

A comparison of foams and a superabsorbent dressing for fluid management in chronic wounds

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Introduction & Aim:

Both foam and superabsorbent dressings are used in the fluid management of chronic wounds, however the superabsorbent category is more recently emerging in the healthcare market. This study aimed to evaluate the performance of selected foam dressings (Allevyn Gentle Border, AquaCel Foam Adhesive and Mepilex Border) and a superabsorbent dressing (KerraMax Care) in order to understand differences in performance.

Methods:

Foam dressings were assessed in comparison to the superabsorbent, for:

Absorbency: Dressings were weighed, submerged in an ionic solution at 37°C for 30 minutes. Dressings were then removed, suspended for 30 seconds and re-weighed to determine the mass of fluid absorbed.

This test was repeated with compression equivalent to 30mmHg on each dressing during absorbency to simulate performance under compression bandaging systems.

Retention on compression

Immediately following the uncompressed absorbency test, each dressing was subjected to a mass equivalent to 30mmHg for 30 seconds. The dressings were then re-weighed to calculate the percentage of fluid retained in the dressing following compression.

Rate of fluid uptake: A 0.1ml drop of ionic solution was gently pipetted onto the surface of each dressing. The time taken to absorb was recorded.

Bacterial Sequestration: MRSA solution (15ml at a concentration of 1×10^6 CFU/ml) was added to each dressing daily. Gauze was used as the control. After 7 days, both active and non-active recovery of bacteria was carried out:

Non-Active: Dressings were removed from the inoculation plate, and the bacterial growth from direct contact photographed (i.e. bacteria released or not absorbed).

Active: Samples of each dressing were processed using biological techniques to see how much bacteria could be recovered from inside the dressing.

Results and discussion:

Table 1 shows the results for absorbency (both uncompressed and under compression), retention on compression and rate of fluid uptake. The foam dressings were shown to absorb similar amounts of fluid to each other. The superabsorbent dressing was seen to absorb a much higher volume.

Aquacel Foam Adhesive and KerraMax Care showed comparable fluid uptake rates, with Foams Allevyn Gentle Border and Mepilex Border both demonstrating slower absorption properties.

	KerraMax Care (10x10cm)	Allevyn Gentle Border (12.5x12.5cm)	Aquacel Foam Adhesive (12.5x12.5cm)	Mepilex Border (10x12.5cm)
Absorbency (g/dressing)	77.67	35.18	30.91	33.60
Fluid retention on compression	84%	68%	72%	67%
Rate of fluid uptake (s)	<1	44	<1	374
Absorption during compression (g/dressing)	44.81	20.70	22.27	22.60

Table 1-Results for each dressing in absorbency and uptake tests

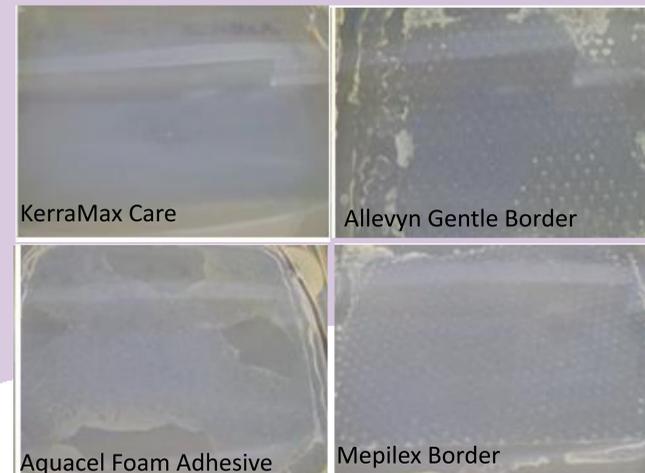


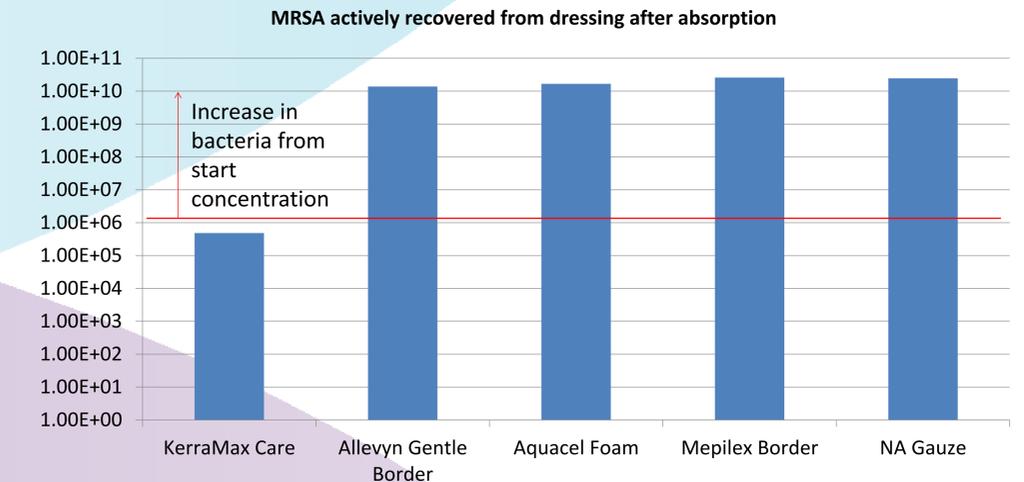
Figure 1- Transfer of MRSA onto agar after 7 days inoculation (non-active recovery). The yellow/white transfer shows bacterial presence.

Figure 1 shows the direct transfer of bacteria onto the inoculation plate (non-active recovery) at day 7. Only KerraMax Care did not leave bacterial imprints on the plate beneath the wound contact surface, suggesting that all bacteria was absorbed into the core of the dressing. Each of the foam dressings showed a bacterial imprint over the wound contact surface in contact with the plate.

Graph 1 shows the results from 'active recovery' of bacteria. 1×10^6 CFU/ml of bacteria was added to each dressing.

At the end of 7 days the added bacteria remained in the core of KerraMax Care with no additional bacterial growth from the starting concentration.

All of the foam dressings allowed bacterial growth within the dressing, therefore more bacteria was recovered than initially added to the dressing.



Graph 1- MRSA actively recovered from each dressing post-absorption. The red line demonstrates the starting concentration of bacteria

Conclusion:

KerraMax Care, the superabsorbent dressing, was superior to the evaluated foam dressings in its ability to absorb, handle fluid, and sequester bacteria.