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 change. The role of barrier products in these areas is well documented. 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 injuries. 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 surface. 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%.

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 tissues, 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:
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-ConvaTec Inc.
E. Proshield- Smith & Nephew Inc
F. Aloe Vesta-ConvaTec Inc.