Don’t Be Basic: Connecting laboratory testing to the field via evaluation of an advanced silicone foam dressing

Authors†: Laura Swoboda, DNP

Aligning foam dressing performance with clinical goals

Problem and Purpose: The development of effective and cost-efficient wound dressings is a significant area of research in wound care. Silicone bordered foam dressings have emerged as a popular choice due to their ability to maintain a moist wound environment, absorb exudate, and minimize trauma during dressing changes. This report on the translation of laboratory findings and clinical outcomes aims to describe the performance of a novel silicone bordered foam dressing in terms of its adhesive properties, fluid handling, and cost-effectiveness.

Methods: A series of laboratory-based studies[1] were conducted to assess the performance characteristics of the novel dressing[2] compared to other common dressings types in both regular and sacral designs (n=10). Adhesive strength, friction, shear were measured using a ground steel sled to determine forces-dressing interactions. Fluid handling was evaluated by exposing the dressing in simulated wound exudate and measuring fluid handling capacity. The cost-effectiveness of the dressing was assessed by comparing its price to other commercially available silicone bordered foam dressings.∞

Average Selling Price (ASP) = Product Revenue / Total number of units sold

∞ *Based on Avg. Sales Price (ASP) from Clarivate – DRG data (decisionresourcesgroup.com)*

Results: The novel silicone bordered foam dressing demonstrated excellent adhesive properties, adhering firmly to the skin simulants without over securement, which can be a concern for medical adhesive related skin injury and dermatitis. It exhibited a high absorbency capacity, effectively managing a wide range of exudate levels with appropriate moisture vapor transition rate to manage the dermal-dressing microclimate. Additionally, the dressing proved to be cost-effective, offering comparable performance to more expensive brands.

Test Name	Purpose/ Method	Clinical Correlations
Point deflection 	Characterizes the effect of a perpendicular force applied to a wound dressing.	The resulting cone-shaped deflection demonstrates the ability of the dressing to distribute that force to surrounding areas, away from the point of force.
Strain ratio 	Ratio based on the deflection diameter and the deflected material length. Closer to 1 indicates the dressing is distributing the applied force to a wider area.	The strain ration tells you if a dressing can spread the force of a boney prominence like the sacrum and coccyx from a small area of focus at the tip of the bone to wider areas and less pressure overall. This is another reason why we use larger dressings for PIP greater than the area directly over the boney prominence.
Fluid Handling Capacity	Measuring and comparing the Moisture Vapor Loss, Fluid Absorbed, and total fluid handling capacity.	Dual-use (PIP and wound treatment) dressings must handle wound drainage and perspiration while preventing significant contamination from urine, feces, and environmental sources. Fluid can be passed out through the dressing, or the dressing can retain the fluid within.
Distance of non-conformity	Dressing non-conformity is measured at the intergluteal cleft of a heated mannequin before and after application of a clinically relevant load.	Distance of nonconformity is the distance between the intergluteal cleft and the dressing. Gaps in dressings adherence leave entrances for contaminants and leakage for wound exudate. Gaps can also prevent the dressing from adequately managing pressure forces.

Product Name	SKU
ALLEVYN LIFE	66801067
OPTIFOAM GENTLE EX	MSCEX44EP
ConvaFoam	423253
MEPILEX BORDER FLEX	595300
HALYARD*	50085
ALLEVYN LIFE	66801306
OPTIFOAM GENTLE EX	MSCEX77EP
ConvaFoam	423256
MEPILEX BORDER SACRUM	282055
HALYARD*	50087

Figure 1. Sacral dressings: Force after 30 seconds. Error bars indicate a 95% confidence interval.

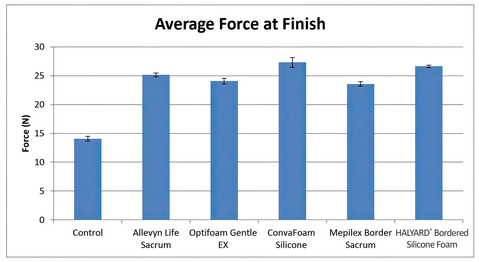


Figure 2. Sacral dressings: Average strain ratio. Error bars indicate a 95% confidence interval.

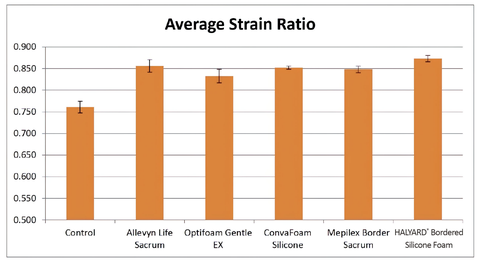


Figure 3. Comparison of fluid handling capacity of small dressings (4x4 inches). Error bars indicate the standard deviation.

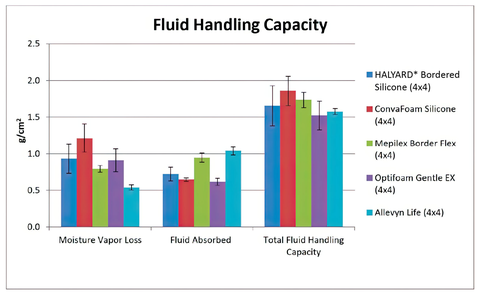
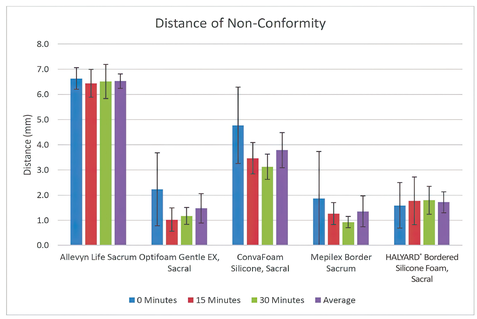


Figure 4. Dressing non-conformity distance comparison. Error bars indicate a 95% confidence interval.



Test Name	Purpose/ Method	Clinical Correlations
Temperature	Temperature was measured at the dressing-mannequin interface (inside dressing) and dressing-support surface interface (outside dressing) at 175 minutes after dressing was applied to a heated mannequin with a clinically relevant load.	Human skin maintains a temperature just less than core body temperature. Elevations and depressions in temperature can contribute to delayed wound healing, tissue breakdown, and increase risk of wound occurrence.
Shear	Simulated boney prominence via a ground steel sled with an angled face slides over the dressing’s surface.	Shear can contribute to pressure injury formation as it impacts the deeper tissue levels. It can also impact perfusion and wound healing.
Friction	Static and Kinetic co-efficients of friction are measured alongside shear.	Friction contributes to pressure injury formation, especially in the more superficial tissues. It can also disturb wound healing.
Pressure mapping	XSENSOR pressure mapping technology is used to evaluate sacral mannequin w/wo product.	Pressure mapping adds another layer of measurement to the clinical evaluation of a dressing’s ability to disperse pressure throughout the dressing and prevent the formation of pressure injuries.
Cost analysis	Publicly available pricing via a USA disruptor was utilized to compare pricing of dressings.	It may be incorrectly assumed that dressing performance in correlated to the price of that dressing. Comparing pricing amongst dressings alongside their performance characteristics provides of objective guidance to clinicians when tasked with making inventory decisions.

Figure 5. Comparison of temperature at 175 minutes (Sacral Dressings). Error bars indicate a 95% confidence interval.

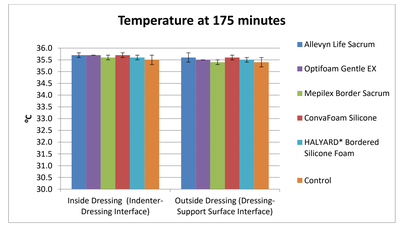


Figure 6. Percentage of forces transmitted through the sacral dressings. Error bars indicate a 95% confidence interval.

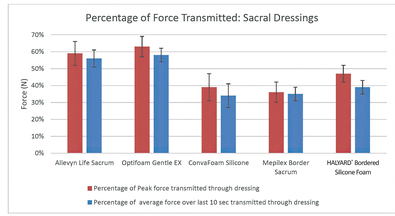


Figure 7. Comparison of coefficients of friction for sacral dressings. Error bars indicate a 95% confidence interval (n=15)

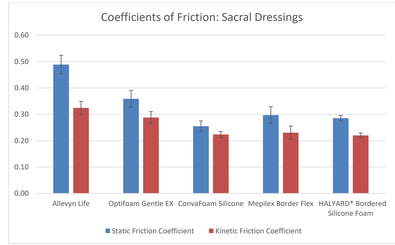
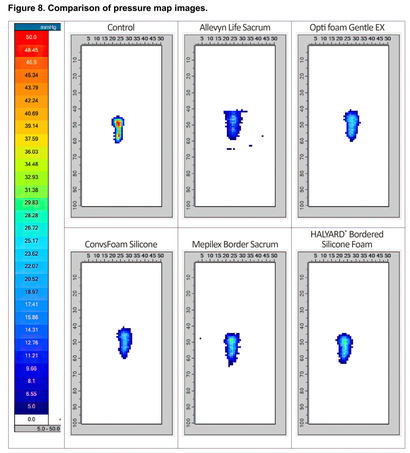


Figure 8. Comparison of pressure map images.



Conclusion: The novel silicone bordered foam dressing[2] shows promising results in terms of its adhesive properties, absorbency capacity, and cost-effectiveness. These findings suggest that this dressing may be a valuable addition to the wound care arsenal, providing a reliable and affordable option for wound management. Further clinical studies are warranted to evaluate the dressing's performance in real-world settings and assess its impact on wound healing outcomes.

1. EC Service, Inc., Centerville, UT, USA
2. O&M Halyard, Alpharetta, GA, USA

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† EC Service, Inc. – Evan Call, Kasey Call, Sandra Guzman, Marianne Russon
O&M Halyard – Geoff Henderson