



WOUNDS THAT WON'T HEAL

We all know that horses and wounds go hand in hand – a certain example of when, not if! With so much information, opinion, antiseptics, disinfectants, lotions, potions, salves, dressings, treatments and bandages available, wound management can easily become confusing and overwhelming. But the longer a wound takes to heal the larger the scar and the longer the recovery period.

Most non-healing wounds are preventable. The early stages of healing are the most critical and the wrong information for treatment can be detrimental. By following a few simple rules, understanding and preventing non-healing wounds is something that you can influence.

There are many reasons why wounds won't heal or experience delayed healing – and there are always those that fail to heal for no apparent reason! A background understanding of how the body responds to injury helps you decide on how to best react and respond to your horse's wounds..

Firstly, you might have noticed that the response in horses to injury is different to other species – and even to ponies! Compared to horses, ponies are less prone to breakdown of sutured wounds, less likely to form a bony sequestrum (dead or damaged bone tissue), less likely to develop proud flesh – and less likely to experience delayed healing. In horses, the initial response to injury is less intense and the formation of a healthy bed of granulation tissue is sluggish (especially in leg wounds). These combine to make horses especially susceptible to non-healing wounds – ie those that are delayed, slow and sometimes difficult. Another outcome is wounds, especially on the lower legs, that are more prone to infection, excess granulation tissue (proud flesh) and delayed healing.

So what is 'delayed' healingand how do we know if a wound becomes non-healing? By understanding the normal process of wound healing in horses, you will recognise the importance of choosing wound care products and dressings to complement healing stages. So, firstly let's look at what's 'normal'. Wound healing is an exquisitely coordinated series of stages, the phases of which overlap and must occur in the proper sequence and time. Normal wound healing consists of four stages:

1. The inflammatory phase – from days 1 to 5. To prepare the wound for healing, white blood cells rush to the wound site to seal torn blood vessels, fight infection and clear out dirt and debris.
2. Granulation – from days 3 to 14 the granulation tissue replaces blood clots and builds a matrix in the base of the wound, protecting it from the environment.
3. Repair, wound closure and new skin formation – from day 14 to many weeks, new tissue and blood vessels grow from the base of the wound upwards, and from the edges inwards. New skin cells begin their migration across the wound surface.
4. Maturation – contraction of the wound margins (edges??), completion of resurfacing by new skin cells and sealing of the surface should be finished by 8-12 weeks after injury.

By measuring the length, width and depth of the wound, a rough estimation of the healing time can be calculated. Again there is a difference between horses and ponies: tissue grows at different rates on the body and ponies heal more quickly than horses. In body wounds in ponies, skin growth across the wound surface advances at 0.75 mm/week between weeks 3 and 7; in horses, 0.62 mm/week. For limb wounds the rate is 0.63 mm/week in ponies, and 0.48 mm/week in horses.

Complicated wounds are often stuck in the first phase of healing ie inflammation. The exact time to heal depends on the structures involved and the ecosystem and size of the wound. Many things inhibit wound repair but wound management should promote healing and prevent infection. Ultimately, the key is matching anything applied to the wound with the stage of healing and the individual issues you are facing. Importantly, there is no single product, ointment or magic dressing that is appropriate for the wound from start to finish. Keep in mind that it can take 12 months for the skin and tissue to reach 80% of its previous strength and the longer a wound takes to repair, the greater the risk of it taking even longer to heal.

There are many factors known to cause delayed or non-healing wounds, including:

1. Genetic factors and congenital skin diseases: very rare.
2. Infection: far-and-away the most common inhibitor of healing – devastating the wound bed and widening the wound. Infection converts normal healing to a destructive process that prevents repair, skin cell migration and contraction of the wound margins. Crush injuries and those with tissue tearing are 100 times more likely to become infected.
3. Biofilms (vast colonies of multiple bacteria) which are very resistant to therapy can set up their home in wounds. When living in a biofilm, up to 1000 times more white blood cells and 100 times more antibiotics are required to kill the bacteria.
4. Foreign bodies: from hair, to soil, grass, sticks, microscopic objects and pieces of fencing, foreign bodies inhibit healing. They can enter a wound depositing debris far from the wound site. A classic is a horse falling to its knees in a flexed position – once standing, the damage can extend way beyond the wound opening. Dead or devitalised tissue can also be a 'foreign object' eg damaged bone (sequestra) and traumatised tendon (which usually harbour bacteria and cause failure to heal) may not become apparent for 3–6 weeks.
5. Dead tissue: Not all dead tissue will show itself in the first days after injury, instead acting as an area of continued inflammation despite surrounding healing. Examples include burns and dog-bite wounds.
6. Movement: Even when standing still, subtle movements of underlying tissues control balance and posture, tugging on wound margins and disrupting healing. Bony prominences also create tension that disturbs newly-growing, baby blood vessels and young skin cells – prolonging the initial inflammatory phase and favouring proud flesh development. Typical of this are hock and lower leg wounds which may be small but then increase to almost double in size over the next 2 weeks.
7. Proud flesh: granulation tissue that rises above the margin of the skin prevents skin cells migrating across the wound surface. Resist the desire to apply products that guarantee to reduce proud flesh because they usually also destroy new skin that has formed over the wound - more proud flesh will be produced creating a vicious cycle that prevents wound healing.
8. Tissue deficits: result in major healing delays due to the combination of other inhibitory factors such as infection, loss of blood supply, necrotic (dead) tissue and foreign matter.
9. Poor health status or medication: stress and Cushing's can impair healing by reducing the immune system response and slowing the initial inflammatory phase (already sluggish in horses). The stress of a severe injury can reduce decrease appetite and intake of essential nutrients.

10. Diet deficiencies: Wound healing places additional stress on the body and nutrition is particularly important when new cells are being created. Energy, proteins, fats, vitamins (A, B complex, C, E, and K) and minerals (especially copper, iron, and zinc) play important roles in wound healing. Proteins are the major building blocks for new cells, blood vessels and tissues and deficiencies in amino acids (especially cysteine, proline, arginine, tyrosine and histidine) will limit new cell formation. Deficiencies in any of these nutrients adversely affects immune function, formation of new blood vessels, the collagen matrix for new granulating tissue, production of elastic tissue and new skin cells, wound tensile strength, scarring, contraction and the remodelling phase of wound healing.
11. Wound transformation: into sarcoid or other skin cancers can occur in horses, and look very similar to normal granulation tissue. Prompt veterinary advice is needed. Transformation may be sourced from other horses and flies. Treatment of affected wounds is difficult. Worm infestation (habronemiasis) can also occur, especially around the eyes, penis, lower limbs and lips.
12. Iatrogenic interference: iatrogenic = inflicted by well-meaning humans! To avoid delayed and non-healing wounds, anything you put on a wound must be considered wisely and carefully. Strongly resist the need to clean and scrub wounds several times a day. Newly-formed healing cells are scrubbed away too – and the ‘slime’ we are intent on removing is actually a nutrient-rich, protective, protein exudate used in the healing process. The trauma and irritation caused by scrubbing also encourages excessive granulation tissue (proud flesh).

The concept of ‘disinfection’ of wounds is now largely discredited due to the damage caused to delicate healing processes. The principle that “better-safe-than-sorry” should never be applied to antiseptics and wounds – antiseptics can have a very negative effect on newly-healing cells and tissues. Choosing the best cleanser or antiseptic for irrigation of a specific wound is not straightforward. Understand the active ingredients of the selected product and their proposed effects on healing tissues. Many ‘wound cleaning’ products have not been tested in horse wounds; baby cells can’t migrate easily through thick ointments; hydrogen peroxide and iodine can kill them, and many wound care lotions and potions contain alcohol – again not good for newly growing blood vessels and baby cells. Inflammation and irritation from the alcohol can promote proud flesh. Be guided by your vet and their nurses.

Chemicals of all descriptions harm the wound healing process and many former treatments are no longer acceptable in modern wound management. Dressings and management techniques have advanced significantly so that best possible dressing for the particular wound at that particular time can be selected. There are stages in wound healing when a dressing is not the best option; there is no single dressing that is suitable for all types and stages of a wound, and no wound can tolerate all dressings. A thorough understanding of each dressing type requires specific training in wound physiology - not a matter that can be addressed by the local tack shop or pharmacy. Many dressings are based on human and rodent studies, but there are major differences between species that affect wound healing. Horses have tight, thick skin and stage 3 of wound healing contributes the most to healing. Humans, rodents and small animals are loose-skinned and muscles in the skin enhance wound contraction (stage 4).

If you ask 10 people, you’ll get 10 opinions on how to treat wounds. Supervision by a vet is essential as over use or use of the wrong cream/lotion will delay wound healing.

Even when modern dressings are used and sound principles of wound management are followed, wounds of horses, particularly those located at the distal (furthest from the body) extremity of the limb, heal slowly. There is little warning re which wounds will heal and which will not, but the first measures largely determine the outcome – so make sure your first aid kit is properly equipped and contains materials and dressings supplied by a veterinary practice. The best wound management has to be applied from the very beginning as this is the stage where you really can make a difference. Irrational, incomprehensible ‘treatments’ (eg, turpentine, formalin, engine oil, castor oil, tar, pulverised torch batteries) should never be applied to wounds. The mantra should be a recurring ‘do not do any harm’

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