Connecting evidence to outcomes

The Evaluation of Absorbent Silver containing Dressings *In Vitro*

Systagenix WOUND MANAGEMENT

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Abstract

Absorbent silver containing dressings are commonly used in clinical practice in order to manage exudate as well as control the bacterial bioburden in the wound. However, while many of these silver dressings can provide antimicrobial efficacy, few provide all of the ideal physical characteristics required. In this study we have utilized a number of *in vitro* methods to assess both the physical and antimicrobial properties of a new non-adherent antimicrobial dressing in comparison with a number of commercially available dressings.

Antimicrobial efficacy was assessed using zone of inhibition and Log_{10} reduction assays against common chronic wound pathogens. The availability of silver for antimicrobial efficacy was determined by measuring silver release from the wound dressing into simulated wound fluid, changed twice daily, and re-challenged for 7 days. The physical parameters assessed include absorbency as determined following BP1993 Addendum (1995) Alginate Dressing; strength when wet and measurement of dressing adherence to a simulated wound surface assessed using a new *in vitro* model.

Results have demonstrated that the new non-adherent antimicrobial dressing was efficacious against common wound pathogens including antibiotic-resistant strains. In addition, its absorbent capacity was found to be comparable to other commercially available dressings. Furthermore, it was found to have superior strength when wet as well as lower adherence to a simulated wound surface. These *in vitro* studies suggest that this new non-adherent silver dressing can be easily removed from the wound in one-piece potentially minimising trauma and pain for the patient.

Adherence

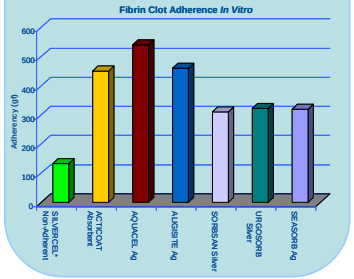
Novel *In vitro* adherence model

Sandwich a fibrin clot between two pieces of dressing material. Incubate for 24 hours at 37°C. Measure the force required to separate the dressing from the clot using the Instron tensile tester.

Fibrin Clot Preparation

Fibrin Clot Placed onto Dressing

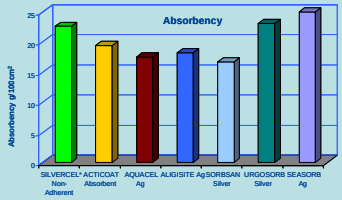
Fibrin Clots Dried then tested with Instron Tensile Tester



Absorbency

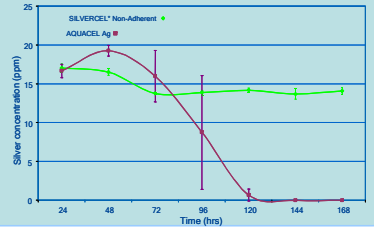
BP 1993, Addendum (1995) For alginate dressings

Weigh test dressing, add a weight equal to 40 times the dressing weight of calcium chloride / sodium chloride solution. Incubate at 37°C for 30 minutes. Remove dressing and allow to drain for 10 seconds, reweigh test dressing.



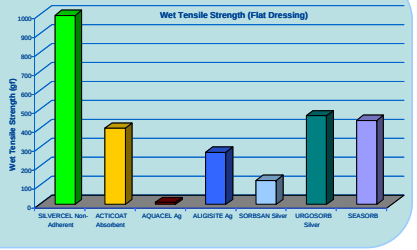
Silver release

Immerse dressing in simulated wound fluid (SWF). Sample fluid and transfer test dressing to fresh SWF twice daily. Analyse silver levels by Atomic Absorption (AA) Spectroscopy.



Wet tensile strength

Cut sample from the width and the length of the dressing. Immerse in calcium chloride / sodium chloride solution for 15 minutes. Remove sample and allow to drain. Place in the Instron tensile tester and pull apart to measure the force required to break the dressing.



Antimicrobial Activity of SILVERCEL* Non-Adherent Hydroalginate Dressing with Silver

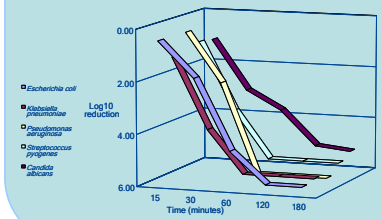
Zone of inhibition test

Dressings applied to bacterial lawn.
Zone of inhibition measured.

Acinetobacter sp.	*Corynebacterium* sp.	*Prevotella* sp.
Aeromonas sp.	*Enterobacter* sp.	*Propionibacterium* sp.
Aspergillus sp.	*Enterococcus* sp.	*Proteus* sp.
Bacteroides sp.	*Escherichia* sp.	*Providencia* sp.
Bacillus sp.	*Eubacterium* sp.	*Pseudomonas* sp.
Branhamella sp.	*Klebsiella* sp.	*Salmonella* sp.
Burkholderia sp.	*Micrococcus* sp.	*Serratia* sp.
Candida sp.	*Morganella* sp.	*Staphylococcus* sp.
Citrobacter sp.	*Peptostreptococcus* sp.	*Stenotrophomonas* sp.
Clostridium sp.	*Porphyromonas* sp.	*Streptococcus* sp.
Commons sp.		*Veillonella* sp.

Broad spectrum antimicrobial activity
Zones of inhibition present against micro-organisms listed

Log10 reduction test, dressings in a quantified suspension of bacteria. Ability to reduce number



Discussion

SILVERCEL* Non-Adherent Hydroalginate Antimicrobial Dressing with Silver (SILVERCEL* Non-Adherent) was comparable with or superior to other commercially available dressings, indicated for use on similar wound types, for absorbency and wet tensile strength.

SILVERCEL* Non-Adherent contains the same alginate & carboxymethyl cellulose fibres as the SILVERCEL* dressing which ensures it's suitability for use on moderately to highly exuding wounds.

Incorporating the unique non-adherent wound contact layer, SILVERCEL* Non-Adherent had the least potential for adherence, *in vitro*.

Conclusion

SILVERCEL* Non-Adherent has been shown to have significantly lower adherence to competitors products using the fibrin clot test and has been demonstrated to have the following properties *in vitro*;

Superior Integrity
Highly Absorbent
Potent Antimicrobial
Sustained Silver Release