

Advanced wound dressings

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Louise O'Dwyer BSc(Hons), DipAVN(Surg), DipAVN(Med), RVN continues her wound management series with a look at various dressing options and how to select one appropriate to the wound type

WOUND dressings play a vital role in creating the optimum wound healing environment. Dressings have advanced greatly since moist wound healing was pioneered in the 1960s by George Winter.

A wide, and often confusing, variety of wound dressings are available for the veterinary market. These have been created to be specific to the wound type and its stage of healing. Advanced wound dressings have been designed to actively rehydrate wounds or to remove and retain excess fluid, and also to protect the wound from further trauma.

Selecting dressings

Dressings are selected according to the patient's needs, wound classification, stage of healing, underlying conditions and anatomical site. Some wounds will require just a protective layer, whereas deeper wounds may require a primary dressing with a secondary dressing to cover and protect the wound. Combining two or more dressings provides greater flexibility in treating the symptoms of the wound.

Dressings should be selected to manage the specific local wound environment and to achieve optimum wound healing. This is achieved by:

- creating a moist (not dry or overly wet) wound environment;
- eliminating debris, slough and necrotic tissue;
- reducing bacterial contamination;
- keeping the wound warm;
- protecting the wound from abrasion or contamination;
- preventing adherence to newly formed tissue; and
- keeping disturbance of the granulating wound to a minimum. Further considerations include:
 - minimising pain; and
 - achieving a good cosmetic outcome.

It is important to be able to recognise the stage in the healing process to confirm whether a wound is following normal healing progression (See *VN Times* 10.06). A knowledge of the mode of action of each dressing is also essential.

Even those dressings considered “advanced” are based on Winter’s research into how a moist environment maximises the rate of healing. Many new dressings have been designed to either absorb excess fluid or exudate or to donate moisture into a wound that is not producing sufficient fluid. Products are also available to manage wound infection or contamination by being antimicrobial, as well as creating the optimal environment for wound healing.

Advanced dressings

Hydrogels

Hydrogels are used in wounds thought to be at risk of drying out. They are composed of 70-95 per cent water in combination with variable quantities of a hydrophilic polymer base, such as carboxymethylcellulose or alginate. The main role of hydrogels is as a fluid donor for dry wounds. They can also be used as an aid to debridement in fragile wounds.

Hydrogels can both donate and trap water; therefore, they are useful for absorbing wound exudate, as well as hydrating and debriding necrotic material within the wound. A secondary dressing is required for hydrogels to work efficiently – this should ideally be a foam dressing with a semi-permeable film backing to maintain humidity and a moist wound environment.

Hydrocolloids

These dressings are usually used in wounds that require additional moisture and natural debridement. Hydrocolloids actively stimulate wound healing and encourage debridement as they degrade on interaction with wound exudate. They can be difficult to apply to animals. They are best used in dry to semi-dry wounds, requiring maintenance in an optimal moist environment.

The dressings consist of polymers suspended in an adhesive matrix that adheres to undamaged skin around the wound edges. Dressings are left in place for several days and provide a near-ideal wound healing environment.

Users should be warned that on initial removal the wound can look much worse – this is because the dressings swell and liquefy as the exudate is absorbed, as well as giving the wound a yellowish appearance. However, this is normal and once the wound has been lavaged it should look much improved.

Polyurethane foam dressings

These foams are highly absorbent and act by drawing excess exudate away from the wound, maintaining some moisture through humidity, which keeps the wound moist.

They are commonly applied on top of other products – for example, hydrogels or honey. The dressing's ability to absorb exudate depends on the viscosity of the exudate and also the dressing's moisture vapour transfer rate (MVTR). The semi-permeable membrane backing allows oxygen exchange and controlled evaporation, resulting in a moist healing environment.

Foam dressings are now available with antimicrobial properties. Polyhexamethylene biguanide (PHMB) is as an antimicrobial agent exhibiting broad spectrum activity against bacteria and fungi. New PHMB-impregnated hydrophilic polyurethane foam dressings are available (for example, AMD Antimicrobial Foam Dressing; Kendall). This PHMB within the dressing attacks bacteria in wound exudate as it is absorbed. This type of foam dressing is effective against *Staphylococci* (including MRSA), *Pseudomonas*, *Proteus* etc. The dressing itself creates a moist environment as well as inhibiting pathogenic organisms from growing within the wound or penetrating the dressing.

Alginates

Alginate dressings are fine, fibrous dressings used to absorb moisture. They are presented in either rope or flat forms. These dressings are derived from kelp and consist of varying proportions of guluronic and mannuronic acids. The wound exudate interacts with the alginate to release cations that actively stimulate wound healing via the inflammatory cascade, allowing the release of endogenous growth factors into the wound. These dressings can be useful in the treatment of wounds that have become stationary – in these cases they should be moistened before use.

Sodium chloride dressings

A relative newcomer to the veterinary dressings market, this is a gauze dressing saturated in a 20 per cent hypertonic saline solution. This dressing promotes biological cleaning and the autolytic debridement process in non-infected and highly exuding wounds. The dressing stimulates the inflammatory response and granulation tissue formation. The hypertonic saline within the dressing has an osmotic action, pulling necrotic tissue and bacteria away from wound. Sodium chloride dressings are indicated for heavily infected and necrotic wounds. These dressings should be replaced every 24 hours and their use stopped once debridement is complete.

Super-absorbent dressings

Wounds that produce vast quantities of exudate can be very difficult to manage. Historically, nappies have been used to manage such wounds; however, new dressings have been designed to cope with very high volumes of exudate by incorporating polyacrylate crystals into the dressings in combination with hi-tech silicone adhesives to make them very “wearable”. These dressings are very useful when used on patients with Penrose drains in place.

Antimicrobial dressings

Honey

Manuka honey is my first choice in wound management due to its excellent antimicrobial effects. This honey is derived from manuka plants and requires a unique manuka factor of 10 or more to be used in wound management. This ensures its potency and antimicrobial effects are adequate, and also that it is effective against common wound pathogens, including *Pseudomonas* species, MRSA and *E coli*. Honey manufactured for medical use undergoes high-level filtering to remove debris and beeswax, as well as gamma sterilisation.

Manuka honey is now available specifically for the veterinary market. An example is Activon (Dechra), which is claimed to be effective against *Pseudomonas* species, MRSA and *E coli*.

Silver dressings

Silver and its salts have antiseptic and antibacterial properties. Historically, silver has been used as a paste for the treatment of burns; however, the introduction of silver-impregnated dressings has made a huge impact on wound management in recent years.

The silver in the dressings ionises to release active silver ions into the wound. Nanocrystalline silver has been developed as a product that rapidly releases high concentrations of silver into an infected wound. Dressings are available that can be left in place for up to seven days. The dressings require activation prior to use, by moistening with water for 10 seconds.

Silver has a similar antimicrobial effect to manuka honey, and is effective against *Pseudomonas* species, MRSA, *E coli* and common yeasts and fungi, including *Candida*.

It should be remembered that holistic assessment and treatment of the patient is essential in order to ensure healing potential is optimised.