Barrier creams for skin breakdown

Debbie Flynn and Sally Williams examine how moisture and pressure can cause skin to break down, how barrier creams can help the skin to heal and a new barrier system.

Nurses have a major role to play in assessing and preventing skin breakdown. It is essential to risk assess all patients to identify those most likely to be vulnerable. Incontinence poses particular risk factors as both urine and faeces have detrimental effects on the skin. This can lead to incontinence associated dermatitis (IAD) and pressure ulceration. The differentiation between IAD and pressure damage is often very challenging for nurses but it is imperative for nurses to make the correct diagnosis to ensure appropriate treatment and care.

Skin care is a basic nursing skill. However, with the ever challenging focus on the profession being evidence-based, it can be very difficult for nurses to determine the best skin care regime for their patients. Good robust evidence is lacking in this area of care. With the plethora of skin care products available, it is essential that nurses are well informed of their benefits and risks to enable them to discuss the options with their patients and make the right choices.

This article informs readers about the components of the ideal skin care regime using the best available evidence identified through searching the British Nursing Index, CINAHL and Medline. This article will also identify the components, risk factors and benefits of skin care routines. It will give a brief update on the basic function of the skin, what can go wrong and lead to breakdown, incontinence associated dermatitis and other skin conditions. It will also describe nine case studies using a new product to the UK.

The barrier function of the skin

The skin prevents fluid loss, regulates body temperature, and protects against harmful substances. The stratum cornuem has layers of keratin-filled corneocytes arranged in a brick-like fashion, which enable the skin to protect its host (Black, 2007). However, certain factors can soon compromise the integrity of the stratum corneum and lead to skin breakdown. This will leave the host vulnerable to a number of adverse effects that can lead to IAD.

Continence and ageing

Farage et al (2007) discussed the effects of the ageing process on urinary continence and suggested that the bladder becomes irritable, reduces in its capacity and empties less efficiently. A combination of these factors, along with long-term conditions, polypharmacy, obstetrical injury, dementia, changes in nutritional status, and postmenopausal changes, can lead to incontinence.

It could be postulated that many of the elderly female population did not have the post natal care that is available today. Therefore, it is possible that pelvic floor and or anal sphincter damage may have gone undetected, leading to urinary and faecal incontinence in later life.

What causes skin breakdown?

Gray et al (2002) described the four main risk factors contributing to skin breakdown particularly when related to incontinence:

- Moisture
- Skin pH
- Colonization with microorganisms
- Friction.

Urinary incontinence leads to the skin becoming over-hydrated, while the urea and ammonia in the urine lead to alkalinity.

Faecal incontinence causes more damage to the skin than urinary incontinence due to the bacterial content and enzyme activity. The enzymes contained in faeces are more active and destructive in the presence of an alkaline environment, having a devastating effect on the skin with the prolonged exposure to urinary leakage and perspiration. Unless successfully identified, managed and treated, this prolonged exposure will lead to IAD and has a high risk of then developing into ulceration.

Residents who are doubly incontinent (have both urinary and faecal incontinence) are at major risk of skin breakdown, particularly if their mobility is limited. The excessive toxic moisture present leads to the need for frequent washing. The permeability of the stratum corneum then increases and reduces the skin's protective barrier function.

Increased pH (alkalinity) raises the risk of bacterial colonization and increases the risk of infection (Beeckman et al, 2009), most commonly by organisms such as *Candida albicans* (a type of fungus, which is also a yeast) from the gastrointestinal tract and *Staphylococcus* species from the perineal skin. These organisms will cause dermal infections that may initially be fungal in origin, but bacterial infection is more likely to occur as *Staphylococcus* easily colonizes skin already compromised by IAD.

Other skin conditions

Intertrigo (a rash in a body fold) and vulvar folliculitis (inflammation of follicles around the vulva) will occur as a result of poor hygiene and excessive moisture caused by incontinence in areas with opposing skin surfaces (Nathan, 1996).

Puritis Ani is an inflammation of the perianal area. This can be caused by overzealous cleansing of the anus, leading to sudden bursts of itching, causing great discomfort and distress. Scratching will damage skin integrity and lead to the invasion of bacteria, poor hand hygiene will also lead to cross contamination and other infections.

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Pressure ulcers and incontinence

Gray et al (2006) identified four main factors that contribute to the development of pressure damage and lead to ulceration:

- Interface pressure
- Shear
- Friction
- Moisture.

Sustained high pressure leads to a decreased capillary blood flow, and blood and lymphatic vessel occlusion, which causes tissue ischaemia. This in turn leads to localized necrosis (tissue death) of the muscle, subcutaneous tissue, dermis and epidermis.

Friction and shearing forces can severely damage the skin's integrity, especially when coupled with incontinence. This also increases the risk of developing pressure damage leading to ulceration. Pressure ulcers have been defined by the European Pressure Ulcer Advisory Panel (EPUAP) as an area of localized damage to the skin and tissue caused by friction, pressure, shearing or a combination of all three (DeFloor et al, 2005).

DeFloor et al (2005) also discussed the term 'moisture lesion' to describe a skin lesion associated with incontinence rather than pressure or shear. However, these lesions could also be classified as incontinence associated dermatitis. These lesions can often be wrongly classified as pressure damage.

In a retrospective review, Kingsley (2007) identified the link between diarrhoea and pressure ulcers. Kingsley (2007) identified the increase in the incidence of pressure ulcers during an outbreak in a district general hospital of infectious intestinal disease, caused by *Clostridium difficile* and *Norovirus*. This led to an action plan for a skin care regime to be implemented for all patients with incontinence. It is essential for nurses to be aware that diarrhoea poses a major risk to the skin surrounding the perianal area, and that accurate assessment to prevent skin damage is paramount.

Once IAD has occurred and lead to the development of a lesion or wound, there will now be exudate to add to the cocktail of moisture on the skin. This exudate will cause further damage as it also contains cellular debris and enzymes, which have a corrosive effect on the skin. Dressing this type of wound can be very difficult as adhesives can cause further damage on removal. Traditional skin barriers, such as zinc oxide or petrolatum have been used, but can interfere with absorption of incontinence when using containment products. Numerous liquid film barriers have been developed in recent years, which can be bewildering for any nurse trying to promote an evidence-based skin care regime.

Skin barriers

Many skin cleansers and barrier creams or films are now available on drug tariff. Choosing the most suitable formulation for effective cleansing and protection requires the nurse to be knowledgeable about the contents and constituents of the product. As many nurses are now prescribers, it is essential to be fully informed about what products are available and effective.

It is imperative that the acid mantle of the skin is maintained. Soap and water is not recommended for cleansing a patient with urinary or faecal incontinence as it is alkaline and can upset the pH balance of the skin (Beldon, 2007). Many studies have shown the benefits of using cleansers and skin protectants in cream or film form.

Bliss et al (2007) showed the benefits of a structured skin care regime in a multi-site quasi-experimental study. This included 1918 nursing home residents, a third of whom were doubly incontinent. A skin care regime of cleanser and moisturizing barrier did reduce the incidence of IAD, and also resulted in significant cost savings.

One quasi-experimental study evaluated the effect on pressure ulcer prevalence, incidence and healing time of using a specific body wash and skin protectant in skin care protocols based on Agency for Health Care Policy and Research guidelines (Thompson et al, 2005). They concluded that the use of body wash and skin protectant reduced the incidence of stage 1 and stage 2 pressure ulcers, and that healing time was decreased.

Beekman et al (2009) showed in their literature review that implementing a skin care regime including cleanser and protectant for patients with incontinence helped to prevent IAD and increase healing.

An ideal barrier protectant

The ideal skin cleanser needs to be pH balanced, and a no-rinse formula that eliminates odour, and breaks down dried stool. The ideal barrier cream needs to be hypoallergenic, transparent, breathable, moisturizing, easy to apply or remove and have protective properties. It needs to be suitable for use on both intact and injured skin and adhere to moist or dry skin. It must be suitable for use in conjunction with incontinence pads or other containment products, and be comfortable.

Silicone

The production of skin barriers using silicone polymers, such as dimethicone as a film forming agent, is a new way of protecting compromised skin. Grove et al (1993) showed that the application of a barrier containing silicone gave better protection to denuded stratum corneum when compared with other barrier treatments. Berry et al (2007) suggested that the application of silicone-based barriers was more comfortable for patients compared with the discomfort caused by alcohol-based products.

A study performed by Hoggarth et al (2005) compared six skin care products against a known skin irritant sodium lauryl sulphate. The skin care products were: Aloe Vesta protective Ointment (ConvaTec); Proshield Plus (Healthpoint Fort Worth, Texas); Triple Care Protective Cream (Smith & Nephew); Baza Cleanse & Protect (Coloplast), Calmoseptine (Calmoseptine); and Cavilon One-Step Skin Care Lotion (3M Health Care). The study concluded that dimethicone-containing products demonstrated a higher skin hydration efficacy than petrolatum-containing products.

It is essential for nurses to be aware of the potential irritants that are present in barrier protectants and emollients to ensure that early detection of a reaction can be identified (*Table 1*).

From *Tables 1* and *2*, we can see what a challenge it is for nurses to be aware of all these constituents. It is essential to help nurses to choose the correct product for patients with skin that is compromised by urinary and faecal incontinence.

Voegeli (2010) highlighted the importance of having skin care protocols for patients with compromised skin. He explained that an improvement in skin integrity and a reduction in pressure ulcer incidence rates can be achieved in both residential and hospital settings (Cole et al, 2004; Lyder et al, 2002).

The National Institute for Health and Clinical Excellence (NICE, 2007) reviewed the evidence and concluded that the use of a foam cleanser together with a barrier protectant is more effective than soap and water.

Table 1. Potential Irritants (*From: Joint Formulary Committee 2010)*	
Beeswax	Imidurea
Benzyl alcohol	Isopropyl palmitate
Butylated hydroxyanisole	N-(3-Chloroally) hexamininum Chloride
Butylated hydroxytoluene	Polysorbates
Cetostearyl alcohol	Propylene glycol
Chlorocresol	Sorbic Acid
Edetic acid	Wool fat and related substances including lanolin
Ethylenediamine	Sodium metabisulphate
Fragrances	
Hydroxybenzoates (parabens)	

Table 2. Other constituents of barrier protectants Joint Formulary Committee 2010	
Zinc Oxide	Liquid paraffin
Arachis oil or Castor oil or Cod liver oil	Cetosteryl alcohol
Calcium hydroxide	Cetyl alcohol
Wool fat	Dimethicone
Oleic acid	Calamine
Water	Hydroxybenzoates, benzoin tincture
Beeswax	Titanium dioxide, Titanium peroxide

They recommend foam cleanser in conjunction with barrier protectant for use on patients with urinary and faecal incontinence.

Proshield Foam and Spray cleanser and Proshield Plus skin protectant

Proshield Foam & Spray cleanser and Proshield Plus Skin protectant are licensed in the UK for use on intact and unlike other barrier systems they can be used on injured skin (up to grade 2 pressure damage). Proshield Foam & Spray cleanser and Proshield Plus skin protectant have been used in Canada, USA, Switzerland, Mexico and the Netherlands but are new to the UK.

Proshield Foam & Spray cleanser is a gentle, pH balanced, no rinse cleanser for continence that may be used as a total body cleanser. The cleanser contains solubilisers which the manufacturers report break down faeces. Proshield Plus is a skin protectant that contains dimethicone, binders and co-polymer bioadhesive ingredients, which the manufacturers claim provides a tacky consistency that enables the barrier to remain effectively on the skin's surface. It is gentle, transparent, easy to apply and remove, and can be used in such difficult areas as the sacrum and perineum for intact and injured skin associated with incontinence as it adheres to moist and dry skin to provide barrier protection. A small user evaluation trial was carried out to assess the efficacy of the Proshield system on nine case studies.

Case studies

Methods

A cohort of patients with compromised broken skin and moisture lesions were included in this study. Consent to be included in this study and to be photographed was obtained from all of the participating patients.

Case study 1

Figure 1: above is before, below is after 3 weeks

A 90 year old female with dementia living in a nursing home, who had a cerebrovascular event (CVE) and is PEG fed. She is doubly incontinent, and has suffered recurring episodes of severe excoriation from faecal and urine burns. The carers had been using soap and water as a skin cleanser and Cavilon as a barrier cream for several months. She was also prescribed Canestan cream on occasions for fungal infections. After 1 week of Proshield Foam & Spray cleanser and Proshield Plus barrier cream, there was a reduction in the area of erythema. Staff observed reduced pain during personal hygiene, although due to her dementia a formal pain scale could not be used. This improvement continued during the next 3 weeks.

Case study 2

Figure 2: above is before, below is after 1 week

A 91 year old female living in a residential home who has type 2 diabetes, is morbidly obese, and has hypertension. Due to her weight she struggles with personal care in her groins. As a result she has had recurring fungal infections and excoriation from moisture (see *Figure 2*). She was using soap and water and Canestan cream when she had a fungal infection, with no great improvement. This had continued for several months. Staff started using Proshield Foam & Spray cleanser and Proshield Plus barrier cream. Within 1 week there was no longer any erythema, and the skin had a normal appearance.

Case study 3

Figure 3: above is before, below is after 1 week

A 74 year old male on a neurological rehabilitation ward with sudden onset double incontinence and poor mobility due to myeli-

tis. He had grade 1, 2 and 3 pressure damage as illustrated in *Figure 3* with excoriation on the left and right buttocks. Aqueous cream as a soap substitute and Cavilon as a barrier cream were being used with minimal effect for 2 weeks. After 1 week of using Proshield Foam & Spray cleanser and Proshield and Plus barrier cream, the area of grade 1 and 2 damage was reduced and there was an improvement in general skin condition. The grade 3 pressure damage was treated with a hydrocolloid dressing and the gentleman was nursed on a Permaflow air mattress for pressure relief.

Case study 4

Figure 4: above is before, below is after 1 week

An 85 year old female living in a nursing home. Due to a fractured pelvis she had become immobile and increasingly frail, with double incontinence causing episodes of excoriation to her buttocks and sacrum. The carers were using soap and water as a skin cleanser, with Cavilon as a barrier cream for a few weeks, but she continued to get recurring episodes of excoriation. There was an improvement observed in her skin condition within a week, after using Proshield Foam & Spray cleanser and Proshield Plus barrier cream, see *Figure 4*.

Case study 5

A 65 year old male with Huntingdons Disease, with some urinary leakage. He had some superficial breaks to his sacrum. He was using soap and water only with no barrier cream. After using Proshield Foam & Spray cleanser and Proshield Plus barrier cream for 1 week the breaks had healed but there were new areas of erythema to the inner aspect of his left and right buttock. Staff said that the cream was only being used on the site of damage rather than the whole

Figure 5: above is before, below is after 1 weeks

vulnerable area. However, after being instructed to use the products over the whole area, staff reported that the skin appeared healthy after a further 2 weeks of treatment (see *Figure 5*).

Case study 6

Figure 6: above is before, below is after 3 weeks

A 62 year old male with Parkinsons Disease, living in a community rehabilitation ward with grade 2 pressure damage to his left and right buttock and excoriation from urinary incontinence as illustrated in *Figure 6*. The ward staff were using soap and water and Canisten cream for approximately a week. After using Proshield Foam & Spray cleanser and Proshield Plus barrier cream for a week, the area of grade 2 damage had reduced to a small break and the general skin condition had improved. The skin appeared normal within 3 weeks. No other dressings were used on this patient.

Case study 7

A 91 year old female staying on a community rehabilitation ward after a fall. She had

Figure 7: above is before, below is after 2 weeks

excoriated groins, and a fungal infection that was not responding to Canisten cream after approximately 1 week. Staff used the Proshield Foam & Spray cleanser with the Proshield Plus barrier cream over the Canestan cream for a further week. After that week the erythema had greatly reduced with normal skin being observed after 2 weeks. This may have improved the efficacy of the Canesten cream by sealing the cream in place. See *Figure 7* for the before and after pictures.

Case study 8

Figure 8: above is before, below is after 2 weeks

A 77 year old female with dementia and much reduced mobility living at home and cared for by carers and her son. She recently returned home after a period in respite in a nursing home. She sustained grade 2 pressure damage on her left and right buttock and is doubly incontinent, making her skin vulnerable to damage. The carers were washing the area with soap and water during the 2 weeks in respite care and for the

week back at home. Proshield Foam, and Spray cleanser and Proshield Plus barrier cream was then started and used alongside pressure relieving management. Pressure management involved using a Quattro plus air mattress and a Flotech pressure relieving cushion, with carers visiting four times daily and hoisting her onto a commode and repositioning her. In 2 weeks the skin was healthy as observed in *Figure 8* with the disappearance of the grade 2 damage.

Case study 9

Figure 9: above is before, below is after 1 week

A 90 year old female living in a nursing home with dementia and poor mobility. The carers were using soap and water with Cavilon as a barrier cream for several months. She had a history of excoriation from double incontinence and the area of excoriation was increasing. There was some doubt whether the carers were adhering to the skin care plan of using the Proshield Foam & Spray cleanser and Proshield Plus barrier cream at all times, but due to the deterioration, in the interest of the patient a regime of aqueous cream as a soap substitute and Cavilon was resumed. The staff report the skin is now healthy after 2 weeks with Cavilon barrier cream.

Conclusion

Skin breakdown due to incontinence associated dermatitis and pressure damage can be devastating for our patients. It causes pain and discomfort and can cause major infection, leading to sepsis and death.

With the ever increasing market for skin care products it is essential that nurses keep abreast of what is available so they are able to make recommendations to their patients. More studies, providing robust and rigorous evidence on a large scale are needed to effectively evaluate the differences between skin care products.

Considering the efficiency, efficacy and cost effectiveness is paramount given the financial constraints health organizations are facing. Both incontinence associated dermatitis and pressure ulceration are preventable skin conditions, as is as long as the correct nursing diagnosis and vigilance in assessment, care planning, treatment and evaluation are maintained.

Nurses now have high quality absorbent incontinence products, good skin care products and good pressure relieving equipment at their disposal. Increasing knowledge and understanding of skin breakdown, and how it can be minimized is a fundamental nursing skill. Promoting good, thorough nursing assessment and giving high quality nursing care is the key to prevention. Nurse specialists in tissue viability and continence have a duty of care to ensure that their colleagues in care homes with registered nurses are enabled and empowered.

Although the case studies looked at a very small cohort of patients, these studies suggested that using Proshield Foam and Spray cleanser and Proshield Plus barrier cream in conjunction with good pressure relieving management produced an improvement in general skin condition, even on broken skin. Staff reported liking the product, although their comments are subjective and from observations. Staff also felt they were getting better results over a shorter period than with soap, water and other products. Carers also liked the fact the Proshield Foam and Spray cleanser avoided the need for bowls of water during episodes of incontinence.

Health professionals involved were interested in the fact that Proshield Plus barrier cream is the only barrier system that could be used on superficial broken skin (up to a grade II pressure ulcer associated with incontinence). This potentially avoids the need for frequent dressing changes and dressings rucking, which can potentially cause further damage. No problems were reported with the use of Proshield Plus barrier cream in conjunction with continence pads.

We must consider that the positive case study results may have been partly due to evaluation encouraging a more rigorous skin hygiene regime. However, I feel this product is worthy of further study and consideration.

Declaration of interest.
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Beeckman D, Schoonhoven L, Verhaeghe S, et al (2009) Prevention and treatment of incontinence associated dermatitis: literature review. *J Advanced Nurs* 65(6): 1141-1154

Beldon P (2007) The Impact of Faecal Incontinence on Wound Care Continence UK 1(2): 8-13

Berry J, Black P, Smith R, Stuchfield B (2007) Assessing the value of silicone and hydrocolloid products in stoma care. *Br J Nurs* 16(13): 778-788

Black P, (2007) Peristomal skin care: an overview of available products. *Br J Nurs* 16(17): 1048-1056

Bliss D, Zehrer C, Savik K et al (2007) An Economic Evaluation of Four Skin Damage Prevention Regimes in Nursing Home Residents with Incontinence: Economics of Skin Damage Prevention. *J Wound Ostomy Continence Nurs* 34(2): 143-152

Cole L, Nesbitt C (2004) A three-year multi-phase pressure ulcer prevalence/incidence study in a regional referral hospital. *Ostomy Wound Manage* 50(11): 33-40

Defloor T, Schoonhoven L, Fletcher J et al (2005) Statement of the European Pressure Ulcer Advisory Panel (EPUAP) *J Wound Ostomy Continence Nurs.* 32(5):302-6

Farage M, Miller K, Berardesca E et al (2007) Incontinence in the aged:contact dermatitis and other cutaneous consequences. *Contact Dermatitis* 57(4): 211-217

Grey J, Harding K, Enoch S (2006) Pressure Ulcers *BMJ* 332(7539): 472-475

Gray M, Ratliff C, Donovan A (2002) Perineal skin care for the incontinent patient. *Adv Skin Wound Care* 15(4):170-5

Grove G, Lutz J, Leyden J, Swartzmiller D (1993) *Data on file at 3M Health Care*, St Paul USA

Hoggarth A, Waring M, Alexander J et al (2005) A controlled, three part trial to investigate the barrier function of the skin hydration properties of six skin protectants. *Ostomy Wound Manage.* 51(12): 30-42

Joint Formulary Committee (2010) *British National Formulary 59.* BMJ Publishing Group Ltd and RPS Publishing, London

Kingsley A (2007) A retrospective review linking diarrhea to pressure ulcers. *Wounds UK* 3 (4): 14-18

Lyder C, Shannon R, Empleo-Frazier O, McGeHee D, White C (2002) A Comprehensive program to prevent pressure ulcers in long-term care: exploring costs and outcomes *Ostomy Wound Manage.* 48 (4): 52-62

Nathan L (1996) Vulvovaginal disorders in the elderly woman. *Clin Obstet Gynecol* 39(4):933-45

NICE (2007) *Faecal Incontinence The Management of Faecal Incontinence in adults.* National Collaborating Centre for Acute Care at the Royal college of Surgeons of England, London.

Thompson P, Langemo D, Anderson J et al (2005) Skin Care Protocols for Presure Ulcers and Incontinence in Long-term Care: A Quasi-Experimental Study. *Adv in Skin and Wound Care* 18(8):422-429

Voegeli D (2010) Care or harm: exploring essential components in skin care regimes. *Br J Nurs* 19 (13): 810-819

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