Issues in clinical practice: *Dressings*

Duncan G • Andrews S • McCulloch W

Issues in clinical practice is a new section which will appear in forthcoming issues of Primary Intention. *It aims to focus on clinical issues in the health care environment that effect best practice.*

Abstract

This is a summary of the dressings workshop held at the first World Wound Healing Congress in 2000. The objectives of the dressings workshops were to review the variety of dressing classes available on the Australian market and consider the general properties of each class, including structure, function, form and use.

Modern interactive/bioactive dressings were discussed in the workshops, with only brief mention made of the inert products. The first dressings classes explored were the film dressings, foams hydrogels and hydrocolloids. Each dressing class is addressed in terms of general description and physical properties, indications, method of application and removal, effective use, limitations and brand name products available.

Workshop objectives

September 2000 saw the first World Wound Healing Congress, held in Melbourne. As part of the congress, numerous workshops were held for practical exploration of a number of clinical experiences. One of those workshops was entitled *Dressings* and was repeated to a full house five times over the period of the workshop day. This article is the first of two covering the text of those dressings workshops.

The dressings workshops recognised the fact that many attendees at the congress were experienced practitioners. Even with this experience, it is useful and necessary to revisit the fundamentals to refresh knowledge and update understanding. It was an opportunity to get back to basics and review our understanding and knowledge of modern wound management products in terms of:

Greg Duncan
Sarah Andrews
Dept of Pharmacy Practice
Monash University, Melbourne
Tel: (03) 9903 9687
E-mail: greg.duncan@vcp.monash.edu.au

Wendy McCulloch
Wound Foundation of Australia
Monash University, Melbourne

- Structure, function and form of the more common dressings.
- Choice of appropriate dressings.
- Application and removal of dressings to reduce risks of further tissue trauma.
- Efficient and effective dressing use.
- Limitations of each class.
- Ability to classify brand name products into particular generic classes with similar structure, function and form.

Introduction

Before choosing a dressing, wound assessment is necessary to identify an underlying aetiology of a wound, to identify other factors that may affect healing and be able to address them. This assessment includes:

- The wound itself – colour, depth, exudate [1].
- The surrounding skin.
- The patient as a whole.
- The patient in their social and environmental context.

Once this assessment has been attended to, we can consider dressing choices based on what we are trying to achieve with dressings, having an understanding of how they work when used appropriately. In a perfect world, we would have a

simple dressing that covers all our needs. If it were to exist, an ideal dressing should [2]:

- Maintain moist environment.
- Absorb excess exudate.
- Allow gaseous exchange.
- Provide thermal insulation.
- Provide a barrier to bacteria.
- Be free from particulate/toxic components.
- Be atraumatic on removal.
- Be comfortable and conformable.
- Protect the wound from further trauma.
- Be cost effective.

Since such a perfect dressing does not exist, we need to look at what is available and develop an understanding of them – how they work, how we use them, how we select them, and how to evaluate their performance.

Dressing classification

Dressings can be divided into two broad classes, modern *interactive/bio-active* and more traditional *passive* dressings. Their main properties are outlined below.

Modern interactive/bio-active dressings

- Alter the wound environment.
- Interact with the wound surface to optimise healing.
- Interactive dressings use the environment provided by the body to encourage normal healing.
- Bio-active dressings also stimulate the healing cascade.

Traditional passive dressings

- Include gauze, lint, non-stick dressings, tulle dressings, combine, absorbent pads, etc.
- Fulfil very few of the properties of an ideal dressing.
- Very limited (if any) use as primary dressing, but some are useful as secondary dressings.

The inert dressings consist of a fairly diverse group of products with differing properties and characteristics. As the name implies, these dressing products are inert, i.e. they don't interact with the wound in any way to enhance healing. Inert dressing products do not generally provide a moist wound environment.

These products have a very limited use as primary dressings in modern wound management. They often impair healing by drying out the wound and/or adhering to the wound surface, resulting in trauma on dressing removal. Some inert dressings do have a role as secondary dressings over products such as hydrocolloid pastes or cadexomer iodine, but are seldom used as the primary wound contact layer.

Sub-classifications of modern interactive/ bio-active dressings

The workshop focussed predominantly on modern interactive dressings. The traditional passive dressings were briefly addressed in the second part of the workshop. The topic was approached from a generic perspective and looked at the major classes of dressings and then identified specific products and variations within each class. This first section of dressings we looked at and those that will be discussed here are the most commonly encountered classes of modern dressings, namely films, foams, hydrogels and hydrocolloids.

Film dressings

Description

Film dressings are made up of a thin (usually polyurethane) membrane coated on one side with a layer of adhesive. They are permeable to moisture vapour and atmospheric gases to varying degrees and are both waterproof and bacteria proof. Films are elastic, highly conformable and transparent. Whilst the adhesive sticks firmly to intact skin, it does not adhere to moist wounds or other moist areas.

Indications

Films are indicated for use on dry or very slightly exudating superficial wounds such as minor burns, simple injuries (such as grazes and lacerations), post-operative suture lines and IV sites.

Films have a number of additional uses. They are extremely useful as a secondary dressing over primary dressings such as foams, hydrogels or alginates. They hold the dressing in place and make it waterproof. Films also have an important role in the prevention of pressure ulcers – their shiny, slippery surface assists in the minimisation of friction and shear over areas such as the sacrum, heels, elbows etc.

Film dressings are also available as an island dressing with a non-stick pad in the centre. The island films are able to absorb slightly more exudate than the simple films, but have the disadvantage of obscuring the wound from view. Some newer products on the market are designed to provide an alternative to the traditional 'band-aid' type product with a modern film-based version.

Method of application

Films should be applied to clean dry skin, free from any moisturisers or creams. The backing paper is removed, the

film is applied to the skin and the covering sheet or frame is then peeled off. Firm pressure with the hand over the film will activate the adhesive. It is important to ensure that no wrinkles or channels are present in the film after application as these may allow the entry of water or bacteria. The film should be large enough to cover the wound plus at least 3-4cm of intact skin around the wound.

Films can be left in place for up to 1 week, provided there is no maceration under the dressing. Removal of films can be painful if attended to incorrectly. To painlessly remove a film, lift a corner and stretch the film away from itself, whilst applying light pressure at the centre. Move around the dressing in this manner until the film is lifted off entirely.

Limitations

Due to the limited moisture vapour permeability of films, they are only suitable for use on dry wounds or wounds with a very low level of exudate. Wetter wounds will tend to macerate under a film dressing. Any maceration appearing in or around the wound bed indicates the need for removal of the film and replacement with a more absorbent dressing.

Due to their semi-occlusive nature, film dressings are not suitable for use on clinically infected wounds. They are also not appropriate for deep or cavity wounds. Due to the strength of the adhesive, film dressings should not be used on fragile or damaged skin. Removal of films in these cases can result in significant trauma to the surrounding skin.

A limited number of patients will display an allergic reaction to the adhesive on some film dressings, particularly after repeated use. This can be avoided by using a barrier preparation such as Cavilon Barrier Wipes® (3M) or Skinprep® wipes (Smith+Nephew).

Products available

Products available can be seen in Table 1.

Foam dressings

Description

Foam dressings allow the wound bed to remain moist and absorb excess exudate to reduce the risk of maceration. They are porous, single or multiple layered dressings that fulfil many of the requirements of an ideal dressing.

They have a high fluid handling capacity and, as such, promote a moist wound environment without allowing maceration of the wound or the peri-skin. They are thermally insulating and permeable to moisture vapour and atmospheric gases. They do not adhere to the wound, nor do they release any particles or toxic components into the wound. Foams are highly conformable and generally provide excellent cushioning and protection of the wound site. They can be used effectively under compression. They are available in many different shapes and sizes, including cavity fillers, and can be cut to size. Some brands are available in waterproof island dressings.

Indications

Foams are extremely versatile and can be used on a wide range of wounds, including light to moderate or highly exudating wounds and superficial or cavity wounds. Burns, leg ulcers, pressure ulcers, simple wounds that are exudating, skin grafts or donor sites are all suitable candidates for foam dressings.

Foams can also be used as secondary dressings over amorphous hydrogels, hydrocolloid powders/pastes, cadexomer iodine and alginates. They also have an important role as protective

Table 1. Available film dressing products.

Brand name	Properties	Manufacturer
Opsite Flexigrid®	Transparent film with measuring grid	Smith+Nephew
Opsite Flexifix®	10m rolls, 5cm or 10cm wide	Smith+Nephew
Opsite Post-Op®	Island dressing	Smith+Nephew
Tegaderm®	Sterile, thin film, waterproof, breathable bacterial barrier	3M
Tegaderm Plus®	Island dressing	3M
Clean Seals®	Island dressing	3M
Cutifilm Plus®	Water and bacterial proof island dressing	Smith+Nephew
Bioclusive®	Transparent, semiocclusive, bacterial/viral barrier	Johnson & Johnson
Polyskin II®	Semipermeable, transparent polyurethane film, acrylic adhesive	Tyco/Kendall

cushioning over bony prominences to prevent the development of pressure ulcers.

Methods of use

Foams are applied either directly to the wound or as a secondary dressing. They can be cut to size, but the dressing should leave about 3-4cm clearance from the outer edges of the wound. The foam can be held in place with a film, tape, lightweight cohesive bandage or lightweight tubular bandage (taking care using films and tapes on patients with friable skin). Depending on the level of exudate, sheet foams can be left in place for up to 7 days.

When filling cavities, the appropriately sized foam cavity dressing can be placed into the wound and left in place for 1-4 days, depending on the level of exudate. If the wound edges are not undermined and no sinuses or tracts are present, Cavi-Care® (see below) can be used instead of preformed cavity fillers. Cavi-Care® can be left *in situ* for up to 2 weeks, but needs to be cleansed daily (as per manufacturer's instructions) in chlorhexidine solution and rinsed thoroughly before re-inserting into the wound.

Limitations

Foams are generally non-adhesive and as such require a secondary dressing or tape/bandages to hold them in place. Most foams are not waterproof and therefore care needs to be taken when showering or bathing. Cavi-Care® has specific limitations due to its unique nature, especially the wound size and the degree of undermining or tracking of the wound. As with all products, it is important to be familiar with the manufacturers' recommendations for use.

Products available

Products available can be seen in Table 2.

Hydrogels

Description

Hydrogels are gels consisting predominantly of a polymer or copolymer and up to 95 per cent water. Hydrogels are able to donate moisture to dehydrated tissue and absorb some moisture from an exudating wound. They are available in two forms; amorphous hydrogels and sheet hydrogels. Amorphous hydrogels are soft formless gels that become less viscous as they absorb fluid. Sheet hydrogels are firm sheets of gel that swell when fluid is absorbed but maintain their integrity.

Hydrogels provide a moist environment for wound healing, they are non-particulate, non-toxic and non-adherent. The viscosity of the gels varies between products and is a consideration in their selection, i.e. how firm or 'runny' they are may affect their use in certain wound types (e.g. cavities vs superficial) and locations.

Table 2. Available foam dressing products.

Brand name	Properties	Manufacturer
Hydrasorb®	Single layer foam	Tyco
Lyofoam Flat®	Double layer foam, place shiny side to the wound	SSL
Lyofoam Extra®	Triple layer foam, place white side to the wound	SSL
Lyofoam C®	Contains charcoal for odour control, place shiny side to the wound	SSL
Lyofoam T®	Tracheostomy use	SSL
Lyofoam A®	Island form of Lyofoam® flat, adhesive, waterproof	SSL
Allevyn®	Triple layer foam, place white side to the wound	Smith+Nephew
Allevyn Adhesive®	Island form of Allevyn®, waterproof, adhesive	Smith+Nephew
Allevyn Cavity®	Non adherent 'pillow' filled with chips of Allevyn® foam	Smith+Nephew
Allevyn Tracheostomy®	Polyurethane hydrocellular foam, highly absorbent, non-adherent, breathable outer film	Smith+Nephew
Cavi-Care®	Dual component product that forms a foam when the two liquid components are mixed. Liquid is poured into the wound and resulting foam shapes exactly to the contours of the wound	Smith+Nephew
Curafoam®	Non-adherent, highly absorbent, conformable hydrophilic polyurethane foam, non linting	Kendall

Indications

Amorphous hydrogels are particularly useful for rehydrating sloughy or necrotic tissue and enhancing autolytic debridement. Hydrogels have a marked cooling effect on the skin and thus are extremely useful for the treatment of thermal burns (particularly sheet hydrogels). Hydrogels in general have a soothing effect on tissues and can significantly reduce pain in a wound. Sheet hydrogels are also useful in the treatment and prevention of pressure ulcers, as they are able to absorb significant amounts of friction and shear.

As the absorbency of hydrogels is limited, they are best used on low exudate or dehydrated wounds such as minor burns, grazes/lacerations, donor sites and pressure ulcers.

Method of application

Amorphous hydrogels are liberally applied onto or into a wound and covered with a secondary dressing (usually a foam or a film). Hydrogels can remain in a wound for up to 3 days, after which they should be removed from the wound by irrigation and replaced as necessary.

Sheet hydrogels are placed over superficial wounds with an excess of 3-4cm around the wound. Simple sheet hydrogels need to be held in position with film, tape, lightweight cohesive bandage or a non-woven retention tape such as Fixomull or Hypafix. Island versions of the sheet hydrogel are available, usually with a film as the secondary dressing.

Limitations

Due to the high water content of the hydrogels, they have a propensity to macerate wounds with moderate to high exudate levels; therefore their use should be avoided in these types of wounds.

Many amorphous hydrogels contain propylene glycol, an agent that with contact can result in allergic reaction. Unpreserved hydrogels should be for single use only. Sheet hydrogels are occlusive and should not be used on clinically infected wounds or on cavity wounds.

Products available

Products available can be seen in Table 3.

Hydrocolloid dressings

Description

Hydrocolloids consist predominantly of a suspension of gel-forming polymer, gums and adhesive on a film or foam backing. Hydrocolloid dressings promote a moist wound environment, aid in autolytic debridement and have no

Table 3. Available hydrogel dressing products.

Brand name	Properties	Manufacturer
Solugel®	Amorphous, preserved or unpreserved available	Johnson & Johnson
Nu-gel®	Sheet hydrogel	Johnson & Johnson
Intrasite® Gel	Amorphous, unpreserved	Smith+Nephew
Intrasite® Conformable	Gauze impregnated	Smith+Nephew
Solosite® Gel	Amorphous, preserved	Smith+Nephew
Sterigel®	Amorphous	SSL
Clear-Site®	Sheet hydrogel, borderless and island version available	Paul Hartmann AG
DuoDERM® Gel	Amorphous, unpreserved	ConvaTec
Purilon® Gel	Amorphous	Coloplast
HydroHeal® Gel	Amorphous, unpreserved	Fauldings
Curafil®	Amorphous	Tyco/Kendall
Curagel®	Sheet hydrogel	Tyco/Kendall
Cutinova® Gel	Amorphous	Beiersdorf
Hypergel® (hypertonic saline)	Amorphous	SSL
SAF Gel™	Amorphous (contains alginate)	ConvaTec
Second skin®	Sheet hydrogel	Spenco

particulate or toxic components. They are waterproof, bacteria proof and conformable.

The entire wound contact surface is adhesive until the dressing comes into contact with wound exudate. The exudate is absorbed by the dressing which converts into a soft gel. The area of the dressing in direct contact with the wound itself loses its adhesiveness and thus will not damage the wound surface on removal of the dressing.

Hydrocolloid dressings are available in thick (regular) and thin versions in a variety of shapes and sizes, as well as a paste and a powder for wetter wounds or to fill cavities. Hydrocolloid dressings are also available in combination with an alginate to increase the fluid handling capability of the dressing.

Indications

Hydrocolloids can be used on lightly to moderately exudating wounds such as leg ulcers, pressure ulcers, burns, donor sites etc. Thin hydrocolloids can also be used over suture lines and at IV sites. Hydrocolloids are useful in the prevention of pressure ulcers.

Method of application

Before application, the hydrocolloid should be warmed in the hand (or underneath the patient) to increase the activity of the adhesive. The backing papers are peeled off and the dressing is applied to the wound. As the entire underside of the dressing is adhesive, there is no need for a secondary dressing. Placing the dressing such that one third of the dressing is above the wound and two thirds are below the wound will maximise wear time by increasing the absorption capacity of the dressing. The dressing should have a margin of 2.5-3cm larger than the wound.

Dressings can be left in place up to 7 days, depending on the level of exudate. Duoderm® hydrocolloid dressings should be changed when the exudate seeps from the edges of the dressing or a white 'blister' appears under the dressing. Comfeel Plus hydrocolloid dressings should be changed when the dressing becomes transparent or there is any leakage.

In more highly exudating wounds, hydrocolloid powder can be applied to the wound bed underneath a regular hydrocolloid dressing to increase the fluid handling capacity of the system. Hydrocolloid paste is used as a cavity filler and should fill the cavity to approximately one third of the wound depth. A range of products, including some passive dressings, foams etc, may be used as secondary dressings over the paste or powder to cover it and hold it in place as well as absorb excess exudate.

Limitations

Hydrocolloids have a limited fluid handling capacity and therefore should not be used on highly exudating wounds. Care needs to be taken when applying hydrocolloids to wounds undergoing surface granulation, as they may result in hypergranulation.

Due to the semi-occlusive nature of hydrocolloid dressings, they should not be used on clinically infected wounds. Caution is required when removing hydrocolloid dressings from very fragile skin.

As the dressing material itself is adhesive, the edges of the dressing are prone to rolling and can leave residues of adhesive on clothing and bedding. This problem can be circumvented by placing a border of tape around the edges of the dressing or using the dressings with bevelled edges.

Products available

Products available can be seen in Table 4.

Comment

In the workshop itself, participants had a 'hands-on' opportunity with a range of sample products available in each class. The experience of applying dressings to oneself or colleague and then removing them gave more insight into the content of the workshop.

Where possible, a similar exercise is useful for practitioners wishing to familiarise themselves with or refresh knowledge of various products while reading this article. It is important in each case to review the relevant manufacturer's literature for the product as well, particularly if one is unfamiliar or uncertain about its indications and use.

Summary

This article has highlighted key features of four major classes of modern wound management products – the film dressings, hydrogels, foams and hydrocolloids. From it, a better understanding of how products work and therefore why we use them in certain circumstances may be derived.

It is important to consider these products in context of the clinical setting. While the theory of the function and form of a dressing is important, it is how it is relevant in a clinical setting that is most important. The information provided

Table 4. Available hydrocolloid dressing products.

Brand name	Properties	Manufacturer
DuoDERM® EXTRA THIN®	Thin hydrocolloid, available in squares, strips and spots	ConvaTec
DuoDERM® CGF®	Regular hydrocolloid, available in squares, sacral dressings	ConvaTec
DuoDERM® CGF® with Border	Regular island hydrocolloid, available in squares, sacral dressings	ConvaTec
DuoDERM® Paste	Hydrocolloid matrix of DuoDERM with addition of natural mineral oil for pliancy	ConvaTec
CombiDERM® ACD®	Non-adherent contact layer, absorbent island pad containing cellulose, adhesive hydrocolloid border	ConvaTec
CombiDERM non-adhesive®	Non-adherent contact layer, absorbent island pad containing cellulose, non-adhesive hydrocolloid border	ConvaTec
Comfeel® Ulcer Dressing	Regular hydrocolloid/alginate combination, bevelled edges	Coloplast
Comfeel Plus Transparent®	Thin hydrocolloid/alginate combination, available in squares, rectangles and strips	Coloplast
Comfeel Plus® Contour Dressing	Hydrocolloid/alginate combination specially shaped to fit difficult to dress areas	Coloplast
Comfeel Plus® Pressure Relieving Dressing	Hydrocolloid/alginate combination fitted with removable foam rings to relieve pressure	Coloplast
Comfeel® Powder	Hydroactive particles in powder form	Coloplast
Comfeel® Paste	Hydroactive particles bound in emollient	Coloplast
Replicare Ultra®	Highly breathable conformable thin hydrocolloid sheets, sacral shapes	Smith+Nephew
Restore Plus®	Tapered edge hydrocolloid, crosslinking agent for increased absorbency, minimal residue in wound bed	Hollister
Restore Extra Thin®	Translusent hydrocolloid, crosslinking agent, minimal residue in wound bed	Hollister
Tegasorb®	Sterile dressing, hydrocolloid with outer clear adhesive cover film	3M
Tegasorb Thin®	Sterile thin dressing with same properties as Tegasorb®	3M
Ultec Pro®	Contains alginate and hydrocolloid products	Tyco

here should be considered in that context, with better therapeutic and economic outcomes as the goal.

Part two of the contents of this workshop will appear in the next edition and will cover alginates, hydrofibre dressings, hydroactives, cadexomer iodone, zinc paste bandages, a range of miscellaneous products as well as a brief overview of the passive dressings.

Notes

1. C, D, E approach as developed by Dr Matthew Pattison and the Wound Foundation of Australia and used in Wound Logic®.
2. Based on the properties of an ideal dressing as described by Geoff Sussman in Sussman C & Bates-Jensen B. Wound Care – A Collaborative Practice Manual for Physical Therapists and Nurses. Gaitherburg: Aspen Publishers, 1998.

Further reading

Given the format of the workshop, no specific references have been stated. The following texts and websites are useful to provide information on a range of aspects of wound dressings including their physical properties and applications for their clinical use.

Thomas S. Wound Management and Dressings. London: The Pharmaceutical Press, 1990.

Sussman C & Bates-Jensen B. Wound Care – A Collaborative Practice Manual for Physical Therapists and Nurses. Gaitherburg: Aspen Publishers, 1998.

Website of the Surgical Materials Testing Laboratory, Wales, 2001 – <http://www.dressings.org/>