Wound assessment part 3: how to assess wound margins and periwound skin

Assessment of the margins around a wound and the periwound skin is an important part of good wound care that should be given as much attention as assessment of the wound bed itself. In some cases, the appearance of the margins can help clinicians diagnose wound aetiology. Re-epithelialisation occurs primarily from the wound margins and, therefore, any physical barriers to new cell growth need to be removed. The presence of conditions associated with vulnerable periwound skin (such as maceration or dermatitis) can hinder wound-healing and, as such, care should also be undertaken to optimise skin care around the wound.

This is part 3 of the series examining the basic elements of a wound assessment — in particular, the wound margins and periwound skin. Previous instalments looked at measuring wounds and assessing exudate.

Wound assessment is an essential skill for providing wound care (Dowsett, 2009). Information gained from wound assessment is used to decide what stage of healing the wound is at, whether it is progressing or deteriorating, and whether the treatment plan is appropriate. Therefore, it is essential to document this information, which can be done in narrative form in the patients’ care records or, more commonly, on a chart or form designed for this purpose. Such forms act as prompts for the elements that need to be assessed and help to compile the relevant information in a format that is easy to interpret (Brown, 2006).

Wound margins
Healing occurs as new epithelial cells migrate from the wound margins (and from hair follicles within the wound bed) across the wound, to cover the area of tissue loss (Dealey, 2012) (Figure 1). Consequently, the condition of the wound margins is important to enable this process. Healthy, new epithelial tissue is usually pink-white in colour and should not be confused with maceration, which also appears white in colour but is associated with moist or wet skin. Any dried crusts formed by exudate or blood will inhibit the growth of new epithelial cells, and should be carefully removed to provide a moist, intact wound edge (Figure 2). Callous can build up around wound margins, particularly...
in neuropathic diabetic foot ulcers; the presence of callous will inhibit epithelial migration. Referral to podiatry for sharp debridement is needed in these cases, and will often require repeated debridement, as callous tends to reform and build up.

Undermining occurs when tissue loss extends beyond the visible surface wound edges. The edges are unattached to the wound bed, creating dead space. Assessment of the wound edge must explore the extent of any undermining and its direction(s), and treatment should be focused on promoting new granulation tissue and allowing the edges to reattach.

The appearance of the wound margins can also indicate the wound’s aetiology. For example, venous leg ulcers (VLUs) typically have less well-defined edges and tend to be sloping, whereas arterial leg ulcers tend to be more ‘punched-out’ in appearance, with well-defined edges (Grey et al, 2006). Of course, these are not strictly defining characteristics — and diagnosis should be made after a full patient history and wound assessment, including Doppler ABPI — but they can provide useful pointers to likely aetiology.

Vasculitic ulcers are also often small and punched-out in appearance, similar to arterial ulcers. Pyoderma gangrenosum is an inflammatory ulcer and typically has a purplish/bluish colour around the margins, surrounded by a halo of erythema, which is a diagnostic feature (Cameron and Newton, 2004; Oakley, 2015). The wound bed is usually sloughy and necrotic. Development of pyoderma gangrenosum is associated with underlying inflammatory conditions such as ulcerative colitis or Crohn’s disease. There is no diagnostic test for pyoderma gangrenosum and, therefore, clinical appearance provides the key indicators.

Rolled or everted edges may indicate a basal cell or squamous cell carcinoma; if one of these conditions is suspected, the patient should be referred for biopsy. Basal cell carcinomas are often characterised by a raised, pearly-edged border. These are slow-growing and rarely metastasise, while squamous cell carcinomas (SCC) are more aggressive and have crusty, scaly and indurated margins (Moffatt et al, 2007). Chronic leg ulcers that are of long duration and showing no signs of healing have the risk of transforming into malignancies, usually SCC, known as Marjolin’s ulcers. Although rare, they are usually aggressive in nature and have a poor prognosis, so urgent biopsy is imperative (Enoch and Lefemine, 2007).

Attention needs to be given to the wound margins to allow the progression of new epithelial cells across the wound bed. Any delay in wound closure or the stalling of healing should be identified and further advice sought from an appropriate specialist.

Periwound skin
The periwound area has been defined as the area 4 cm from the wound edge and any skin underneath the dressing (Dowsett et al, 2015). Periwound skin problems are very common, affecting around 70% of patients (Dowsett et al, 2015; Ousey et al, 2013). The importance of the periwound skin to the wound assessment process has been recognised by the recent addition of ‘S’ (for surrounding skin) to the ‘TIME’ assessment framework. Common conditions in vulnerable periwound skin include maceration and excoriation, and contact or irritant dermatitis. Problems in the periwound area may cause the patient pain and discomfort, and impede dressing adherence. Erythema and swelling around the wound may also indicate wound infection (WUWHS, 2008).

Maceration/excoriation
Excessive exudate that is not adequately managed will cause the periwound skin to become macerated. Maceration appears as soft, soggy, spongy white tissue. Although some exudate is necessary to create a moist environment, and to provide growth factors and cytokines essential for wound-healing, chronic wound exudate contains bacteria and proteolytic enzymes that reduce the skin’s barrier function, thereby increasing infection risk (Davies, 2012; White and Cutting, 2006). The presence of proteolytic enzymes will also cause skin excoriation, which presents as sore, red, shiny, wet, ‘burnt’ skin (Figure 3). Excoriation can be very painful and, if not managed, will destroy tissue and expand the wound size. Ageing skin is particularly susceptible to damage from exudate (Tickle, 2016).
In the event of excess exudate, the wound management products chosen should absorb and lock the fluid away from the skin; a skin protectant should also be considered (Wounds UK, 2012). There are two general categories of barrier products that provide a protective ‘shield’ for the skin against external moisture. Barrier films contain silicone polymers (e.g. dimethicone), which create a dry, water-repellent barrier. Barrier creams are water-based and contain dimethicone, zinc oxide or lanolin, and will repel fluid (Lloyd Jones, 2013).

Addressing the underlying cause of the excessive exudate is essential, and the use of appropriate compression therapy, where indicated, is vital to protect the skin from the detrimental effects of exudate (Vowden and Vowden, 2012).

**Irritant dermatitis**

Prolonged use of wound care products can lead to skin irritation due to repeated removal of adhesives, or due to contact dermatitis where the skin produces an inflammatory reaction to dressing material (Box 1). Contact dermatitis can be either irritant contact dermatitis (where there is no immune reaction) or allergic contact dermatitis (where antibodies are produced upon exposure to an allergen, resulting in a systemic reaction) (Ewart, 2015).

Skin-friendly adhesives (e.g. silicone) should be chosen, unless the patient has an allergy to this ingredient, to reduce the risk of skin stripping at each dressing change. If repeated removal of adhesives is required, skin barrier products or the use of adhesive removers should be considered. Good skin care at each dressing change is essential, and will include removal of wound materials and residue from previous products by washing/cleansing the wound edge and periwound skin. Regular application of emollients to rehydrate and moisturise the skin, which helps restore barrier function, is recommended. If a cleansing product is the cause of skin irritation, the reaction will tend to be localised to the area of contact, with a clearly defined demarcation line (Ewart, 2015).

Patients with VLUs often exhibit skin changes as a result of damage to the venous circulation (Newton, 2013). Dry, flaky skin can build up into layers of thickened, scaly plaques known as hyperkeratosis. Brown/yellow staining is often present, as haemosiderin released during the breakdown of red blood cells is deposited into the skin. If this hyperkeratosis is not managed, it will become hard and ‘woody’ in appearance, and eventually lead to the ‘champagne bottle’-shaped leg (Morison and Moffatt, 2004). It will also predispose the patient to fungal infection underneath the plaques and repeated re-infection of the VLU.

Varicose eczema is also a common feature of VLUs. It presents as scaly, erythematous and itchy skin that may be either wet and weeping, or dry. Topical steroids, in conjunction with emollient therapy, may be needed to manage any acute exacerbations of eczema (SIGN, 2010). Patients with venous eczema are particularly susceptible to developing allergic contact dermatitis to products over time (Cameron, 2007). A number of ingredients in dressings, bandages and/or emollients can become sensitisers and, sometimes, patch-testing is required to help identify the specific sensitisers. Management consists of avoiding potential sensitisers, application of emollients and topical steroids, and the application of compression therapy to reverse the underlying venous hypertension (Newton, 2014).

**Periwound skin and pressure ulcers**

When assessing pressure ulcers, persistent redness of the surrounding skin which is non-blanching indicates Category 1 pressure damage (NICE, 2014; NPUAP et al, 2014), and unless strategies are put in place to relieve the pressure, this area of tissue can break down further, extending the size of the pressure ulcer. The area of periwound skin may feel warmer or cooler to touch, or may feel hard and firm. This is particularly relevant in patients with darker skin where erythema is less easily identified (NICE, 2014; NPUAP et al, 2014).

**Conclusions**

The condition of the wound margins and periwound skin affects how the patient’s wound will heal. Any physical barrier to re-epithelialisation needs to be removed to let new epithelial cells migrate across the wound bed. Poor skin condition around the wound will also impede healing, and may even lead to expanding wound size in the case of unmanaged maceration. Optimising wound margins and periwound skin will create an environment conducive to healing; assessing these parameters in order to determine their management is of equal importance to assessing the wound bed itself.

**References**

Brown G (2006) Wound documenta-


Box 1. Signs of contact dermatitis (Ewart, 2015).

- Itching, burning, stinging pain
- Erythema
- Oedema, swelling
- Dry skin, hyperkeratosis
- Blistering
- Vesicles
- Delayed healing
- Crusting
- Pruritis, eczema
- Weeping of the periwound skin

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