Case Report

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Management of Dog Bite Orofacial Lacerations in Children: An Unusual Presentation to a Paediatric Dentist

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ABSTRACT

Dog bite is the most frequently followed by cat and rodent bite. Bite wounds are potentially contaminated with uncommon microorganisms. Most of the time children are victim and are bitten more often on face. Since many of these bites involve the facial region, the paediatric dentist must be aware of the magnitude and management of the problem. Literature suggests both primary closure as well as secondary closure of orofacial laceration. Here, we present and discuss the management of a facial dog bite wound in a 11-year and seven-year old female children by primary and secondary closure.

Keywords: Children; dog bite; primary closure; secondary closure.

INTRODUCTION

The excellent relationship between humans and dogs is sometimes deteriorated by bites. Face being one of the most common areas involved, its seriousness is increased due to the cosmetic and functional sequelae. Most victims are under five years of age and its frequency decreases with age.[1] More than 1000 species of pathogenic bacteria are present in the oral cavity of dog which increases the risk of infection. The treatment includes cleaning, debridement, and closure of the lesion, antirabies and tetanus control, and antibiotic prophylaxis.[2] Here, the authors discuss two cases of facial dog bite wound management done by primary and secondary closure.

CASE REPORT 1 (PRIMARY CLOSURE)

A healthy 11-year-old female reported to the Department of Paedodontics and Preventive Dentistry, College of Dental Surgery (CODS), B.P. Koirala Institute of Health Sciences. (BPKIHS) Dharan, Sunsari, Nepal with an alleged history of an attack by a stray dog. The patient reported within five hours after the accident took place. On extraoral examination, a deep laceration was present on lower lip approximately (2X1) square centimetres (sq. cm.) in size and a laceration on left side of chin approximately 1.5 cm in length (Figure 1). Intraoral examination did not reveal any significant soft tissue and hard tissue injury. Informed consent was taken from the parents. Under local anaesthesia (LA), the soft-tissue wounds were thoroughly debrided and irrigated with normal

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Figure 1: Soft tissue injury.

Figure 2: Primary closure.

Figure 3: After one month.

saline, hydrogen peroxide, and povidone iodine. The rabies immunoglobulin was administered intralesionally. Wound approximation was done by suturing in double layered fashion, inner layer with 4-0 vicryl and on skin with 4-0 prolene suture (Figure 2). The analgesics and antibiotics were prescribed. Tetanus and rabies prophylaxis were evaluated. The parents were informed about the post-operative wound management. The patient was reviewed after one week when sutures were removed. The follow-up visit showed good wound healing after one month (Figure 3) with no local or systemic complications.

CASE REPORT 2 (SECONDARY CLOSURE)

A healthy seven-year-old female reported to the Paediatric Emergency of BPKIHS, Dharan, with alleged history of domestic (pet) dog bite. The patient reported two hours after the accident took place. On extraoral examination, deep lacerated injury with tissue loss was present over left temporal region approximately (2.5X0.5) sq.cm in size (Figure 4). A deep laceration over the body of mandible on right side approximately (1.5X0.5) sq.cm in size communicating with the oral cavity in the buccal vestibule region of 84, 85 (according to two-digit teeth numbering system) was also present (Figure 5 and 6). Subconjunctival haemorrhage along with periorbital oedema over the left eye was present. Orthopantomogram was done to rule out the presence of any associated fracture. Informed consent was taken from the parents. The wound was cleaned in the same manner as done in the previous case under LA. The rabies immunoglobulin was administered intralesionally. Wound approximation was done by suturing in double layered fashion, inner layer with 4-0 vicryl and on skin with 4-0 prolene suture in the left temporal region and right side on the body of mandible (Figure 7). Intraorally wound was sutured with 4-0 vicryl (Figure 8). The post-operative care was done similar to previous case. Unfortunately, after third day, patient reported with soft, fluctuant swelling on left temporal region that was tender on palpation. It was sign of infection with abscess formation so the sutures

Figure 4: Avulsion on left temporal region

Figure 5: Lacerated wound.

Figure 6: Intra oral communication.

Figure 7: Primary closure extraorally.

Figure 8: Primary closure intraorally.

Figure 9: Healing on tenth day.

Figure 10: Secondary closure on tenth day.

Figure 11: Secondary closure on tenth day.

Figure 12: Follow up after three months (left lateral view).

were removed and pus discharged was sent for microbiological examination which confirmed the presence of Acinetobacter species. The wound was vigorously irrigated with normal saline and povidone iodine regularly for next one week. On the tenth day, the wound healing was satisfactory with good granulation tissue (Figure 9) so secondary closure was done in single layer with nylon suture extraorally (Figure 10 and 11). Antibiotics was prescribed based on culture and sensitivity for next 10 days. The patient was kept on regular follow-up for three months and healing was satisfactory with no local or systemic complications (Figure 12).

DISCUSSION

Animal bite, especially dogs, have been a major public health problem. These traumatic injuries can cause infectious, functional, aesthetic implications, and sometimes may even lead life threatening condition, and eventually to death, especially when victims are affected in the head and neck region. The nose, lips, and cheeks are most commonly affected areas and are known as 'central target area'.[2] The typical dog bite results in a combination of torn tissues and adjacent punctures, and are called as "hole-and-tear effect. The force delivered by dog jaws while biting can be as high as 200-450 psi and result in devitalisation of the wound tissue with associated ripping and tearing motion and may lead to severe deep laceration.[2]

Facial bite injuries hold a special position in maxillofacial trauma care due to their propensity to get infected compared to similar soft tissue wounds caused by other reasons. Children are the most common victims of dog bites due to their short stature especially in incidents that prove fatal. The highest incidence of bites occurs in boys 5-9 years of age.[3] The dog bite wound gets more often infected as there is direct inoculation of microbes in the tissue.

According to literature, about 90% of these lesions affect the body of the adult victim and only 10% affect the head and neck; however, when it comes to paediatric victims, this relationship is reversed, so that up to 76% of cases involve the facial region, mainly affecting cheeks, lips and nose.[4] Dog bites are commonly associated with soft-tissue injury to the face which are generally classified into three major types: laceration, avulsion (tissue loss), and puncture. Although cat and human bites are much more likely to become infected, dog bites still carry around a 10% risk of infection. The incidence of dog bites peaks during the spring and summer seasons and most of the cases are often unprovoked, and frequently occur at home with a dog that is familiar to the child.[5,6] The most frequently associated soft-tissue injury is the laceration which in the orofacial region may include facial nerve damage, lacrimal duct damage requiring stenting and reconstruction, ptosis from levator transection, and blood loss requiring transfusion. The facial fractures are not commonly associated with dog bite injuries, however, when the injury occurs in a child, particularly near the orbit, nose, and cheek the index of suspicion for a fracture should be raised.[7] The small stature of children, the disproportionate size of the head relative to the body, their willingness to bring their faces close to the animal, and limited motor skills to provide defense are believed to account for the maxillofacial injuries in the children.[8]

The symptoms usually present are pain, cellulitis, and purulent drainage. In addition to local wound infection, other complications may occur, which include lymphangitis, local abscess, septic arthritis, tenosynovitis, and osteomyelitis. Rare complications may include endocarditis, meningitis, brain abscess, and sepsis with disseminated intravascular coagulation, especially in immunocompromised individuals. To combat these complications, antibiotics coverage should be considered which was done in both the cases. In the first case, no signs of infection and other complications were present. However, wound infection with purulent discharge was observed in the second case. The probable cause of the infection may be the inadequate antibiotic taken by the patient and improper wound care. The infections caused by mammalian bites are polymicrobial in nature, with mixed aerobic and anaerobic species. Bacteriology of infected dog and cat bite wounds includes Pasteurella multocida, Staphylococcus aureus, Viridans streptococci, Capnocytophaga canimorsus, and oral anaerobes.[8] In the second case here, the microbiological examination confirmed the presence of Acinetobacter species.

The management of dog bites remains a topic of controversy. Dog bite injuries are unique and require individualised treatment plan. The methods of dog bite treatment must be based on the degree and circumstances like the type of injury, contamination of the wound, and health status of the dog.[9] Treatment options range from primary and delayed primary closure to secondary intention, including surgical approaches, such as local flaps, and skin or composite grafts. With every surgical approach, the aim is good functional and aesthetic outcome. In addition to surgical procedures, another important aspect of dog bite treatment is anti-infective therapy against rabies, tetanus, and other bacteria. Antimicrobial therapy is always indicated, whereas treatment against tetanus depends on the patient's immunisation status and therapy against rabies is determined by the immunisation status and health of the attacking dog.[9] In both of current cases, antirabies immunoglobulins and antirabies immunisation were provided per WHO protocols. None of them presented with symptoms of rabies during the follow-up period.

The immediate primary closure of the facial dog bite lacerations neither increase the wound's infection rate nor accelerate wound's infection. However, important issues to be emphasised are: enforcing primary closure after thorough cleaning, disinfection, and debridement. The debridement is designed to make contaminated wound into clean wound, so that it can be sutured immediately and reach primary healing[10] which was done in these cases.

Anticipatory guidance by paediatric health care providers should attend to dog bite prevention. The need to improve community knowledge of rabies and the availability and affordability of

rabies vaccine must be highlighted.[8] The choice between primary closure and secondary closure in the dog bite cases depends upon the various factors, though, whenever possible secondary closure should be done to avoid any further complications. A thorough wound debridement and irrigation for dog bite orofacial lacerations under appropriate antirabies immunoglobulins (for post-exposure prophylaxis) and antibiotic regimen forms the backbone in the successful management of the victims of dog bite injuries. The present case reports add to the knowledge about dog bite injuries and the required individualised multidisciplinary treatment approach.

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Conflict of Interest: None.

JNDA

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