

# A Clinical Approach to Animal Bites with an Avulsion Flap: A Case Report

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Perm J 2017;21:16-156

E-pub: 06/28/2017

<https://doi.org/10.7812/TPP/16-156>

## ABSTRACT

**Introduction:** Animal bites are a common reason for visits to the Emergency Department in the US and worldwide. There are many different approaches to managing these wounds.

**Case Presentation:** We present a case of a 90-year-old white woman who sustained a large dog bite to her hand, over the dorsal aspect of the first metacarpal. We used the avulsion flap as a biologic dressing and employed a perforating technique to successfully treat the wound and allow for optimal wound healing.

**Discussion:** Pitfalls to this dog bite management approach include the risk of infection and flap necrosis. Patients must obtain proper follow-up in 24 to 72 hours to reevaluate the wound. To optimize outcomes, comorbidities, location of the bite, complexity of the bite wound, and the risks of infection must be considered when one is choosing the best approach.

## INTRODUCTION

Animal bites are a common chief complaint seen in the Emergency Department (ED) and urgent care centers. There are many different approaches and considerations in the management of these wounds. It is always important to consider and identify the best approach to allow for maximal wound healing and to reduce the risk of infection as much as possible. We present one possible approach to treating a patient with a dog bite who had an avulsion flap that was used as a biologic dressing, allowing for optimal wound healing.

## CASE PRESENTATION

### Presenting Concerns

A 90-year-old white woman came to our ED less than 1 hour after sustaining a dog bite to her nondominant hand. There was a 4 cm × 1 cm, gaping wound over the dorsal aspect of the first metacarpal. Of note, there was a large full-thickness avulsion flap attached distally (Figure 1).

Radiographs confirmed that the patient did not have an acute fracture or retained a foreign body.

### Therapeutic Intervention and Treatment

The decision was made to reapproximate the skin flap loosely using 4.0 single interrupted nylon sutures. We ultimately elected to use a fenestration technique. With use of an 18-gauge needle, multiple puncture wounds were made in the skin flap. The skin flap was loosely reapproximated, to allow the wound to drain while providing the best biologic dressing, with fenestrations in the skin flap (Figure 2). A pressure dressing was applied using petrolatum and 3% bismuth tribromophenate-infused gauze dressing, a woven gauze bandage, and a splint.

### Follow-up and Outcomes

On Day 13, the patient returned for a scheduled wound recheck. The flap continued to be viable without signs of skin necrosis (Figure 3).

On Day 19, the decision was made to remove the woman's sutures despite some concerns for possible epidermolysis of the skin flap (Figure 4). The wound was gently cleaned using hydrogen peroxide. Another pressure dressing and a splint were reapplied.



Figure 1. There was a 4 cm × 1 cm wound over the dorsal aspect of the first metacarpal. There was also a large full-thickness avulsion flap attached distally.



Figure 2. The skin flap was loosely reapproximated to the skin edges, avoiding tension on the flap. Small fenestrations were made with an 18-gauge needle in the skin flap.



Figure 3. The skin flap continued to be viable without signs of skin necrosis on Day 13 after treatment.



Figure 4. Sutures were removed on Day 19.



Figure 5. The wound was almost completely healed and the skin flap was viable on Day 29.

On Day 29, the wound was almost completely healed and the skin flap was viable (Figure 5). A timeline of the case is shown in Table 1.

**DISCUSSION**

Complex dog bite wounds are often seen for the first time in the ED. Primary closure of a dog bite wound remains controversial. This case offered several challenges in the decision making of the proper wound care of a dog bite. The first was the advanced age of the patient. Second was the location of the bite on the hand. Last, the wound involved a large skin flap avulsion. Fortunately, despite her advanced age, this patient was very healthy.

There are several comorbidities that one must consider when choosing the ideal method of closure. In a diabetic, immune-compromised, or malnourished elderly patient, our approach would have been different. In these patients, wound healing is often impaired, and therefore keeping the wound open to drain and allowing the wound to heal by secondary intention or delayed closure would most likely be a better alternative. It is important to

avoid primary closure of wounds that are at high risk of infection.<sup>1</sup>

The time to presentation to the ED or urgent care center is another important consideration. In this case, the patient presented to our ED within 1 hour of the time of injury. Previous studies have shown that the rate of infection increases from 4.5% to 22.2% if the patient seeks medical attention after 8 hours.<sup>2</sup> Therefore, primary closure should be avoided in patients who have a delayed presentation to the ED.

Other considerations include débridement of the wound. Wounds should be irrigated thoroughly and inspected for necrotic tissue. Débridement of any devitalized tissue should be considered. General surgical consultation should be obtained in patients with deep wounds, signs of abscess, or evidence of deep-tissue infection. These patients may benefit from extensive washout or operative management.<sup>3</sup> Furthermore, complex facial bite wounds or complex pediatric wounds often warrant plastic surgery consultation to improve cosmetic outcomes and reduce scarring.<sup>4</sup>

Prophylactic antibiotics should be considered in patients with dog bite wounds. There are several common organisms in the oral flora of dogs. *Pasteurella* species are isolated from 50% of dog bite wounds and 75% of cat bite wounds.<sup>5</sup> Other considerations are gram-negative organisms as well as common skin flora such as staphylococci and streptococci. Amoxicillin-clavulanate is often a good choice for antibiotic coverage in these patients given the common organisms. Furthermore, tetanus prophylaxis should be considered in all patients with open wounds.

**CONCLUSION**

This case provides one approach to managing dog bites. Some pitfalls to this approach include the risk of infection and flap necrosis. It is important that patients obtain proper follow-up in 24 to 72 hours to reevaluate the wound. There are many factors involved in wound management, as discussed earlier. To optimize outcomes, comorbidities, patient population, location of the bite, complexity of the bite wound, and the risks of infection must be considered when one is choosing the best approach. ❖

Table 1. Timeline of the case	
Day	Event
0	Patient presented with dog bite to hand
13	Patient presented for wound check; flap remained viable without signs of infection
19	Suture removal
29	Wound almost completely healed

**Disclosure Statement**

The author(s) have no conflicts of interest to disclose.

**Acknowledgment**

Kathleen Loudon, ELS, of Loudon Health Communications provided editorial assistance.

**How to Cite this Article**

Williamson A, Thomas C. A clinical approach to animal bites with an avulsion flap: A case report. Perm J 2017;21:16-156. DOI: <https://doi.org/10.7812/TPP/16-156>.

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