Product Performance Characteristics to Protect Skin Integrity

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Long before I entered the pressure ulcer prevention and management field, incontinence in elderly people, particularly those confined to a bed or chair, was closely associated with compromised skin integrity and the risk of skin breakdown. Fragile skin in a person with poor nutritional status, as is often the case with elderly patients, is particularly vulnerable. Outstanding research by Shigeta et al published in this journal in December 2010 examined intact skin in people wearing absorbent products to identify environmental factors affecting skin properties. Absorbent pad surface pH and excessive sweating were significantly associated with skin pH, illustrating the effect of occlusion with pads and the risk of dermatitis. The researchers called for future studies to evaluate various types of pads, recognizing that differences in design and composition affect skin differently. I am grateful to Professor Shigeta and her colleagues for awakening others to the science and art of product selection and for placing each patient’s unique needs at the heart of their research objectives.

Coincidentally, I already had submitted my column for the January 2011 issue of the journal. My article focused on the recent National Association For Continence (NAFC) initiative to assemble a council to establish national product performance standards for adult absorbent products. The NAFC is beginning this Herculean task by focusing first on people cared for privately in their homes under waivers from nursing home and other residential placement and whose state Medicaid agencies cover the cost of absorbent supplies otherwise not typically paid for by Medicaid in most states.

Key Performance Characteristics for Skin Safety

For decades, the approach to managing incontinence focused on containment of fluid, feces, and odor; occlusion traditionally was synonymous with containment. As a result, the properties of skin exposed continually to urine and feces in people wearing an absorbent pad and brief to manage incontinence had not been fully investigated until the research by Shigeta et al.

Breathability. The importance of breathability has been identified in the NAFC national council’s early discussions. Breathability is measured by the rate at which water vapor passes through a fabric or other shield. It is measured in grams of water vapor per square meter of fabric per 24-hour period and often simply abbreviated as “g.” Sports apparel designed to direct water away from the body as an athlete perspires, contributing both to comfort and improved functionality, typically is labeled to indicate relative breathability, with mid-range considered 5,000 g and the best materials having 20,000 g. Such measures also can be applied to absorbent products worn for managing incontinence, although the disposability of nonwovens places practical ceilings on the level of breathability permissible because such high levels come at a high price.

Air permeability. Air permeability is the ability of a fabric to allow air to pass. Fabrics with high air permeability tend to have relatively high moisture vapor transmission, although it is not necessary to be air-permeable to be breathable. Air permeability is a function of the porosity of the outer layers of a garment. Water droplets are much larger in size than the gaseous state of water vapor, allowing a fabric to breathe and let pass the vapor from the skin to the outside. Due to body heat and moisture, heat and humidity are almost always higher inside a garment, including an absorbent product worn next to the body for managing incontinence. This differential actually pushes the vapor toward the outside, while preventing leakage of fluid (urine) onto bed linens in the case of incontinence.

Rewet. Rewet is the amount of wetness returned to the surface of an absorbent product onto an absorbent filter paper. The rewet rate referred to by the researchers is also an important characteristic because it measures the ability of a product to accept and retain urine by determining the amount of time required for a product to absorb a fixed volume of fluid. In essence, this reflects a wicking action aimed at keeping the skin dry. Typically, rewet is measured using a saline solution under laboratory simulation. By approximating the cycle of voiding, the rewet determines whether the garment can absorb more urine immediately upon the next incontinent episode.

Other factors. Aside from the construction design — and subsequently, performance — some absorbency factors such as frequency of changing are beyond the manufacturer’s control. Additional considerations are sizing and...
fit, which can influence the functionality of a garment. An oversized brief may actually permit leakage instead of absorbing excess urine.

Product performance also is affected by the clinical diagnosis; gender plays a role. Elderly women are more likely to have mixed incontinence — ie, both urge and stress urinary incontinence; as a result of obstetrical trauma, parous women are more likely than men to experience fecal as well as urinary incontinence. Elderly men are far more likely to experience urge incontinence than stress incontinence and with greater severity. Men also have been documented to experience an average of two-thirds greater volume of urine between changing than women. The increased volume places special demands on the absorption rate of super absorbent polymers embedded in absorbent nonwovens and the immediate wicking action of a disposable product’s construction.

The NAFC council’s goal is to determine standardized ways to measure and compare these factors to facilitate patient-centered selection of absorbent products for managing urinary and fecal incontinence. Choices must be based not only on their functionality, but also on how well their particular characteristics fit the particular patient for whom they are selected. It won’t help to set national standards unless clinicians and caregivers know how to utilize such guidelines in making judgments and selections.

References