Novel *in-vitro* Test Method for Comparing Moisture Management Performance of Various Adhesive Border Foam Dressings Utilizing a Simulated Vertical Leg Model

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BACKGROUND & PURPOSE

Production of wound exudate is a normal and necessary part of wound healing but can lead to maceration of the periwound if not properly managed.[1] An ideal dressing should maintain optimal moisture balance while keeping harmful exudate away from the periwound surface.[2] Inadequate dressing performance can lead to "pooling" of exudate at the dressing-wound interface resulting in skin breakdown.[1]

A novel test method using a vertical leg model was designed to compare the performance of a new border foam dressing (study dressing*) with other commercially available border foam dressings.

METHOD

The novel test consisted of a vertical leg model with a simulated wound surrounded by gauze representing a simulated periwound and surrounding skin within the dressing leg model interface. The simulated periwounds were shaped to capture leaking or pooling of simulated wound fluid (SWF) occurring at the dressing-simulated leg model interface. The bordered foam dressings were centered over the simulated wound and periwound and wrapped lightly with a cohesive bandage for securement

SWF was delivered at a constant rate of 0.4 mL/hour, consistent with a highly exuding wound.[3] Six replicates of each dressing setup were tested.

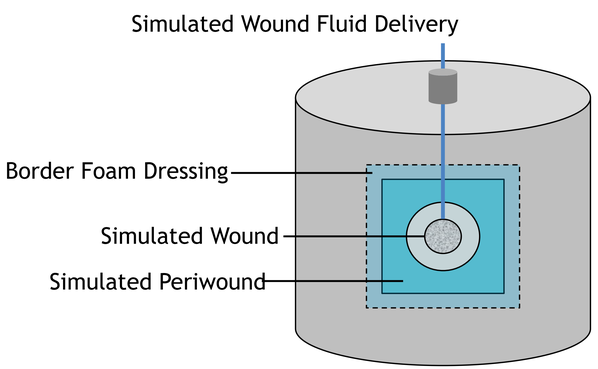

Figure 1. Vertical Leg Model testing setup

RESIDUAL FLUID ANALYSIS

After 24 hours, the periwound gauze and border foams were analyzed qualitatively (residual fluid inspection) for "pooling" of SWF and overall fluid movement within the dressing.

Test dressing performance was categorized in two groups: minimal saturation and high saturation.

Table 1. Representative photos taken after 24 hr for each test dressing and simulated periwound.

SPECTROPHOTOMETER ANALYSIS

Simulated periwound samples were rinsed to remove SWF and the amount of SWF was quantified by UV-Vis Spectrophotometry. The average maximum absorbance (A_{max}) readings were recorded across the six replicates for each dressing type. Higher average A_{max} correlated with higher levels of SWF.

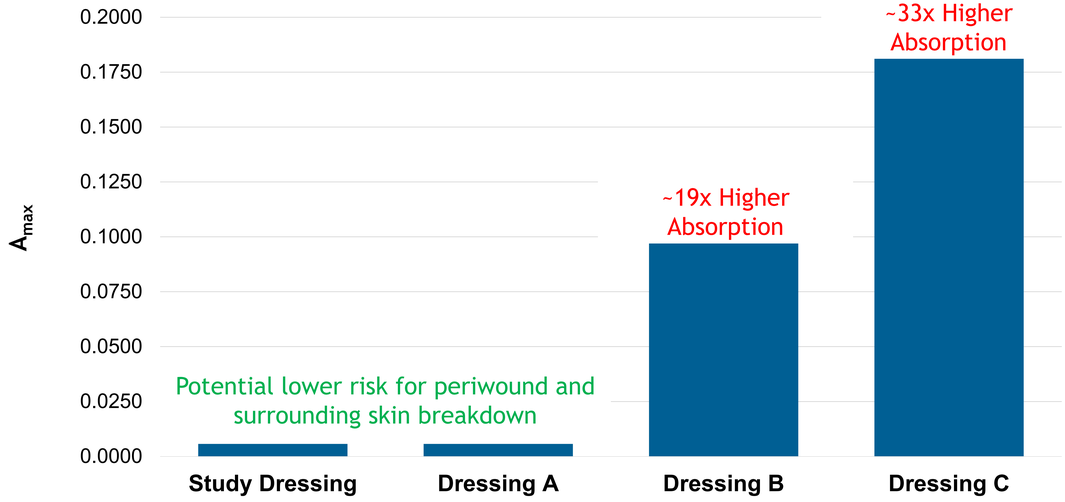

Figure 2. Periwound saturation levels based on average maximum absorbance readings.

DISCUSSION & CONCLUSION

Study Dressing and Dressing A resulted in minimal absorption of SWF by the simulated periwound. Dressing B and C resulted in the simulated periwound becoming saturated, as well as the dressing itself, which may result in higher frequency of dressing changes if used on a similarly exuding wound.

With the Vertical Leg Model, Study Dressing and Dressing A are seen to manage moisture better than Dressings B and C. On average, the Study Dressing reduced the risk of "pooling" by a factor of 17.7 when compared with to the average of the other bordered foam dressings tested. The technology† within the study dressing not only moved the SWF through the dressing, but also prevented backflow and saturation of the surrounding skin at the dressing interface.

FOOTNOTES

*Study Dressing: ULTRA Border, †Active Fluid Management® (AFM), Milliken Healthcare Products, LLC, Spartanburg, SC

Dressing A: Mepilex® Border, Molnlycke, Gothenburg, Sweden
Dressing B: OPTIFOAM® GENTLE Border, Medline, Northfield, IL
Dressing C: ALLEVYN Gentle Border, Smith & Nephew, London, UK

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