



Invited lecture/Case report

# Successful Second Intention Healing of a Large Skin Wound in a Cat's Cheek Using Manuka Honey

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## Abstract:

A recent case report (Lukanc et al., 2020) demonstrated successful second-intention healing of a large skin wound on a cat's leg. The wound was treated with honey to kill pathogens, stimulate the immune response and keep the wound moist. The present case report complements this result by showing a similar result in a different part of the body. The subject presented with a burst abscess which left 42-45 square cm of necrotic skin on the side of his cheek. The wound healed over a period of two months through a combination of new skin regeneration and the stretching of existing skin. As a result of this, euthanasia was avoided and the patient made a full recovery. The case report details stages in the recovery process and discusses the challenges of protecting the wound while still allowing the patient to experience a reasonable quality of life.

**Keywords:** Skin healing; Second-intention; Manuka honey



## 1. Background

The patient was a 16-year old castrated male Exotic Shorthair Cat with no underlying health issues. He was treated as an in-patient in a local veterinary clinic for the first three days, then he was treated at home.

Following a bite wound from another cat received during play fighting, the patient developed an abscess on his cheek which grew rapidly over the course of two days. He scratched it, causing it to bleed. At this point, the veterinary clinic was contacted for an emergency appointment. By the time he had reached hospital, the skin had broken and the abscess had burst, releasing large amounts of pus. The patient was in a state of shock and was dehydrated, and was therefore put on a saline drip. A blood panel showed elevated white blood cell count but was otherwise normal.

## 2. Wound debridement

The wound was initially de-bridged under local anaesthetic to reveal a small hole in the middle (1cm x 1cm). The total area of apparently necrotic tissue was about 6.5 cm x 6.5 cm.

## 3. Antibiotic treatment

Each day for the next three days the patient was given Cefazolin (1.76 ml) together with Buprenorphine (0.08 mg) for pain relief. His wound was cleaned, flushed and debrided under local anaesthetic. Before being sent home he was injected with 0.4ml Convenia. On days 10-30 this was supplemented with Clavaseptin (62.5mg x 2/day).

## 4. Use of Manuka Honey

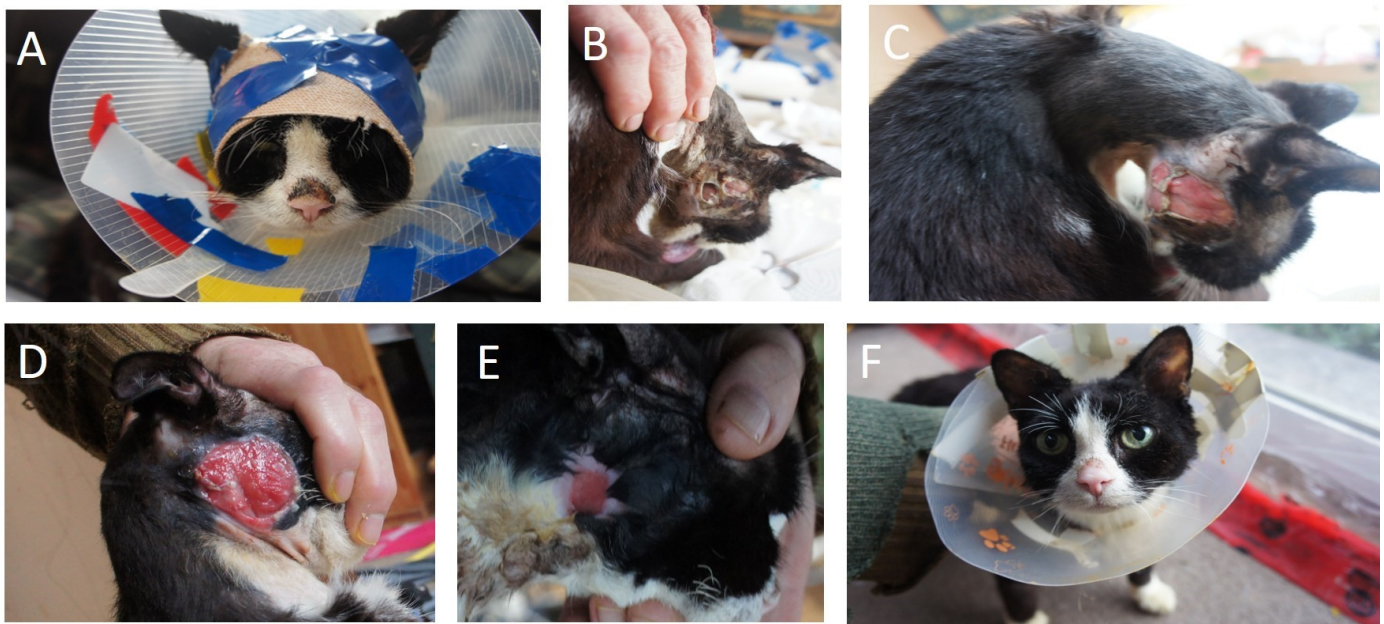
For days 1 and 2 the wound was treated with supermarket honey; this was changed to Viaderm (Taro Pharmaceuticals Inc., Brampton, Ont, CA) for days 3, 4, 5, and 6 and then replaced with Manuka honey for the rest of his treatment. There was a noticeable increase in redness after the honey was used (presumably because Viaderm contains triamcinolone, which reduces inflammation).

Several benefits to using Manuka honey were reported (see Lukanc et al., 2018), e.g. it has broad-spectrum antibacterial properties, provides a moist healing environment and stimulates angiogenesis and the formation of granulation and epithelial tissue.

Manuka honey is available at low cost, without a prescription. Its content is regulated by an independent body ([umf.org.nz](http://umf.org.nz)) and given a Unique Manuka Factor (UMF) score which measures its potency and its content of leptosperin, a natural anti-inflammatory agent. A separate classification system, the Methylglyoxal (MGO) score, is based on its methylglyoxal content in mg/kg, and a measure of its antibacterial potency. This case study used Flora brand, which has a 400+ MGO rating (showing 400mg/kg of methylglyoxal) and a 12+ UMF rating. The honey was applied to the non-adhesive dressing (see below) using a sterile cotton-tipped applicator (AMG Medical Inc., Montreal, QC, CA). Because of the extensive bandaging it largely stayed in place and stayed moist between dressing changes (**Figure 1D**).

## 5. Dressings

The wound was dressed with a non-adhesive pad (McKessen, Montreal, QC, Canada). The non-adhesive pad was protected with several layers of strong bandages held in place with electrical tape to form a semi-rigid helmet. In addition, the patient wore a collar to prevent scratching (**Figure 1A**). The wound was rinsed with sterile saline and the dressings were changed daily. After the first ten days the frequency was reduced to every three days and this was reduced still further, until the last month, when dressings were replaced every week. The position of the bandages were checked frequently to make sure they hadn't slipped (or been pulled off) and that there was no smell or exudate, which would have indicated an infection. The wound was also photographed regularly to monitor changes.



**Figure 1.** A: Bandaging and collar applied to the patient. B: The wound one week after the abscess burst. C: The wound two weeks after the abscess burst. D: After 24 days the granulation tissue was much smoother. E: Rapid contraction by day 42 to 1cm across. F: The patient after his wound had healed.

## 6. Welfare Aspects

The patient showed no sign of depression or significant behavioural changes and appeared to be in good spirits throughout his treatment. He kept up his normal activities but was more subdued than normal when interacting with other cats (probably because of physical limitations caused by his protective collar). He was only allowed outside for very brief periods in case he came into contact with raccoons. He was able to eat and drink with the collar in place but was spoon-fed to make this easier for him. He attempted to scratch at the cone and dressings, sometimes for several minutes at a time, and managed to remove them on two occasions. The replacement of dressings was stressful, so the frequency of this procedure was kept to a minimum (see above). Buprenorphine was discontinued after day 4 because this was causing constipation and urinary retention. The only time when the patient appeared to be in pain was when his granulation tissue was flushed with sterile saline. The main welfare issue was that he had to be heavily bandaged (**Figure 1**). There's no doubt that this was uncomfortable. However, it's not uncommon for humans who have a broken limb to wear a similarly uncomfortable plaster of Paris, often for many months. Even at 16, there was a reasonable expectation that he would have several more years of good quality life ahead of him, so the trade-off between short-term discomfort and long-term benefit seemed reasonable. The initial prognosis was of 20% survival; however, encouraging indications could be found in the literature (e.g. Lukanc et al., (2020)).

## 7. Healing process

**Figure 1B** shows the wound one week after the abscess burst. At this stage, there were two holes in the necrotic tissue, exposing what appeared to be granulation tissue underneath. **Figure 1C** shows the wound one week later. At this stage, more of the necrotic skin had sloughed off. There was some concern at this stage about the interface between the granulation layer and the existing healthy skin: it looked as though a pouch was forming. Over the following two weeks, the wound contracted extremely quickly. It was clear that this was from the stretching of the surrounding skin, because this skin already had fur on it. A small circle of new epithelial cells approximately 1 mm across could be seen around the wound. The underlying structures were not smooth, and there was some concern at



this stage that the new skin would not follow the contours of this tissue: for example, in **Figure 1C** there are obvious folds and pockets. However, the granulation tissue gradually became smoother (**Figure 1D**). After 24 days, the granulation tissue was much smoother. Between 24 days and 42 days the size of the wound decreased very rapidly down to about 1 cm in diameter (**Figure 1E**), again, due to stretching of the surrounding skin. The color of the wound became less red, suggesting the formation of a thin epithelial layer across the whole surface. Over the following 27 days, the wound contracted much more slowly. On day 67, the bandages were removed, but the collar was kept in place for a further 60 days to give the new skin time to strengthen (the position of the wound made it very vulnerable to scratches from the patient's back claws) (**Figure 1F**).

## 8. Discussion

After the initial assessment, the patient was given a prognosis of 20% survival, on the basis that his necrotic skin would not heal and would become inflected. A skin graft was considered; however, because of the position of the wound (near to his jaw) there were concerns that it would not be possible to immobilize this long enough for a capillary bed to form. He lived in a very remote area in the North of Canada with extremely limited veterinary facilities.

However, a record of Lukanc et al., (2020), which described a similarly-sized wound, showed that complete wound healing by second intent was entirely possible.

The main challenge to a wound in this area was getting the dressings to stay in place. The patient managed to get them off twice by pushing against things, and they sometimes slipped back over his head, exposing part of the wound. Each time the dressings were changed he was closely monitored to check for problems.

There were two noticeable differences between this case and the case described in Lukanc et al., (2020). First, in the here presented case, the wound was smaller (42 – 45 cm<sup>2</sup> vs 51.54 cm<sup>2</sup>). Probably as a result of this, the wound healed more quickly (69 vs 105 days). This wound was on the cheek rather than the leg. Cheek skin is much looser, so there was much more capacity for existing skin to stretch. A second difference is that the three-dimensional structure of this wound was less straightforward. After two weeks a pouch formed, and there was concern that the new skin would not be continuous with the existing healthy skin. However, this problem resolved itself over the course of the following two weeks (**Figures 1D** and **E**).

This case shows that it's entirely possible to treat skin wounds of this magnitude in a domestic environment and in such a way that the patient can continue an almost normal life through the long healing process. Doctors of veterinary medicine need to be more aware that healing is possible, and that euthanasia can be avoided.

**Conflicts of Interest:** The author declares no conflict of interest.

## References

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