TECHNICAL EVIDENCE
WOCN Journal - Bradley-Clarke et al (2025)

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Computer-Simulated Model Examining the Effects of Convexity Characteristics at the Skin Barrier-Abdomen Interface

Overview

- Convex skin barriers are widely used in ostomy pouching systems to improve fit, wear time, and to protect peristomal skin.
- Clinical consensus supports the use of convex skin barriers postoperatively, with benefits outweighing the comparatively rare risks of mucocutaneous separation or pressure injury.
- Five characteristics of convex skin barriers; depth, compressibility, flexibility, tension location, and slope, are thought to promote stomal protrusion or leveling of the peristomal skin; however, the mechanism remains unclear.
- Although flexibility is recognized as one of the key characteristics, it was not measured in this simulation study due to limitations in the modeling approach.
- This simulation study examines characteristics of convex products to understand their impact on ostomy care and provides evidence to guide more prescriptive patient-specific convexity selection.

Results

In the thick, soft abdomen model a deeper convex skin barrier with a narrower tension location proved the most effective at increasing the magnitude of fat compression located immediately adjacent to the stoma.

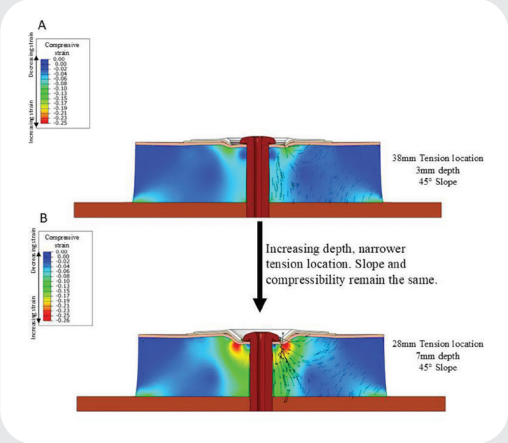

Figure 1. Adapted from Bradley-Clarke J *et al*. Computer-Simulated Model Examining the Effects of Convexity Characteristics at the Skin Barrier–Abdomen Interface. J Wound Ostomy Continence Nurs. 2025;52(5):392–400.

Models using thinner fat layers experienced high strain concentrated at a point immediately below the apex of the convex dome, radiating all the way down to the muscle layer. In models using thicker fat layers, strain gradually decreases in intensity further from the contact point. Additional fat allows strain to be more evenly distributed due to its being more readily deformable than surrounding tissues.

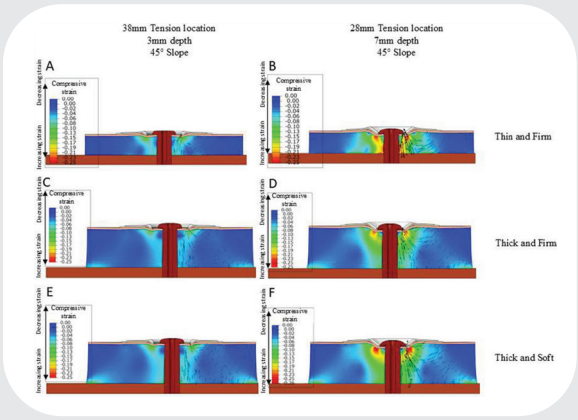

Figure 2. Adapted from Bradley-Clarke J *et al*. Computer-Simulated Model Examining the Effects of Convexity Characteristics at the Skin Barrier–Abdomen Interface. J Wound Ostomy Continence Nurs. 2025;52(5):392–400.

Key findings

Central tension: Factorial regression analysis across all 3 simulated abdomens demonstrated that size of depth and tension location had the greatest effect on fat layer compression in creating central tension.

Compressibility vs. depth: The models suggested that doubling the stiffness of the convex dome only increased strain in the tissue by 30%, while increasing depth from 3mm to 7mm increased strain by 100%. Therefore to achieve desired strain in the tissue, increasing depth is more effective than increasing compressibility (i.e. increasing depth has a greater impact on clinical outcomes than switching between soft and rigid convexity).

Compressibility challenge – soft vs. rigid: These finding challenges teachings that rigid convexity should be used for soft abdomens and soft convexity for firm abdomens. Instead, this study suggests that soft convexity is effective across a wide range of abdominal types.

Conclusion

- Convexity selection should be based on a clinical assessment of the stoma and abdominal profile, and tailored to achieve the desired clinical outcome—whether protrusion or leveling of the peristomal skin—according to each patient's individual goals.
- For recessed or flushed stomas where central tension is required to promote stomal protrusion, a convex skin barrier with greater depth and tension locations closer to the ostomy's perimeter stoma should be considered.
- Depth and a wider tension location should be considered if peripheral tension is required to flatten uneven peristomal skin to improve pouching system seal and reduce leakage.
- Soft convexity has shown to be effective more broadly across a range of abdomen types, and the least amount of convexity (least pressure) possible should be used to avoid skin damage and complications.
- These models should be validated in clinical studies including people living with an ostomy.

SCAN TO READ FULL ARTICLE

Reference: Bradley-Clarke J, Evans J, Waller J, McGill K, Long C, Brindle T, Carty N. Computer-Simulated Model Examining the Effects of Convexity Characteristics at the Skin Barrier–Abdomen Interface. *J Wound Ostomy Continence Nurs.* 2025;52(5):392-400. **SC-77560**