Pressure redistribution properties of prophylactic dressings using an *in vitro* model with clinically relevant pressures and a novel sacral indenter

[Poster #]

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Introduction

- Pressure injuries (PIs) have significant deleterious impacts on patients, healthcare professionals, and payors
- Recent clinical studies indicate that multilayer foam dressings may be an effective addition in the prevention of hospital-acquired PIs[1,2]
- *In vitro* work has further demonstrated that these dressings can absorb and redistribute forces applied directly to the skin[3]

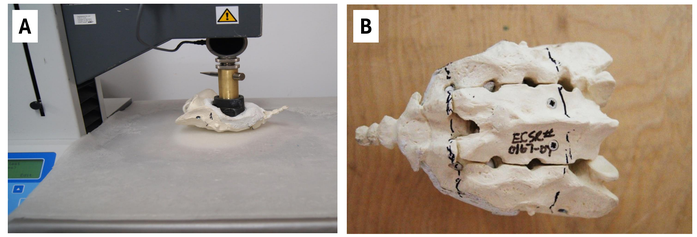
Study Objective

To evaluate pressure distribution properties of commercially available wound dressings used in high-risk body areas when applying clinically relevant interface pressures, using a novel sacrum model[3,4]

Methods

- Five dressings were evaluated: A, B , C, D, and E
- A high-resolution pressure mapping system was used to test the pressure redistribution properties of the dressings
- The dressing was applied to a 6 mm thick silicone gel[5] layer (to simulate overlying tissue), and a clinically relevant load (30 mmHg) was applied for 60 seconds using a novel sacral indenter. A control was performed using the same construct without a dressing applied (**Figure 1**)
- Six replicates were performed

Figure 1. Set up for testing

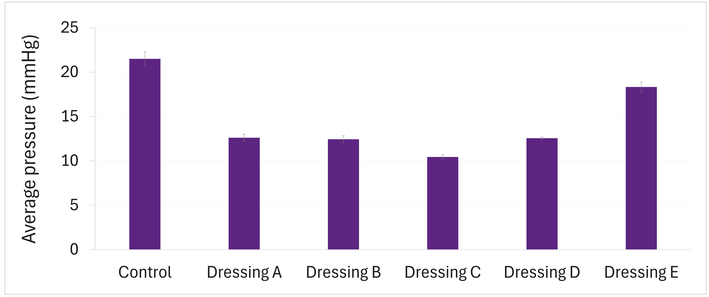


A: Dressing placed under silicone gel and on top of pressure map; B: Sacral indenter

Results

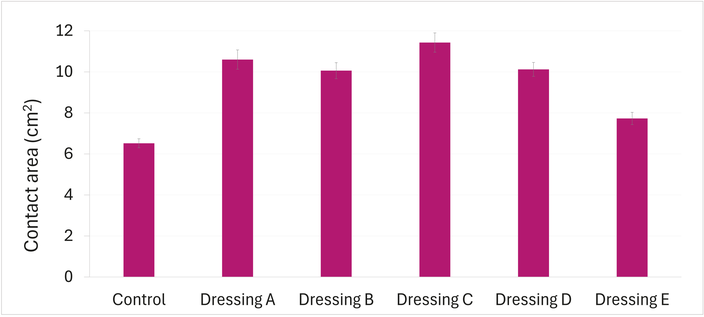
- All dressings showed a significant reduction in peak and average pressure and increase in contact area compared with the no dressing control ($p \leq 0.001$; **Figure 2** and **Figure 3**)
- Dressing A showed a significant reduction in peak pressure compared with dressings D and E, and in average pressure compared with dressing E only ($p < 0.001$; **Figure 2**)

Figure 2. Comparison of the average pressure of tested products



Error bars represent 95% confidence intervals

Figure 3. Comparison of the contact area of tested products



Error bars represent 95% confidence intervals

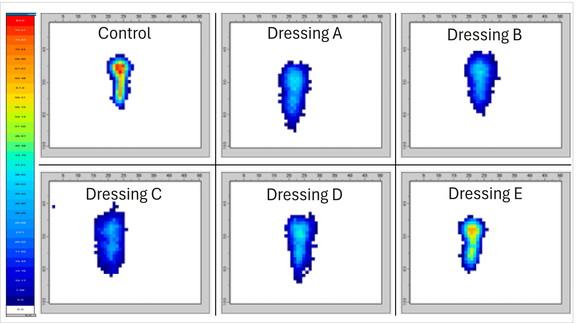
- Dressing B showed a reduction in peak and average pressure compared with Dressings D and E; the difference was statistically significant only with Dressing E ($p < 0.001$; **Table 1**)
- Dressing C is significantly lower than all other dressings in peak and average pressures ($p < 0.01$, **Table 1**)
- **Figure 4** shows the pressure map images of all the dressings and control

Table 1. Comparison of metrics calculated (α=0.05)

Product tested	Contact area (cm^2)	Peak pressure (mmHg)	PPI (mmHg)	Average pressure (mmHg)
Control	6.52 ± 0.22	50.36 ± 1.21	42.12 ± 1.37	21.5 ± 0.77
Dressing A	10.6 ± 0.47	26.24 ± 0.65	23.27 ± 0.89	12.61 ± 0.42
Dressing B	10.06 ± 0.39	27.48 ± 0.52	23.84 ± 0.48	12.44 ± 0.4
Dressing C	11.43 ± 0.47	22.91 ± 0.95	19.38 ± 0.74	10.44 ± 0.25
Dressing D	10.12 ± 0.34	29.43 ± 1.82	23.33 ± 0.98	12.56 ± 0.11
Dressing E	7.73 ± 0.30	43.9 ± 1.99	37.61 ± 1.29	18.33 ± 0.55

PPI, peak pressure index

Figure 4. Comparison of pressure maps



Discussion

- Using an anatomically accurate sacral indenter and clinically relevant testing pressure, these findings indicate that dressings A and B provide a significant reduction in interface pressure compared with no dressing
- Dressings A and B also showed comparable or improved pressure reduction compared with most other test dressings

Conclusion

These data suggest that these dressings may be considered as a component in the toolkit of PI prevention protocols

References

1. Walsh NS et al. *J Wound Ostomy Continence Nur* 2012:39,146–149.
2. Santamaria N et al. *Int Wound J* 2015;12(3):302–308.
3. NPIAP Guidelines; Prevention and Treatment of Pressure Ulcers/Injuries: Clinical Practice Guideline.
4. Call E et al. *Int Wound J* 2015;12(4):408–413.
5. Section 6 Annex A. Test Apparatus Description: Sensored Hemisphere. In: American National Standard for Support Surfaces—Volume 1: Requirements and Test Methods for Full Body Support Surfaces. Arlington, VA: Rehabilitation Engineering and Assistive Technology Society of North America (RESNA); 2019.

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