Assessment of the Uptake of Simulated Viscous Exudate by Adhesive Foam Dressings

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Introduction

The absorption of fluid by wound dressings is paramount to their overall performance in the treatment of chronic wounds. Wound exudate presents with a wide range of physical properties; from thin, runny clear exudate to viscous and sticky.

Traditional fluid handling data presented to clinicians attempts to demonstrate the ability of dressings to absorb and manage wound fluid in a clinical environment. However, little of the research available takes into account the variation in wound exudate presentation that a dressing would be expected to handle. The industry standard makes use of Solution A *(142mmol sodium ions, 2.5mmol calcium ions)*, which has a viscosity equivalent to water, however wound exudate is often more viscous than this. It is therefore essential to understand how dressings perform with a range of exudate characteristics.

In this study, the effect of the viscosity of wound exudate on dressing absorption was measured. A range of commercially available foam wound dressings were assessed for their ability to absorb fluid of both viscous and non-viscous qualities.

Method

Solutions modelling thin and thick wound exudate were prepared as per table one:

Simulated Thin Exudate (Solution A)	Simulated thick exudate
1000g water	1000g water
0.368g calcium chloride	10g xanthan gum
8.298g sodium chloride	0.368g calcium chloride
	8.298g sodium chloride

Table one – Preparation of simulated exudate

The solutions were vigorously mixed too allow all particulates to dissolve, then left for 24 hours to deaerate. Viscosity measurements made at 25°C and speed 12RPM gave a value of 950cS for the viscous exudate and 1.0cS for the Solution A *(thin exudate)*.

Dressings were applied to a WRAP[1] simulated wound model. This model allows the delivery of fluid to a dressing at a rate typical of that of an exuding wound. The model is heated to 37°C. Fluid that is not absorbed by the dressing is collected, and can be weighed to determine the fluid uptake ability of the dressing.

Fluid was supplied to dressings at a rate modelling that of a highly exuding wound[2] 1.5ml/hr for a period of three hours. After the three hour period the mass of fluid absorbed by the dressing was measured, as well as the mass of fluid not taken up by the dressing. Four foam dressings were assessed using both the thin and thick simulated wound exudate. Testing was repeated in duplicate.

Results

When the foam dressings were tested using Solution A *(thin exudate)*, all four dressings were able to handle 100% of the fluid delivered. However, when tested using simulated viscous exudate the absorption characteristics of each dressing varied *(see graph one)*.

- Graph one shows a clear difference in the ability of each dressing to absorb viscous exudate.
- Dressing A was able to absorb the exudate with the most efficacy; absorbing approximately 25% of the viscous fluid delivered.
- Dressing D absorbed 12%, and Dressings B and C managed to absorb 5% and 6% respectively.

The results demonstrate difficulty in the area of viscous exudate and therefore demonstrate the importance in dressing selection. The results of the test also demonstrate a need to use testing solutions of differing thicknesses in order to understand dressing performance over a variety of wound types.

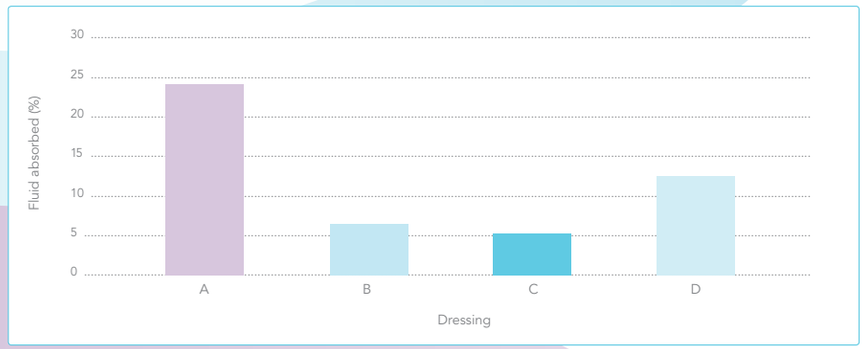
Conclusion

The test demonstrated a clear difference in the capability of dressings to absorb exudate of different thicknesses. All dressings performed well when tested with Solution A *(thin exudate simulation)*. However in the difficult area of thick exudate handling a clear decline in absorption is seen.

Of the dressings tested, Dressing A was able to absorb the largest amount of viscous fluid.

*Dressing A- KerraFoam Gentle Border (Crawford Healthcare); Dressing B-Allevyn Gentle Border (Smith & Nephew); Dressing C-Aquacel Foam (Convatec); Dressing D- Mepilex Border (Mölnlycke Healthcare)

Dressing A was able to absorb the largest amount of viscous fluid



Graph one – Percentage of simulated viscous exudate absorbed by each dressing

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