International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

Case Reports on Reconstruction of Injuries on the Face and Scalp after Dog Bite

Ana Carolina Salomão Gerolamo[1], Roberta de Souza Oliveira[2], Frederico Alonso Sabino de Freitas[3]

[1]Franca Municipal University Center – Uni-FACEF, Pernambuco Street 977, Franca, Brazil
Email: *anasalomaog[at]gmail.com*

[2]Franca Municipal University Center – Uni-FACEF, Doutor Plaucio Angelo Presoto Street 2509. Franca, Brazil
Email: *robertadesoliveira[at]outlook.com*

[3]Coordinator of Undergraduate Medicine at Franca Municipal University Center – Uni-FACEF,
Alonso Y Alonso Avenue, 2400, Franca, Brazil
Email: *fredericoalonso70[at]gmail.com*

Abstract: ***The present work aims to report 2 cases of dog bites to the scalp and face, resulting in complex and potentially disfiguring injuries. The reported patients are female, victims of bite attacks from medium and large dogs, which occurred in the family environment. The affected regions were the scalp and lower lip respectively. The authors discuss surgical treatment, clinical evolution and follow-up from 6 months to 2 years after trauma. The aim of discussing the cases is to contribute to expanding the knowledge acquired on the subject and awakening interest in the implementation of preventive measures, thus benefiting any patients affected by dog bites. Negligence in dealing with dogs has increased the severity and mortality resulting from dog bite injuries. A multidisciplinary approach and care by a qualified team are necessary, in specialized centers for this type of incident.***

Keywords: Dog bite, Facial injuries, Scalp injuries, Reconstruction

1. Introduction

The dog, since ancient times, has practically been part of the human family. There are hundreds of breeds, each with its specific characteristics and purposes, whether for companionship, guarding or hunting.

A census carried out in 2012, by the USP Veterinary Faculty, revealed that there were 2.5 million dogs in the city of São Paulo. Between 2002 and 2011, the increase in the dog population was 60%, compared to the 3.5% increase in the human population [1].

According to Langley, dog bites are a major public health concern, affecting more than 4 million people and resulting in 6,000 to 13,000 hospitalizations each year in the United States [2].

Bini et al., described that dog attacks result in serious bodily injuries, mutilations and, less commonly, death, and these tragedies are preventable. Attacks by pitbulls are associated with greater morbidity, higher hospital costs (US$10,500 x US$7,200) and a higher risk of death (10.3% x 0%) than attacks by other breeds, according to a study carried out at the University of Texas [3].

According to Brogan et al., dog bite accidents are frequent and mainly affect children under 7 years of age, male (60%), white (87%), with injuries most commonly on the face, head and neck (82%). The most serious injuries involve the last 2 body segments mentioned, caused by large dogs [4].

School-age children are frequent victims admitted to hospital emergency departments. According to Reisner et al., most children already knew the attacking dog (72%) and the accident occurred during positive interactions, initiated by the dog [5].

Dog bite accidents are associated with a high rate of morbidity worldwide, especially in pediatric age groups. The literature on the subject is not very detailed in Brazil and there is a need for more studies and research in the area [6]. In Brazil, according to studies by Carvalho and Silva, there are no relevant statistics, which are fragmented and demonstrated through few local and regional studies [7]-[8].

It is known that humans can be affected in different ways after attacks, from lacerations, tissue loss, avulsions and fractures, culminating in various complications, such as polymicrobial infections of the affected site, with potential spread to other body regions and functional aesthetic impairment of the injured segment.

According to Tu et al., there is great controversy in the literature regarding the early treatment or not of wounds and facial bone fractures resulting from this trauma mechanism, with a current tendency towards early repair, according to Javaid et al. and Suárez et al. [9]-[11].

Therefore, the primary objective of this work is to report two complex cases of dog bites on the face and scalp, involving immediate and definitive reconstruction using sutures and local flaps, comparing them with the current literature.

In this context, as a secondary objective, we seek to relate the surgical techniques used in the management of cases as a form of reconstruction and the long-term evolution of individuals. Possible complications are also discussed through a literature review.

2. Case Report

The study format is descriptive, consisting of a report of two cases of patients who suffered trauma to the head region resulting from dog bites. They were received in private emergency services, for initial clinical-surgical treatment and, subsequently, outpatient follow-up in a private clinic, where all their medical records and photographic documentation are kept. The project was approved by the Human Research Ethics Committee [CAAE: 78029924.4.0000.5384].

The researchers committed to collecting data ensuring confidentiality, as well as preserving the anonymity of patients. All data were handled and analyzed anonymously, without nominal identification of the research participant and the results resulting from the study were presented in a way that did not allow such recognition.

2.1 Case 1

Female patient, 7 years old, was admitted to the hospital emergency service as an emergency victim of aggression by a domestic animal, bitten by a large dog. The child had multiple and extensive lesions on the scalp with partial scalp, almost total avulsion of the scalp of approximately 80% of the hairy area (Figure 1). Furthermore, lacerations were found in the lower limbs and left gluteal region. There was moderate blood loss at the scene of the accident. At the time of admission, he was conscious and hemodynamically stable, with no signs of active bleeding.

Figure 1: Multiple and extensive lesions on the scalp with partial scalp, almost total avulsion of the scalp of approximately 80% of the hairy area.

The surgical procedure was performed under general anesthesia with orotracheal intubation. The surgical area was cleaned and the surgical wound was thoroughly washed with 0.9% saline solution, the edges of the surgical wound were stabilized and the bleeding vessels were vascularly ligated. Regular perfusion of the scalp flap was observed, nourished only by the temporal pedicle. The wound was 400 cm2 in area, with calvarial exposure in some areas, at the subperiosteal level (pericranium). Microsurgical replantation was considered; however, the condition of the avulsed segment combined with the lack of adequate microvascular anastomoses precluded this treatment option.

Next, reconstruction of the scalp was carried out by suturing the wounds in layers, with few stitches of 4-0 monocryl thread in the aponeurotic galea, followed by suturing the skin with 4-0 mononylon thread in separate stitches. Antibiotic therapy was used for 7 (seven) days. Control visits were scheduled in the immediate postoperative period. On the first day after surgery, the patient was calm, with good perfusion of the scalp, without collections. She was treated with anti-rabies, tetanus and painkillers. On the second postoperative day, the patient was discharged from the hospital and his legal guardian was instructed on the use of medication and hygiene and antisepsis of the wounds. When returning for stitch removal, 10 days after the event, the child did not present additional episodes of unusual bleeding or any other local or systemic complication (Figure 2).

Figure 2: Return to collect points, 10 days after the event

At the 2-year late outpatient return, the patient complained of mild paresthesia in the fronto-parietal region of the scalp and small scattered areas of parietal alopecia. The scar had a good appearance (Figure 3).

Figure 3: Wound healing looking good

2.2 Case 2

A 22-year-old female patient presented for evaluation at the hospital emergency service reporting a bite on her lower lip caused by her own dog, regularly vaccinated, thirty minutes earlier. He had no active bleeding, history of systemic disease or drug allergies.

The primary assessment revealed that the patient was lucid, interacting with the emergency team, with normal vital signs. On facial examination, there was a full-thickness laceration involving the lower right labial region, with loss of substance up to the mucosa and retraction of the edges of the orbicularis oris muscle (Figure 4).

Figure 4: Laceration involving the lower right labial region, full thickness and with loss of substance up to the mucosa and retraction of the edges of the orbicularis oris muscle.

Despite the complexity of the injury, the patient's collaboration allowed the wound to be managed under local anesthesia. After adequate antisepsis and preparation of the surgical field, the edges were anesthetized with 2% lidocaine with vasoconstrictor and irrigated with 0.9% saline. It was decided to create a mucosal flap in V-Y advancement, using 4-0 monocryl sutures for the muscle, 5-0 chrome catgut for the oral mucosa and 6.0 mononylon for the skin (Figure 5).

Figure 5: Creation of a mucosal flap in V-Y advancement

Prevention of human rabies was carried out on the same day and three days later, given the location of the lesion, despite the attacking animal (family dog) being properly vaccinated. Tetanus prophylaxis was not performed due to the patient having recent immunization, in accordance with the national immunization calendar. Amoxicillin associated with clavulanic acid was the choice for the seven-day antibiotic regimen. The patient's follow-up revealed no signs of infection. The patient returned to have the stitches removed (Figure 6) and in the late follow-up of 3 months, he demonstrated the absence of any functional impairment of the oral region, in addition to a good-looking scar and partial atrophy of the advanced flap (Figure 7).

Figure 6: Return to remove stitches

Figure 7: Post-operative, 3 months, demonstrating the absence of any functional impairment of the oral region, in addition to a good-looking scar, slight partial atrophy of the flap

She underwent 2 lip filling sessions at the site of the mucous flap, with hyaluronic acid, obtaining a good late result, after 6 months (Figure 8).

Figure 8: (a) Patient underwent 2 lip filling sessions, performed at the site of the mucous flap, with hyaluronic acid, obtaining a good late result, (b) after 6 months of it.

3. Discussion and Results

Dog bite accidents are considered a public health problem worldwide. It is known that attacks affect humans in a variety of ways, such as scratching, licking and other forms of direct contact and not just through biting. Infections can be bacterial, fungal, viral or parasitic, culminating in rabies, tetanus, secondary infections and rarely death [26].

In addition, the associated mortality is low, but in the fatal outcomes described, the main cause of death is due to blood loss after trauma to large arterial vessels [6].

Dog attacks mainly affect male (60%) and white (87%) children under 7 years of age [26]. According to Saha et al, the majority of the affected child population is aged between 6 and 12 years old and the minority is between 0 and 1 year old [17]-[26].

The region of the body most affected by attacks depends on the victim's age group. While in adults the injuries are more common on the trunk and limbs, in children they are more common on the face and skull [12]. Abreu et al found 82% of injuries to the face, scalp and neck.

This happens due to their small stature, tendency to play on the floor, extreme curiosity, less awareness of danger and inability to defend themselves. Most children already know the attacking dog and the accident occurs during positive interactions, initiated by the dog [26].

The tables summarize the main epidemiological data on dog bites reported in the world literature.

Table 1: Distribution of dog bites according to location in various tests [29]

Part of the Body Affected	% of Accidents
Head and neck	18,34%
Upper limbs	51,45%
Lower members	23,04%
Back and Trunk	7,16%

Table 2: Region of the body most affected according to age group [12]

Age Group	Part of the body most affected
Children	Face and skull
Adults	Trunk and limbs

The treatment of injuries caused by dog bites should begin with cleaning the region, debridement followed by suturing,

anti-rabies, anti-tetanus control and antibiotic prophylaxis [12]. The recommendation of primary suturing immediately after the episode is controversial, some surgeons prefer not to suture the bites of unvaccinated dogs to prevent additional trauma that increases the risk of deep infections [17]. However, there is a current trend towards early repair of wounds, especially in the facial region, resulting from this trauma mechanism [26].

To manage dog bites, the wound must initially be cleaned with saline solution, followed by debridement of devitalized tissues in the most conservative way possible, primary closure of lacerations and antibiotic prophylaxis. Another important factor is the establishment of anti-rabies and tetanus immunization protocols [16].

Due to the colonization of the canine oral cavity by a very diverse microbiota, it was necessary to research the etiological pattern to establish the most appropriate antibiotic choice. The most prevalent agents were identified in samples of gingival mucosa from dogs, including more than 213 bacteria and 20 fungi. The most prevalent are Gram positive species of the genera Staphylococcus, Streptococcus, Micrococcus, Lactobacillus, Enterococcus, Propionibacterium, Bacillus and Clostridium; Gram negatives of the genera Escherichia, Pseudomonas, Proteus, Klebsiella and Neisseria; and the yeast-like fungi Candida and Malassezia [6].

For injuries of moderate to severe severity of the face and upper limbs, short courses of antibiotic prophylaxis are recommended, while in severe injuries with bone fractures and joint penetration, the prescription of longer courses is preferable. Amoxicillin with clavulanate is effective against most pathogens and amikacin is effective against Gram-negative bacteria, including Pseudomonas. Therefore, the combination of both provides effective empirical coverage [17].

Morales et al. states that the administration of antibiotics is often associated with the local treatment of injuries caused by dog bites, and this choice is based on the probability of possible infections caused by microorganisms present in the oral cavity of these animals. The antibiotics of choice after bites to the face and scalp are amoxicillin with clavulanic acid or cephalexin (1st generation cephalosporin) [18].

For small infected wounds, oral amoxicillin with clavulanate provides excellent coverage for infected dog bites. In cases of allergy to penicillin, clindamycin can be used [19]. Additionally, administration of rabies vaccination remains the gold standard of treatment for animal bite wounds.

From an aesthetic point of view, wounds closed by secondary intention evolve undesirably, with deformities and extensive scars. While closure by first intention demonstrates better aesthetic and functional results due to better tissue regeneration, with a similar infection rate despite avoiding contamination and subsequent infection of exposed deep tissues [17]. What interferes with reducing infection rates is the institution of early intervention, regardless of the use of sutures.

The surgical techniques used depend on the region affected, with the scalp and frontal region being the most resistant tissues, while injuries to the face are more complex due to the presence of structures such as the malar regions, lips, lip commissure, nose and nasal columella. When there is substantial tissue loss and avulsions, grafts and flaps are necessary [17].

In cases of scalping, the treatment of choice is reimplantation even if the scalp is very damaged, as there is no donor site that has the same characteristics as the scalp tissue [20].

In cases where the scalp has been completely rendered unusable by a dog bite, making reimplantation impossible, the etiology, size of the defect, previous treatment and future treatment planning are taken into account when selecting the type of flap. the first choice being the use of the latissimus dorsi muscle, associated with a skin graft [14].

Anbar et al. describes the existence of a range of possible lesion closure techniques and the principle of simpler to more complex reconstructions should be adopted [20]. Amongst them:

Primary closure is the best technique for small defects (<3cm). Defects in the galea should be closed with absorbable sutures and the skin with sutures or staples.

Skin grafting is a quick and effective method. It requires a vascularized bed and cannot be placed on exposed bone. It can be associated with tissue expansion, which has the advantages of preserving sensitivity, color, thickness and hair. For small to medium-sized injuries, local flaps composed of skin, subcutaneous tissue and galea are the technique of choice. When skin, local flaps, grafting or healing by secondary intention are not viable options, free flaps are chosen; in addition, they result in better outcomes in areas previously subjected to radiation or with an active infectious process [20].

When the skullcap is exposed without periosteum, it becomes a devitalized area, requiring coverage with a muscle flap to perfuse it. The biggest advantage of the muscle flap in relation to the skin flap is the capillary density. Furthermore, a common complication of this type of injury is chronic osteomyelitis and erosion of the outer table, making adequate treatment of the wound even more essential.

Another commonly affected region on the face is the lip. Its injury can result in aesthetic and functional changes, with adequate coverage of the vermilion and adjacent skin being of great importance, in addition to preserving oral sphincter competence. The ideal donor areas are the remaining lip tissue and the opposite lip due to the same color, texture, thickness and epithelium. As a second option, the genial region and neighboring tissues of the face can be used and, as an exception, distant flaps.

The most relevant factors when choosing the reconstructive approach are the size and location of the lip defect, taking into account limitations imposed by the patient's general condition and comorbidities [15].

Smaller defects (loss of up to 30% of substance) allow tension-free primary suturing and approximation of anatomical planes with less scarring and morbidity. While larger defects (substantial loss greater than 35%) are better repaired with local flaps, as the primary synthesis would culminate in retrusion and shortening (microstomia), known as the "curtain" effect [23].

Due to the presence of the Cupid's bow, it is more difficult to advance flaps to the upper lip without causing distortion and asymmetries. There is a relationship between the upper and lower lips, in which the upper lip protrudes anteriorly, which cannot be lost. On the other hand, the lower lip allows reconstruction of larger defects without major aesthetic repercussions [24].

One of the techniques described for reconstructing defects in the lower lip is the Yu flap, a good option for defects that occupy more than 1/3 of the lip extension, and is the combination of three local flaps:

First rhomboid sliding flap that advances to the lip defect from the buccinator zone – has an upper base when the defect is in the upper lip and a lower base when the defect is in the lower lip; second sliding-rotation flap, approximately triangular in shape, used to cover the donor area of the first flap; and, finally, a flap of the buccal mucosa to reconstruct the vermilion

The advantages of this technique are functional preservation, respecting the orientation of the orbicularis muscle fibers, preserving oral continence and lip symmetry and, therefore, achieving good aesthetic-functional results without implying limitations in speech and eating [24].

Lip injuries are divided into three types according to their depth and the need for reconstruction, being mucosal only, skin only or a combination of both [21]. One way to define the approach to lip lacerations is based on this classification.
It is concluded that, due to the wide range of existing reconstructive techniques, the lack of systematization of patient management and care is notable, taking into account the possibility of physical sequelae and unwanted aesthetic and functional outcomes, which makes it necessary to further disseminate procedures and approaches within Plastic Surgery, such as the use of flaps and grafts. In this way, the need for specialized centers, trained professionals and greater investments in research in this area is justified.

In Brazil, dog bite accidents are a public health problem, therefore, the importance of implementing actions that promote the prevention of these injuries is evident, as they can cause the transmission of diseases, such as rabies and tetanus, in addition to physical and emotional consequences for the individuals involved [6].

Dog bite accidents are of substantial importance to public health, given their magnitude and impact on people's lives [26]. Strategies for preventing dog bites include close supervision of interactions between children and dogs, public education about responsible dog ownership and dog bite prevention, stronger animal control laws, better resources for enforcing these laws, and better notification of bite cases [6].

According to Morgan and Palmer, around 90% of these injuries affect the adult victim's body and only 10% affect the head and neck; However, when it comes to pediatric victims, this relationship is reversed, so that up to 76% of cases involve the facial region, mainly affecting the genital region, lips and nose. Soft tissue injuries are divided into three categories: lacerations, perforations and avulsions (tissue loss) [25].

In view of the increase in crime, especially in large cities, the use of guard dogs has increased significantly. They are strong animals, sometimes trained to attack strangers who enter properties, as demonstrated by the injuries resulting from their attacks in the first case reported in this work.

According to Bini et al., negligence in dealing with ferocious dogs, such as the Rottweiler and Pitbull breeds, increased the severity of injuries and mortality from dog bites, especially in preschool-aged children, in whom the head represents a large area of the surface body, resulting in craniomaxillofacial trauma and potential more serious cosmetic sequelae, data in agreement with the cases reported in the present study [3].

It affects children in early childhood, males and whites, with injuries most commonly occurring on the face, head and neck, a predominance of which is corroborated by data from the literature [26].

It's difficult to explain why so many children are injured by dogs. This age group is one in which awareness of danger is very low or absent. The locations of the injuries suggest, to some extent, that children may get too close to dogs and put themselves in vulnerable positions [17].

The treatment and approach to injuries secondary to dog bites must be carried out with an initial approach through asepsis of the region, debridement and suturing if necessary; Anti-rabies, tetanus control and antibiotic prophylaxis are part of this approach and have a relevant impact on the reduction of secondary complications [12]. There is a current trend towards early repair of wounds, especially in the facial region, resulting from this trauma mechanism, aiming to minimize functional complications, infections and aesthetic damage to patients [26].

It was seen that when approaching wounds resulting from bites, the fact of allowing closure by secondary intention, leaving them open in the first instance, could be unsatisfactory for the patient and the doctor. The literature reports that in the case of small wounds, which were not sutured, there was a higher incidence of infections, so that poor wound asepsis was identified as the main cause. Data indicate that 10% of sutured wounds become infected, compared to 21% of infections in wounds closed by secondary intention. Wound management must be carried out systematically, in a hospital environment, with a minimally equipped surgical room, with careful cleaning of the region and irrigation of the area, the presence of an experienced medical team, has an impact on the results [27].

In several studies, it has been pointed out that the size of the wound has no impact or direct relationship with the increased risk of complications. The aesthetic results resulting from the

primary suture approach bring greater patient satisfaction and less impact on public health in terms of expenses. Normally, after primary closure, patients with sutures can be discharged, maintaining their care at home, while patients with closure by secondary intention, in which the wounds remain open for longer, lead to a greater demand for healthcare, a greater number of outpatient consultations for supervision and management of the injury [28].

Data from the literature indicate that the use of Amoxicillin-clavulanate demonstrated to have significantly impacted the infection rates of post-bite wounds, reducing them, especially in those that had complete loss of the skin barrier through the lesion and that were between 9-24 hours of exposure. after the event. The coverage of this antibiotic appears to be adequate in relation to the strains isolated in the events described. Three factors were identified as beneficiaries of the use of prophylactic antibiotics, namely: bites in the hand region, patients over 50 years of age and in cases of late approach and treatment of the injury. The effectiveness was confirmed only in the last case, considering that bites with late manifestations already qualify as a case of potential infections, however, in this case, the use of antibiotics would be used as treatment and not prophylaxis. Involvement of tendons, bone apparatus or joints also benefits from the use of antibiotic therapy [29].
The data studied present evidence that indicates the preference of patients for the surgical approach, a parallel is made between this demand and the number of related legal actions. It is established that the type of approach must be individualized by the doctor, who must take into account several factors regarding the context of the patient in question, social level, location of the wound, comfort and health risks inherent to the patient and less exposure to risks for the same. The decision on the approach can be made together with the patient, after explaining the positive and negative points, also taking into account the cost-benefit [29].

In Brazil, epidemiological data is scarce, with a lack of detailed description of attacks and therapeutic approaches after episodes. Therefore, establishing public policies to prevent and control these accidents becomes a challenge. Furthermore, they are important causes of morbidity, as they transmit infections, cause emotional consequences for the victim, aesthetic damage to the affected regions and a high cost for treatment [12].

According to the prospective randomized study by Rui-Feng et al., in which two groups were compared for 6 years: A – laceration left open and B – laceration sutured immediately; immediate closure does not increase the rate or accelerate wound infection [30]. However, it must be emphasized that primary closure must be done after thorough cleaning, disinfection and debridement. It was concluded that immediate suturing had a great impact on the healing of facial lacerations, as in group B the healing time was 6.75 to 9.12 days, while in group A it was 10.5 to 14.24 days. In this study, therefore, it was evident that secondary healing is more deficient, resulting in extended healing time and no complete recovery of functionality due to scar hyperplasia and contracture, mainly in the eyes, nose, ears and mouth, where deformities can lead to serious complications, such as ectropion and trichiasis. Therefore, primary closure of facial lacerations is recommended.

Another possibility for correcting dog bite injuries is the use of medical glues. As they can prevent inflammation and scars from traditional sutures, they have been widely used to correct injuries in the cephalic segment, mainly facial. However, its use requires management by a plastic suture specialist, which is unsuitable for emergency department surgeons [31].

Applying medical glue to facial lacerations has many advantages over traditional suturing. It is a convenient and simple method that avoids pain caused by anesthesia, dressing changes and subsequent suture removal. In addition, it has good biocompatibility, stimulates blood clotting and bacteriostasis, promoting wound healing [31].

The study by Lisong et al.shows that traditional wound suturing is easier to handle compared to plastic suturing with medical glue, however, the operation time was shorter when using glue, which is more suitable for emergency situations. It was also observed that medical glue has the effect of healing the wound, strengthening it, reducing tension and, after healing, there is no hyperplastic scar as in traditional suture and, therefore, the treatment effect was more satisfactory and better met the expectations and psychological needs of patients and their families. However, more studies are still needed regarding the cost-benefit of medical glues due to the great controversy in the available research [31].

The literature highlights the urgent need for robust and randomized clinical research and comparative studies on the subject of dog bites. Studies are needed that seek correlation between primary and secondary closure, injuries caused by mammals other than dogs, what are the complications after bites, taking into account See low reports and research on mortality and rabies transmission following these events. Comparative studies between age groups should also be better established in research, including adults. The socioeconomic status of patients in studies, the demographic areas in which accidents occur, and the quality of service delivery and care should also be reported [29].

It is evident that studies agree with the importance of complete cleaning, disinfection and debridement of wounds and most recommend primary closure of lacerations due to better aesthetic and functional results, however, the need for standardization in the care of dog bite victims is emphasized.

4. Conclusion

Dog bites are a serious public health problem, affecting 1.5% of the United States population annually, according to a study by Gilchrist et al., and, as a result, has been demanding effective prevention programs, with strict regulation of feral breeds and educational measures in relation to children.

This report has a descriptive function of exposing the great complexity of these traumas, since national statistics and standardization of surgical procedures are scarce.

Dog bites are very common injuries that mainly affect children, with the face being the most affected region. Trauma can leave aesthetic and psychological consequences for victims, which is why treatment must involve a multidisciplinary team in order to minimize the damage

caused. According to literature data, immediate primary surgical intervention provides a better aesthetic result and antibiotic prophylaxis reduces the risk of infection.

References

[1] Canatto, B. D., et al. "Caracterização Demográfica Das Populações de Cães E Gatos Supervisionados Do Município de São Paulo." Arquivo Brasileiro de Medicina Veterinária E Zootecnia, vol. 64, no. 6, Dec. 2012, pp. 1515–23, https://doi.org/10.1590/s0102-09352012000600017. Accessed 12 Jan. 2021.

[2] Langley, Ricky L. "Human Fatalities Resulting from Dog Attacks in the United States, 1979–2005." Wilderness & Environmental Medicine, vol. 20, no. 1, Mar. 2009, pp. 19–25, https://doi.org/10.1580/08-WEME-OR-213.1.

[3] Bini, John K., et al. "Mortality, Mauling, and Maiming by Vicious Dogs." Annals of Surgery, vol. 253, no. 4, Apr. 2011, pp. 791–97, https://doi.org/10.1097/sla.0b013e318211cd68.

[4] MA; "Severe Dog Bites in Children." Pediatrics, vol. 96, no. 5 Pt 1, Pediatrics, 2023, pubmed.ncbi.nlm.nih.gov/7478841/. Accessed 6 Aug. 2024.

[5] Reisner, Ilana R., et al. "Behavioural Characteristics Associated with Dog Bites to Children Presenting to an Urban Trauma Centre." Injury Prevention, vol. 17, no. 5, Oct. 2011, pp. 348–53, https://doi.org/10.1136/ip.2010.029868. Accessed 21 Sept. 2020.

[6] Roberta Ribeiro Fernandes, et al. "Mordedura de Cães E Sua Interconexão Com a Saúde Única." Brazilian Journal of Health Review, vol. 6, no. 1, Brazilian Journal of Development, Jan. 2023, pp. 537–48, https://doi.org/10.34119/bjhrv6n1-044. Accessed 2 Dec. 2023.

[7] Carvalho, Cláudia Castro, and Barbara Tereza Fonseca da Silva. "Características Epidemiológicas de Acidentes Por Mordedura de Cão Atendidos Em Unidade Básica de Saúde No Nordeste Do Brasil - Doi:10.5020/18061230.2007.P17." Revista Brasileira Em Promoção Da Saúde, vol. 20, no. 1, 2007, pp. 17–21, https://doi.org/10.5020/996. Accessed 27 May 2022.

[8] Ciampo, Del, et al. "Acidentes de Mordeduras de Cães Na Infância." Revista de Saude Publica, vol. 34, no. 4, University of São Paulo, Aug. 2000, pp. 411–12, https://doi.org/10.1590/s0034-89102000000400016. Accessed 23 Oct. 2023.

[9] Tu, Alexander H., et al. "Facial Fractures from Dog Bite Injuries." Plastic & Reconstructive Surgery, vol. 109, no. 4, Lippincott Williams & Wilkins, Apr. 2002, pp. 1259–65, https://doi.org/10.1097/00006534-200204010-00008. Accessed 6 Aug. 2024.

[10] Javaid, M., et al. "Primary Repair of Dog Bites to the Face: 40 Cases." Journal of the Royal Society of Medicine, vol. 91, no. 8, Aug. 1998, pp. 414–16, https://doi.org/10.1177/014107689809100804. Accessed 9 Apr. 2023.

[11] Suárez O;López-Gutiérrez JC;Burgos L;Aguilar R;Luis A;Encinas JL;Soto-Bauregard C;Díaz M;Ros Z. "[Surgical Treatment in Severe Dog Bites Injures in Pediatric Children]." Cirugia Pediatrica : Organo Oficial de La Sociedad Espanola de Cirugia Pediatrica, vol. 20, no. 3, Cir Pediatr, 2022, pubmed.ncbi.nlm.nih.gov/18018741/. Accessed 6 Aug. 2024.

[12] Cavalcanti, Alessandro Leite, et al. "Facial Dog Bite Injuries in Children: A Case Report." International Journal of Surgery Case Reports, vol. 41, 2017, pp. 57–60, https://doi.org/10.1016/j.ijscr.2017.10.008.

[13] Marcondes, Caio, et al. "Estratégias Em Reconstruções Complexas Do Couro Cabeludo E Da Fronte: Uma Série de 22 Casos." Revista Brasileira de Cirurgia Plástica, vol. 31, no. 2, Jan. 2001, pp. 229–34, https://doi.org/10.5935/2177-1235.2016RBCP0036. Accessed 6 July 2022.

[14] KAAM, DANIEL NOWICKI, et al. "Scalp Reconstruction with Large Dorsal Muscle-Free Flap after Dog Bite Scalping." Revista Brasileira de Cirurgia Plástica (RBCP) – Brazilian Journal of Plastic Sugery, vol. 36, no. 3, 2021, pp. 353–57, https://doi.org/10.5935/2177-1235.2021rbcp0025. Accessed 6 Feb. 2022.

[15] Alencar, Marília Gabriela Mendes de, et al. "Tratamento de Importante Avulsão Labial Por Mordedura Humana." Revista de Cirurgia E Traumatologia Buco-Maxilo-Facial, vol. 14, no. 3, Sept. 2014, pp. 65–72, revodonto.bvsalud.org/scielo.php?script=sci_arttext&pid=S1808-52102014000300011.

[16] Macedo, Jefferson, et al. "Estudo Prospectivo Do Fechamento Primário Das Mordeduras Caninas E Humanas Na Face E No Couro Cabeludo." Revista Brasileira de Cirurgia Plástica, vol. 21, no. 1, Revista Brasileira de Cirurgia Plástica, 1AD, pp. 23–29, www.rbcp.org.br/details/121/pt-BR/estudo-prospectivo-do-fechamento-primario-das-mordeduras-caninas-e-humanas-na-face-e-no-couro-cabeludo. Accessed 6 Aug. 2024.

[17] Saha, Srinjoy. "Life-Threatening Panfacial Wild Dog Bites in a Child." Wilderness & Environmental Medicine, Aug. 2021, https://doi.org/10.1016/j.wem.2021.07.001. Accessed 6 Nov. 2021.

[18] Morales, Carmen, et al. "Accidentes Por Mordedura Canina, Casos Registrados En Un Hospital de Niños de Lima, Perú 1995 - 2009." Rev. Peru. Med. Exp. Salud Publica, 2024, pp. 639–42, pesquisa.bvsalud.org/portal/resource/pt/lil-611695. Accessed 6 Aug. 2024.

[19] MACEDO, JEFFERSON LESSA SOARES, et al. "Reconstruction of Face and Scalp after Dog Bites in Children." Revista Do Colégio Brasileiro de Cirurgiões, vol. 43, no. 6, Dec. 2016, pp. 452–57, https://doi.org/10.1590/0100-69912016006007. Accessed 26 Oct. 2021.

[20] Anbar, Rafael Anache, et al. "Métodos de Reconstrução Do Couro Cabeludo." Revista Brasileira de Cirurgia Plástica, vol. 27, no. 1, Mar. 2012, pp. 156–59, https://doi.org/10.1590/s1983-51752012000100026. Accessed 1 Nov. 2021.

[21] Jang, Hyeon Uk, and Young Woong Choi. "Scalp Reconstruction: A 10-Year Experience." Archives of Craniofacial Surgery, vol. 21, no. 4, Aug. 2020, pp. 237–43, https://doi.org/10.7181/acfs.2020.00269. Accessed 4 June 2022.

[22] Sanniec, Kyle, et al. “Simplifying Lip Reconstruction: An Algorithmic Approach.” Seminars in Plastic Surgery, vol. 32, no. 02, May 2018, pp. 069–74, https://doi.org/10.1055/s-0038-1645882. Accessed 27 June 2022.
[23] Mendes, Gabriela, et al. “Reconstrução de Lesão Em Lábio Superior Por Mordedura Animal Em Criança.” Revista de Cirurgia E Traumatologia Buco-Maxilo-Facial, vol. 15, no. 4, UPE/FO, 2015, pp. 53–58, revodonto.bvsalud.org/scielo.php?script=sci_arttext&pid=S1808-52102015000400009. Accessed 6 Aug. 2024.
[24] Batista, Mariana Sousa, et al. “Retalho de Yu Na Reconstrução de Defeitos Labiais.” Surgical & Cosmetic Dermatology, vol. 10, no. 3, 2018, https://doi.org/10.5935/scd1984-8773.20191121399. Accessed 1 Mar. 2023.
[25] Morgan, Marina, and John Palmer. “Dog Bites.” BMJ, vol. 334, no. 7590, Feb. 2007, pp. 413–17, https://doi.org/10.1136/bmj.39105.659919.be. Accessed 22 May 2019.
[26] Alexandre, Rogério, et al. Traumatismo Complexo de Face Na Infância Causado Por Mordedura Canina Face Complex Trauma in Childhood due to Dog Bite. abccmf.org.br/cmf/Revi/2011/out-dez/08-Traumatismo%20complexo%20de%20face%20na%20inf%C3%A2ncia%20causado%20por%20mordedura%20canina.pdf. Accessed 6 Aug. 2024.
[27] Maimaris, C., and D. N. Quinton. “Dog-Bite Lacerations: A Controlled Trial of Primary Wound Closure.” Emergency Medicine Journal, vol. 5, no. 3, Sept. 1988, pp. 156–61, https://doi.org/10.1136/emj.5.3.156.
[28] Brakenbury, P. H., and Cyrus L. Muwanga. “A Comparative Double Blind Study of Amoxycillin/Clavulanate vs Placebo in the Prevention of Infection after Animal Bites.” Emergency Medicine Journal, vol. 6, no. 4, BMJ, Dec. 1989, pp. 251–56, https://doi.org/10.1136/emj.6.4.251.
[29] Bhaumik, Soumyadeep, et al. “Primary Closure versus Delayed or No Closure for Traumatic Wounds due to Mammalian Bite.” Cochrane Database of Systematic Reviews, Dec. 2019, https://doi.org/10.1002/14651858.cd011822.pub2.
[30] Rui-feng, Chen, et al. “Emergency Treatment on Facial Laceration of Dog Bite Wounds with Immediate Primary Closure: A Prospective Randomized Trial Study.” BMC Emergency Medicine, vol. 13, no. S1, July 2013, https://doi.org/10.1186/1471-227x-13-s1-s2. Accessed 23 Jan. 2021.
[31] Lisong, Huang, et al. “Clinical Effect Analysis of Using Medical Glue versus Conventional Suturing to Treat Dog Bite in Children’s Maxillofacial Region after Negative Pressure Sealing Drainage: A Randomized Trial.” Medicine, vol. 102, no. 37, Sept. 2023, p. e34837, https://doi.org/10.1097/MD.0000000000034837. Accessed 4 June 2024.

Author Profile

Ana Carolina Salomão Gerolamo medical student at Franca Municipal University Center- Uni-FACEF. During her undergraduate studies, she had an important academic participation in the Plastic Surgery Interest Group and Dermatology Interest Group, and served as part of the Scientific Committee of the I International Integrative Medical Congress. In the scientific field, there is an emphasis on Plastic Surgery.

Roberta de Souza Oliveira medical student at Franca Municipal University Center- Uni-FACEF. During her undergraduate studies, she had an important academic participation in the Plastic Surgery Interest Group, and served as part of the Scientific Committee of the I International Integrative Medical Congress and II International Integrative Medical Congress. In the scientific field, there is an emphasis on Plastic Surgery.

Frederico Alonso Sabino de Freitas Coordinator of Undergraduate Medicine at Franca Municipal University Center – Uni-FACEF. Graduated in Medicine from the Federal University of Triângulo Mineiro (1993), completed medical residency in general surgery at USP-RP in 1996. Completed medical residency in plastic surgery at USP-RP in 1999. Master's degree in Surgery from the University of São Paulo (2002) and PhD in Surgery from the University of São Paulo (2007). He worked as a professor and assistant physician in the discipline of plastic surgery at the University of São Paulo (USP - RP) from 2000 to 2010. He is currently a plastic surgeon at the Hospital Regional de Franca, Professor of the Medicine Course at the University of Franca (UNIFRAN) and Professor of the Medicine Course at the Centro Universitário Municipal de Franca (Uni-FACEF), working mainly on the following topics: aesthetic and reconstructive plastic surgery, breast reconstruction, skin tumors, burns and active methodologies in medical education.