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MOIST WOUND HEALING – A NEW CONCEPT IN WOUND MANAGEMENT

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The concept of moist wound healing dates back to World War II when cellophane was used successfully on wounds for moisture retention. A warm, moist environment enhances wound healing. Wound exudate is rich in healing properties including white blood cells, growth factors, metalloproteinase, and cytokines. Leukocyte function is enhanced and scar formation is minimized in a moist environment. Autolytic debridement of necrotic tissue is rapid in a moist environment. A balance in fluid production and removal must be maintained under an occlusive dressing to minimize tissue maceration. Bacterial colonization will occur under an occlusive dressing, so preventive measures must be taken in minimizing the load. It has been demonstrated that wound occlusion nearly doubles the rate of re-epithelialization. Full-thickness wounds maintained in a moist environment, epithelialize in less than 15 days, whereas similar wounds exposed to air took twice as long. Finally, wounds exposed to air are more inflamed, painful, pruritic and maintain a thicker crust that delays the healing process.

Today there are literally thousands of wound care products on the market. Few have been looked at discretely in the horse. Although many equine practitioners are using some or all of the basic principles of moist wound healing, a plethora of new medications have evolved around the subject. Most, if not all of these products are designed using ancillary methods. The purpose of this topic to review information supporting the concepts of moist wound healing and describe some of the more popular compounds that are available, elaborate on their ingredients, aiding the product selection process.

Initial wound treatment should also be considered when discussing the subject of moist wound healing. Ideally wound cleansers should be non-toxic, non-irritating, isotonic, pH-balanced and in abundant supply. Although water does not meet these criteria, it is usually in abundant supply and can be used on wounds as long as exposure time to traumatized tissues is minimal. Such is the case when using high-pressure lavaging techniques. Once initial gross contamination is removed, saline is satisfactorily used to complete the lavaging portion of the wound care. Commercial products containing Polysorbate 20 are also very useful in treating open wounds. This product is a surfactant that facilitates removal of bacteria and debris. Once a wound is thoroughly and copiously lavaged, a combination of surgical debridement and lavage is used to remove additional gross contamination and devitalized tissue.

In selecting a dressing to facilitate the principles of moist wound healing, several key factors should be considered. The dressing should be appropriate in treating the underlying cause of the wound, as well as its location and depth of injury. Exposed tissues should be kept moist, while ideally, the surrounding peri-wound skin is dry. The dressing should not manage the amount of exudates produced by the wound. They should minimize scab formation and compensate for tissue sloughing. Ideally, a topical dressing will address localized tissue infection. Advanced wound care dressing that work to keep exposed tissues moist include, films, hydrocolloids, hydrogels, alginites, hypertonic gauze, antimicrobial impregnated gauze, foams and composites. Many products are occlusive in nature and basic steps must be taken to minimize the bacterial load, before they are incorporated into the treatment regimen.

The wet-to-dry bandage (WTDB) has been used successfully in the horse. Although it doesn’t fall into today’s classical classification of moist wound healing, it does follow many of the same principles and is still considered useful as a mechanical form of debridement, while maintaining a moist environment. The primary contact layer of the WTDB is 4 – 6 layers of wide-meshed sterile gauze sponges soaked in either 0.01% dilute povidone iodine, 0.05% dilute chlorhexidine, or physiological saline solution. Excess fluid is squeezed out, leaving damp sponges that are applied directly to the exposed tissues on a wound surface. Damp versus soaked, saturated sponges minimizes tissue maceration. Sponges are secured to the area using sterile gauze under a bulky, absorbent secondary bandage layer. The tertiary layer secures the bandage to the skin surface. Damp sponges enhance capillarity, promoting the movement of fluid and bacteria away from the tissues, into the intermediate layers of the bandage. The contact layer adheres to the wound surface, and when it is removed, the surface of the wound is cleared of necrotic debris and foreign material. Bandages are changed daily until the tissues associated with the wound are healthy. The moist environment of the bandage minimizes tissue desiccation and enhances healing.

Amorphous hydrogel dressings incorporate water, glycerin and a polymer, creating a medical grade gel that promotes moist wound healing. The dressing conforms well to uneven surfaces. It is nondrying and sterile. The dressing is used on light exudating, partial and full thickness wounds, lacerations and abrasions. The material can be used to pack wound cavities.

Calcium Alginate is a derivative of seaweed, compressed into soft, non-woven fabric pads. Calcium alginate interacts with the sodium in wounds and is capable of absorbing up to 20 times its weight in exudates. The product conforms to wound contours, is easily applied and it painless to remove. It reduces maceration of the surrounding healthy tissue. The product is useful in moderate to heavy exudative wounds, including degloving injuries, lacerations, and wound dehiscence. The product can be used safely in wound cavities.

Hypertonic saline wound dressings are pre-moistened, highly concentrated saline dressings that promote an osmotic action in wounds. The concentration of saline used in the product is 20 % versus the normal saline that is 0.9 %. The function of this dressing not only keeps the wound be moist, its action is similar to the wet-to-dry bandage in that it non-selectively debrides wound surfaces. Hypertonic saline dressing is used in heavy exudating, infected or dirty wounds, where bacteria, necrotic debris and particulate matter require removal.

Hydrophilic polyurethane non-adherent foam is a highly absorptive and protective dressing. It absorbs moderate to high amounts of exudates and conforms well to any surface area. It is easily applied, is non-adherent and is easily removed from a wound surface. The material is used on post-surgical incisions, lacerations, abrasions, and severe traumatic wounds in areas with moderate to heavy exudates production. The material can be used as cover dressing for wounds that have been packed with another suitable material.
Antimicrobial dressings are available. One such product contains polyhexamethylene biguanide (PHMB), a product similar to chlorhexidine, but less tissue toxic. The product has been incorporated into sponges and other suitable materials acting as an antiseptic. PHMB resists bacterial colonization within the bandage and reduces bacterial penetration through the dressing. It is suitable for all wounds that are susceptible to infection and can be packed into large wound cavities.