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Abstract

Aims
To evaluate, *in vitro*, the potential for dressing adherence of commercially available wound dressings and a new variant of an existing Hydro-Alginate Antimicrobial Dressing with Silver incorporating a Novel, Non-Adherent wound contact layer. To confirm the existing physical and antimicrobial properties, measured *in vitro*, of the dressing remain unchanged, ensuring its applicability in the management of critically coloured or infected pressure ulcers and other wound types.

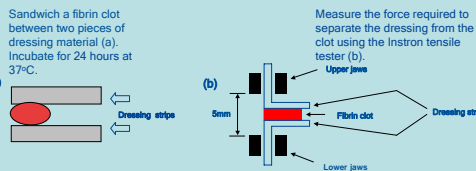
Methods
A new *in vitro* method has been established that measures the maximum force (grammes, g) required to separate the dressing from a fibrin clot indicating the potential for dressing adherence *in vivo*. The fibrin clot represents a synthetic biological matrix, used to simulate the wound bed. Additionally, the absorbency, wet tensile strength, availability of silver ions for antimicrobial activity over 7 days and antimicrobial efficacy against common chronic wound pathogens was assessed.

Results
The maximum adhesion force measured, was between 2 and 4-fold higher for the commercially available dressings, compared to the Hydro-Alginate Antimicrobial Dressing with Silver with a Novel Non-Adherent wound contact layer. Reevaluation of the properties of the existing Hydro-Alginate Antimicrobial Dressing with Silver demonstrated comparable absorbency, silver release and antimicrobial efficacy against a broad spectrum of microorganisms. The addition of a Novel, Non-Adherent wound contact layer increased the overall wet tensile strength of the dressing.

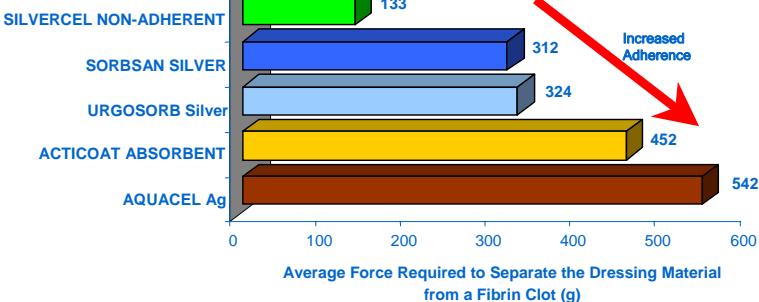
Conclusion
The suitability of an Hydro-Alginate Antimicrobial Dressing with Silver in the management of moderately to heavily exuding wounds, such as pressure ulcers, is well characterised^{1,2,3}. The addition of a Novel, Non-Adherent wound contact layer, and the ability of the dressing to remain integral when wet provides a unique dressing benefit for all indicated wound types, including large and/or cavernous exuding pressure ulcers. Limiting any potential for dressing adherence that may occur *in practice*, as a consequence of changing wound conditions i.e. as a wound infection is resolved or the healing process progresses, is a desirable dressing attribute for both patient comfort and clinical outcome.

Hydro-Alginate Antimicrobial Dressing with Silver incorporating a Novel, Non-Adherent wound contact layer - SILVERCEL NON-ADHERENT
Hydro-Alginate Antimicrobial Dressing with Silver- SILVERCEL

In vitro adherence model



In vitro Adherence

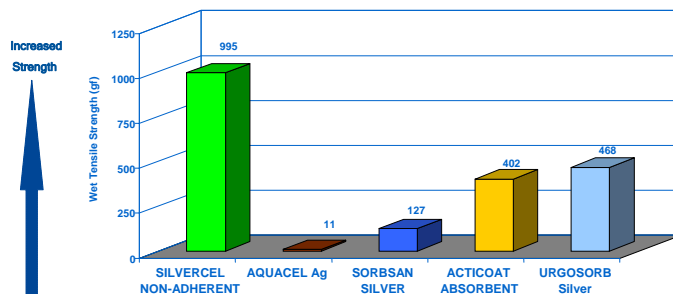


Wet Tensile Strength

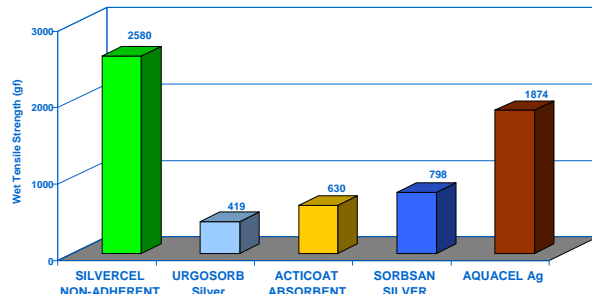
Force required to break dressings using Instron tensile tester. Dressings were tested in both their 'flat' presentation at 2.5cm wide, and their 'rope' dressing format which was tested in the width as sold.

Generally the wet tensile strength results for rope dressings are higher as either the material format is only tested in one direction favourable to the fibre direction (SILVERCEL NON-ADHERENT & ACTICOAT ABSORBENT) or it has a unique characteristic not present in the 'flat' dressing such as strengthening fibres in rope dressing (AQUACEL Ag) or the rope dressing is in a different format, thicker than flat dressing (SORBSAN SILVER).

FLAT DRESSING - Wet Tensile Strength



ROPE DRESSING - Wet Tensile Strength



Fibre Shed

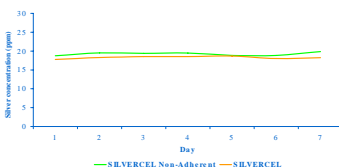
Dressing samples placed on to red synthetic adhesive substrate with 40mm Hg pressure applied, when the dressing sample is removed the fibre shed can be seen.



Silver release

Silver levels measured by elution of the silver from the dressings into simulated wound fluid. Fluid was changed every 24 hours and removed fluid analysed on Atomic Absorption (AA) Spectrometer.

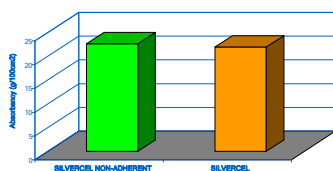
SILVER RELEASE



Absorbency

Absorbent capacity, BP 1993, Addendum (1995) For Alginate Dressings.

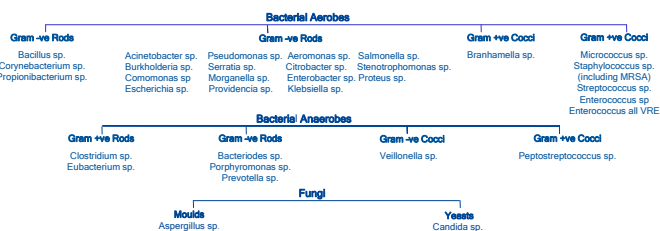
ABSORBENCY



Antimicrobial activity

Zone of inhibition test, dressing applied to bacterial lawn. Zone of inhibition measured.

Broad spectrum antimicrobial activity present against clinically isolated micro-organisms listed



Conclusion

Alginate and fibrous based materials have been used for many years in the management of pressure ulcers and other wound types^{1,2,3}.

This study assessed the suitability of an alginate wound dressing, Silvercel Non-Adherent by *in vitro* methodology for use on such wounds.

The dressing was shown to be absorbent, had the ability to release silver ions and was proven to be antimicrobial against a range of clinically isolated micro-organisms. Additionally, Silvercel Non-Adherent had the greatest wet tensile strength of all products tested.

There is the potential, *in practice*, that alginate or fibrous based wound dressings could leave fibre debris at the wound surface and adhere to the wound bed⁴. This has been shown, *in vivo*⁵ and further demonstrated within this study, *in vitro*.

A unique feature of Silvercel Non-Adherent is its wound contact layer. In the present study, this product was found to be less adhesive than the other commercially available wound dressings tested and less fibres were observed on the adhesive substrate that provided a matrix to simulate, *in vitro*, adherence and subsequent removal of dressings to a tacky surface.

Silvercel Non-Adherent maintains the desired product characteristics that aid in the management of all types of chronic wounds, with the additional feature of a non-adherent wound contact layer. This layer has been applied to all product sizes, including the rope, typically used to dress pressure ulcers.

References

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