An assessment of dressing integrity using an *ex-vivo* porcine cavity wound model

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Introduction:

Ribbon dressings, when used to pack cavity wounds must be able to be removed in one-piece. Clinicians are often presented with laboratory data for ribbon strength, however, this method of assessment bears little resemblance to the way in which these dressings are used clinically. The number for 'strong enough' for clinical use is also left to be determined. In order to look more closely at the way dressings perform on removal, a selection of fibrous ribbon dressings were assessed for integrity on removal after 3 days of use in two porcine (pork) cavity models.

Method:

Preparation of porcine models (Figures 1 & 2)

A 2cm diameter corer was used to punch 5cm deep cavity wounds across a piece of porcine (pork) middle. A piece of tubing was placed in each cavity to allow fluid in-feed. This was fed to the bottom of the cavity, and remained in place for the entire trial. 3ml of Solution A was added to each cavity. A second model was prepared using wounds of 4cm depth, and 0.1cm width (Slit wounds). This was to provide an additional 'clinical' challenge to the dressing removal.

Dressing assessment

Each dressing was cut to 20cm length for the wide wounds, and 10cm for the slit wounds. Dressings were placed in the simulated wounds leaving approximately 1.5cm protruding from the cavity to aid removal. Photographs of the dressings were taken and observations recorded. After 72 hours each of the dressings was removed from their respective cavity using forceps. Photographs were taken of the dressings, and notes on product integrity made. All dressings were tested in triplicate.

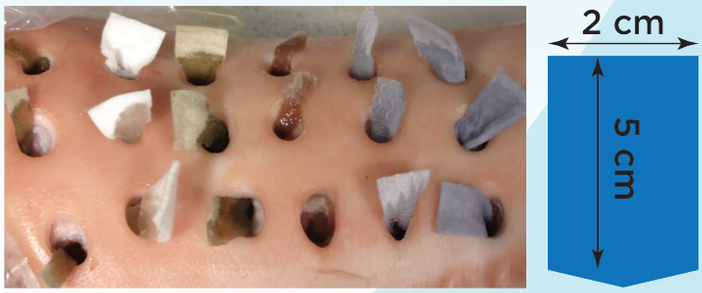

Figure 1 – Wide cavity (2cm diameter) wound model set up

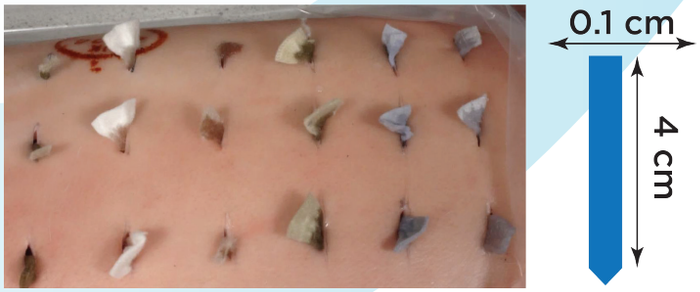

Figure 2 – lit cavity (0.1cm diameter) wound model set up

Dressing	Wide Cavity Wounds – One piece removal?	Slit cavity wounds – One piece removal?
A (2cm width)	YES	YES
A (cut to 1cm width)	YES	YES
B	NO	NO
C	YES	YES
D	YES	YES
E (non silver)	YES	YES

Product Key:
A. KerraCel Ag –Crawford Healthcare Inc.
B. Sorbsan Silver-Aspen Medical Ltd.
C. Durafibre Ag- Smith & Nephew Inc.
D. Aquacel Ag Ribbon-ConvaTec Inc.
E. KerraCel – Crawford Healthcare Inc.

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Results and Discussion:

Dressings showed varying performance, however all dressings with exception of Dressing B were able to be removed in-tact from both the narrow and wide simulated cavities. Dressing B became more gel- like throughout it's application to the clinical simulation model. Dressing A was still able to be removed successfully from the model when cut to half the width. Dressing C left fibres when removed but was still able to be removed in one piece.

Clinicians and healthcare professionals are often presented with graphs and numbers which 'demonstrate' the ability to perform *in-vivo*. However, it would appear that there has never been a defined numerical value for this efficacy. Tensiometer (quantitative strength) testing demonstrates breaking point when a dressing is pulled at a force spread evenly from either side of the ribbon. This however is often not the case clinically, with wounds being different shapes and sizes. This therefore poses the question of the relevancy of this data. The use of models simulating clinical situations is one method of attempting to demonstrate how a dressing may perform clinically.

In this model, the performance of dressings has been assessed in both narrow and wide simulated cavity wounds to better understand a variety of clinical information

Conclusion:

The tensile strength of a ribbon on a tensiometer may not directly translate to performance in a clinical situation, with certain factors not being considered in this method (length of time in a wound, wound shape etc.).

- It is possible to create more clinically relevant models using porcine middle, in order to assess dressing removal several days after application.
- Dressings known to have low quantitative strength values were able to be removed from two simulated wound models effectively. With Dressing A still being able to be removed when cut to half its width.
- This would suggest that quantitative data should be used along side more appropriate models when evaluating dressings for clinical use. A high tensile strength value may not directly translate to clinical effectiveness.

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