

# Simple solutions for complex wounds

Background  
Information  
and the History  
of Advanced  
Wound Healing

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*Healthcare*

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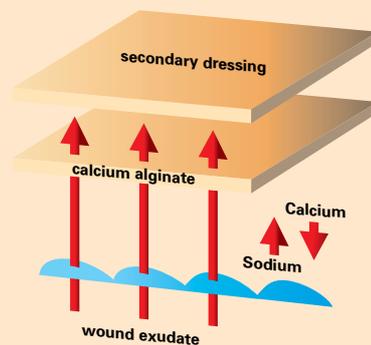


Advanced  
Wound Care™

# Types of Advanced Wound Care Products

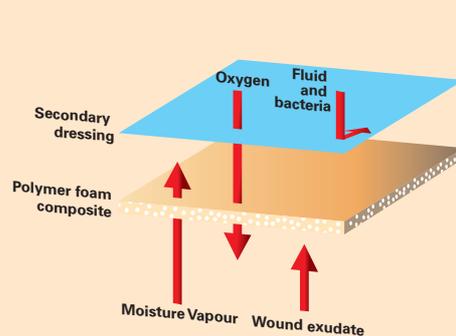
## Calcium Alginates

Calcium alginates provide a moist healing environment by converting the exudate into a gel. A reaction between the calcium in the dressing and the sodium in the wound exudate results in a chemical ion exchange, which forms a gel-like substance. The gel conforms to the wound, providing a soft, moist healing environment. Due to its dehydrating effect, this dressing should not be used with dry wounds.



## Foams

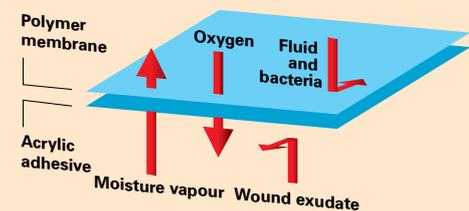
Foam dressings are indicated for partial-thickness or superficial wounds. The open pore structure of a foam dressing gives it a relatively high moisture vapour transmission rate (MVTR). Absorptive ability varies by manufacturer. Pore size, texture, and absorbency are controlled by agents impregnated in the dressing. The degree of occlusion depends on the presence of a film backing.



## Films

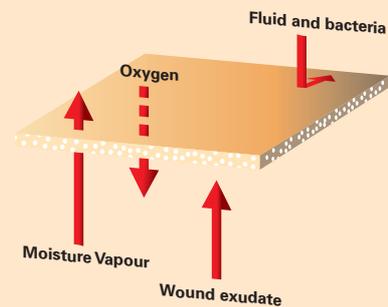
Film dressings are non-absorbent, permeable to moisture vapour and oxygen, whilst being impermeable to bacteria and viruses.

Film dressings are typically made from a thin, transparent polymer membrane, which is coated with a layer of acrylic adhesive (Tyco's adhesive is hypoallergenic). Film dressings can also be combined with other dressing materials.



## Hydrocolloids

Hydrocolloid dressings are backed by either a water-proof polyurethane foam or a thin film. In some cases, this backing extends beyond the margin of the hydrocolloid to form a border. Totally occlusive, hydrocolloids seal the wound area to keep the moisture in, whilst keeping bacteria and fluids out. This limits any gas exchange between the wound and the environment. Fluid absorption occurs slowly, primarily through swelling of particles in the dressing. This swelling allows a soft, non-adherent gel to form over the wound.



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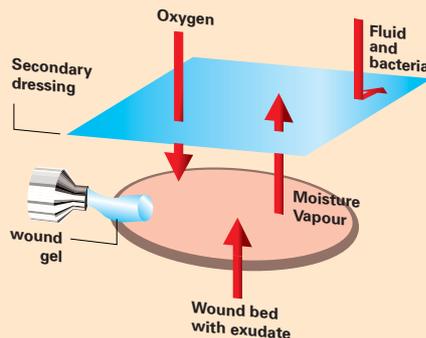


## Hydrogels

Hydrogels maintain balanced hydration through controlled evaporation – exudate is absorbed into the gel, whilst moisture evaporates through a semi-permeable film backing or a secondary dressing.

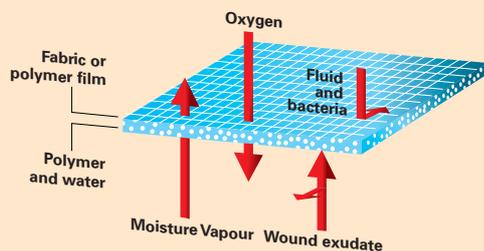
## Amorphous Hydrogels

Amorphous hydrogels, need a secondary dressing to control the amount of moisture vapour transmitted through the dressing.



## Hydrogel Sheet

Hydrogels in a sheet form have a backing of fabric or polymer film, which may or may not have adhesive borders.



## Traditional and Advanced Dressings

Today, dressing a wound does not mean managing it according to personal experience or historical knowledge. In more recent times we are guided by clinical studies and evidence based medicine. It is recognised that there are two wound care systems, these being the traditional and advanced dressings. Many dressings are available and have been described: a classification suggested by Ricci includes 10 dressing classes (Tab. 1)

Gauzes
Antiseptics
Proteolytic Enzymes
Absorbents
Granulation Promoters
Bio-dressings
Skin derivatives
Semipermeable Dressings
Occlusive Dressings
Hydrogels

Tab. 1: Dressing materials classification (Ricci - 1996)

## Traditional Dressings:

These wound care systems are based on the conditions shown in tab. 2, and have a variety of origins.

Exudate absorption and drying of the wound
Haemostasis
Antisepsis
Protection from infection
Covering wound

Tab. 2: Traditional dressing conditions

Keep a moist micro-environment
Remove exudate and necrotic tissue
Keep temperature constant
Oxygen permeable
Protection from exogenous infection
Easy to handle
Non-traumatic at the dressing change

Tab.3: Advanced dressing conditions

## Advanced Dressings:

Opposite to the previous conditions those in (tab. 3), were already well known in the Arabian period. The moist wound healing philosophy has been scientifically explained by George Winter whose studies were published in the early 1960's in 'Nature'. On the basis of these conditions, a new wound care method was born, promoting and respecting the physiological healing processes. The dressing materials included in this class of products, are the following: Polyurethane Films, Foams, Hydrogels, Hydrocolloids and Alginates.

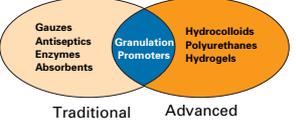


Fig. 1: Dressings categories (according to use)

Fig. 1 shows the different classes of products; we can highlight that alginates are positioned in the middle of the two wound care philosophies, because they keep the microenvironment moist and do not occlude the wound. Alginates promote granulation. We can now analyse the conditions which advanced dressings produce.

**They keep a moist microenvironment** as human cells can only live in water. The only tissue that can live in the air is that of the skin (keratinised dead cells). The wound has a superficial loss of tissue and so the structures that need water to live are exposed. It is obvious then, we need to promote a moist environment to support the healing process. The second most important condition, is that of the length of healing time. Epithelialization starts from the edge of the wound, is due to cell migration: keratinocytes need a moist microenvironment. In a dry wound they will migrate under the dry dermis, but in a moist wound they will migrate on the surface (looking at Fig. 2). We can easily understand that a water mass movement is quicker than that of the removal of dry tissues.

**Thermal stability:** mitosis stops at 32°/33°C and this is the temperature on the wound surface when it is exposed to air. Dressings made from fabric cannot isolate the wound but this can be achieved by using synthetic materials because they have a lower thermal conductivity and can be worn over a longer period of time. This helps to restore the thermal stability lost by the skin.

**Prevention of Infection:** it's commonly believed that a moist wound is frequently infected. Hutchinson demonstrated in a very large number of studies that advanced dressings can reduce the incidence of infection by more than 50% (Fig. 3) in comparison with traditional dressings.

**Ease of use:** not always clear at first, becomes evident after training.

**Comfortable:** advanced dressings do not adhere to the lesion and so avoid further damage to the wound or it's surrounding tissues. The comfort during dressing changes is immediately noticeable and the creation of a moist, warm environment can reduce pain.

**Low cost:** everyone knows that dressings represent 5% of the management costs of a chronic wound, whilst 70% of the cost is absorbed by nursing time. It is evident that if dressings worn over a longer period are used, nursing time can be reduced. This represents a gain, both economically and in clinical resources.

In conclusion we can suggest evaluating the different possibilities offered by the two classes of dressings but we must always remember that these dressings adapt to the wound and not vice versa. Fig. 4 shows a simple diagram that we can call "How to dress a wound" (according to the tissues of the wound bed); this is a suggestion for those approaching wound care for the first time. Experience and knowledge will allow the indications to be extended.

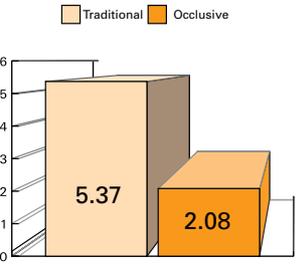


Fig. 3: Infections incidence – comparison between traditional and advanced dressings (Hutchinson, mod.)

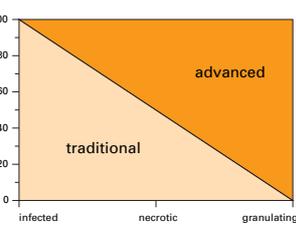


Fig. 4: How to dress a wound (depending on the condition of the wound bed)



Fig. 2: (Winter, mod.) Epithelial cells migration under advanced and traditional dressing.

# The Role of Dressing

***A chronic skin lesion: "skin loss, variable in depth, which does not heal by itself. It is usually due to a pathology or disorders that may affect the whole body"***

When we start to treat a chronic skin lesion, we must first avoid focusing all of our attention on the lesion itself. It is important to remember that this is an epiphenomenon – a symptom of a pathological process affecting the whole body. So the treatment of a chronic skin lesion should be holistic and be approached in three steps:

- general evaluation of the patient and correction of any possible disorders (e.g. malnutrition).
- diagnosing the cause and correcting it (e.g. vascular pathology or immunological disorder).
- local treatment.

A dressing should not be seen as the sole treatment for the lesion, as it may not lead to satisfactory healing and there is a high risk of a recurrence. Although these concepts are universally accepted by most specialists today, they are not yet applied correctly in daily clinical practice.

The dressing must be considered as being a part of the treatment, characteristically it is the most evident part of it. The role of the dressing is to promote the healing process and facilitate it, after all aetiological factors have been dealt with.

The chronic lesion is an evolving process which is subject to complications and changes; the most severe complication is infection and this must be prevented or, if present, treated. The use of advanced devices for prevention and antiseptic dressings must be considered as "the gold standard".

Necrotic tissue in a wound may behave as a foreign body and must be removed. A necrotic lesion must always be debrided. A clean lesion which is actively healing must be protected and helped to re-epithelialize. In fact, advanced dressings do represent "the gold standard" and they can maintain the moist micro-environment, thermal stability and oxygen diffusion, which helps in accelerating the healing process. The last item needing evaluation is exudate management, whilst avoiding the lesion drying out (drying out can halt re-epithelialization) an excess of exudate may lead to maceration and enlargement of the lesion. The right choice of product for absorption and the correct evaluation of wear-time are the keys to success for wound management.

Prof. Elia Ricci, University of Turin, Italy

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# Tyco has the simple solution and the right product in any phase<sup>1</sup>.

Open wounds have many different clinical appearances and consequently the treatment objectives for each phase is different. In addition the wound in any phase may have different amounts of exudate which requires management and will influence the selection

of dressings. The Advanced Wound Care System is developed to simplify medical care – this dressing selection guide has been developed to support and simplify your choice.

Chronic Wound

Epithlization

Phase	 <b>Necrosis</b>	 <b>Infection/Slough</b>	 <b>Remodelling</b>						
									
Techniques of advanced wound healing	<b>Debridement Agents</b> Hydrogels	<b>Antimicrobial Agents</b> <b>Debridement Agents</b> <hr/> Topical antiseptics Impregnated Gauze <hr/> Hydrogels Alginates	<b>Granulation Facilitators</b> + <table border="1"> <tr> <td>Hydrogel</td> <td>Alginates</td> </tr> <tr> <td>Hydrocolloids</td> <td>Hydrocolloids with Alginate</td> </tr> <tr> <td>Films</td> <td>Foams</td> </tr> </table> - wound exudate +	Hydrogel	Alginates	Hydrocolloids	Hydrocolloids with Alginate	Films	Foams
Hydrogel	Alginates								
Hydrocolloids	Hydrocolloids with Alginate								
Films	Foams								
Products from Tyco Healthcare	CURAGEL CURAFIL AQUAFLO	CURASALT CURAGEL CURAFIL AQUAFLO CURASORB	CURAGEL CURAFIL AQUAFLO ULTEC PRO POLYSKIN II POLYSKIN MR BLISTERFILM CURASORB CURAFOAM HYDRAFOAM						

<sup>1</sup> This Tyco Healthcare protocol is not applicable in case of Tumours and/or major burns.  
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