Skin care for the protection and treatment of incontinence associated dermatitis (IAD) to minimise susceptibility for pressure injury (PI) development

ABSTRACT

This manuscript summarises the important clinical concept of having a skin care protocol to protect and treat skin against incontinence associated dermatitis (IAD) to prevent and minimise the association IAD has on the subsequent development of pressure injuries (PI).

Skin protection for all skin tones is imperative to protect skin against exaggerated late presentations of IAD.

Keywords IAD, incontinence associated dermatitis, IAD skin protection, pressure injuries

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INTRODUCTION

Preserving the barrier function of the skin is an important clinical practice role that is often found in the nursing practice domain. Incontinence associated dermatitis (IAD) frequently includes severe discomfort to patients and tends to develop quickly in white skinned individuals and later, but in exaggerated form, in persons with darker tones of skin; this is due to the first clinical visual cues being obscured and not identified. Using evidence from the literature with clinical examples, the authors will highlight zinc oxide paste as a care option in the clinical setting due to ease of availability and relative low cost.

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INCONTINENCE ASSOCIATED DERMATITIS (IAD)

IAD is one of the four aetiologies included in the moisture associated dermatitis (MASD) category. IAD has been defined in the literature as a "form of irritant contact dermatitis that develops from chronic exposure to urine or liquid stool"[1–3]. The aetiology is believed to be from prolonged exposure of skin to urine or liquid stool (often in combination), with a resulting change of the normal acid pH of the skin into an alkaline pH level.[1–6] Once the 'acid mantle' of the skin is compromised, the skin can undergo an inflammatory response (erythema) to the moisture from urine and/or faeces and the skin barrier may become compromised[1–6].

Red skin (erythema) looks different depending on the natural pigmentation of the skin[5]. In brown or black skin, the erythema may not appear red but can have a darker tone to the surrounding skin and create diagnostic difficulty in examining the skin (Figure 1). Skin damage prevention is always better than treatment, but early skin damage is often harder to detect in darker skin tones[5], leading to late initiation of interventions.

PRESSURE INJURIES (PI) AND IAD IN COMBINATION

The literature supports an association between IAD and pressure injury (PI) formation, although the aetiology differs between the two[7–11]. Lachenbruch et al.[8] analysed 176,689 patients and found that 92,889 persons with incontinence had a 16.3% incidence of PIs as opposed to continent persons (n=83,800) with an incidence of 4.1%. IAD was associated with a higher incidence of PIs than predicted by the Braden Risk Scale Score alone. Gray and Giuliano[9] evaluated 5,342 patients, of whom 2,492 (46.6%) were incontinent of urine. They

concluded that 21.3% of IAD may be associated with secondary yeast infection, immobility and an increased incidence of sacral PIs[9].

Clinically, PIs present themselves over distinct bony prominences with distinct borders[10]. IAD, on the other hand, has a more diffuse appearance that may be present in the perineal area and spread out over the buttock area, causing a distinct dermatitis on the skin in prolonged contact with the incontinence content[2,3,5,10]. When they co-exist, the IAD diffuse pattern remains in exaggerated form[8,9] (Figure 2). McNichol and colleagues[4] summarised the literature on the importance of treating IAD aggressively in an attempt to decrease the subsequent development of PIs.

Further support to this IAD/PI association is documented in the most recent European Pressure Ulcer Advisory Panel, National Pressure Injury Advisory Panel, and Pan Pacific Pressure Injury Alliance Pressure Injury Guideline[10]. Three guideline elements are crucial to practice with regards to IAD and PI co-existence.

The difference in clinical presentation of erythema based on skin melatonin content

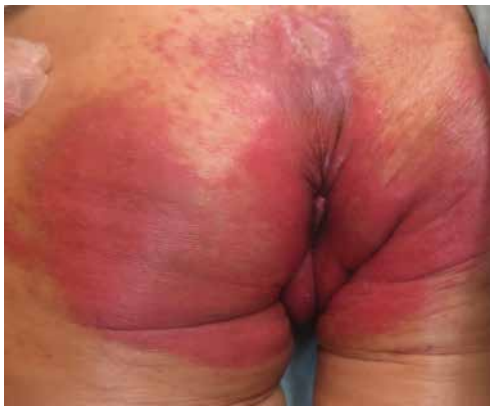
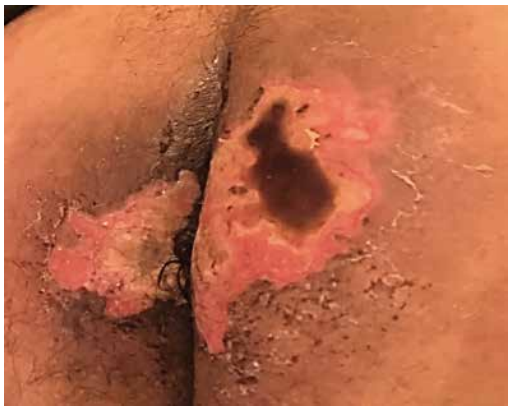
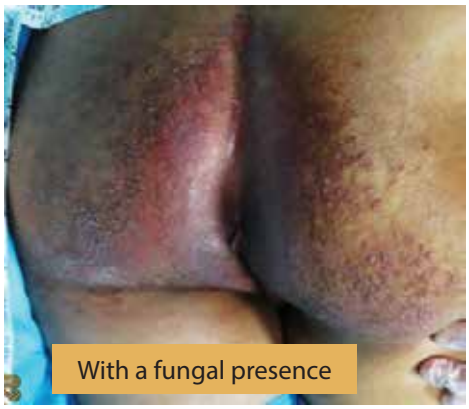
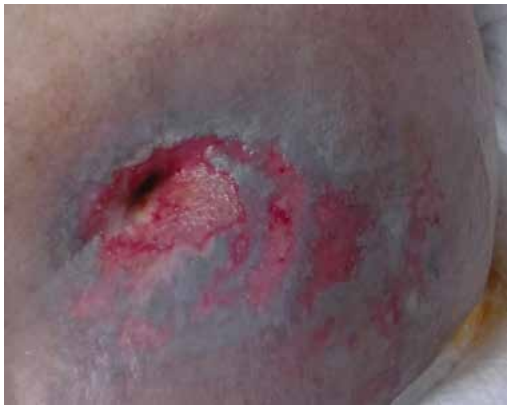
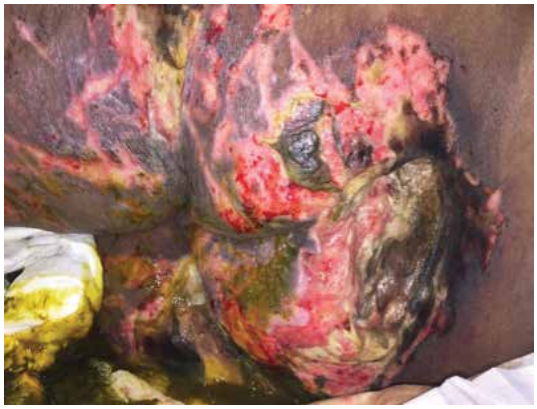
	Superficial presentation with or without fungal involvement	Clinical presentation of IAD and PI co-existing regardless which appeared first
Yellow skin		
Brown skin		
Black skin		

Figure 1. Clinical presentation of erythema and IAD co-existing with PI as seen in darker skin tones (Table and photos © Smart & Sibbald)

Pressure injuries clearly visible over three main bony prominences – sacrum and two ischial tuberosities	Pressure injuries combined with incontinence associated moisture damage (IAD) with bony prominences obscured by additional skin damage
	

Figure 2. PIs alone and when co-existing with IAD in darker skinned persons (Table and photos © Smart & Sibbald)

The one relates to the loss of the inert protective ability of the skin with the statement: "Moisture associated skin damage may compromise the epidermis barrier function and hence predispose tissue to pressure injury"[10(p.21)]. The other relates to the ability of skin to tolerate additional forces if compromised by surface moisture: "Skin surface moisture combined with pressure and/or shear can increase the incidence of pressure injuries"[10(p.86)].

Yet another statement, that may sound contradictory in nature, also advises against ultra-dry dehydrated or flaky skin as a risk factor for skin breakdown when in contact with incontinence content:

> *Although research directly linking skin moisturizing to reduction in pressure injury incidence is lacking, one epidemiological study in hospitalized individuals with limited mobility (n=286) noted that dry skin was a significant and independent risk factor for pressure injuries in a multi-variate analysis 21 (Level 3 prognostic). Regular application of a moisturizer in a skin hygiene regimen is suggested for promoting skin hydration and preventing other adverse skin conditions, including dry skin and skin tears*[10(p.86)].

BARRIER FUNCTION AND SKIN PROTECTIVE INTERVENTION STRATEGIES

The key is to keep skin well moisturised as that maintains the moisture protective gradient of skin[4,8,12,13]. In white skinned individuals this moisture unit protective gradient is three times lower than in darker skinned persons (2:6 ratio)[12]. This explains the risk of dry skin as a factor in moisture damage from stool enzymes and urine urea that occurs in white skinned persons far quicker than in persons with darker skin tones. The quality of the stratum corneum is also important as it is on its thinnest on the two opposite ends of the age continuum (babies[13] and the frail aged[14]). Early intervention to treat the cause of the incontinence needs to be achieved in conjunction with a skin care protocol to protect, maintain and restore the skin's barrier[4–8,11].

In clinical practice, raising awareness of staff nurses and non-healthcare professionals and including the person's family involved in their care about the use of appropriate skin cleansing products is vital. Educational enablers are easy ways to summarise key points and provide caregiver learnings about essential components regarding care. One such educational

	ACT © Ayello & Sibbald 2016	
A	Assess	Assessment skill present for correct skin assessment Pro-active approach with correct timing
C	Cleanse	Cleansing directly after incontinence incidence Maintain pH balance by correct product use Procedural correctness in preventing skin micro-trauma
T	Treat	Address the cause of incontinence Protect vulnerable skin against moisture before injury occurs Avoid the presence of additional devices that may lead to trauma Use appropriate and available products correctly Timing of product application is crucial

Figure 3. Clinical enabler to guide skin care in the presence of IAD

enabler for IAD skin care is the use of the ACT mnemonic to guide the clinician into a comprehensive skin care approach[4] (Figure 3).

Skin care options

Skin cleansing after episodes of incontinence has evidence at B2 level as an effective intervention to remove residual surface debris from stool or urine on skin[10]. Neutral soaps or superfatted products[15] are better options than ordinary soaps that are too alkaline (pH 9–10). This pH extreme either disrupts the skin's acid mantle or damages structural proteins present in skin. Proper rinsing and gently patting the skin dry add additional value to skin protection as it prevents vigorous rubbing or massaging that may lead to micro-damage of the skin and substructures[10,11].

Use of skin barriers

The natural moisturising factor of skin is achieved by in-built humectants to keep the skin surface moisture content at 10% for intact skin[14]. Products that do not alter the pH (as bacteria thrive in an alkaline environment[10]) and provide a barrier from incontinence are preferable and imperative to achieve better skin restoration outcomes[4–8,16,17]. Moisturisers frequently used in skin protection protocols could be either in a humectant or an emollient form. Humectants are available in many forms that may contain liquid-forming acrylates, ceramides, urea, lactic acid or glycerin, with the purpose to bind water to the skin surface[16,17]. It may cause local stinging and burning when water is drawn from the deeper layers. If applied after washing or bathing while the skin is still damp (within 2–3 minutes), this is prevented[16]. Emollients, on the other hand, can be applied at any time; they prevent insensible losses of moisture from the skin surface[18]. Since skin damaged from IAD can be painful, products that do not sting or burn on application may be better to address patient-centred concerns of pain management.

Zinc oxide as an example of an emollient in IAD preventative care

Zinc oxide is an enhanced barrier that prevents bacteria, contact irritants (e.g. stool, urine) and allergens from penetrating the skin. In zinc oxide ointment preparations, zinc oxide is combined with petrolatum as it creates a 'stiff' barrier, providing additional skin adherence and protection. It is less likely to soften or migrate from the skin into any co-existing deeper wound in that same area than with the petrolatum base alone[18].

The 2016 Cochrane review on the prevention and treatment of IAD in adults[17] cited several trials on zinc ointment that prevented or successfully treated IAD. The zinc oxide ointments do not always need to be removed if the surface is clean, but can be left to fill in the spaces. By using a clean tongue depressor to spread the zinc oxide preparation evenly, it helps to minimise the frictional resistance on the skin often encountered in application. It is well known that the topical application of zinc on skin adds to enhancement of the local defence systems in skin against superficial infection, while increasing epithelium migration to quickly cover any small lesion in the area[18]. Since the German dermatologist Unna created the zinc oxide paste bandage for venous ulcers in 1895, sufficient evidence has existed on its effect on aiding skin healing, with no currently documented adverse systemic effects encountered[16]. Although further robust studies are needed, zinc paste preparations are known to be effective skin protectants[17] and are safe enough for use on babies[13].

From a practice perspective, on skin without erythema or in the presence of mild redness, a zinc oxide barrier can be applied with ease using a gloved hand or tongue depressor. If there are erosions (loss of surface epidermis with an epidermal base as opposed to a dermal or deeper base) or satellite papules or pustules indicating candidiasis, a topical antifungal agent would then be required as a first layer. The antifungal agent can be applied first to the skin as a treatment and then the protective layer of zinc oxide is added as the second layer. This often poses as a practice challenge, as application in the presence of moisture is difficult. By layering the zinc ointment on a carrier medium (either on plain gauze or on impregnated gauze if available) and then applying this carrier as a last layer upside down on the area, this challenge can be averted. If the zinc oxide wears off between episodes of incontinence, a repeat layer can be applied once or twice a day. With consistent episodes of incontinence, skin cleansing, gentle pat drying and barrier ointment application should be repeated every time as soon as the incontinence occurs[10,11].

CONCLUSION

Healthy skin requires it to be intact and have a stratum corneum moisture content of 10%. Incontinence of stool and urine can compromise this barrier in both white and darker skinned persons while adding to susceptibility of IAD and PI development. Skin protection for all skin tones is imperative to protect darker skin against exaggerated late presentations of IAD. Zinc oxide ointment provides an evidence-based ideal skin barrier that is readily available even in the most resource restricted environments. Proper application and use thereof has sufficient evidence[10] to incorporate this in skin protective strategies to prevent and treat this common skin problem, especially in the young and aging populations with incontinence issues.

CONFLICT OF INTEREST

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