

The role of emollients in maintaining skin integrity

KEY WORDS

- ▶ Emollients
- ▶ Skin barrier
- ▶ Skin health
- ▶ Ageing skin

Patients with wounds may have compromised skin healing ability, and many will be older people; therefore, assessing and caring for surrounding skin is extremely important. The article will discuss the importance of skin health and skin barrier repair to prevent dry skin. It will provide practical guidance on understanding emollient use in wound care patients with vulnerable skin and discuss the evidence base for complete emollient therapy (CET). Information will be given on different types of emollients and guidance on good prescribing practice.

Emollients are the most important treatment in dry skin and dry skin diseases, including atopic eczema, asteatotic eczema and irritant contact dermatitis (Cork and Danby, 2009). The terms ‘moisturiser’ and ‘emollient’ are often used interchangeably: ‘moisturiser’ is considered cosmetic terminology, whereas an emollient is defined as a lipid or oil that hydrates and improves the appearance of the skin, reduces clinical symptoms of dryness and scaling, and improves sensation such as itching and tightness (Loden, 2003).

It is important to distinguish between emollient and barrier preparations. Barrier preparations are usually applied to areas of skin that are vulnerable to breakdown (e.g. the sacral area), rather than large areas (e.g. whole limbs). Barrier preparations do share characteristics with emollients, but have added ingredients that form a barrier specifically to interfere with absorption and reduce the penetration of allergens (Zhai and Maibach, 2006). This paper will focus on emollient therapy rather than skin barrier protection.

Emollients are available in a wide range of formulations, including wash products, lotions, gels, creams and ointments. Complete emollient therapy (CET) is defined as ‘everything that goes on the skin should be emollient-based and all soaps replaced with emollient wash products’ (Cork, 1997). Emollients are essential for promoting skin health, preventing dry skin and repairing the skin barrier, which is compromised in chronic inflammatory skin conditions and as a result of ageing (Seyfarth et al, 2011).

MAINTAINING SKIN HEALTH

Why skin health is important

The past half-century has seen a large increase in the prevalence of atopic diseases (atopic eczema, asthma and hay fever). In the early 1950s, the prevalence of eczema in children in the UK was under 5%; it now affects around a quarter of pre-school age children and continues to rise (Schofield, Grindlay and Williams, 2009). There are several types of eczema, which are increasingly common in older people: discoid eczema, varicose eczema and asteatotic eczema (Schofield, Grindlay and Williams, 2009). In addition, up to 75% of older people are diagnosed with clinically significant xerotic cutis (dry skin) (Yalcin et al, 2006).

This rise in prevalence may be due to lifestyle issues, with daily showering and bathing potentially playing a dominant role (NICE, 2007). The use of harsh detergents can compromise the skin barrier, allowing potential pathogens and allergens into the deeper layers of the skin. In older people, chronic diseases, drugs and environmental factors also damage skin barrier integrity (Yalcin et al, 2006).

Damage to the skin surface also renders it itchy and dry. Rubbing or scratching causes further damage and exposes skin to the risk of secondary infection. In turn, inflammation switches off the natural processes that maintain the skin barrier, which creates a vicious cycle.

Understanding normal skin barrier function

The epidermis has a barrier function, preventing water loss from the surface of the skin and

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pathogens and potential allergens from invading our bodies. Without it we would die within a few hours. Understanding the skin's physiology is central to appreciating the role of emollients in our management of the skin.

In the normal adult skin barrier, the cuboidal cells of the stratum granulosum develop intracellular granules of waxy material (mainly ceramide) as well as a large protein called profilaggrin. These granules of ceramide are oozed out from the cell into the intercellular space, producing a 'lipid lamellar envelope', which seals the spaces between the cells – rather like the cement around the bricks in a wall

(Figure 1a).

The profilaggrin breaks down into filaggrin (so-called because it aggregates micro-filaments), which binds with filaments that are also produced in this layer. As they aggregate, the complexes undergo torsion collapse (rather like an ironing board being put away), which converts the cuboidal cells into the flatter, overlapping cells seen in the stratum corneum. This filaggrin is then broken down into constituent amino acids, urea and a number of other small acid molecules, known collectively as natural moisturising factors (NMF).

These NMF have powerful humectant properties, drawing and retaining water into the surface cells, further sealing the barrier. They are also all acidic and therefore drop the surface pH of the skin from around 7.5 below the stratum corneum to around 4.5 on the surface. This acidic environment is critical for a healthy surface epidermis, controlling protease activity (enzymes that digest the bonds, or 'corneodesmosomes' that hold the cells on the surface together), as well as having important antiseptic properties (Rippke et al, 2004).

At the same time, sebaceous gland activity releases an oily material from the follicular infundibulum, forming a film on the skin surface. Sweat is also acidic and further contributes to maintaining the normal healthy acidic surface of the skin.

When the skin barrier is broken down or impaired by age or chronic inflammatory skin disease (Figure 1b), there is a key reduction in stratum corneum lipids (ceramide, cholesterol and free fatty acids) and NMFs. This allows transepidermal water loss (TEWL) and entry of irritants and allergens, which can cause an inflammatory reaction within the skin.

The ageing skin barrier

For everyone over the age of 60 years, the skin barrier is disrupted. As the skin gradually becomes thinner, the normal functioning of the skin barrier is compromised, causing dry skin (xerosis cutis) and making the skin more vulnerable (White et al, 2012).

The graph (Figure 2) demonstrates the physiological effects of ageing skin, which start to develop over the age of 40 years. All people over 60 years have decreased skin integrity (White et al, 2012).

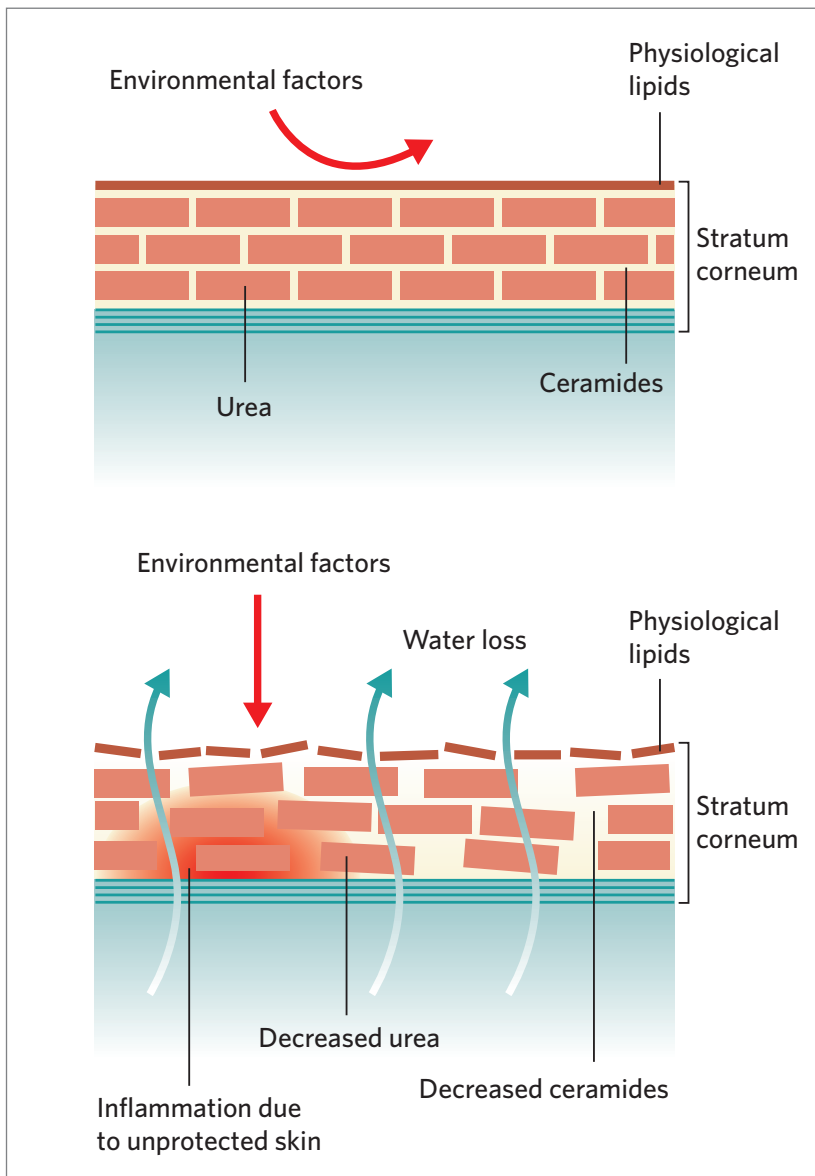


Figure 1: The skin barrier in normal skin (a) and dry skin (b).

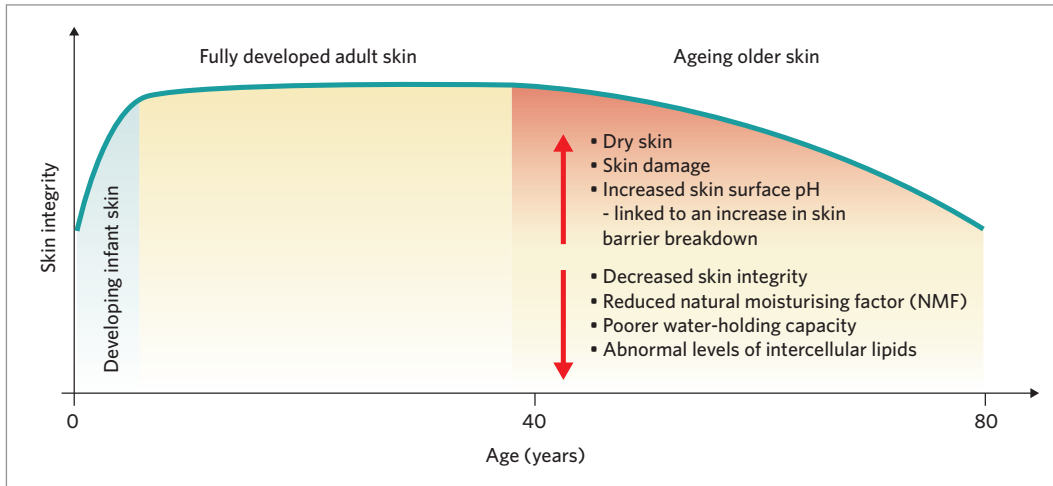


Figure 2: The problem with ageing skin

SKIN ASSESSMENT AND EXAMINATION

The Best Practice Statement on Care of the Older Person’s Skin (White et al, 2012) states: ‘all individuals should be assessed to determine the condition of their skin’. A holistic skin assessment should be included (every area of skin examined, including the scalp) and documented.

It is important to take the patient’s skin history. This should include general health, current medications and previous skin diseases, particularly any history of allergy, sensitivities or skin infection (Lawton and Gill, 2009). The skin assessment should include questions on past and current topical treatments, including health remedies and, in particular, personal hygiene products.

The whole body should be examined in natural light: looking at any skin lesions and inflammation, and recording any physical effects, such as itch and pain. Body outlines are a useful way to document skin observations, and clinical images can also be taken with the patient’s consent. The patient should be assessed for psychosocial effects on their quality of life, as they may be distressed by symptoms or alteration in body image.

WHY EMOLLIENTS?

How do they work?

Emollients should be used as soap substitutes and leave-on treatments. It is important not to use soap and detergent-based cleansing products. These are designed to remove sweat and grease;

dirt is trapped in that grease and thereby the skin is cleaned, but at the expense of de-greasing the surface. Furthermore, all detergents are alkaline and raise the pH of the skin surface to around pH8. It takes healthy skin around 48 hours to recover the normal acidic environment; in infant or older skin, or even more so in chronic inflammatory skin conditions (such as eczema), it takes considerably longer. A key benefit of emollients is that they re-grease the skin whilst cleansing, rather than de-greasing it; they are also buffered so they maintain the normal surface pH.

Many leave-on emollients also contain humectants, which either mimic or comprise the same molecules as NMF (e.g. urea, glycerol and isopropyl myristate). These emollients have been shown to prevent TEWL for considerably longer than simple emollients. Some emollients also contain povidone, which leaves a microscopic membrane on the surface of the skin and extends the TEWL effect to at least 12 hours. One emollient available on the NHS contains a lipid lamellar-mimicking agent (ceramide-5) and this product has now been shown to provide a 24-hour TEWL effect. Finally, some emollients contain anti-itch agents or antiseptics, which are useful for treating skin conditions like eczema, which is commonly secondarily infected.

Understanding the range of emollients

Emollients are only effective if they are used appropriately. Patient preference is key in encouraging adherence. Generally speaking, oil-in-water

Table 4. Examples of leave-on emollients (not an exhaustive list)

Simple	Heavy	Humectant	Humectant ingredients
Dermol cream (contains bezalkonium [antiseptic] and chlorhexidine)	50% white soft paraffin in 50% liquid paraffin	Aveeno cream	Glycerine Polysaccharides Avena Sativa (oatmeal)
Diprobase cream	Emollin spray	Balneum cream (Balneum Plus cream)	5% urea 0.1% ceramide NP Additionally contains 3% lauromacrogols (topical anaesthetic with anti-pruritic effect)
Doublebase gel	Epaderm ointment	Doublebase dayleve	Isopropyl myristate
E45 cream	Hydromol ointment	Hydromol Intensive	10% urea
Unguentum M cream	Hydrous ointment	Oilatum cream	Glycerol Providone

emollients are more cosmetically acceptable and penetrate the skin easily. Heavy emollients (water-in-oil) have significantly more impressive TEWL effects, but are usually considered too greasy for everyday use, although many patients are prepared to use them at bedtime (Cork and Danby, 2009).

Simple emollients should be used as soap substitutes, but more sophisticated humectant emollients should be the choice for leave-on treatments. Humectant emollients with longer TEWL effect are a sensible choice, particularly for patients who are out at work where applying emollients during the day is impractical, and also for infants and older people who may depend on the help of a carer.

There is an additional safety concern using heavy paraffin-based emollients. Products such as white soft paraffin, white soft paraffin plus 50% liquid paraffin, or emulsifying ointments that have contact with dressings or clothing, have been identified as a fire risk (MHRA, 2008).

Why aqueous cream is NOT recommended

Clinical studies have confirmed that aqueous cream weakens the skin barrier and increases TEWL (Danby, Al Enezi and Sultan, 2011). In response to this evidence, the Medicines and Healthcare Regulatory Agency (MHRA) have issued a drug safety update for aqueous cream, warning of potential local skin irritation, and

have advised that patients with eczema should be advised of risks (MHRA, 2013).

How should emollients be applied?

Each individual should have a regimen consisting of emollient wash products, and leave-on creams and ointments. Daily washing and bathing is recommended and most leave-on emollients (with the exception of ointment containing 50% white soft paraffin) can also be used as soap substitutes.

Some people may require one emollient product (used as both a wash/bath product and leave-on emollient); others may require several products, such as emollients combined with antibacterials (recommended for short-term use if infection is present, or to prevent recurrent infections) or anti-pruritics (to reduce itch). Patient choice is the most important factor and cosmetic acceptability is just as relevant for older people. Leave-on emollients should be applied in downward strokes (in the direction of hair growth), ‘frequently and liberally, so that the skin glistens’; recommended amounts are 500g/week for adults (PCDS/BAD, 2006). The frequency of application for optimal emollient effect, however, is influenced significantly by how long a TWE effect an individual emollient has.

Applying emollients in conjunction with topical treatments

Emollients and topical steroids are first-line eczema treatments. Emollients should be used every day, but when the skin becomes inflamed, a short-term course of topical steroids may be required simultaneously. Dermatology clinicians recommend that emollients and topical steroids should be applied separately. Never mix emollients or any topical treatment together, which will alter chemical formulations and lead to ineffective treatment. All guidelines recommend a 'gap' between applying an emollient and topical steroid (NICE, 2007; BAD/PCDS, 2006). The length of this gap depends on the dryness of the skin and formulation of emollient (Penzer, 2012), but in our experience, 20–30 minutes is usually perfectly satisfactory. The one exception is Protopic ointment, where an hour or two is recommended.

The NICE guidelines in children (2007) conclude: 'the order in which emollients and topical steroids should be applied is not known'. If skin is very dry, applying the emollient first may help topical steroids absorb into the skin and treat the target area more effectively. Applying the topical steroid first means that the active areas of eczema are treated without emollients occluding the target area; however, there are concerns that applying an emollient after a topical steroid can lead to a risk of smudging the steroid onto unaffected skin.

Role of the patient

Helping patients achieve adherence with CET is very important. The choice of emollient should be a joint decision between the patient and healthcare professional, considering lifestyle needs (Lawton, 2009). The 2012 Best Practice statement on emollient therapy states that individuals should be able to discuss and be shown how to apply emollients by a healthcare professional. Adherence is higher and CET more effective if the individual has been shown how to do this properly (Penzer, 2012). This is very important for older people, who may face difficulties such as reduced mobility and dexterity (Cowdell and Radley, 2012).

EMOLLIENTS AND TISSUE VIABILITY

Once dry skin has been identified, patients should have frequent skin assessment, and a structured skin care regimen should be implemented to prevent breakdown. This may help to prevent

the skin tears and superficial pressure ulcers (Bale et al, 2004).

Skin tears are the most common dry skin problem for tissue viability practitioners. The International Skin Tear Advisory Panel (ISTAP) have produced guidance on how to classify, manage and importantly prevent skin tears, through a rigorous risk reduction programme (Le Blanc et al, 2013), with emollient therapy playing a key part. In an Australian randomised controlled trial, skin tear prevalence was reduced by almost 50% in an elderly in-patient population when emollient therapy was applied twice daily (Carville et al, 2014). The results have prompted the introduction of a skin care programme that uses a monofilament debridement pad for removing hyperkeratosis and dry skin, followed by application of a urea-based emollient (Young, 2015).

Where the patient has a wound, the focus is often on controlling the wound environment and not the surrounding skin. Poor management of vulnerable skin in the immediate peri-wound region or the surrounding area can cause multiple problems for both the patient and the healthcare professional (Lawton and Langeon, 2009). In addition to protecting the peri-wound skin from damage due to excessive moisture, there is a need to treat dry, flaky skin in the surrounding area to create the optimum conditions for wound healing. Dry skin is likely to be present over the whole body, so the skin should be treated as one organ and CET used universally.

In patients with venous leg ulcers who are receiving compression therapy, compression garments should be used that permit patients to remove and reapply on a daily basis. This allows more frequent application of emollient therapy, improving the severe itching that is experienced by many patients.

Patients with diabetes frequently present with dry, cracked skin and deep fissures (particularly in the heel area), which may lead to a chronic wound if left untreated. Prevention by topical emollient therapy is paramount, using urea-based products to hydrate the skin.

CONCLUSION

Tissue viability nurses are not necessarily dermatology specialist nurses; however, skin care is central to their work. Tissue viability nurses may

be more familiar with barrier preparations to prevent peri-wound breakdown; however, CET involves preventing dry skin and potential skin breakdown of the entire body. It is therefore important for tissue viability nurses to have knowledge of the vulnerable skin barrier in older people and understand the benefits of CET. Emollients should not be viewed as an adjunct but as a key component to any structured skin care protocol. **WUK**

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