

## TO HELP THE HEALING PROCESS OF ACUTE WOUNDS IN HORSES WHAT CAN WE OFFER AND AT WHAT TIME?

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When a horse is presented with an acute wound, measures should be taken to reduce contamination and the inflammatory response should initially be stimulated rather than inhibited. When possible, the practitioner should follow some of the following recommendations.

### A. Preparation of the wound

After grooming the patient, the preparation of the surgical site should include hair removal (clipping) and cleansing to remove dirt and to reduce resident skin flora. The hair should be clipped 10 to 20 cm further distal or proximal from the wound and circumferentially if a limb is involved. Antiseptics are best used around the wound on the skin but not in the wound. Surgical scrub with 5% povidone-iodine solution or 4% chlorhexidine diacetate are applied to an area starting at and around the wound and moving outward in expanding concentric circles. Different scrubs will alternate with alcohol rinse for an approximate period of 10 minutes.

### B. Debridement

Debridement is the best and most effective way to reduce most of the bacterial load within a wound and to minimize necrotic tissue. Although, the way the veterinarian will debride may have some negative consequences on wound healing and this explain the importance to select the best suitable technique.

#### *Sharp (surgical) debridement*

When it is possible, sharp debridement is recommended to start a therapeutic wound approach. It is performed with a scalpel or scissors either on a standing, sedated horse with local anaesthesia or under general anaesthesia. It is the least traumatic method especially when a scalpel is used.

#### *Mechanical debridement*

We do not recommend mechanical debridement with woven or nonwoven gauze because it can be very traumatic to the wound bed. A lavage method should be preferred that can be successful if a noncytotoxic cleansing solution is applied with a pressure between 10 and 15 pounds per square inch (psi). These objectives can be reached by squeezing a bottle of sterile saline in which you have punched approximately eight holes in the cap with a 16-gauge needle (Fig. 1).



Fig. 1



Fig. 2

#### *Maggot debridement*

Used in addition and approximately 24 to 72h after a sharp debridement, maggot debridement is a very effective method to finalise the surgical and the natural debridement (Fig. 2). Helping at the same time the all wound healing process (see abstract "Is biotherapy with maggots a solution to increase wound healing in equids?" by O. Lepage).



### Autolytic debridement

This method is the least traumatic and should be allowed, in selected cases, after surgical debridement. It is achieved by leaving wound fluid in contact with the wound bed. This technique reduces the bacterial count by allowing easy access of white blood cells to the moist wound bed. It is used for example in wounds of the foot, pastern or fetlock where a second intention healing is decided and managed with a cast (Fig. 3).

### Chemical debridement

This type of debridement is nonselective and should be reserved for very contaminated wounds in specific locations. Dakin's solution, a diluted sodium hypochlorite solution is an effective method when working on solar debridement of a foot (Fig. 4). Another chemical agent often used in the debridement of tooth root abscess is hydrogen peroxide (Fig. 5).



Fig. 3



Fig. 4



Fig. 5



Fig. 6

### C. Decision for wound closure

The appropriate technique for wound closure is chosen based on classification of the wound (clean, clean-contaminated, contaminated, infected) and the stage of healing (see abstract "From the veterinarian to the owner: understanding and explaining wound cicatrization in horses by O. Lepage). In general wounds that are clean or clean-contaminated are candidates for primary or delayed primary closure and wounds that are contaminated, infected or in later stages of healing will heal best by second intention. To make his decision two other factors should be taken into account by the veterinarian: location and vitality of the structures involved in the wound.

### D. Drugs

The inflammatory response to wounding in horses is characterized by a weak onset but persists over time. This implies that corticosteroids should be banished and NSAIDs used *ad minima* during the initial inflammatory response. Later on, this inflammation should be inhibited and these drugs can be beneficial in some cases. When possible antibiotics should be administered in a loco-regional manner in combination or not with systemic antibiotics.

### E. Dressings

To obtain the best results, different dressing should be used at the different stage of wound healing. The ideal dressing keeps the wound bed lightly moist and the surrounding skin dry. The clinician needs to learn how to manage the amount of exudate present in a wound but also get experience with a couple of dressing chosen from the vast amount of products that are present on the market (antimicrobial dressing, hydrogel, biologic dressing, semioclusive or occlusive (Fig. 6) dressings.

### F. Bandaging and casting techniques for wound management

Bandaging or casting will protect the wound from environmental contamination, reduce limb oedema, increase limb temperature which favours angiogenesis and increase tissue metabolism and wound healing. Also by reducing CO<sub>2</sub> loss from wound surface it reduces the pH which is detrimental to bacterial growth.



Bandages are usually composed of a dressing directly in contact with the wound or the skin (deep layer) and an intermediate layer with the main purpose of absorbing fluids and conforming well to the wound location. A superficial layer composed of a stiffer material will hold the previous layers in place. It will prevent trauma and decrease flexion and extension of the limb. The last step in bandaging is an elastic self-adhesive bandage that is applied above these 3 layers and an adhesive bandage tape that adheres to both the outer bandage and the skin that is fixed to the proximal and distal ends of the bandage. New reusable materials specific for horses, that replace this last step in bandaging, have been developed in the last 5 years (Fig. 7)

To support the limb or to reduce the development of exuberant granulation tissue a better immobilisation can be obtained by the introduction of splints made of PVC or wood into the bandage (Fig. 8). The cast providing the most effective rigid external immobilization of a limb, they are recommended for laceration that compromises the integrity of any type of soft tissue support structure distal to the carpus or tarsus (Fig. 9).

## E. Management of specific wounds

Tips for management of injuries of the neck, the body and the distal extremities are presented as clinical cases.



Fig. 7



Fig. 8



Fig. 9