

Hydrocolloids in practice

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Introduction

Hydrocolloids are adhesive, pliable, absorbent and waterproof wound dressings that can provide an effective barrier to microorganisms. They create a moist wound environment, facilitate autolysis and promote granulation tissue formation (Fletcher et al, 2011). Hydrocolloid dressings have been available for many years and can be used on a wide variety of wound types to promote healing and can help meet quality agenda targets.

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HYDROCOLLOID DRESSINGS AND THE QUALITY AGENDA

In 2011, the Chief Nursing Officer (CNO) for England reported on the importance of reducing harm to patients and introduced the Safety Express, a national campaign. This aims to support the delivery of safe and effective care to help drive up standards and provide patients with a positive experience when accessing healthcare.

To meet the quality agenda, healthcare trusts in the UK have published locally developed CQUIN (Commissioning for Quality and Innovation) target schemes that include, but are not limited to:

- enhancing recovery for patients undergoing major elective surgery
- improving patient experience
- improving end-of-life care for patients managed in the acute setting
- reduction in healthcare associated infections.

Although these targets are not directly linked to wound management, it is clear that choosing the most appropriate wound dressing will help practitioners meet these targets. This should aim to promote the wound healing process, reduce the risk of infection, reduce pain and prevent readmission to hospital due to a wound infection (Shorney and Ousey, 2011).

Recently, it has been argued that wound care practitioners need to look further than the 'gold standard'

randomised control trial to provide the required evidence for dressing selection, as large adequately-powered randomised controlled trials in patients with wounds remains problematic due to difficulties with recruitment, their costs and with heterogeneity of wounds (Leaper, 2011).

In light of the lack of clear evidence to support dressing choice, the practitioner should choose a dressing that protects the fragile wound tissue, provides the optimum environment for wound healing and is comfortable for the patient. Hydrocolloid dressings may meet these aims and provide a cost-effective option in the management of a wide range of wound types.

WHAT IS A HYDROCOLLOID DRESSING?

Hydrocolloids have been described by Thomas (2010) as dressings that contain a gel forming agent, such as carboxymethylcellulose (CMC), pectin or gelatin. This is often combined with adhesives and tackifiers and applied to a polyurethane foam or film carrier to create an absorbent, self-adhesive sheet.

The dressings are capable of absorbing low to moderate levels of exudate and can be used to promote autolytic debridement of dry, sloughy, or necrotic wounds (British National Formulary, 2011). Thinner versions are generally used on wounds that are dry or have low levels of exudate (Fletcher, 2005). Additionally hydrocolloids are suitable for promoting granulation tissue (Fletcher et al, 2011).

Hydrocolloid dressings come in a variety of sizes and shapes. They are self-adhering and available with or without an adhesive border for application to wounds on the body, including the sacrum, heels, elbows and flatter surfaces such as the back.

Box 1: Key properties of hydrocolloids (Queen 2009)

- Provide an occlusive bacterial and viral barrier – reduce the risk of cross infection
- Lower the wound PH – reduce the ability of bacteria to proliferate
- Maintain moisture at the wound bed – allow for faster epithelialisation and lower levels of pain
- Prevent desiccation of the wound bed – provide a moist wound healing environment

There are also variations in the backing materials of some products. Those with a more 'slippery' outer surface help to reduce the friction coefficient between the support surface and the patient and decrease the amount of shear and friction transmitted to the underlying skin, reducing the risk of pressure ulceration (Fletcher et al, 2011).

HOW DO HYDROCOLLOID DRESSINGS WORK?

Hydrocolloid dressings create and maintain a moist wound environment that supports wound healing (Finnie, 2002). Moisture under occlusive dressings such as hydrocolloids can help to promote angiogenesis, increase the number of dermal fibroblasts, stimulate the production of granulation tissue, and increase the amount of collagen synthesised (Box 1).

In the presence of wound exudate the hydrocolloid forms a hydrophilic gel that facilitates autolytic debridement of the wound by gently softening and rehydrating necrotic tissue and slough (Fletcher, 2005). Some dressings form a cohesive gel, which is largely contained within the adhesive matrix; others form more mobile, less viscous gels that are not retained within the dressing structure (Heenan, 1998). As the gelling process takes place, the dressing becomes progressively more permeable – this results in the loss of water vapour through the dressing and increases the ability of the product to absorb exudate (Thomas and Loveless, 1997).

HYDROCOLLOIDS AND WOUND HEALING

There is a plethora of research and evidence discussing the use of hydrocolloids in the treatment of acute and chronic wounds (Queen 2009; Thomas 2010). Hydrocolloids can be used in a wide range of partial-thickness wounds and have a particular role in the management of Category/Stage II pressure ulcers. They are also increasingly used in the management of Category/Stage I pressure ulcers and to protect newly formed skin (Fletcher et al 2011).

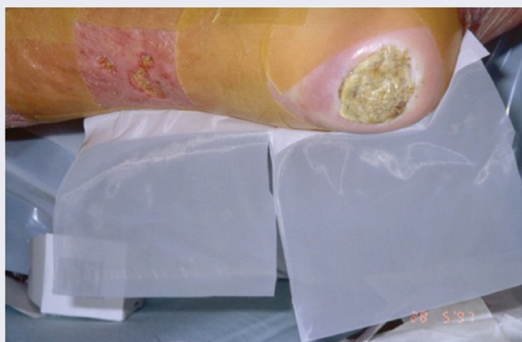


Figure 1 Hydrocolloid dressings used to protect the surrounding skin of multiple wounds prior to the application of maggot therapy

Box 2: Ten things you may not have known about hydrocolloid dressings

1. Some hydrocolloid dressings contain gelatin
2. Hydrocolloids are occlusive and waterproof and may help to reduce infection and cross infection
3. Hydrocolloid dressings can be used for Stage/Category I and II pressure ulcers
4. Hydrocolloids are easy to remove and may reduce pain on dressing change
5. Hydrocolloids maintain a moist wound healing environment without over hydrating the wound bed
6. Hydrocolloids can protect the periwound area as they overlap the wound bed
7. Hydrocolloids facilitate autolytic debridement
8. Hydrocolloids may help to reduce costs as they can be left *in situ* for up to seven days providing there is no excessive exudate or infection present. On average they stay in place for 3–5 days
9. Hydrocolloids do not require a secondary dressing
10. The shiny outer surface and tapered edges of some newer hydrocolloid dressings help to protect tissues from pressure-related damage by reducing the effects of pressure, shear and friction, and reducing the likelihood of rucking, wrinkling or edge rolling (Fletcher et al, 2011)

This made easy supplement focuses on the use of hydrocolloid dressings to manage three types of wounds:

- Leg ulcers
- Minor injuries
- Burns, including split-thickness graft donor site wounds.

The following review presents the rationale for selection and particular challenges.

HYDROCOLLOIDS FOR LEG ULCER MANAGEMENT

Venous leg ulcers can present with a variety of tissue types within the wound bed, including eschar, sloughy tissue, granulating tissue or a combination of tissue types (Figure 2). In addition, these wounds often have light to moderate exudate levels. Hydrocolloid dressings are an ideal choice for the management of venous leg ulcers as the dressings are designed to cope with up to moderate levels of exudate, while promoting autolytic debridement of sloughy tissue and protecting existing granulation tissue (Figure 3).

Compression therapy is the cornerstone of therapy in the management of venous leg ulcers. This needs to be in combination with adequate wound bed preparation (debridement and cleansing of the wound) to optimise the environment for wound healing to take place. Compression bandaging is designed to be renewed on a weekly basis, unless high exudate levels demand more

Box 3: When and how to use hydrocolloids in leg ulcers



Figure 2: Venous leg ulcer with a variety of tissue types at the wound bed, including dehydrated slough, which is turning into eschar and some smaller areas of healthy granulation tissue. This wound is suitable for management with a hydrocolloid dressing



Figure 3: Healthy clean granulating wound bed. This wound is suitable for management with a hydrocolloid dressing



Figure 4: Evidence of extensive maceration caused by inadequate management of exudate

Figure 5: Large venous leg ulcer, which could be managed using a hydrocolloid dressings. It is important to select an appropriately-sized dressing that covers the whole of the wound plus a margin of 2-3cm



frequent dressing changes. Hydrocolloid dressings have the ability to be left in place for up to seven days making them an ideal primary dressing under compression systems.

When applying hydrocolloids to a venous leg ulcer, the practitioner needs to ensure that the exudate level is not too high for the hydrocolloid dressing to manage effectively. If the exudate level is excessive this may require an alternate dressing, e.g. superabsorbent dressing. Poor or inadequate exudate management can lead to maceration and an increase in the ulcer size (Figure 4). When using hydrocolloid dressings, it is essential that the correct dressing size is selected. This should cover the whole of the ulcer and allow for a margin of approximately 2-3cm to ensure adherence to the surrounding skin. This then forms a seal around the ulcer to help prevent maceration (Figure 5).

Evidence for use

A systematic review and meta-analysis performed by Palfreyman et al (2007) examined healing rates of dressings in venous leg ulcer management. The author concluded that there was insufficient evidence of effectiveness to recommend one type of dressing over another and stated that, wherever possible, simple non-adherent dressings should be applied under compression.

Tip: Overgranulation may occur under hydrocolloids. A more permeable dressing (e.g. non-adhesive foam or film dressing) should be substituted

An earlier cost-effectiveness study by Harding et al (2000) measured the cost per healed wound using published clinical trial data. They concluded that hydrocolloid dressings were more cost-effective than gauze in the treatment of venous leg ulceration.

Box 4: When not to use a hydrocolloid

- Clinically infected wounds (unless used in conjunction with appropriate treatment such as systemic antibiotics. Occlusive dressings such as hydrocolloids should not be used in the presence of anaerobic bacterial infection)
- Full thickness burns
- Exposed bone and tendon
- Ulcers resulting from diabetes, tuberculosis, syphilis or fungal infection
- Active vasculitis
- Deep narrow sinuses
- Where there is a possibility of the wound becoming necrotic due to poor vascularisation

HYDROCOLLOIDS FOR MINOR TRAUMATIC INJURIES

Hydrocolloid dressings can be used in minor injuries to provide a protective barrier. The dressings are low profile and less bulky than traditional finger padding and bandaging regimens. They can be used on skin tears to keep the realigned lacerated skin edges in position, while thin versions are easily removed from fragile skin. Hydrocolloids are also very effective at drawing out foreign bodies such as splinters or gravel from the wound bed, preventing the need for surgical intervention.

Hydrocolloids can also promote self-management as dressing changes can be performed by patients/carers at home and may offer a flexible option for people who need to balance work with effective wound management (see Box 5). Patients can also shower with the dressings in place, allowing them to maintain normal daily activities. The types of minor injuries suitable for treatment with a hydrocolloid dressing, include lacerations, digit injuries, skin tears and scalds.

Hydrocolloid dressings are available in a variety of sizes, but the main advantage is the clinician's ability to cut the dressing into strips and shapes to fit individual wounds and/or areas that are difficult to dress, e.g. between finger and toes, or to prevent damage from shearing forces, e.g. ears, heels, elbows. This technique works well with thin hydrocolloids (Fletcher, 2007), which can provide better conformability, improved fit and allow greater mobility of the affected area.

Key principles for cutting and shaping hydrocolloid dressings, include:

- Always use sharp, clean/sterile scissors to prevent shredding of the dressing edges and contamination
- Always cut across the peelable adhesive back on dressings – otherwise this will be difficult to remove
- Round off cut edges to reduce the chance of uneven edges catching on bedding and clothing (Fletcher, 2007).

HYDROCOLLOIDS FOR BURNS MANAGEMENT

Hydrocolloids have been used for over the last 20 years in clinical practice in burns, but there remains little evidence to support any particular dressing, especially in relation to small partial thickness burns, skin grafts and donor site wounds.

Until the early 1980s, only a few wound care products were available in minor burns care – traditional dressings (e.g. petroleum-gauze based products such as Jelonet™ or Parane™) and an antimicrobial agent (e.g. Flamazine™). Paraffin-based gauze dressings remain one of the most common burns dressing, despite the literature suggesting that it adheres to wounds, requires more frequent dressing changes and may traumatise newly epithelialised surfaces.

Hydrocolloid dressings provide an occlusive moist wound environment to optimise healing and are associated with less frequent dressing changes. Observational evidence suggests that hydrocolloids may lead to fewer operative interventions and should be used preferentially in paediatric burns (Martin et al, 2010)

Hydrocolloids are suitable in burns care for the following:

- Superficial to partial thickness burns
- Donor sites – clean open shallow wounds
- Burn wounds healing by conservative methods, e.g. not indicated for skin grafting, with a small to moderate amount of exudate
- Healing skin grafts – low exudate, not infected or colonised and with a superficial granulating base
- Any burn wound, graft or donor site that is close to healing and in need of a small amount of protection (the local condition of the wound bed determines the dressing choice)
- Any other burn wound that appears clean, superficial with minimal drainage or minor sloughing and/or scabbing.

Hydrocolloid dressings should not be used on full thickness burns and on clinically infected wounds (see Box 4).

Box 5: Using a hydrocolloid dressing for the management of a traumatic injury

A 29 year old man sustained a traumatic injury in the workplace where he inadvertently stood on a piece of sawing machinery and obtained a deep flap laceration to his heel. He went to the local minor injuries department and was assessed by the medical and nursing team who decided to suture the flap laceration. At the follow-up appointment a week later it was evident that the flap was necrotic and non-viable (Figure 6).

Following discussion with the patient it became apparent that his priority was to continue working. This required a dressing regimen that would allow him to wear his working shoes and to remain active. In considering the available options it was felt that a hydrogel would not stay in place and remain effective and therefore a hydrocolloid dressing was chosen. As well as protecting the wound, the dressing facilitated autolytic debridement, fitted snugly around the injury and the young man was able to redress the wound himself and continue working. Improvement was seen at two weeks and the wound healed within a further four weeks, despite only short periods of rest.



Figure 6: Flap laceration one week following injury

Application of hydrocolloid dressings in minor burns and scalds

Hydrocolloids may be considered 3–5 days post burn injury, following initial assessment and treatment. Once the acute traumatic inflammatory phase subsides a thin hydrocolloid can prove useful, especially for children with small burns (Afilalo et al, 1992; Martin et al, 2010). Management of the superficial burn is aimed at providing dressings that deliver pain-free wound care, protect the wound and encourage re-epithelialisation. Hydrocolloid meet these aims, although where there is a high risk of infection or suspicion of colonisation, an antimicrobial dressing should be selected instead.

Application of hydrocolloid dressings on split thickness skin graft donor site wounds

The management of a partial thickness burn injury and a split-thickness skin graft donor site is similar. The donor site should have a low risk of infection and antimicrobial dressings are not normally required. Initially an alginate may be the primary dressing of choice, but once haemostasis is controlled, a hydrocolloid may prove to be more beneficial from a comfort and infection control perspective (Cadier and Clark, 1996). As with superficial burns, the presence or suspicion of infection will preclude the use of a hydrocolloid.

Tip: Hydrocolloid dressings have a distinctive odour on removal. This is normal and should not be mistaken for a problem with the wound

BENEFITS OF USING HYDROCOLLOID DRESSINGS

Hydrocolloids can be used on a wide range of low to moderately exuding wounds and are available in a number of sizes, shapes and specifications. They are simple to apply, are conformable and pliable. This allows them to be used where greater flexibility is required. Thinner, more transparent versions may also allow visual checks of the wound without removal of the dressing. Hydrocolloid dressing may also result in less pain on application and on removal (Queen 2009).

Hydrocolloid dressing are waterproof and can be used as secondary dressings to hold other products in place to reduce the risk of contamination.

In the current economic climate, cost savings are essential, without reducing the quality of care offered to each patient. Hydrocolloids may provide a cost-effective option in patients with pressure ulcers and venous leg ulcers when compared with gauze (Meaume et al, 2002, Harding et al, 2000). This may be due to a reduction in the number of clinic visits required during treatment and faster healing times (Queen, 2009).

Tip: Prior to the application of gelatin-based hydrocolloids derived from porcine, patients should be informed to avoid any cultural concerns

Box 6: Ten top tips for application

Individual manufacturers' labelling and application instructions should be consulted before using any hydrocolloid dressing to ensure correct application and use. The following offers some practical tips for application:

1. Prepare the wound according to local protocols. Burn blisters larger than the patient's little finger nail should be de-roofed (LSEBN, 2011). Care is required to avoid infection in immunosuppressed patients or those with diabetes.
2. Select a hydrocolloid dressing that is appropriate for the size and shape of the wound. This must be large enough to overlap normal skin by at least 3cm around the wound. If the dressing is too small the interactive gel will leak and this will cause the surrounding tissue to become macerated and potentially increase the size of the wound.
3. Warm the product between the hands for a few moments to improve adhesion. This improves pliability of the dressing and allows greater conformability to the wound contours and the body area. Remove the backing sheet.
4. Press the dressing firmly in place and gently hold for a few moments to aid adhesion. The sheet will not stick to gloves or other cool surfaces.
5. The dressing can be framed with an adhesive film tape or surgical tape to help secure the dressing and increase the length of time *in situ*.
6. Depending on the site of the wound, it is advised that the patient does not put weight over the dressing for 20-30 minutes after application to give the dressing time to stick properly.
7. If leakage occurs from one side of the dressing, e.g. due to gravity, consider applying the dressing so that there is a greater overlap onto the skin on that side.
8. Hydrocolloid dressings that are very thin or have tapered/bevelled edges are less likely to wrinkle, ruck or roll at the edges. If they are not tapered and are used on the posterior of the thigh or sacrum, using a film dressing as a window frame will help prevent this from occurring.

Note: It is important to inform the patient that if there is slough or any eschar (scabs) that the wound may enlarge initially because of autolytic debridement

9. As the dressing fully absorbs exudate, it changes colour to an opaque/cloudy appearance. Once this occurs the dressing should be changed. Depending on the amount of exudate the dressing can be left in place for up to 7 days. Thicker hydrocolloids are more appropriate for moderate levels of exudate (Fletcher et al, 2011).
10. Hydrocolloid sheets can be cut to adhere to specific wound areas such as heels, fingers or ears; or the sheet can be left whole for larger wounds, such as on arms or legs.

Summary

As individual clinicians we continuously strive to find the ideal dressing for our patients and their specific wound needs. It remains an exciting time to evaluate products for the best patient outcome. Hydrocolloid dressings are easy to use, require changing only every 3–5 days or up to seven days under compression, and do not cause trauma on removal. They may be cost-effective and decrease healing times. This makes them an appropriate dressing choice for a wide range of wounds, including pressure ulcers, minor injuries and leg ulcers and will rightly remain a key product in most burn wound formularies in the UK.

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