**Background**

Recently, a foam dressing was redesigned to allow it to be more responsive to the degree of moisture present in the wound. This dressing (Dressing A)* differs from its predecessor and other marketed foam dressings in that it incorporates a new moisture control layer that modulates moisture vapor permeability through the backing under varying wound conditions.

**Objective:** To assess breathability and fluid handling properties of several marketed foam adhesive wound dressings under simulated high moisture conditions using two in vitro (laboratory) methods and one in vivo (human) test method.

**Laboratory Fluid Handling**

Fluid handling performance of foam adhesive dressings C*, D*, and E* were compared to Dressing A* with a novel in vitro procedure. Using time lapse photography, side by side comparisons were made hourly in the weights gains of Dressing A and three comparator dressings as the dressings were continuously fed 0.75 ml/hour of an isotonic test fluid (EN 13726-1) over the course of 7 days. The test was conducted at 23 ± 2 °C and 50% ± 5% relative humidity. For each dressing type, a minimum of three dressings from three different manufacturing lots were tested.

**Laboratory Moisture Vapor Transmission Rates (MVTR)**

The in vitro MVTR of seven test dressings* were determined per European Standard EN 13726-2. This in vitro method determined both the “wet” and “dry” MVTR of the dressings. During the “wet” procedure, the apparatus was inverted and the dressings were in contact with only the water vapor above the test fluid, thus determining the MVTR of the dressings when placed over highly exuding wounds. During the “dry” method, the apparatus was left upright and the dressings were in contact with only the water vapor above the test fluid, thus determining the MVTR of the dressings on dry or low exuding wounds. For all seven test dressings, three lots of each dressing with a minimum of 5 replicates per lot were tested. Additional replicates of Dressings A and C were performed as internal controls within the various tests.

**Human Fluid Handling**

Artificial Wound Model

Artificial wounds were constructed on the lower backs of healthy human subjects and the test dressings were placed over the artificial wounds. Twelve 1.0 ml injections of artificial wound fluid (AWF) were infused into the artificial wounds at intervals no less than 1 hour apart. This dose of AWF was chosen to model a highly exuding wound. A paired design was utilized with each subject receiving two test dressings alternately placed on the left and right sides of the lumbar region. Six individual studies with 12 to 24 subjects each were performed, with Dressing A serving as a control in each of the studies. The dressings were worn continuously for up to 7 days (plus 3 injections on day 8) or until failure of the dressing. Dressing A absorbed significantly more AWF prior to failure (p<0.001) and had significantly longer wear times (p<0.01) than each of the other test dressings, based on a Cox regression model. The median time to failure for Dressing A ranged from 6.1 to >7 days, whereas the other test dressings ranged from 1.0 to 3.5 days.

**Conclusions**

- Manufacturers continuously seek to improve performance of medical products. Dressing A is an adhesive foam dressing redesigned to improve patient outcomes and decrease complications associated with exudate management. It has an innovative moisture control layer that allows the dressing to effectively respond to changing exudate levels within the wound.
- Standard laboratory MVTR tests show that Dressing A is highly breathable under simulated high exudate conditions, yet moisture retentive under simulated low exudate conditions. Additionally, a novel laboratory test with continuous flowing fluid demonstrates the capacity of the Dressing A to evaporate large amounts of fluid through the backing material.
- The fluid handling studies on healthy human subjects challenged the dressings in ways that are not possible in the laboratory or on patient wounds. Results showed that Dressing A has significantly higher fluid handling and wear time capabilities than the other adhesive foam dressings tested.
- These studies demonstrate the high breathability and fluid handling properties of Dressing A. These performance attributes may result in the reduced risk of maceration and desiccation, longer clinical wear times, and more cost-effective wound management outcomes.

* Dressing Footnotes

Dressing A: 3M™ Tegaderm™ High Performance Foam Adhesive Dressing
Dressing B: Coloplast Biatain® Foam Adhesive Dressing
Dressing C: Smith & Nephew Allevyn™ Adhesive Dressing
Dressing D: Medline Optifoam® Adhesive Dressing
Dressing E: Mölnlycke Mepilex® Border Dressing
Dressing F: ConvaTec Versiva® XC® Adhesive Dressing
Dressing G: Smith & Nephew Allevyn™ Gentle Border Dressing

*Data reflects the dressings on the market at the time the studies were completed before March, 2010

Acknowledgements

This study was supported by 3M Health Care

Poster design by Lutz Consulting LLC

3M Health Care, St. Paul, MN, USA