# The Versatile Use of a Silver Alginate Powder+ in the Treatment of a Variety of Wounds

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Study # LIT599

## PURPOSE

Until recently, local wound infection has been a challenge for wound care clinicians with few management options. Silver ions are potent antimicrobial agents and have proven antimicrobial activity against antibiotic-resistant bacteria such as methicillin-resisitant staphylococcus aureus (MRSA) and vancomycin-resistant entercocci (VRE). Ranges of antimicrobial dressings containing silver either incorporated within or applied to the dressing are now available for clinical use.

## OBJECTIVE

Ulcers with tunneling/undermining or with irregular aspects are challenging wounds to treat with standard silver dressings (i.e. foams/alginates) and may cause skin staining. We evaluated a silver treatment that could be applied directly to a multitude of wounds of any shape, size, or depth and that could be combined easily with other dressings to create a system for bioburden control and optimal moist wound healing. It was also important to us that the design and protocol of the product allowed the WOC Nurse to teach unskilled patients and caregivers to perform the dressing change themselves.

## CONCLUSION

Dressing selection is a vital part of the successful management of infected wounds and those at risk of infection. The evaluation of the silver alginate powder proved to be compatible with our other dressings and assisted with infection free healing with the release of silver over a sustained period of time. The powder was well suited for abnormal contouring wounds making it very versatile in its use. Caregivers and patients verified the ease of use of the product and its ability to cut down the amount of dressing changes due to the products ability to manage fluid.

## BACKGROUND AND PURPOSE

Control of infection in the wound bed is an integral part of the process of "wound bed preparation" (1-2). Recent literature reveals the importance of infection control (3). It is known that obvious signs of wound infection (edema, erythema, odor, purulent discharge, temperature, pain) indicate that clinical intervention, in the form of systemic or topical antibiotic therapy is required (4). The concept of "critical colonization" has also been developed, to describe a situation where signs of clinical infection are not obviously present, yet culture of the wound reveals the presence of pathogens in relatively high concentrations, such colonization is often associated with a wound that appears non infected, yet is "stalled" from a healing perspective (5).

The use of silver based wound dressings provides the means to control bioburden in such "critically colonized" wounds (5). Even when obvious signs of infection are present, and systemic/topical antibiotic treatment is in progress, the use of silver based wound dressings provide a level of bioburden control in distal locations on extremities and on skin surface, where systemic antibiotics may have a problem reaching due to poor circulation (6). This study examines a silver based alginate powder that appears to be extremely versatile, potentially enabling the clinician to convert any plain (non silver) dressing to a silver containing antimicrobial barrier product.

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## METHODS

Patients were recruited in this non randomized, uncontrolled open label pilot study with a wide inclusion criteria, the only exclusion criteria being individuals that had known allergies to silver, patients who had obvious signs of clinical infection that required systemic therapy, and patients on whom the clinician would have chosen a sheet type silver dressing. Recruitment of patients was limited to those who presented with a wound that either had tunneling or an irregular aspect. Such wounds are generally challenging to treat with a sheet type dressing. The study protocol called for the use of any dressing deemed appropriate to the wound by the attending clinician. Prior to the application of the dressing, the antimicrobial silver alginate powder was sprinkled into or on the wound. Then, closely following the product instructions of use, the secondary dressing was applied.

The silver alginate powder was covered by a secondary dressing (one of the following: hydrogel*, foam**, gauze, enzymatic debriding agents***, packing strips). A tertiary dressing was used as required (compression wrap, film dressings). Dressing changes were performed in the clinic at appropriate intervals for each patient at clinician discretion. A stream of saline was used to gently remove any debris from the wound bed.

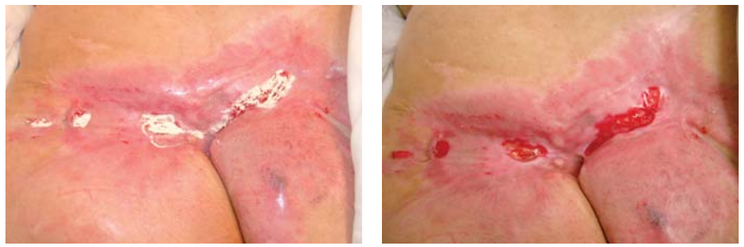
The study examined the ease of dressing changes in terms of whether the silver alginate powder caused the secondary dressing to adhere abnormally and harmfully to the wound bed. Also studied was whether any of the patients developed infections, and if any of the wounds got noticeably worse in terms of wound appearance or size. The study was performed for a period of 8 weeks from the date of first dressing application for each patient.

## RESULTS

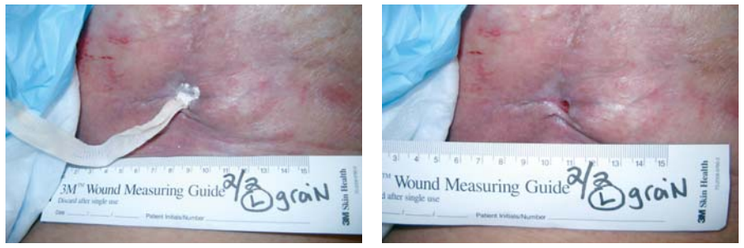
Five patients were included in this study, none dropped out, and no adverse events were associated with the use of the silver alginate powder in combination with the chosen secondary dressing. No infections developed during the 8 week course of the study. The silver alginate formed a translucent and soothing gel at the wound site upon application, this gel adhered to the wound contours irrespective of the degree of the irregularity of the wound surface. During dressing changes the majority of this gel came off the wound bed with the secondary dressing, except when the debriding agents were used. A gauze was used to remove the entire material off the wound prior to fresh application in that instance. The debriding agents were effective in the presence of the silver alginate powder, with no loss of clinical activity due to interference with the silver ions.

## CASE STUDIES

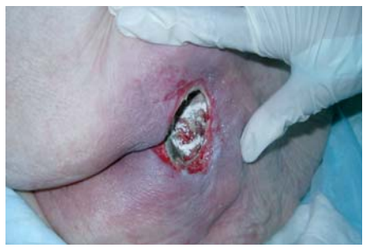
AB was admitted to the hospital with an infected right stump. Patient had been using negative pressure wound therapy at home which was discontinued due to complaints of severe pain. On unltrasound, an abscess with purulent drainage was found. The silver alginate powder with enzymatic agents were used.



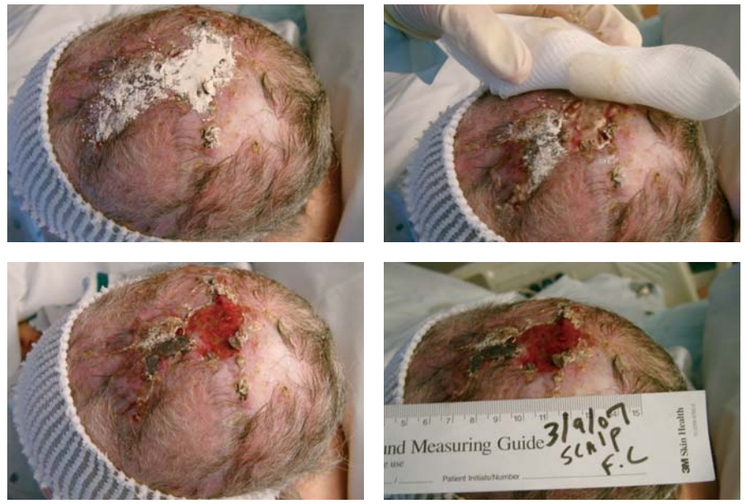
MC is a 47 year old obese female that was admitted to the acute care with a symptomatic urinary tract infection. She has a PMH of an AKA following a motor vehicle accident. While in rehab, she developed multiple Stage III pressure ulcers to the coccyx/upper buttocks. The wounds presented with purulent drainage and cultured positive for pseudomonas. The silver alginate powder was used with an adhesive foam dressing.



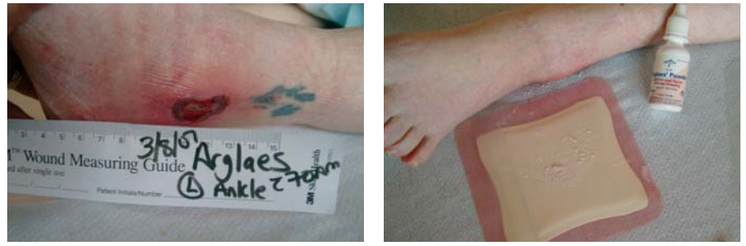

AG is an 83 year old female that was seen for a non healing groin site, following a left femoral bypass surgery. The wound presented with a large amount of purulent drainage and the wound cultured positive for pseudomonas. Due to the location and the size of the wound, the silver alginate powder was applied to a plain ¼ inch packing strip and placed into the wound.



EG is an 88 year old female with a history of a CVA and subsequent development of a Stage IV pressure ulcer that cultured positive for MRSA. While awaiting negative pressure therapy, the silver alginate powder was used in combination with a calcium alginate.




FC is a 78 year old female who sustained a full thickness burn to her scalp after her hair caught fire from a burning candle. The silver alginate powder was used with a amorphous hydrogel.




JP is a 65 year old female who presented with an infected Stage II pressure ulcer to her left ankle. She has a PMH of a CVA with resultant left leg lateral rotation. The silver alginate powder was used with a foam dressing.

## DISCUSSION

This pilot study had its limitations: it was not controlled, not randomized and not blinded. Still, we felt that the product was versatile enough to be easily used with a number of dressings that did not contain silver. In essence, the study indicates that it is possible to render a non silver dressing with the desired moisture handling properties into a silver based antimicrobial product. This is of clinical significance specially when the wound contours are irregular and it is often difficult to reach the entire wound surface with traditional dressings. None of the wounds studied developed full blown clinical infection, and though wound biopsies or any other quantitative assays were not performed, the overall health of each of the wounds did not deteriorate over the 8 week period. Wound cleanup was easy and painless for dressing changes. It did appear as if the silver alginate powder helped to prevent the other dressing from adhering to the granulating wound bed. This is beneficial because it is known that trauma during dressing change is a major factor in non compliance (7).

Further studies are necessary with appropriate controls in place, and with primary outcome measures such as rate of wound size reduction and time to healing.

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