Universal Testing Machine. The dressing was hydrated with 2 ml of physiological saline solution (sodium chloride calcium chloride BP solution) before testing (Figure 4).

Results

In vitro testing on the new CMC dressing compared to the established CMC dressing predicts statistically significant improvement in fluid management (absorption $P < 0.05$).

The addition of strengthening fibers shows a noteworthy improvement on hydrated tensile strength ($P < 0.05$).

Conclusion

- Absorbency on the new CMC dressing has been increased by 39% compared to the established CMC dressing, as demonstrated *in vitro*. Increased-absorbency dressings are predicted to have longer wear time and the ability to manage moderately to heavily exuding wounds more efficiently.
- Hydrated tensile strength on the new CMC dressing has been increased 9 times compared to the established CMC dressing *in vitro*. Increased-tensile-strength dressings are predicted to provide integral dressing removal, which assists in both patient comfort and clinical time.

Reference

1. WHRI3461 TA214 Rev.1. Preliminary Assessment of the Physical Properties of AQUACEL® EXTRA™ AND AQUACEL® Dressings

Product Notation

* New CMC dressing is AQUACEL® EXTRA™

† Established CMC dressing is AQUACEL®

Tencel is a trademark of Lenzing Aktiengesellschaft

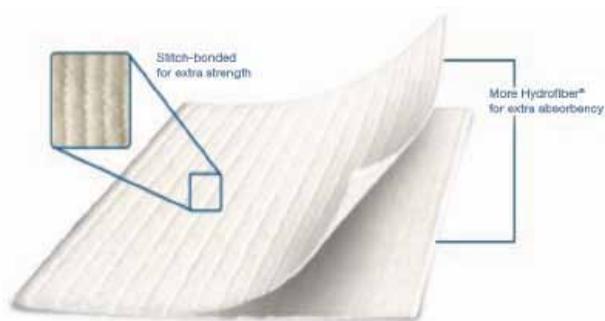


Figure 1. New CMC dressing construction

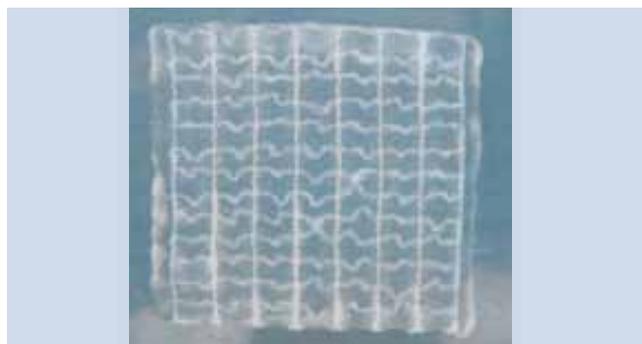


Figure 2. New CMC dressing, hydrated

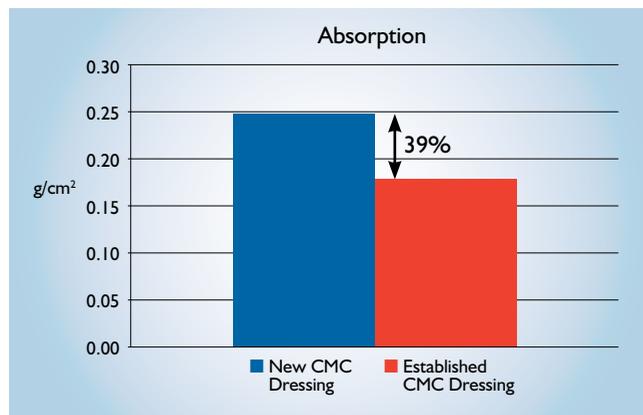


Figure 3

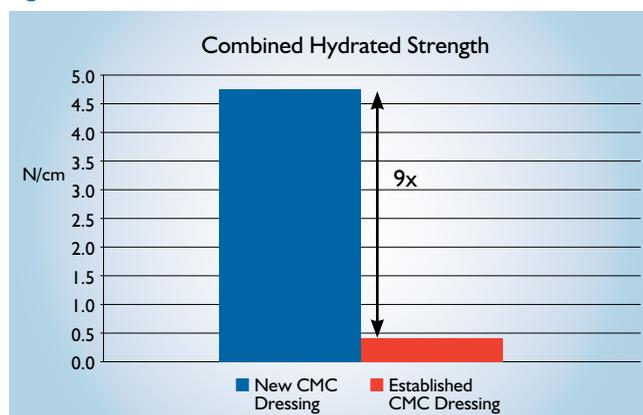


Figure 4

Carboxymethylcellulose Dressing With Strengthening Fibers: An Old Friend With a New Look

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Statement of Clinical Problem

Choosing the right product for the management of chronic non-healing, exuding wounds is challenging. An alternative option is now available.

Description of Past Management

Eight wounds with the etiology stemming from Charcot disease, diabetic neuropathy, chronic venous hypertension, and necrotizing fasciitis were treated with a wide range of modalities and products. The patients were managed with standard wound care ranging from ultrasonic debridement, use of CMC dressing with silver, silver alginates, collagen matrix dressings, and various others.

Current Clinical Approach

All patients were managed with carboxymethylcellulose dressing with strengthening fibers (CMC-SF) and received either a 1-, 2-, 3-, or 4-layer compression wrap. Each wound was cleansed with PCMX (detergent) sponge and tepid water followed by CMC-SF, a cover dressing and compression wrap. Two of the 8 necessitated the changing of twice a week due to heavily exuding wounds.

Patient Outcomes

Three out of the 8 wounds were healed, 1 showed slow progress, 2 were changed to a silver dressing due to contamination, and 2 were stalled but continued on the therapy for exudate management. Of the 5 patients who were not yet healed, it was found that they shared some form of noncompliance, e.g., poor diabetic management, tampering with dressing and smoking. Of the 3 wounds that healed, all had good diabetic control and compliance with appointments and no tampering with the dressings.

Conclusions

CMC-SF combined with compression therapy and patient compliance with diabetic management and wound care therapy, is a viable choice for non-healing wounds. The limitations are that it may not be the best choice for heavily contaminated or infected wounds because the dressing does not contain silver.

Case 1

A 45-year-old woman reported to the emergency department with left foot swelling, and discoloration that was diagnosed as necrotizing fasciitis. The wound was debrided followed by a series of hyperbaric therapy sessions. The 4th toe was amputated 5 months after her admission. Multiple ultrasonic debridements were done and negative pressure wound



Case 1, Figures 1A and 1B. On Day 1 of the new protocol, the most distal wound measured 5.0 x 2.3 x 0.1 cm, and the proximal wound measured 4.9 x 2.5 x 0.1 cm. Carboxymethylcellulose dressing with strengthening fibers (CMC-SF) was applied.



Case 1, Figure 2. Day 45: The distal wound was healed 1 week later.

therapy was used. The wound was covered with a split thickness skin graft 8 months after she was first seen. A new wound care protocol including CMC-SF was initiated 11 months after she was first seen (Case 1, Figures 1A–2).



Case 2, Figures 3A and 3B. Day 1 of the new protocol: the right medial ankle ulcer measured 8.5 x 5.5 x 0.2 cm. The left lateral ankle ulcer measured 1 cm diameter; it healed 1 week later.

Case 2

A 45-year old male with hypertension and a 5-year history of venous status ulcers presented. He was obese and presented with bilateral leg/ankle ulcers. He was most recently managed with a silver dressing and an Unna boot (Case 2, Figures 3A–4).



Case 2, Figure 4. Day 33: Right medial ulcer healed.

An Evaluation of a Carboxymethylcellulose Dressing With Strengthening Fibers*

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Introduction

The objective of this evaluation was to assess the effectiveness and benefits of this carboxymethylcellulose dressing with strengthening fibers (CMC-SF).

Prior Management

The past protocol for each wound was based on the principals of modern wound care based on a validated algorithm.[†] Two cases of chronic, non-healing wounds are reported. Each patient had a complex medical history and required frequent dressing changes due to the volume of exudate.

Method

Based on the need for greater absorption of wound exudate these patients were selected for the evaluation of this dressing. All other aspects of the protocol of care remained the same.

Results

Each wound showed improvement within 1 week of the application of the CMC-SF. Although this dressing was placed on 2 very difficult wounds, impressive outcomes were obtained in a few weeks. The overall wound size decreased, evidence of wound healing progression and the peri-wound skin improved.

Case 1: Pressure Ulcer of 1 Year's Duration

The first was a 69-year-old male with multiple sclerosis (MS) with a stage 3 pressure ulcer of 1 year's duration. He was hypertensive with a neurogenic bladder and spastic paresis.

Case 2: Pressure Ulcer of 2 Years' Duration

The second was a 67-year-old female with MS who had a pressure ulcer of 2 years' duration. In addition, she had mitral valve prolapse and had recently fractured her femur.

Product Notations

*AQUACEL® EXTRA™ dressing with strengthening fiber

†Solutions® Algorithms

‡AQUACEL® ribbon dressing

§Versiva® XC® dressing



Case 1, Figure 1. Day 1 of the new protocol: Undermined edges filled with a carboxymethylcellulose ribbon dressing,[‡] then the carboxymethylcellulose dressing with strengthening fibers (CMC-SF) was applied and covered with a gelling foam dressing.[§] The wound measured 3.5 x 3.5 x 5.5 cm with copious exudate.



Case 1, Figures 2A–2B. At 1 week, wound size had decreased to 3.0 x 1.5 x 5.0 cm. Macerated edges were healthy and exudate was controlled, with only 50% of the dressing saturated. Protocol of care continued.



Case 1, Figure 3. The wound measured 3.0 x 1.5 x 0.5 cm at 5 weeks.



Case 2, Figure 4. Day 1: The rolled edges of the wound were edematous and the peri-wound area was denuded. There was copious wound drainage.



Case 2, Figures 5A–5B. At 7 weeks, the wound had continued to contract.

Clinical Experience With an Extra-Absorbent Dressing*

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Introduction and Background

The ideal wound healing environment is one that provides moisture adequate to promote angiogenesis, fibroblast proliferation, collagen synthesis, and epithelial migration, as well as exudate absorption to control risk for periwound maceration, irritation, and secondary infection.¹ The length of time between dressing changes is guided by the ability of the particular wound dressing to respond to the moisture management needs of a particular wound. Longer wear times promote cost effectiveness by decreasing demands on the wound care provider and the amount of product needed.

Modern wound dressings are designed to support this balance between moisture and absorption.² Hydrogels provide moisture for drier wounds. Foams and alginates absorb active drainage from a moderately to heavily exuding wound. A carboxymethylcellulose[†] (CMC) dressing consists of soft, non-woven sodium carboxymethylcellulose fibers. This moisture-retentive dressing forms a gel on contact with wound fluid, inherently balancing moisture and moisture management.

New Approach

A new, extra-absorbent CMC dressing with stitch-bonding provides a durable dressing with enhanced moisture management. The performance of this new product in 2 cases is reported: a wound related to unstable calciphylaxis and a wound related to post-phlebotic episode. For these cases, the new dressing managed the exudate well, maintained its integrity and was comfortable when in place and upon dressing removal.

Case 1: Wound Related to Unstable Calciphylaxis

A 47-year-old female with a history of diabetes, hypertension, obesity, and end-stage renal disease presented with an unstable left breast calciphylaxis lesion. This wound was carefully debrided, then managed with silver CMC[‡] dressing until all signs of local infection were resolved. At that time, the wound measured 3.0 x 1.0 x 1.3 cm. A new protocol with the extra-absorbent dressing (EAD) was initiated; the patient was instructed to keep the dressing in the wound for a full week (Case 1, Figures 1A–3).

Case 2: Wound Resulting From a Post-Phlebotic Episode

An elderly woman presented with a persistent right posterior-lateral malleolus ulcer of 27 years' duration, thought to be related to venous insufficiency associated with post-phlebotic syndrome. As she refused a wound biopsy, it is unclear if an undetermined etiology such as malignancy was



Case 1, Figures 1A–1C. Day 1 of new protocol of care. Wound measured 3 x 1 x 1.3 cm. EAD dressing was applied and secured with a gauze and tape. The patient instructed to change based on amount of exudate and dressing absorption.



Case 1, Figures 2A and 2B. Day 7: The patient reported that wound dressing wear time had increased from daily to every 3 days. The wound now measured 2.8cm x 1.1 cm x 1.2 cm. Silver nitrate was applied to periulcer edge due to evidence of rolling. The patient was instructed to extend dressing wear-time to a full week.

present. Over the years, she had been treated with oral and parental antibiotics and had many wound cultures. She had been seen by the clinician for the last 3 years in a long-term care facility. Her laboratory data was unremarkable; wound cultures were negative. Her arterial/brachial index was 1.31. Dressing changes were done daily. She felt her quality of life was impacted with daily dressing changes and wanted to reduce the frequency. An absorbent dressing was needed to achieve this (Case 2, Figures 4–5).

References

1. Okan D, Woo K, Ayello EA, Sibbald G. The role of moisture balance in wound healing. *Adv Skin Wound Care*. 2007;20(1):39–53.
2. Chen WYJ, Rogers AA, Walker M, et al. A rethink of the complexity of chronic wounds — implications for treatment. *Eur Tissue Repair Soc Bull*. 2003;10(2,3):65–69.

Product Notations

- *AQUACEL[®] EXTRA[™] dressing with strengthening fiber
- [†]AQUACEL[®] dressing
- [‡]AQUACEL[®] Ag dressing



Case 1, Figure 3. Day 42: On return to clinic, the wound healed.



Case 2, Figure 4. Day 1: Appearance of wound before using the extra-absorbent dressing (EAD). Wound measured 2.1 x 1.1 cm, with a satellite lesion measuring 0.7 x 0.4 cm.



Case 2, Figure 5. Day 21: Dressing upon removal. Wound measured 1.7 x 0.8 cm. Wound red, with increasing fibrin in base. Weekly dressing changes.

Exudate Control in Heavily Exudating Ulcers Managed With a Carboxymethylcellulose Dressing With Strengthening Fibers*

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Background

Managing heavily exudating ulcers represents a challenge from different perspectives including quality of life, costs related to the frequency of dressing changes, and delayed healing. Available absorptive dressing options include foams, polymer-based dressings, alginates and carboxymethylcellulose (CMC), but the absorptive capacity does not always meet the requirements. We present a case series using a new version of a dressing composed of CMC with strengthening fibers that has 39% more absorptive capacity and material 9 times stronger than its predecessor.[†]

Materials and Methods

Two patients with venous ulcers and one with an idiopathic ulceration of the plantar aspect of the foot were evaluated over 4 weeks. All patients had had the ulcers for at least 6 months, and were previously treated with compression therapy. All had had difficulties managing the exudate and had tried other dressings to help manage the excess drainage without success.

Each patient was treated with 3-layer compression therapy and the CMC dressing with strengthening fibers (CMC-SF). They received only weekly visits to our wound center. The saturation of the external dressings was monitored visually by inspecting the presence of exudate beyond the absorptive dressing, as well as the ulcer bed, and the peri-ulcer tissue was evaluated for maceration. The ulcers were measured and photographed.

Results

All patients improved during the study period and wound exudate was managed with only once-weekly dressing applications.

Patients tolerated the dressing well without pain while the dressing was removed. The CMC-SF was easily removed intact from the ulcer base.

Case 1

A 59-year-old male with a history of venous stasis had bumped his leg 4 months earlier. At another facility, he failed treatment with Unna's boot and skin substitute. Heavy exudate was managed successfully with CMC-SF. Wound management included weekly dressing change using CMC-SF and short stretch compression bandaging. The wound healed on Day 67 (Figures 1A–2F)



Case 1, Figures 1A–1F. Day 1



Case 1, Figures 2A–2F. Day 21

Continued

Continued

Exudate Control in Heavily Exuding Ulcers Managed With a Carboxymethylcellulose Dressing With Strengthening Fibers*



Case 2, Figures 3A–3E. Day 1

Case 2

A 53-year-old male with diabetes and a history renal transplant. He had bilateral plantar foot blistering and ulcers with heavy exudate. CMC-SF was used to manage the exudate and improve the periwound skin. Periwound skin improved over the management period (Figures 3A–6).

Conclusions

This preliminary report suggests that the use of the CMC-SF can be well-tolerated and may allow a decrease in the frequency of dressing changes.

Reference

1. Data on file. Assessment of the physical properties of AQUACEL® EXTRA and AQUACEL® dressings. Scientific Background Report WHR13461 TA214 Rev.1. ConvaTec, 2011.

Product Notations

*AQUACEL® EXTRA™ dressing with strengthening fiber

† AQUACEL® dressing



Case 2, Figures 4A and 4B. Day 5



Case 2, Figures 5A–5E. Day 13



Case 2, Figure 6. Day 24

Use of a Highly Absorbent Dressing* for Multiple Wound Types

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Introduction

Healthcare costs related to wound care in the United States continue to rise. Cost-effectiveness studies demonstrate that the use of an advanced wound dressing such as a carboxymethylcellulose dressing with strengthening fibers* (CMC-SF) has the potential to reduce the cost of wound management by decreasing the frequency of dressing changes, thus lessening nursing time involved, while at the same time optimizing wound healing with reduced local tissue disturbance during dressing removal.

Methods

To meet the demands of exudating wounds and nursing workload, a 6-patient case series was initiated to evaluate a new extra absorbent dressing with stitch bonding.* Patient selection included acute surgical and chronic wounds. The surgical group included patients that had incision and drainage of abscesses and dehisced surgical incisions. The chronic wound category included patients with pressure ulcers and diabetic foot ulcers.

Outcomes

We were satisfied with our evaluation of the new dressing. We understand in vitro testing shows that the new dressing has increased absorptive capacity compared to its predecessor.[†] Patients stated low pain levels during dressing removal. Other potential benefits we observed were increased nursing satisfaction with ease of application and evidence of positive wound characteristics that reflect progress in wound healing. A case example is shown.

Case 1

A 72-year-old man with diabetes developed a dehiscence of surgical incision post-knee replacement. The dressing was changed every other day and as needed for strike through drainage. The patient was discharged to rehab with extra dressing supplies (see Figures 1–3B).

Reference

1. Data on file. Assessment of the physical properties of AQUACEL® EXTRA™ and AQUACEL® dressings. Scientific Background Report WHR13461 TA214 Rev.1. ConvaTec, 2011.

Product Notations

*AQUACEL® EXTRA™ dressing with strengthening fiber

†AQUACEL® dressing

‡Versiva® XC® dressing



Figure 1. Day 1 of new protocol: A carboxymethylcellulose dressing with strengthening fibers* (CMC-SF) was covered with a gelling foam dressing.



Figures 2A and 2B. Day 4: Appearance of CMC-SF dressing after removal and the wound after cleansing.

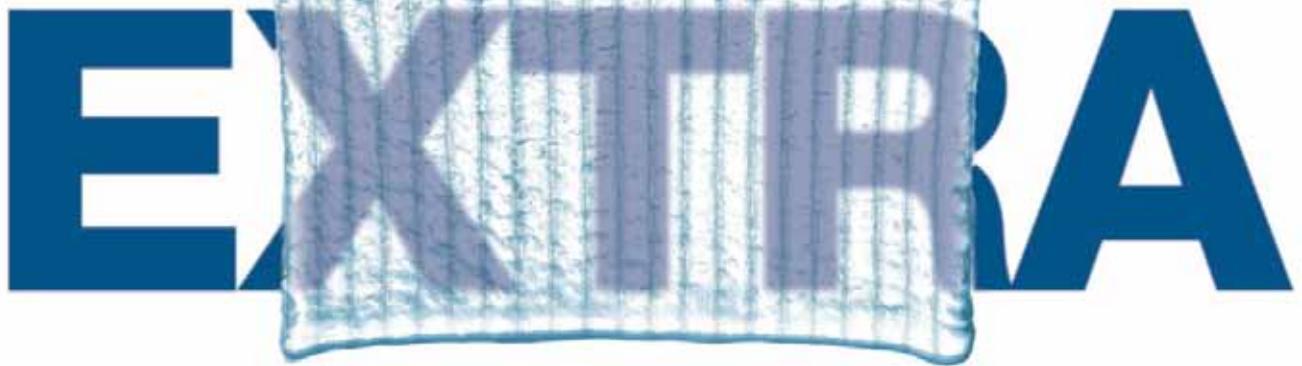


Figures 3A and 3B. Day 4: CMC-SF dressing protocol continued. Patient was discharged to rehab services with instructions to continue this protocol of care.

This compendium has been sponsored by ConvaTec.
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www.convatec.com

Reference: 1. Preliminary assessment of the physical properties of AQUACEL[®] EXTRA[™] and AQUACEL[®] Dressings. Scientific Background Report. WHRI3461 TA214 Rev.1. 2011, Data on File, ConvaTec Inc.

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