

An assessment of barrier creams to reduce surface friction

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Introduction:

Skin protectant products are used to protect intact or damaged skin in at risk areas such as a peri-wound area or in incontinent patients. These products protect from potential causes of skin breakdown, including excessive moisture on the skin, and pH change¹. The role of barrier products in these areas is well documented¹. Another factor known to increase the potential for skin breakdown is friction, this is a contributing factor to shear, which is one of the main causes of pressure injuries². Studies have shown that the presence of moisture (for example from sweat, and incontinence episodes) causes an increase in the coefficient of friction between the skin and a surface³. It was hypothesised that skin protectants containing lubricating ingredients could have the ability to reduce the friction at the skin's surface. A selection of skin protectant products were therefore assessed to understand their effects on surface friction.

Method:

Surface friction of a Polyurethane film (simulated skin) was assessed using a British Pendulum Tester (Figure 1) as per ASTM E303-03. The British pendulum number (BPN value) for the film was recorded to give a baseline friction reading. Each product was then applied onto a new piece of film as per manufacturers instructions.

The BPN value for each swing was recorded (N=5). Water was also assessed for comparison. Percentage reduction in friction was calculated for the use of each product compared to the baseline simulated skin reading.

Results:

Graph 1 shows the reduction in surface friction by each product. Each treatment lowered the surface friction compared to an un-treated surface. Products A and B reduced friction more effectively than the other tested products, with 31% and 32% reductions for products A and B respectively. The least reduction in friction was observed following treatment with product C, which reduced the surface friction by 16%; which was comparable to the use of water, which reduced surface friction by 17%.

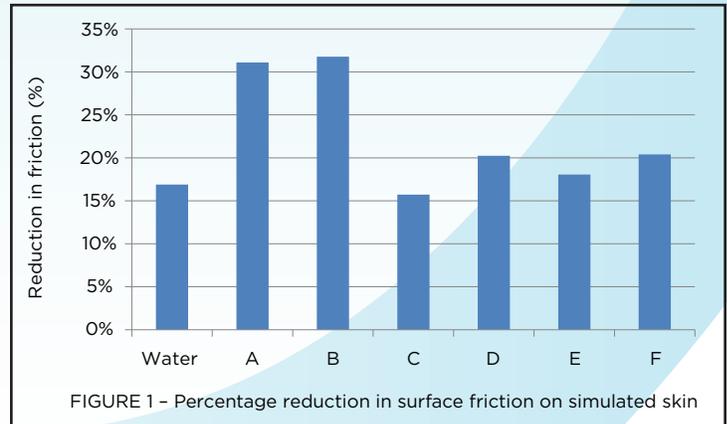


FIGURE 1 - Percentage reduction in surface friction on simulated skin

Discussion:

The ability of these barrier products to reduce friction could translate to a clinically relevant reduction in friction at the surface of the skin. As friction can contribute to shear in deeper tissues¹, this could have an implication in helping to prevent pressure ulcers. This data suggests that barrier products may provide this additional anti-friction level of protection to the skin alongside being a physical barrier to moisture and pH. Products A & B were shown to be the most effective of the treatments tested at reducing surface friction. Product C was shown to be the least effective, with water out-performing it.

Conclusion:

In laboratory based test methods, barrier products show varied performance in the reduction of surface friction. This would suggest that some products are able to provide a more lubricating surface than others. This could potentially translate into the reduction of friction at the skin's surface in a clinical situation. Further studies need to be conducted to understand the clinical translation of this data, and if this has implications in pressure ulcer prevention.

References:

1. Beeckman D et al. Proceedings of the Global IAD Expert Panel. Incontinence associated dermatitis: moving prevention forward. *Wounds International* 2015.
2. International review (2010). *Pressure ulcer prevention: pressure, shear, friction and microclimate in context. A consensus document.* London
3. Gerhardt LC, Strässle V, Lenz A, et al. Influence of epidermal hydration on the friction of human skin against textiles. *J R Soc Interface* 2008; 5(28):1317-28.
4. The BPN value for each swing was recorded (N=5). Water was also assessed for comparison. Percentage reduction in friction was calculated for the use of each product compared to the baseline simulated skin reading

Product Key:

- A. Touchless Care Zinc Oxide Protectant Spray –Crawford Healthcare Inc.
- B. Touchless Care Clear Protectant Spray- Crawford Healthcare Inc.
- C. Sensicare-ConvaTec Inc.
- D. Calmoseptine-Calmoseptine Inc
- E. Proshield- Smith & Nephew Inc
- F. Aloe Vesta-ConvaTec Inc.