# The use of adhesive dressings on the diabetic foot

Lynne Watret and Alison Rodgers

## ARTICLE POINTS

1 There is a need for research into the safety aspect of the adhesive properties of specific dressings and their use on diabetic foot lesions.

2 Manufacturers of dressings are increasingly recognising the need to provide products which minimise trauma to the surrounding periwound margin and prevent pain and trauma on removal.

3 The use of dressings with adhesive or non-adhesive borders relies on the assessment skills and knowledge of individual healthcare professionals carrying out patient care.

4 The risk of epidermal stripping due to damage to periwound margins on removal of dressings on the neuroischaemic lesion has traditionally deterred healthcare professionals from using adhesive dressings.

## KEY WORDS

- **Adhesive wound dressings**
- **Diabetic foot**
- **Periwound margins**
- **Epidermal stripping**
- **Sensitivity**

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## Introduction

**Characteristics of the ideal wound dressing have been well documented on the basis of Turner's research (1985) but additional factors are considered relevant to people who have diabetes and foot lesions (Watret and Rodgers, 2002). An essential criterion of a dressing is removal without causing trauma to the periwound margins, which may occur due to the use of adhesive dressings on vulnerable skin. This article discusses the qualities of adhesive wound dressings and their effect on the periwound margins.**

Thomas (2003) describes an adhesive as being the 'interaction which takes place between the dressing and the intact skin'. This interaction is essential to ensure that the cohesive qualities are a balance between ensuring the dressing will secure to the periwound margin whilst maintaining skin integrity at its removal. Pain at dressing changes is also an issue with adhesive dressings causing discomfort on removal (Collier, 2000). Although not always an issue in the insensate foot, for those with sensation, adding avoidable pain to an already distressing experience is unacceptable practice. In a multinational survey of practitioners, dressing changes were perceived as the time of greatest pain (Moffat and Briggs, 2002). There is a need for research into the safety aspect of the adhesive properties of specific dressings and their use on diabetic foot lesions.

### What is epidermal stripping?

Bryant (1992) states that epidermal stripping is the inadvertent removal of the epidermis by mechanical means (e.g. removal of tape), with the resultant lesions often being irregularly shaped and shallow, involving only the epidermis. Viamontes and Jones (2003) describe skin stripping as the cause of minor small abrasions and/or periwound blistering, which with repeated trauma may give rise to skin irritation, bacterial invasion and infection. Epidermal cell turnover is normally a dynamic physiological process with apoptosis of most cells types and subsequent regeneration. As a normal feedback mechanism, high cell proliferation will occur following trauma, such as epidermal stripping. However, the high cell proliferation and feedback response may be impaired in people with diabetes due to:

- Delayed or reduced inflammatory response.
- Poor perfusion due to small vessel disease.
- Potential unawareness of damage as a result of lack of sensitivity in the neuropathic foot.

Large vessel disease causing impaired perfusion in the neuroischaemic foot may result in reduced epidermal cell turnover.

It is important to identify people who are at risk and initiate an appropriate care package to prevent trauma. Bryant and Wysocki (1992) argue that prevention of epidermal stripping is through recognition of vulnerable skin and instituting preventive methods, (e.g. slow removal of dressings) as per manufacturers' instructions. Avoiding stretching the dressing on application, which may cause blistering and shearing injury to the epidermis is also a preventive measure.

Wysocki and Bryant (1992) advocate the use of skin sealants. Alcohol free sealants are available and may be used prophylactically when vulnerable skin is recognised, or as treatment if epidermal stripping has occurred. Evidence for the use of sealants tends to be in chronic wounds other than those resulting from the diabetic foot (Hampton, 1997). Once risk assessment has been completed, the healthcare professional can decide whether to use adhesive dressings, or alternatively, to use the non-adhesive form of dressings with atraumatic adherent islands.

Dykes and et al (2001) argue that the peel force taken to remove an adhesive dressing may remove the stratum corneum (the outer layer of the epidermis), with subsequent increased transepidermal water loss and epidermal oedema. Repeated removal of adhesive dressings can exacerbate this trauma. A dressing which minimises this effect is therefore of value.

## Challenges of adhesive dressings in people with diabetic foot lesions

Manufacturers of dressings are increasingly recognising the need to provide products which minimise trauma to the surrounding periwound margin and prevent pain and trauma on removal. *Figure 1* shows the potential effects of an adhesive dressing.

A study by Collier (2000) identified that pain and trauma at dressing changes was an area which nurses were becoming increasingly concerned about. Collier noted that only 40% of nurses were aware of products specifically designed for this purpose, such as soft silicone dressings. However, the study concentrated on pain and trauma to the wound bed as opposed to the specific effect of trauma on periwound margins. Collier identified that although the respondents were aware of issues around trauma caused by use and misuse of dressings and the general availability of dressings, there remained a general confusion as to appropriate use of products. This may be due to the increased number of dressings on the market or the need for education of the healthcare professional. It would have been of value to have extended the study to include the views on dressings which may be safely removed from the periwound margins.

Dykes et al (2001) carried out an experiment on the epidermal stripping effect of three adhesive dressings on 12 healthy volunteers. Dye was placed on the skin and the extent of removal at dressing change noted. Results showed that there was significantly less epidermal stripping in the group which used Mepilex Border over the other two commonly used dressings.

An additional study was carried out by Dykes and Heggie (2003) on the discomfort caused by the force taken to peel test strips from skin of healthy volunteers with six different adhesive dressings. Their results

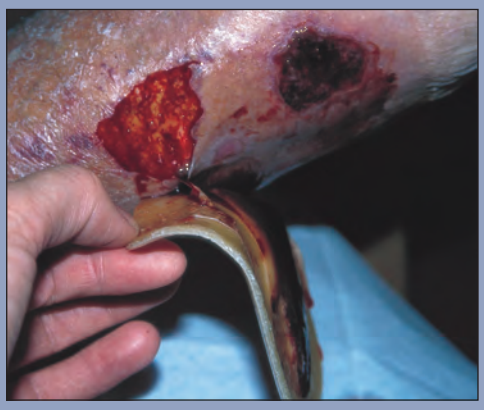

*Figure 1. Hydrocolloid dressing being removed*

showed that Mepilex Border was significantly less painful than the other adhesive dressings. Dykes concluded that the level of discomfort experienced was not entirely dependent on peel force factors.

Research in this area is fraught with problems as people with diabetes may not be able to respond to painful stimuli in the insensate foot, or may be at high risk of irreversible tissue breakdown due to poor perfusion. In order to draw conclusions about the value of individual dressings it is essential for healthcare professionals to make informed choices. Choices regarding dressings should be based on current scientific data on healthy human or animal models, from studies on other patient groups, case studies on diabetic foot lesions and empirical experience of clinicians. The use of dressings with adhesive or non-adhesive borders relies on the assessment skills and knowledge of individual healthcare professional carrying out patient care.

Viamontes and Jones (2003) studied epidermal dressings between two foam dressings. A total of 267 people participated in the study. Epidermal stripping was defined as 'skin blistering'. The study showed that there was little evidence of skin stripping in both groups. Participants were treated with adhesive dressings for over 92.8 days (a prolonged period of time for use of adhesives) with minimal problems of sensitivity and epidermal stripping. Although the study maintained that it had included all chronic wound types, including diabetic foot lesions, only one participant was identified as having a diabetic ulcer. The majority of participants had pressure ulcers, grade and site of damage not being stated. It was therefore not possible to ascertain if dressings were being used for heel

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1 The balance between achieving confidence that the dressing will remain in situ for the required period of time and the risk of epidermal stripping to the periwound margins on removal is difficult to achieve.

2 Bandaging a wound relies on the skill of the healthcare professional, and tight bandages, particularly in the presence of poor perfusion or oedema may further compromise wound healing.


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ulcers. The study is of interest due to the number of patients involved. However, the study was not a randomised controlled trial but a retrospective study of a number of patients, and therefore may be subject to bias. Due to the lack of information on heel lesions, and lack of participants with diabetes in the study, this does not add to the debate on the use of dressings in people with diabetes and foot ulcers.

### Benefits of adhesive borders on dressings

The rationale for using adhesive dressings is as follows:

- To optimise the moist wound healing environment.
- To minimise leakage.
- To secure the dressing.
- To minimise dressing changes.
- To enable the patient to carry out social hygiene with the dressing in situ.

The balance between achieving confidence that the dressing will remain in situ for the required period of time and the risk of epidermal stripping to the periwound margins on removal is difficult to achieve. In the event of the dressing wrinkling or shearing off, the wound would be exposed to further trauma, dry out and increase the risk of infection to the wound bed. Depending on the cohesive properties of the dressing, epidermal stripping may result. The scrunched up dressing may cause pressure on other areas of the foot resulting in further trauma. This is particularly important in the insensate foot where the patient may not be aware of the dressing movement. This also has cost implications when frequent unnecessary dressing changes are made.

The risk of epidermal stripping due to damage to periwound margins on removal of dressings on the neuroischaemic lesion has traditionally deterred healthcare professionals from using adhesive dressings. A general avoidance of adhesive dressings in the management of the diabetic foot has led to the use of bandages and tapes to secure dressings. This in itself is problematic, as the tape used to secure the dressing may cause epidermal stripping on removal, which defeats the purpose of using non-adherent dressings. Larger dressing are used to tape well clear of the wound field, increasing the size and possible bulk of the dressing to secure tape onto healthy skin.

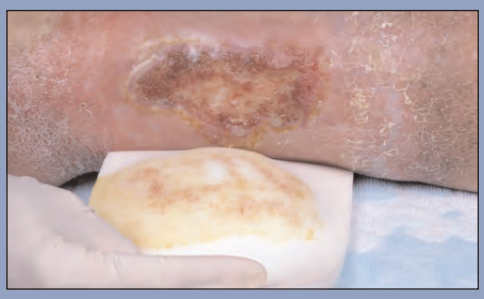

*Figure 2 Mepilex dressing*

Alternatively, bandaging a wound relies on the skill of the healthcare professional, and tight bandages, particularly in the presence of poor perfusion or oedema, may further compromise wound healing. Bandages are bulky and make the use of footwear difficult. Bulky bandaging may not be cosmetically acceptable to the patient compared with a discrete foam dressing. Adhesive borders are therefore of value as they minimise the need for bandaging, tape and reduce bulk, following appropriate risk assessment. However, care must be taken when emollients are used on the remainder of the foot to ensure that the adhesive properties of the dressing are not compromised.

### Sensitivity to adhesives

Another challenge is the effect of sensitivity to adhesives (*Figure* 2). Patient history and evaluation of the surrounding skin at the onset should be made for baseline assessment to identify any problems with sensitivity to adhesives. Thereafter, frequent reassessment should be carried out to identify early signs of sensitivity. Sensitivity to an adhesive may not occur immediately, and if it does a non-adhesive dressing should be used. It is important in heavily exuding wounds not to mistake irritant from excess moisture or chronic exudate as a reaction to adhesives.

### Conclusion

It is evident that manufacturers are considering the importance of preventing epidermal stripping whilst ensuring the dressing remains in place. Further research is required on the properties of adhesive dressings to determine their suitability on the diabetic foot. Caution should still be taken with the use of adhesive borders on neuroischaemic foot lesions. ■