

Animal burn victims & First aid

The Namibian 2021 dry season will be remembered for its wide ranging and severe bushfires. Much veld has been lost, infrastructure destroyed, and humans as well as many animals have been injured and killed. Animals that have sustained burn injuries should be assessed as soon as possible to determine the extent of the injuries and then, depending on the injuries, either treated or euthanized.



There are different kinds of burns, but this article will focus on thermal burns in mammals, caused by external heat sources such as fire or boiling water. We will explain what happens to body when it gets burned and how to assess and treat wounds.

How does the body react to a burn injury?

When an animal or human sustains burn injuries from for example a fire, it has several consequences to the body. The heat will cause (severe) skin damage, which, depending on severity, will lead to the skin cells to die. Damage to the protective skin cover has the following serious consequences:

- 🐾 Fluids and electrolytes are lost. This can lead to a drop in blood pressure and shock.
- 🐾 A severe inflammatory reaction (both locally and systemic) results in increased permeability of blood vessels. This increases/causes fluid leakage out of blood vessels, leading to swelling (oedema).
- 🐾 Increased susceptibility to burn wound infection. This together with a weakened immune system often leads to septicaemia (systemic, often fatal, spread of infection via blood to the body)

The visible burn wounds are not the only health concerns. Smoke inhalation is another major concern in burn victims (Figure 1). Smoke and heat can damage the respiratory tract, causing the airway to swell up. This can cause severe airway soot (tiny carbon particles) accumulation and inflammation, which will interfere with breathing. A lack of oxygen (hypoxia) combined with possible Carbon Monoxide poisoning, as well as a pneumonia are common, and often these are fatal complications. The full effect of airway and lung damage in burn victims may only become apparent 2-3 days after the initial smoke/fire exposure. It is thus essential to keep such patients under close observation for a few days. The lungs, heart, brain and kidneys are at highest risk of damage when there is not enough oxygen in the body.

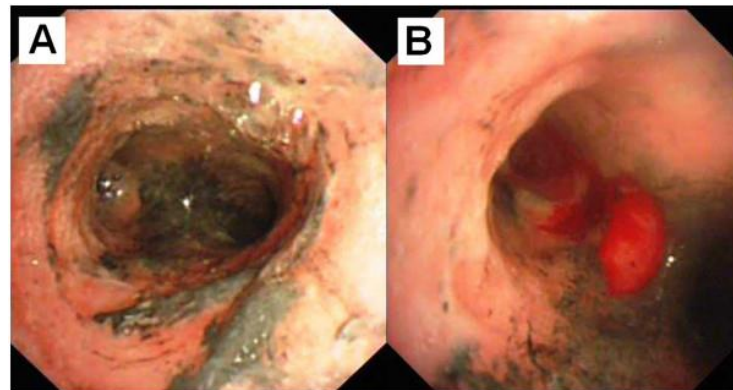


Figure 1 Visual inspection (bronchoscopy) of a patient with a severe smoke inhalation injury. Note the inflammation and accumulation of soot in the trachea (windpipe) and bronchi (upper airway) © [Paul Zarogoulidis \(2013\)](#)

It is important to understand that burn wounds are very serious and challenging to treat.

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Assessing burn wounds

When an animal has suffered from burn wounds, one must assess the following things:

1) Depth of the burn wounds

The depth and extent of the burn wounds are major determinants regarding the long-term outlook (prognosis) of an injured animal. Superficial burn wounds usually don't require veterinary care, deep burn wounds heal slowly and are more difficult to treat, while very deep burn wounds are life-threatening (especially if extensive). Burn wounds are classified into 1st to 3rd degree burns (Figure 2):

- 🐾 Superficial burn - First degree burn
 - Superficial burns, affects the outer layer of the skin (epidermis)
 - Red, painful, non-blistered skin (example is a sunburn in people)
 - Usually does not require veterinary care
- 🐾 Partial-thickness burn – Second degree burn
 - Affects the skin's outer and inner layer (dermis)
 - Pain, swelling, redness, blistering
 - These burn wounds are painful, take long to heal and create a real risk of infection → veterinary care is advised.
- 🐾 Full thickness burn - Third degree burn
 - Very deep, affecting all the layers of the skin and fatty tissue beneath it.
 - Leather-like skin, white/red/black colour. Often very painful. When there is no pain, it's a sign of nerve damage. Charring can be seen.
 - These burns are dangerous and life-threatening! The animal is highly susceptible to infection, and its circulation and immune system are compromised → Requires immediate and extensive veterinary care.

Especially in veld fire victims burn wounds over the body usually vary from 1st to 3rd degree wounds on different parts of the body.

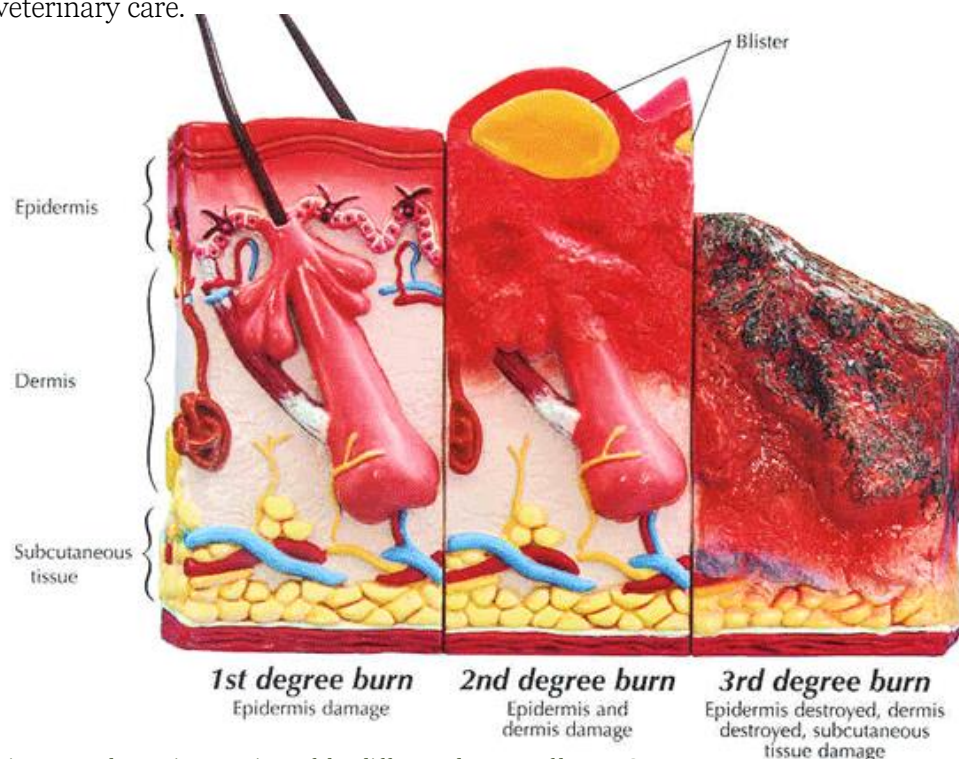


Figure 2 Schematic overview of the different degrees of burns © TGP

2) Extent of the burn wounds

The amount of skin that has been burned is often more important in determining the prognosis than the degree of burn wounds sustained.

In human medicine the surface of the palm is equivalent to about 1% of the total body surface area. The 'rule of 9' is a quick way to estimate the burnt body surface area in both man and animal (Figure 3). As a general rule, when 25-30% or more of the body has sustained severe burn wounds, the prognosis is grave, and, in animals, contrary to human medicine, euthanasia must be considered. One must be aware that the true extent of the burn wounds might increase with time.

3) Location of the burn wounds

Especially in animals (livestock and wildlife) a functional body is of utmost importance. Certain locations of burn wounds will have a great impact on the locomotion, and thus on rehabilitation success of an animal. Burn wounds near joints might lead to scar tissue, which will restrict the movement of that joint. Damage to the hooves also carries a poor prognosis (Figure 4). Burn wounds around the eyelids and mouth might impair movement of surrounding muscles. Severe burns around the udder, penis and scrotum may affect performance of milk cows and/or breeding animals.

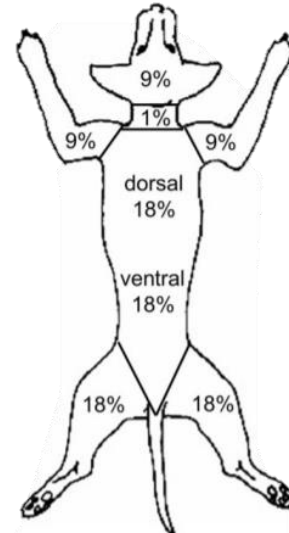


Figure 3 A way of estimating the extent of the burn areas, according to the 'rule of 9', in animals. © [Wolhsein et al \(2016\)](#)



Figure 4 Eland calf that sustained severe burn injuries during a veld fire. Note the hooves that are severely damaged and dropped off. This would require long term treatment with the prognosis for full functional recovery is not good. © Dr J. van der Westhuizen

4) Species (tame or wild)

Whether an animal is a pet or wild, small or big, are some important considerations to evaluate the long-term outlook for the animal. The tamer and smaller and animal, the easier and cheaper treatment will be. A burnt pet which can be kept in a clinic and treated over the long-term, obviously has a better chance of survival than a burnt sable bull.

Never underestimate the detrimental effects stress has on an animal's wellbeing. Tame animals will be easier to treat and regular human contact will be less stressful than for wild animals. Especially in wild animals the question is whether we make the animal suffer more by treating it.

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5) Value of the animal and the financial situation of the owner

Other considerations would include the inherent value (monetary and emotional) an animal owner attaches to an animal. A 3-legged dog may be perfectly acceptable, but amputating a leg on a horse would be cruel and unacceptable.

Finances are an important consideration. Burn wounds require expensive, long-term treatment and dedication, and the question will arise whether it is worth it to save the animal. The owner might be more inclined to put more effort in saving an endangered species like a rhino (Figure 5) than a common springbuck.



Figure 5 This rhino calf was severely burned a few years ago in a veldfire. Dr Axel Hartmann and rhino caretaker Miss Juliette Erdsieck pulled the calf through with extensive treatment and care. When the rhino was recovered and old enough, it was released back onto the farm. The only thing one can still see from the burn injuries are the rounded ears. © J. Erdsieck

Livestock & wild animals

For the below information you must always consider the species – is it a wild or tame animal? Can it be handled or must you get a specialist person in?

1. Assess the situation and check for danger – own safety first!

Before you rush in to rescue an animal, always check if the situation is safe for yourself. Where is the fire? Any change of the fire turning and coming to your direction? Any risks of trees/branching breaking off that surround the animal?

Scan the veld for animals, use binoculars. Animals might run and flee from the fire, and run into the fences, so check these. What is the behaviour of the animal? The animal might be frightened and in pain, it might try to attack. Remember that burn wounds are extremely painful. Especially in bigger wild animals it is best to call in a wildlife vet rather than risk the chance of getting hurt. In case of dogs being aggressive, you might want to put a muzzle on them.

2. General assessment of farm and wild animals after a bushfire

Areas that must be closely examined on each animal include: face, ears, lips, anus, vulva, teats, penis, prepuce, scrotum, axilla, inguinal areas, legs and feet. Animals, no matter what species, should be examined for the following lesions. Those having sustained these injuries should immediately be euthanized.

- 🐾 Severe injuries to limbs, muscles or face that limit eating, drinking or breathing.
- 🐾 Smoke or flame inhalation showing difficult breathing, coughing, frothing at the nose and mouth.

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- 🐾 Animals that are down and unable to rise due to burn (or other) injuries.
- 🐾 Animals with severe burns destroying skin on more than 10-15% of the body and/or to vital parts (feet, face, inguinal areas). Apparent “mild burns” to vital areas can result in rapid deterioration, suffering and death.
- 🐾 Animals with major limb swelling.
- 🐾 Where daily reassessment of animals is not possible, consider euthanasia of animals with less severe burns but having hooves missing and/or separation between hooves and coronary band. Hoof regrowth is possible but slow. These animals will be in severe pain and need intensive foot care. Proper functional recovery is in no way guaranteed.

One must thus always ask the question whether it’s possible to treat the animal long-term, it is not fair to have an animal suffer if the chances of healing and rehabilitation (going back to the wild) are limited. The next step involves examining non- critical animals and moving those injured and in need of treatment into pens (may be temporary pens).

3. Species-specific issues

Farm animals

- 🐾 Sheep are particularly prone to burn injuries (Figure 6) since the flock tends to run before a fire and pack against fences or in gullies where they are burnt or suffocated. This behaviour is reflected in the fact that animals that milled on the outside of the flock sustain severe burns while those in the middle often escape injury. Scorched wool is a poor indicator of the severity of a sheep’s burns, where the outer fleece may be scorched without the animal sustaining skin burns. Short fleeced or recently shorn sheep will be more likely to sustain serious burns.
- 🐾 Due to their shorter coat of hair, goats are more susceptible to burns than sheep.
- 🐾 Unless trapped against a fence etc., cattle generally escape the full effect of a fire. Teats (Figure 7), udders, penis, scrotum and prepuce are commonly affected and may result in secondary problems (e.g. mastitis, skin around the penis - preputial stenosis).
- 🐾 Horses will usually escape from the path of the fire. Horses, even severe burns often respond well to intensive veterinary treatment.
- 🐾 Pigs are very susceptible to heat stress and will often die from it. They do not cope with burns and all burnt pigs must be euthanised.
- 🐾 Poultry is also very susceptible to heat stress and will usually die from it. Those surviving a fire will normally recover without treatment.



Figure 6 Sheep with burn wounds. Although wool is a good insulator, one must carefully check the entire animal. Note the animal that lying down; the face and wool are severely burned and she cannot stand up. The lamb has a hunched posture, indicating pain, and the legs are discoloured. © [National Council of SPCAs](#)



Figure 7 Burnt teats, it is unlikely that this cow will ever be able to feed her young anymore © [National Council of SPCAs](#)

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Wild animals

Wild animals, because of their ability to jump over/creep under most stock fences, tend to escape from a fire. Since most game farms in Namibia only have a game-proof perimeter fence, with no internal fences, wildlife is afforded far greater escape opportunities in case of a fire. Serious burns and mortality may occur when game is trapped against a fence etc. The risk of fire injury is greatly increased where expensive game species are kept in small game proof fenced camps.

Unless severely injured and debilitated, it is unlikely that game that has sustained burn injuries will be identified soon after a fire. Only the severely injured animals can be examined without prior immobilisation, but in these cases, it would usually be more fair to the animal to euthanize it. If practically and economically feasible, the clinical evaluation and treatment of wild animals would follow the same guidelines as for farm animals. When the injuries are severe, euthanasia is the best option. A once-off treatment is very unlikely to have any effect. In case of orphans or tame-ish animals, one could try, in consultation with a vet, to place them into a boma and treat them.

4. First aid and what should a farmer have in stock?

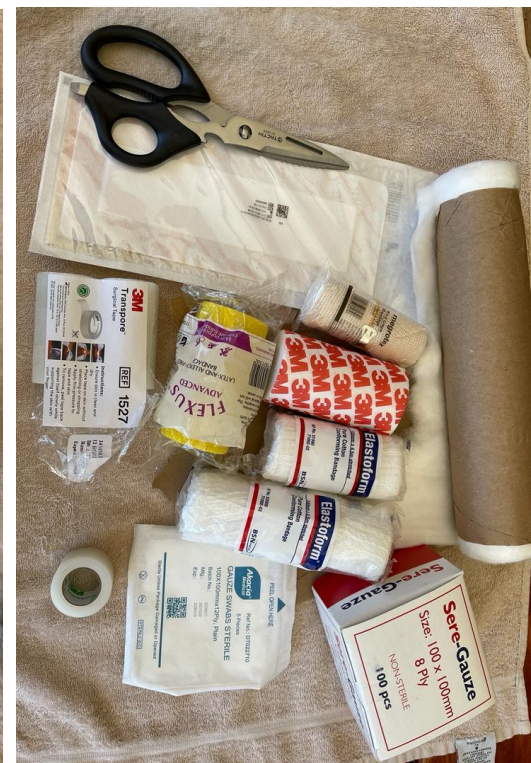
If the animal has a fair chance of survival and you are able to get it into a kraal/boma, try to cool the burn wounds with luke-warm water for about 20 min. If you don't have running water, use wet towels/compresses. Its important to keep in mind that one must not stress the animal too much so it will run into the fence. Once the burn wounds are cooled off, the wounds should ideally be covered as much as possible.

Jelonet is a paraffin gauze which can be used to cover the wound. This prevents the bandage from sticking to the wound. On top of the Jelonet, one can put an antibacterial ointment on. We like to use Silbecor, which gives a soothing feeling, and it has a good antibacterial action to prevent wound infection. So first the Jelonet on the wound, then the Silbecor cream on top of the Jelonet, and then you can bandage it with cotton wool and a crepe-type bandage material. To secure it even more, one can place a Flexus bandage over it.

Septic (infected) wounds should be bandaged on a daily basis, clean wounds every 2-4 days, depending on how the bandage looks. When wet/dirty, it needs to be changed.

The animal should get painkillers and antibiotics, contact your veterinarian for this.

Figure 8 Bandage material which should be in any first aid kit (for humans and animals) © U. Tubbesing



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5. Post-bushfire care

For optimal animal care and comfort, all animals that were selected for treatment should be put in a 'hospital camp' where they can be regularly inspected, treated and nursed. Make sure that:

- 🐾 They are on the softest, most level ground available, especially if their feet are burnt.
- 🐾 They have ready access to good-quality feed and water. Burnt animals are reluctant to move and usually do not feed for a few days. They should be given high-protein feeds such as good quality lucerne and/or camel thorn pods.
- 🐾 They can move to water and can drink. Those unable to drink must be euthanised.
- 🐾 They have ready access to existing – or makeshift – shade.
- 🐾 They are treated for worms, especially after rain.

Check all animals regularly for signs of deterioration, in particular check for flystrike on burnt areas and feet and treat as necessary. Affected animals may benefit from long-acting antibiotics for secondary infections.

First aid in animals one can handle (pets, tame animals, young orphans)

In case of burn wounds, make an estimation of the depth and extent of the burns. When an animal suffers from first degree burns, veterinary care is usually not required. Second/third degree burn wounds will require veterinary treatment and advise. Besides the actual burn wounds and infection possibilities, other issues such as shock, electrolyte imbalance, kidney failure and anaemia are risks.

When you have an animal with severe burn wounds that you can physically handle, take the animal to a veterinary clinic as soon as possible. The animal needs to be stabilized (it will get a drip with fluids, blood is drawn to evaluate the organ's functions etc.), and it will receive antibiotics and pain medication. The animal may need to undergo surgeries, whereby dead skin is removed, and skin defects later repaired by skin grafts.

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Below you can find some general guidelines what you can do when you have a tame animal with burn wounds. As we said before, contact your veterinarian and go to the clinic! Burn wounds are not easy, and you cannot see what damage the animal has on the inside of the body.

1. Check breathing and pulse

When an animal struggles to breath, and/or has a weak pulse, it is an emergency and the animal should be taken for urgent veterinary care! If the animal struggles to breath and you have an oxygen machine, bring the hose to the nose of the animal, hold it in front, and go to a vet ASAP.

2. Cool the burn wounds

Following burn injury, the skin traps the heat resulting in continued damage. To stop this 'microwave' effect, immediately cool down the wound with ideally cool (12-18°C) slow-running water. This will minimize the progression of the burns and thus tissue damage, it decreases pain and partly cleans the wound. Ideally, let the water run for at least 20 minutes. To avoid hypothermia (under-cooling) don't immerse the animal in water but only rinse the burned areas. For the same reason, don't use ice or very cold water, this not only causes hypothermia, it also causes vasoconstriction (tightening of the blood vessels) and worsens the injury by reducing the blood supply to that area. In the absence of available running water, place wet clean towels or compresses on the burned areas for at least 20 minutes.

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3. Cover the burn wounds

Following the wound cooling, the wounds should be covered to help prevent bacteria from entering the body. It also relieves pain. Cover the wound with a non-stick dressing, ideally a paraffin gauze like Jelonet (Figure 8). If you don't have any non-stick dressings, use a clean cloth. Over the Jelonet apply a thick layer of a soothing antibiotic type ointment (Silbercor is ideal, after initial rinsing and cleaning). DON'T apply butter, egg white etc. to a burn wound since these may promote bacterial growth and infection. Honey, on the other hand, is a good emergency remedy to be used.

Once you have covered and bandaged the wounds, take the animal to a veterinarian. Bandages should be renewed every day when the wounds are infected. Once the wounds are clean, the bandages should be renewed every 2-4 days, depending on how the bandage looks.

4. Pain relief

There are many ways to relieve/control pain, and this depends on what is appropriate for the situation and patient, the drugs available, the experience of the person and access to the nearest veterinarian.

If you can get to a veterinary clinic in within 1-2 hours, do not give anything to the animal. If it takes a long time to get to a clinic, take stock of the painkillers you have in the house and then call your veterinarian for specific advice. VERY IMPORTANT – you can use Paracetamol (Panado) in dogs BUT NEVER in cats!!

5. Fluids

Fluids, nutrients and electrolytes are lost via burn wounds. When an animal loses large amounts of fluids, it can lead to shock, tissue death, poor blood circulation, kidney failure and death. When the animal wants to drink (and is able to), let it drink from a bowl (lukewarm water, not too much). NEVER force an animal to drink, as this can lead to aspiration pneumonia.

Other burn victims

In case of reptiles, birds etc., consider taking the animal to a clinic or rehabilitation centre. First phone the clinic/rehabilitation centre and send photos, so they can do a first evaluation. Keep the animal in a dark, quiet place and provide some water.

Some important last notes

Do's
✓ Assess the situation, own safety first
✓ If you can't handle an animal, rather call in a vet
✓ When needed, restrain the animal (e.g. muzzle your dog as it might bite due to the pain)
✓ Cool the burn wounds with cool water or wet towels/compresses, then bandage it
✓ Give the animal water if it wants to drink (not too much)
✓ Always get veterinary advice – 2 nd /3 rd degree burn wounds are serious

Don'ts
☒ Don't apply ice on the burns
☒ Don't apply any ointments or butter-like substances just after the burn happened
☒ Don't break blisters
☒ Don't touch the burn wounds
☒ Don't cool the entire animal → risk of undercooling (hypothermia)

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