

# Dog Bite Emergency

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## Abstract

The bites caused by mammalian teeth are characterized by strong tissue kneading between the jaws, laceration of the skin and deep tooth penetration. The outside of the wound can give an impression of the incoming wound of the tooth, the laceration of the skin, and the avulsion of entire pieces of tissue. Regardless of the external appearance of the wound, it should be kept in mind that the tissue under the skin was exposed to vigorous kneading and cleavage.

## Keywords:

Dog; Bite; Rabies; Wound; Health

## Introduction

An emergency is commonly defined as any condition perceived by the prudent layperson or someone on his or her behalf as requiring immediate medical or surgical evaluation and treatment [1]. On the basis of this definition, the American College of Emergency Physicians states that the practice of emergency medicine has the primary mission of evaluating, managing, and providing treatment to these patients with unexpected injury and illness.

So what does an emergency physician (EP) do? He or she routinely provides care and makes medical treatment decisions based on real-time evaluation of a patient's history; physical findings; and many diagnostic studies, including multiple imaging modalities, laboratory tests, and electrocardiograms. The EP needs an amalgam of skills to treat a wide variety of injuries and illnesses, ranging from the diagnosis of an upper respiratory infection or dermatologic condition to resuscitation and stabilization of the multiple trauma patient. Furthermore, these physicians must be able to practice emergency medicine on patients of all ages. It has been said that EPs are masters and mistresses of negotiation, creativity, and disposition. Clinical emergency medicine may be practiced in emergency departments (EDs), both rural and urban; urgent care clinics; and other settings such as at mass gathering incidents, through emergency medical services (EMS), and in hazardous material and bioterrorism situations.

In healthcare delivery, we attempt to meet the health and medical needs of the community by providing a place for individuals to seek preventative medicine, care for chronic medical conditions, emergency medical treatment, and rehabilitation from injury or illness [2]. While a healthcare insti-

tion serves the community, this responsibility occurs at the level of the individual. Each individual expects a thorough assessment and treatment if needed, regardless of the needs of others. This approach is different than that practiced by emergency managers, whose goal is to assist the largest number of people with the limited resources that are available. As such, emergency management principles are focused on the needs of the population rather than the individual. When either planning for a disaster or operating in a disaster response mode, the hospital should be prepared at some point to change its focus from the individual to the community it serves and to begin weighing the needs of any individual patient versus the most good for the most patients with scarce resources. Moving from the notion of doing the most for each individual to doing the best for the many is a critical shift in thinking for healthcare institutions considering a program of comprehensive emergency management. While the initial planning for emergencies by hospitals is focused on maintaining operations and handling the care needs of actual or potential increased numbers of patients and/or different presentations of illness or injury than is traditionally seen, there is also the need to recognize that at some point during a disaster, act of terrorism, or public health emergency there may be an imbalance of need versus available resources. At this point the approach to delivering healthcare will need to switch from a focus on the individual to a focus on the population. This paradigm shift is one of the core unique aspects of hospital emergency management that allows the hospital to prepare to maximize resources in disasters and then to know when to switch to a pure disaster mode of utilizing its limited and often scant resources to help the most people with the greatest chance of survival.

The healthcare delivery system is vast and comprised of mul-

multiple entry points at primary care providers, clinics, urgent care centers, hospitals, rehabilitation facilities, and long-term care facilities. The point of entry for many individuals into the acute healthcare system is through the emergency department (ED). Since the late 1970s, the emergency medical services (EMS) system has allowed victims of acute illness and injury to receive initial stabilization of life-threatening medical conditions on the way to the emergency department. Among the many strengths of the ED is the ability to integrate two major components of the healthcare system: prehospital and definitive care. The emergency department maintains constant communications with the EMS system and serves as the direct point of entry for pre-hospital providers into the hospital or trauma center. Emergency physicians represent a critical link in this process by anticipating the resources that ill and injured patients will need upon arrival at the ED, and initiating appropriate life-saving medical care until specialty resources become available. In this context, the healthcare system is an emergency response entity.

## Patient Conditions

In most emergencies there is no time to disclose the necessary information for an informed consent [3]. Here the providers simply act according to what they think will be in the best interests of the patient. These situations frequently happen in hospital emergency rooms and when emergency medical personnel arrive on the scene of an accident or sudden illness.

The emergency exception to informed consent is often quite obvious, but this is not always so. It does not apply, for example, when personnel taking care of somebody in an emergency happen to know what the patient wants. In such a situation they would not do what they think is best for the patient but what they know the patient wants.

It is important to note that the emergency exception that allows physicians to do what they think is best for the patient without obtaining informed consent from the patient or proxy has one major restriction; namely, they cannot do what they think is best if it is otherwise than what they know the patient or proxy wants. Sometimes, for example, emergency department personnel might know from previous admissions that a particular patient from a local nursing home desires only palliative care. If that patient arrives by ambulance at the same emergency department, it is hard to see how it would be morally reasonable for physicians to take aggressive measures to keep the patient alive when, even though there is no time to obtain consent for orders not to attempt resuscitation or not to intubate, they know he or she or a proxy has decided not to have aggressive life-sustaining measures performed.

Patients accessing emergency care services can present with complaints that are extremely diverse, and the way doctors, nurses and paramedics elicit information from patients predominantly focusses on obtaining biomedical details [4]. In some cases, this approach is warranted, as the urgent need to identify signs and symptoms of life-threatening illness or injury is paramount. Yet, 90% of patients accessing emer-

gency services are not critically ill or injured but seek help and advice. In addition to seeking advice, patients may also be anxious, frightened, intoxicated, misusing drugs or have unhealthy lifestyles. They may have psychosocial reaction to physical disease or vice versa – physical illness such as irritable bowel syndrome, asthma, tension headache can be triggered by psychosocial factors. The effects and interpretation of illness will trigger a different response to the individual depending on their view and experiences. All these factors will have different needs and concerns and it is important to elicit these concerns within a consultation. However, it has been found that nurses working in emergency care disregard the potential for anxiety and the need for support and reassurance in patients who are not severely ill or injured. In addition, where communication skills of junior doctors working in emergency departments have been researched, they are found to use approaches considered to be more physician/illness orientated than patient-centred. By way of similarities of patient presentations in the pre-hospital setting, this could equally be assumed for paramedic practice.

## Dog Bite

A dog bite is a serious matter [5]. Not only can it be frightening to think about being bitten by a dog, but the bite of a dog can have serious repercussions, including injury, illness-for example, being infected with the virus that causes rabies-and even death. Furthermore, being bitten by a dog can cause psychological injury, thereby potentially making the victim fearful of dogs for years to come, perhaps for his or her entire life. The number of recorded dog bite injuries is significantly higher in children than adults. Why? First, children have higher numbers of dog bite injuries recorded compared with adults because children are more likely to seek out interactions with dogs, for example, petting or otherwise showing dogs a affection. Second, dogs sometimes see children as more threatening than adults-in other words, a dog might be more likely to try to display dominance over a similarly sized human, such as a child, and as a result intentionally or unintentionally hurt the child. Third, children are also more likely than adults to be presented for care at a health-care facility after a dog bite, thereby increasing the numbers of children counted as having dog bite injuries. In addition, elderly persons and utility workers, such as mail carriers and meter readers, are also frequently bitten by dogs. Unfortunately, sometimes owners are the recipients of their own dog's bite, such as when breaking up a dog fight.

Despite media reports and other rumors, there is no credible scientific evidence that any one breed of dog is more likely to bite than another. All breeds and sizes of dogs have the potential to bite-from American pit bull terriers and rottweilers to Chihuahuas and Yorkshire terriers. Despite this, large dogs are capable of delivering more than 450 pounds of pressure per square inch in a single bite-enough to penetrate light sheet metal- making the bite of a large dog more capable of delivering injury, compared with the bite of a small dog. But it is important to remember that all dog bites are capable of inoculating bacteria to the bite victim, creating infection, and in fact certain bacteria (e.g. *Staphylococcus intermedius*) are more likely to be associated with a bite

from dogs weighing less than 40 pounds.

## Rabies

Rabies is a viral infection of mammals that occurs in most parts of the world, including much of the Arctic, as well as tropical and temperate regions [6]. At present it is not endemic in the UK, Norway, Sweden, Iceland, Australasia, or Japan. Human and animal rabies is most common in the Indian subcontinent, China, Thailand, the Philippines, and parts of South America. Most human infections result from dog bites, but rabies can be transmitted by many other domesticated or wild animals, such as cats and foxes. Rabies virus in an animal's saliva may cause infection by contamination of a bite or scratch or by absorption through mucous membranes of the eye, mouth or nose. Rarely, infection occurs from inhalation of the virus in bat-infested caves.

Nowadays the most common source of the rabies virus is wild animals [7]. Nonetheless, there are still reported cases of rabies virus associated with a dog bite. Rabies immunization must be considered when the bite is from a stray dog or in a country where the disease could be endemic. Patients with a bite from a nonprovoked dog should be considered at risk for rabies infection than patients with a bite from a provoked dog. If the dog owner is reliable and can confirm that the animal's vaccination against rabies virus is current, the dog may be observed at the owner's home. When possible, observation of the dog for 10 days is advised in all cases but it is appropriate when the vaccination status of the animal is unknown. During observation, if the animal becomes aggressive or erratic, it should be sacrificed and microscopic study of the brain should be performed for typical rabies pathological alterations in countries where the disease is endemic. If rabies is confirmed or the aggressor animal is not captured, prophylaxis is indicated. Rabies immunization should begin within 48 hours after the bite, but it can be subsequently discontinued if the animal is shown to be free of rabies virus. Rabies immunization consists of an active immune response with a vaccine and a passive immune response with rabies immune globulin. The prophylactic regimen consists of a series of 5 doses of human rabies vaccine associated with 20 IU/kg. of rabies immunoglobulin. Types of rabies vaccine currently available are formulated for intramuscular use, and for intradermal use. All forms seem to have equivalent safety and efficacy. Once the vaccine series has begun, it is usually completed with the same vaccine type. Vaccine is administered on days 0, 3, 7, 14 and 28.

## Wounds

Animal bites account for 1% of emergency department visits in the United States, costing \$53.9 million annually [8]. Of the 4.7 million emergency department visits for animal bites every year, about 2% of patients need hospitalization. There are 10 to 20 animal bite-related deaths, mostly from dogs, annually.

Dog bites account for 85% to 90% of animal bites in the United States at a rate of 103 to 118 per 100,000 population; no one dog breed is most often responsible. Pit bull and Rottweiler breeds account for most of the human fatalities

related to dog bites over the past two decades. Most dog bite victims are children, and these bites usually involve the head and neck. Adolescents and adults tend to have more bite wounds to the extremities. More than 70% of bites are from a dog that is known to the victim, and about 50% are self-reported as unprovoked.

Cat bites account for 5% to 10% of animal bite wounds. Cat bites occur most often in adult women, usually on the extremities. Almost all of these bites are self-reported as provoked.

The wound should be carefully explored for tendon or bone involvement and foreign bodies, such as teeth fragments. Older dogs and cats often have significant periodontal disease, increasing the risk that a tooth will break off during a bite. Radiography is indicated if a foreign body or bone involvement is suspected. Tendon ruptures should be evident on examination, but identifying a partial tendon rupture requires careful exploration of the wound. Observing the tendon throughout the joint's full extension and full flexion can reveal small or partially torn tendons, which warrant referral for repair.

## Responsibility of the Physicians

The aim is to provide excellence in emergency department (ED) care by cultivating the following desirable habits [9].

- Listen to the patient.
- Exclude the differential diagnoses ('rule out') and refine the possible diagnosis ('rule in') when assessing any patient, starting with potentially the most life- or limb-threatening conditions, and never trivializing.
- Seek advice and avoid getting out of depth by asking for help.
- Treat all patients with dignity and compassion.
- Make sure the patient and relatives know at all times what is happening and why, and what any apparent waits are for.
- Maintain a collective sense of teamwork, by considering all ED colleagues as equals whether medical, nursing, allied health, administrative or support services.
- Consistently make exemplary ED medical records.
- Communicate whenever possible with the general practitioner (GP).
- Know how to break bad news with empathy.
- Adopt effective risk management techniques.

The duty of care is a physician's obligation to provide treatment according to an accepted standard of care [10]. This obligation usually exists in the context of a physician-patient relationship but can extend beyond it in some circumstances. The physician-patient relationship clearly arises when a patient requests treatment and the physician agrees to provide it. However, creation of this relationship does not necessarily require mutual assent. An unconscious patient presenting to the ED is presumed to request care and the physician assessing such a patient is bound by a duty of



care. The Emergency Medical Treatment and Active Labor Act (EMTALA) requires ED physicians to assess and stabilize patients coming to the ED before transferring or discharging them. Such an assessment presumably creates the requisite physician–patient relationship.

When caring for a patient, a physician is obligated to provide treatment with the knowledge, skill, and care ordinarily used by reasonably well-qualified physicians practicing in similar circumstances. In some jurisdictions, these similar circumstances include the peculiarities of the locality in which the physician practices. This locality rule was developed to protect the rural practitioner who was sometimes deemed to have less access to the amenities of urban practices or education centers. However, the locality rule is being replaced by a national standard of care in recognition of improved information exchange, ease of transportation, and the more widespread use of sophisticated equipment and technology.

Establishing the standard of care in a given case requires the testimony of medical experts in most circumstances, unless the breach alleged is sufficiently egregious to be self-evident to the lay jury member—for example, amputating the wrong limb or leaving surgical implements in the operative field. A physician specializing in a given field will be held to the standard of other specialists in the same field, rather than to the standard of nonspecialists.

To be eligible to receive federal funds such as Medicare and Medicaid, hospitals with an emergency department must offer emergency and stabilizing treatment services to the public without bias or discrimination [11]. The Emergency Medical Treatment and Active Labor Act is a comprehensive federal law that obligates hospitals offering emergency services to do so without consideration of a patient's ability to pay. It's important to note that this obligation does not apply to inpatients or non-emergent conditions. The absence of bias in the delivery of care should not be misunderstood to suggest all hospitals must provide all medical services, but rather the services they choose to offer must be delivered without bias to the individual patient.

A hospital and its entire staff owe a duty of care to patients admitted for treatment [12]. Following an emergency call, the ambulance service has a duty to respond and provide care. Accident & Emergency (A&E) departments have a duty of care to treat anyone who present themselves and are liable for negligence if they send them away untreated. Hospitals without an A&E facility will display signs stating the location of the nearest A&E department. This ensures that the hospital could not be held negligent if a patient presented and required emergency treatment as the hospital or its staff had never assumed a duty of care. Once a patient is handed over, a duty of care is created between the patient and the practitioner and this cannot be terminated unless the patient no longer requires the care or the carer is replaced by another equally qualified, competent person. It is therefore extremely important that practitioners are aware of their local policies, professional standards and their scope of practice to avoid becoming liable for litigation by putting a patient at risk, delivering ineffective care or breaching

their duty of care.

## Conclusion

The bite wound should first be thoroughly rinsed with soap and water to effectively remove saliva and secretions from the bite site. When a dog bite occurs, bitten should contact family doctor or emergency medical service where the wound will be treated and disinfected. As a rule, bite wounds are not sutured except when skin and tissue defects are very large. Tetanus protection is performed and antibiotic therapy is estimated to prevent secondary wound infection.

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