Management of tissue excoriation in older patients with urinary or faecal incontinence

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Summary

This article discusses good skin care in relation to the management of incontinence. It outlines the structure and functions of the skin and describes how the skin changes as we age. It examines how incontinence can damage the skin and provides an overview of the current management methods that are used to prevent tissue excoriation. It also suggests an effective alternative that could be used if previous strategies have failed and the skin begins to breakdown, that is, the use of a silver regimen.

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THE SKIN is the largest body organ and one of the most important (Tortora and Anagnostakos 1990, Gawkrodger 1997). It is an outer protective covering that is usually unbroken. It has a surface area of approximately 1.8m^2 and weighs approximately 3kg. It hosts a variety of appendages such as blood vessels, nerves, sweat glands, sebaceous (oil) glands and sensory receptors, making it a complex and multifunctional organ.

The skin varies in its thickness depending on the region of the body; it is thinner over the eyelids (0.6mm) and thicker (3mm or more) on the back, palms and soles (Gawkrodger 1997, Stephen-Haynes and Gibson 2003). It consists of three separate layers, the epidermis, dermis and subcutis (Figure 1). These distinct layers are attached to each other, but are segregated by an undulating or wavy borderline known as the Rete ridge (Powell and Soon 2002).

The epidermal layer is the rough outer surface that consists of many layers of epithelial cells. As new epithelial cells are made the old ones die and slough off the skin, providing an impermeable yet renewable barrier. The epidermis is maintained by diffusion as nutrients contained in interstitial tissue fluid pass through the dermal blood vessels. This process supplies the epidermis with essential vitamins, minerals and oxygen for regeneration.

The underlying dermal layer is vascular connective tissue that receives one third of the body's circulating blood volume (Flanagan and Culley 1996).

The subcutis, often referred to as subcutaneous tissue, provides support for the dermis and consists of adipose (fat) tissue, connective tissue and blood vessels (Gawkrodger 1997, Graham-Brown and Bourke 1998).

Healthy skin serves several purposes: it protects the internal organs chemically, physically and biologically (Stephen-Haynes and Gibson 2003) (Box 1). Skin secretions and melanin provide chemical protection. A plethora of commensal bacteria and yeasts cover the skin's surface; the acidity of the skin's secretions reduces their proliferation and controls possible overgrowth. It has also been suggested that sebum (an oily substance secreted by the sebaceous glands) contains chemicals that can destroy some bacteria. Melanin is a chemical pigment that protects vulnerable tissue from over-exposure to the sun's harmful ultraviolet rays (Graham-Brown and Bourke 1998). The epidermis is hard, which means that the skin also protects against physical and mechanical damage such as abrasions or accidental injury. It also prevents the diffusion of water and/or water-soluble compounds (electrolytes and proteins), thus safeguarding both their loss out of and entry into the body (Mairis 1992).

The skin controls the body's temperature through a process called thermoregulation (Tortora and Anagnostakos 1990). For example,

when there is a decrease in the external temperature and the skin becomes cold, the dermal vessels constrict keeping blood closer to the body's core. We may start to shake to generate heat energy and experience 'goose bumps'; these are caused by the erector pili muscles contracting, forcing the hairs to stand on end to provide an insulating layer of air at the surface of the skin. These responses are an attempt to conserve body heat and maintain a safe body temperature (Toole and Toole 1991).

Alternatively, when the external temperature rises, the dermal blood vessels dilate and our appearance may become flushed as blood passes closer to the surface of the skin. The sweat glands may increase their secretory activity, resulting in increased perspiration (sweating). The arrector pili muscles relax, causing the hairs to lie flat. A cooling effect is obtained when sweat evaporates off the surface of the skin, thus preventing us from overheating (Clark 1993).

Tortora and Anagnostakos (1990) note that removal of waste products is made easier by the skin. Although the majority of nitrogen-containing waste is expelled from the body as urine, small amounts of urea, uric acid and ammonia are excreted from the body in sweat.

The skin plays a pivotal role in the synthesis of vitamin D. Epidermal cells contain molecules of cholesterol, which can be irradiated by ultraviolet light and converted to vitamin D (Tortora and Anagnostakos 1990). Vitamin D is carried in the dermal vessels to other parts of the body and plays a precursory role in calcium metabolism, since calcium cannot be absorbed without this vitamin.

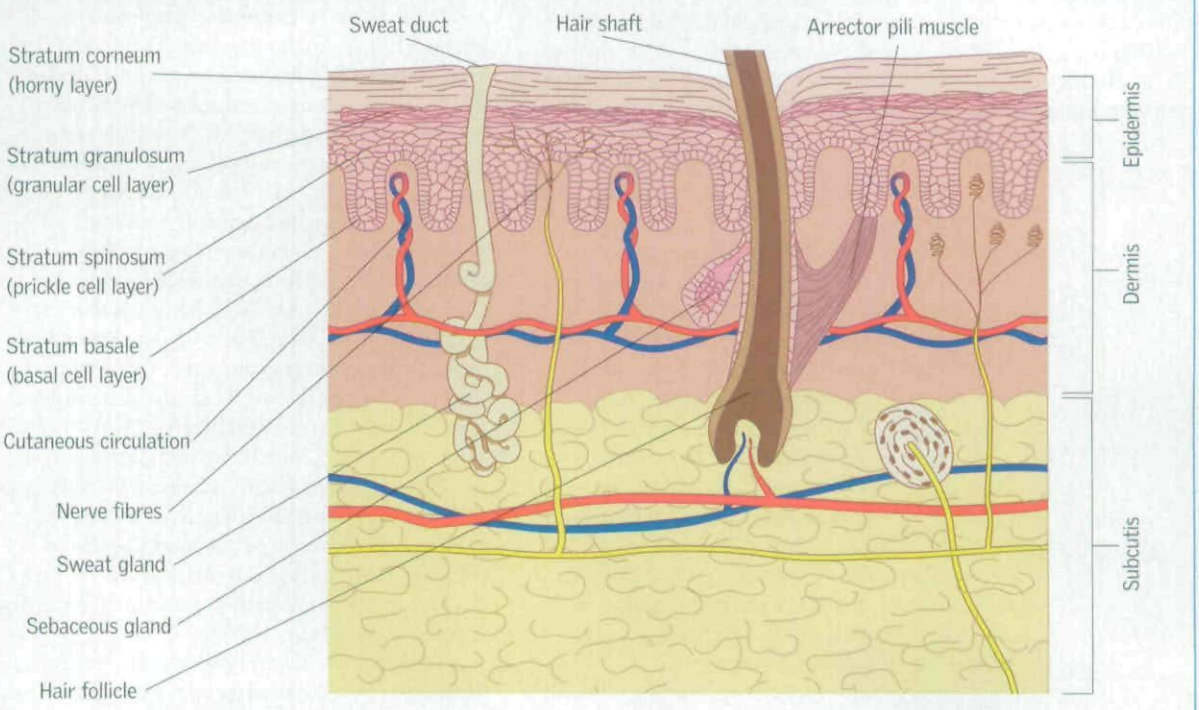
The skin allows us to detect external stimuli through touch, pressure and pain. The skin contains numerous nerve endings and tactile receptors. If activated, the receptors send impulses to the brain to evaluate whether a tactile response is required (Clark 1993). For example, if we were to touch an extremely hot object, the tactile response from the brain would be to instantaneously remove the part of the body in contact with the heat source to prevent skin damage.

In summary, the skin is a metabolically active organ. Unlike most other organs in the body, its cells are constantly dying and being replaced throughout life. It consists of tissues structurally joined together to perform specific tasks.

Maintaining skin integrity is a complex process and one that is often taken for granted until damage occurs. Skin damage can happen easily in many different ways, and whatever the cause, the end result is often a wound. When wounds occur the protective function of the skin

FIGURE 1

Structure of the skin



is breached. It is therefore important to close the defect as quickly as possible, thereby preventing infection and allowing normal skin function to occur (Timmons 2006).

Skin and ageing There are a number of factors that may affect skin function (Holloway and Jones 2005), all of which may be exacerbated by ageing. As we get older the skin undergoes many structural changes, which may make it susceptible to disease and damage. Such changes include (Desai 1997):

- Thinning of the epidermis.
- Reduced vascularity.
- Reduced elasticity.
- Dehydration due to loss of water content.
- Decreased sensation.
- Reduced sebum production.

All of these changes have the potential to impede the skin's primary function of protection. Furthermore, this protective function can be rapidly weakened if the individual experiences bouts of faecal and/or urinary incontinence.

Incontinence and its effect on skin

Involuntary loss of control of the bladder, bowels or both, more often referred to as incontinence (Cooper and Gray 2001), is a condition that mainly affects older patients (Department of Health (DH) 2000). It has been suggested that faecal incontinence may affect 1 per cent of adults in their own home and one in four in nursing and residential accommodation (DH 2000). Recent data suggest that 50 per cent of nursing home residents in Britain and Northern Ireland have urinary incontinence (Durrant and Snape 2003). Bale *et al* (2004), in a study of older patients cared for in a nursing home, found that

BOX 1

Main functions of the skin

- Protection
- Immunity
- Excretion
- Temperature regulation
- Reception of stimuli
- Synthesis of vitamin D

(Tortora and Anagnostakos 1990)

FIGURE 2

Severe excoriation as a result of urinary and faecal incontinence

29 per cent of residents were incontinent of urine, 65 per cent were doubly incontinent and 6 per cent were catheterised. Little evidence exists of the prevalence of incontinence in the acute setting (Lyder 1997, Hughes 2002). Skin care of incontinent patients is a significant challenge for practitioners (Cooper 2000).

Continuous or prolonged exposure of the skin to urine and/or faeces can result in loss of barrier function and epithelial breakdown. This is due to the skin becoming too moist and fragile (macerated) and changes in its pH (Gray *et al* 2002). The pH of healthy skin is usually between 4.0 and 5.5 (Cooper and Gray 2001), making it slightly acidic and inhibiting the growth of bacteria (Anthony 1993). The mixture of urine and faeces on the skin alters the pH, making it more alkaline and ideal for bacterial proliferation (Neander 1990). The prolonged effects of this can result in local dermatitis, tissue excoriation (Figure 2), irritation and/or pain, an increased risk of pressure ulceration and possible infection (Berg *et al* 1986, Barbenel *et al* 1997, Cooper 2000).

Management of compromised skin

The first and most common method of managing the skin of incontinent patients is with soap, warm water, a flannel or soft wipe and towel to dry. It is still not known what effect water temperature has on the integrity of the skin (Voegeli 2005). For the patient who has occasional incontinence this method may be acceptable. However, the frequency of washing will be increased if the patient is continuously wet and/or soiled. For this reason practitioners should be aware of the potential detrimental effects that some soaps may have on the skin.

Most soaps are known to have a drying effect because they decrease the natural sebum content of the epidermis (Cork 1997). They may also leave residues on the skin and if they are

perfumed there is the possibility of chemical irritation, which may lead to skin breakdown (Wortzman 1991, Kirsner and Froelich 1998). Friction damage from repeatedly drying the skin after cleansing may also reduce the integrity of the epithelium, thus exacerbating the problem (Huh *et al* 2002). Therefore, if soap is to be used to cleanse the skin of an incontinent patient, a mild, pH-balanced and non-scented product should be used, for example, baby soap or shampoo.

Foam cleansers are another popular product advocated in healthcare settings (Cooper 2000). Cooper and Gray (2001) found these products were far better at maintaining the skin of incontinent patients than soap and water. They reduced the potential for friction damage, as well as preventing the skin from drying out because of their emollient content, which moisturised the skin thus maintaining its hydration after cleansing. However, it is recommended that the practitioner understands how these products should be used because a common error observed in clinical practice is the incorrect application of the foam. The simple mistake of applying the cleanser onto a soft wipe instead of directly onto the patient's skin is often made. By doing this the practitioner will reduce the efficacy of the product because it must be in contact with the skin if it is to reduce the pH and rehydrate and moisturise it.

Barrier creams are often used in conjunction with a suitable cleansing regimen, for example, Sudocrem®, Metanium® and Cavilon® Durable Barrier Cream. These are topical preparations manufactured to provide a protective barrier between the skin and the irritant effects of urine and/or faeces. This barrier is achieved by applying a thin layer over compromised skin and intact skin that is at risk of tissue damage. However, over-application of these products may reduce the effectiveness of continence pads if worn by clogging or interfering with their absorbency (Williams 2001, Newton and Cameron 2005), thus increasing the risk of maceration and possible excoriation.

Protection of broken skin may be achieved through the use of a film barrier, for example, Cavilon® No Sting Barrier Film, an alcohol-free skin protector that, once applied, can last for up to 72 hours (Williams 1998). In many cases this product is effective in managing damaged skin. However, if the patient has antibiotic or parenteral nutrition-induced faecal incontinence or *Clostridium difficile*, he or she can be washed several times an hour. The question to be asked in these situations is 'how often should Cavilon® be applied?'

Faecal collectors are useful in these situations, however, not every patient is suitable for or willing to have these devices fitted. For this reason Nottingham University Hospitals NHS Trust has adopted an alternative approach to managing skin excoriation caused by incontinence.

An alternative approach to managing excoriation

When asked to describe the feeling of tissue excoriation to the tissue viability nurse, many older patients describe it as 'an agonising burning sensation', 'dreading the thought of being cleaned again', 'I can't bear to be touched' and 'I just want the pain to go away'. As excoriation is caused by a chemical reaction damaging the surface of the skin (Cooper and Gray 2001), the effect is, in essence, a chemical burn.

For many years burns patients have been treated with a cream containing silver, which is renowned for its broad-spectrum antimicrobial properties (Russell and Hugo 1994, Lansdown 2002a, Thomas and McCubbin 2003). Flamazine® is a common example. It is a white cream containing silver sulfadiazine 1% w/v in a semi-solid oil in water emulsion. Its main therapeutic indications are for the prophylaxis and treatment of infection in burns wounds (Holt 1998, Howell 1998). It is also used in the treatment and management of leg ulcers and pressure ulcers and abrasions (British National Formulary 2006).

Locally, this product has been successful in rapidly reducing the effects of tissue excoriation associated with incontinence. However, there is no published evidence to date that promotes the use of silver sulfadiazine 1% cream for this condition.

After every episode of incontinence the skin should be gently cleansed with an appropriate cleansing agent and allowed to dry. A thin layer of Flamazine® cream should then be applied to the affected area(s); this should be carried out after every incontinent episode, or up to four times a day until general cleansing or barrier creams or films can be used to manage the problem. If, after two weeks, the problem is not resolving then an alternative method of managing the incontinence should be sought, for example, a faecal collection system or catheterisation, if this has not previously been considered. The benefits of using this product are usually observed in 24 to 48 hours, and most patients will state that they feel much more comfortable and that the pain has reduced.

Generally, silver sulfadiazine is well tolerated, but there have been occasional reports of

irritancy, argyria (staining, a dull blue or grey colouration of the skin) and associated stinging (Lansdown and Williams 2004). However, this is more common when using silver nitrate compounds (Lansdown 2002b). To be systemically toxic, silver must be absorbed in sufficient amounts to evoke irreversible changes in a target organ such as the kidney or liver. Coombes *et al* (1992) documented that there were no measurable changes in serum silver levels (normal level less than 2.3mcg/l) in two volunteers exposed to daily topical applications (3-5mm depth) of silver sulfadiazine for two weeks. As only a thin layer (less than 1mm depth) of cream is applied to the incontinent patient using the Flamazine® regimen, it could be argued that the risk of high levels of silver being absorbed systemically is low.

Flamazine® is relatively thin in texture. The advantage of this is that it is almost painless on application and a small amount can be spread over a large area. It also provides a soothing effect (Kagan and Smith 2000). The risk of infection is also reduced because of the antimicrobial properties of the silver in the cream. An example of the benefits of the Flamazine® cream method is outlined in Box 2. Figure 3 shows the skin before the application of Flamazine® cream and Figure 4 demonstrates skin improvement after one week of applying the cream.

BOX 2

Case study of excoriation treated with Flamazine® cream

The patient, a 91-year-old female, presented with severe tissue excoriation caused by a two-week episode of faecal incontinence as a result of antibiotic therapy for a recent chest infection. Her skin was not responding to a regimen of general cleansing (soap, warm water and towel drying and Cavilon® No Sting Barrier Film).

The patient was commenced on a Flamazine® cream regimen after every episode of incontinence. She was then nursed using continence pads and pants. Figure 3 shows the patient's skin before commencing the Flamazine® cream regimen. The patient's skin was dry, possibly due to the effects of soap, it was discoloured and had localised excoriation with superficial broken areas that were hypersensitive to touch and cleansing. Figure 4 shows the significant improvement of the patient's skin one week later. The skin was well hydrated and supple and almost all of the superficial broken areas had healed. The patient also stated a decrease in pain and discomfort during cleansing. The patient's skin was subsequently managed using a general cleansing regimen (soap, warm water and towel drying) and the application of a barrier cream.

FIGURE 3

Skin before application of Flamazine® cream

PHOTO: ALISON TYRER

FIGURE 4

Skin one week after application of Flamazine® cream

PHOTO: ALISON TYRER

While the author does not recommend that the silver sulfadiazine regimen be instigated as soon as incontinence becomes a problem, he does recommend that staff in local trusts and care settings develop a skin care protocol that accommodates this method if skin damage, pain and risk of infection are evident. At present there is a lack of evidence to support the use of this regimen and its efficacy if used for longer than two weeks. The only way its benefits can be promoted are through continued use and publication of findings, which the author recommends. All of the management techniques described in this article are secondary to establishing and addressing the cause of the patient's incontinence.

Conclusion

Skin care is a fundamental aspect of nursing. For nurses to be effective at this they should have a sound knowledge of the skin's structure and

function. They also need to be aware of skin changes as a result of the ageing process, and the damage that faecal and/or urinary incontinence may cause to the protective function that the skin provides. The mainstay of treatment for managing compromised skin is with a mild pH-balanced soap, warm water and a soft wipe. However, other methods are available if the skin becomes further compromised, for example, barrier creams and films. This article provides an overview of the current management methods that could be used to prevent tissue excoriation. It also suggests the use of silver sulfadiazine 1% cream as a simple yet effective alternative that could be used if previous strategies have failed and the patient's skin begins to breakdown **NS**

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