

# Reconstructing Facial Animal Bite Injury - A Case Report

Nada Ahmed<sup>1\*</sup>, Shehata Mekhaeel<sup>2</sup>, Andrey Protasov<sup>3</sup>, Sameh Hadhoud<sup>4</sup>, Abdelrahman Jomaa<sup>5</sup>

<sup>1</sup>Department of Operative Surgery and Clinical Anatomy, I. D. Kirpatovsky Medical Institute, Peoples' Friendship University of Russia (RUDN University), Moscow, Russian Federation. Email: na6977012@gmail.com

<sup>2</sup>Department of Operative Surgery and Clinical Anatomy, I. D. Kirpatovsky Medical Institute, Peoples' Friendship University of Russia (RUDN University), Moscow, Russian Federation. Email: mekhaeel60@yahoo.com

<sup>3</sup>Department of Operative Surgery and Clinical Anatomy, I. D. Kirpatovsky Medical Institute, Peoples' Friendship University of Russia (RUDN University), Moscow, Russian Federation. Email: protasov-av@rudn.ru

<sup>4</sup>Department of Operative Surgery and Clinical Anatomy, I. D. Kirpatovsky Medical Institute, Peoples' Friendship University of Russia (RUDN University), Moscow, Russian Federation. Email: samehahhoud80@gmail.com

<sup>5</sup>Kirov State medical university, Russian Federation. Email: abdulrahmanj526@gmail.com

## Abstract

Children's small stature and exposed posture make their face particularly susceptible to animal bites where the attacking animal's saliva injects an inoculum of dangerous germs into the deep punctured wound making it highly susceptible to infection, which is worsened by the presence of devitalized tissue that has been crushed by the bite force. Appropriate wound debridement, administration of broad-spectrum antibiotics, anti-rabies and anti-tetanus vaccinations as well as primary closure; are the main components of effective management. Our article is devoted to discuss the surgical management of a 17-year-old male patient who suffered from a wolf bite involving the anterior and lateral regions of the face (superficial and deep). Primary repair of the lacerated facial wound in addition to restoration of the continuity of the disrupted Stenson's duct had effectively resorted functional and aesthetic aspects together with prevention of salivary complications, aiming at promoting our realization about individualized, interdisciplinary management of such cases.

**Keywords:** Animal Bite, Facial Injuries, Stenson's Duct.

## INTRODUCTION

According to surveillance data, there are over 200,000 animal bites reported annually in Egypt, primarily from dogs, and an average of 60 rabies-related deaths occur throughout the country each year, approximately 85–90% of such cases are brought on by dogs, and teenagers are typically the victims rather than adults<sup>[1]</sup> versus 565 cases in the Nizhny Novgorod region of Russia.<sup>[2]</sup> Every animal bite is different, which makes it difficult to set clinical recommendations. Animal bite injuries can range in severity from minor crush wounds or superficial abrasions to significant tissue loss, including bone injury. The severity of each trauma determines how each patient is treated individually.<sup>[3]</sup> Surgeons encounter significant difficulties when dealing with bites that harm the human face.<sup>[4]</sup> Treatment options include surgical techniques such as local flaps and skin or composite grafts, as well as primary and delayed primary closure and secondary intention. Remarkably, just 10% of adult animal bite injuries occur in the head and neck, compared to 78%

of child bite injuries. Children's small size, which renders the face more vulnerable, is the cause of this notable disparity.<sup>[5]</sup> Lips, nose, and cheek make up the main target area.<sup>[6]</sup> The force exerted by a dog's jaw can reach 450 pounds per square inch. The three primary forms of soft tissue wounds that can arise from the high amount of force exerted by these mammals' sharp teeth are punctures, lacerations, and avulsions, with or without a real tissue defect. In a typical dog bite, the bite dynamics cause a combination of a puncture-type wound and surrounding tissue ripping, or "hole and tear" effect. Additionally, there is some degree of crush injury.<sup>[7]</sup> Clinically, puncture wounds are more likely to become infected because they contain microorganisms deep within the wound, which has a restricted entrance site, poor drainage, and an environment that is perfect for

**\*Correspondence:** Department of Operative Surgery and Clinical Anatomy, I. D. Kirpatovsky Medical Institute, Peoples' Friendship University of Russia (RUDN University), Moscow, Russian Federation. Email: na6977012@gmail.com

**Submitted:** 02<sup>nd</sup> September, 2024

**Received:** 08<sup>th</sup> October, 2024

**Accepted:** 14<sup>th</sup> October, 2024

**Published:** 18<sup>th</sup> October, 2024

Access This Article Online

Quick Response Code:



Website:  
<https://jcrmt.com>

**How to Cite This Article:** Ahmed N, Mekhaeel S, Protasov A, Hadhoud S, Jomaa A. Reconstructing Facial Animal Bite Injury - A Case Report. J Case Rep Med Stud Train. 2024;1(2):25-30

anaerobic bacterial growth.<sup>[8]</sup> Conversely, crush injuries generate tissue ischemia, which leads to infection with fewer microorganisms. Animal bite wounds to the face can be problematic due to aesthetic concerns, infection, and occasionally serious damage to the airway, cervical spine, vascular system, cerebral and ocular structures, facial nerve, and parotid duct simultaneously. One stage primary closure was used to successfully treat a reported case of facial injuries caused by an animal bite.<sup>[9]</sup>

### Case report

A 17-year-old boy was referred to our emergency clinic from a rural primary health care unit due to a wolf bite. The patient was completely alert, conscious, in pain. By examination; there were no signs of fractures or wounds

throughout the whole body except for the head region. Local examination; Type II B, wound involving the full thickness of the upper lip reaching the nasal apex [Figure 1,2], moreover it extended to about 8 cm to the right cheek [Figure 3]. Intraoral examination revealed the presence of disrupted Stenson's duct on the right side [Table 1]. No active bleeding, no tongue or other oral cavity tissue injuries, no evidence of facial nerve affection, no lost teeth with normal oral occlusion. Not a single fracture affecting facial bones, no signs of cervical spine affection, no foreign bodies in the airways with normal respiration, the Glasgow Coma Scale (GSC) was 15/15. The patient was normotensive with normal cardiac rhythm except from slight tachycardia. No fever.

**Table 1: Lackmann's Classification of Facial Bite Injuries.<sup>[10]</sup>**

Type	Clinical Finding
I	Superficial injury without muscle involvement
II A	Deep injury with muscle involvement
II B	Full thickness injury of the cheek or lip with oral involvement through the wound
III A	Deep injury with tissue defect (Complete avulsion of tissues)
III B	Deep avulsive injury exposing nasal and auricular cartilages
IV A	Deep injury with severe facial nerve and/or parotid involvement
IV B	Deep injury with concomitant bony fracture



Figure 1: The Wound Involving the Full Thickness of The Upper Lip Including the Philtrum Reaching the Nasal Apex. Anterior View.

Source: Author's own material.



Figure 2: The Wound Involving the Full Thickness of the Upper Lip Including the Philtrum Reaching the Nasal Apex. Lateral View.

Source: Author's own material.



Figure 3: The Wound Extends to the Right Cheek.

Source: Author's own material.

### Management

The patient was given 1.2 gm penicillin-clavulanic acid and 500 mg metronidazole I.V. injections together with 1000 IU Rabies Immune Vaccine (RIG) I.M. and infiltrated around the wound before sending to the operative theatre. Under general anaesthesia, the wound was cleaned and irrigated with regular saline, the Stenson's duct continuity was restored using a silastic stent connecting both distal

and proximal portions of the transected duct and sutured throughout [Figure 4], followed by suturing the oral mucosa using nonabsorbable silk sutures [figure 5]. The edges of the wound were carefully approximated geometrically, trimmed and sutured in layers using absorbable sutures Vicryl® 3-0, which led to the establishment of an appropriate vermilion border [Figure 6,7].

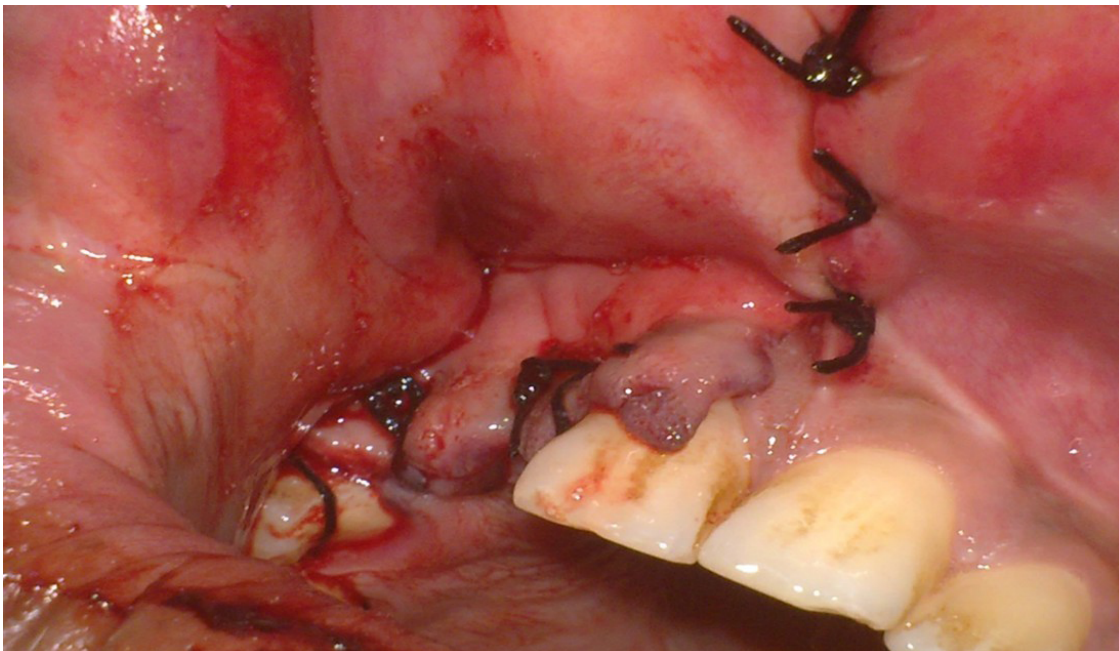


Figure 4: Stenting and Repair of the Stenson's Duct.

Source.<sup>[11]</sup>



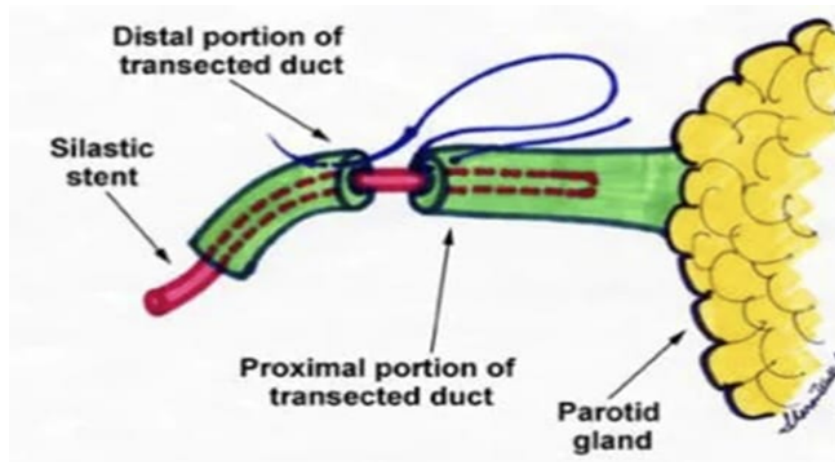


Figure 5: Suturing of the oral mucosa.

Source: Author's Own Material.



Figure 6: Postoperative repair.

Source: Author'S Own Material.



Figure 7: Postoperative Repair.

Source: Author'S Own Material.

Operative-time: 1 hour.

### Postoperative

The patient started oral feeding within few hours postoperatively, with no complications regarding cosmetic, functional aspects and no salivary complications. The patient was discharged on the 5<sup>th</sup> day and was advised to attend our outpatient clinic for follow up.

### Follow Up

During the follow-up for 6 months, the patient showed no complications regarding speech, masticatory functions or salivary complications.

The patient continued his RIG vaccinations poster doses successfully.

## DISCUSSION

Animal bite injuries affects the head and neck by about 10% and 78% for adults and juveniles respectively.<sup>[5]</sup> Punctures, lacerations, and avulsions, with or without tissue losses are the three primary forms of soft tissue injuries caused by animal bites,<sup>[7]</sup> which could be complicated by infection, damage to the airway, cervical spine, facial nerve, and parotid duct simultaneously,<sup>[9]</sup> beside aesthetic concerns.<sup>[12]</sup>

The most targeted areas of animal facial bites in juveniles which haven't reached their second decade of life are; oral and nasal regions in the central region of the face, such injuries are frequent reasons of patients' referral to the emergency rooms.

Immediate primary repair of facial soft tissues injuries along with prevention of bacterial/viral infection through administration of prophylactic antibiotics tetanus vaccine, and rabies prophylaxis particularly in regions where rabies is endemic, together with restoring the continuity of the disrupted Stenson's duct, were the three corner stones of succussing our operation. Furthermore, Children psychosocial support; focusing upon creating a safe space to express emotions, validating the experiences, and teaching strategies to manage anxiety and fear e.g., cognitive-behavioral therapy. In parallel with teaching children how to interpret animals' body language, empowering them to recognize potentially risky situations and take appropriate actions.<sup>[13]</sup>

In our case, wound of class IIB according to Lackmann's classification of facial bite injuries, it is recommended to use prophylactic antibiotics; amoxicillin-clavulanic acid and early primary closure of the wound.<sup>[10]</sup> But, does a valuable difference between primary and delayed repair of Stenson's duct do exists!!! The study of Fukumasa *et al.*<sup>[14]</sup>, gave a satisfactory answer for our question; In their study, which was concerned with a young man with injured Stenson's duct due to an animal bite, they selected the second choice for mangment; conservative mangment in the form of pressure-dressing therapy and delayed repair of Stenson's duct. During the follow-up, parotid ultrasonography revealed atrophy of the parotid gland, suggests that the healing mechanism of the conservative

treatments for a parotid duct injury could be accused of making fistula and atrophy of parotid gland, recommending primary immediate repair of such clinical cases.<sup>[15]</sup>

We successfully restored the cosmetic, anatomical and functional aspects in our patient as well as preventing the occurrence of salivary complications; mouth dryness and infection, and salivary fistula. No complications were reported during both postoperative hospitalization and follow-up periods.

### Ethical Statement

This study was conducted in accordance with the ethical principles outlined in the Declaration of Cairo and its amendments. The authors certify that they have obtained all appropriate patient consent forms.

### Author Contributions

Conceptualization, preparation of the final submission, overall supervision: Salem, Mohamed Ahmed Eissa Sameh; Mekhaeel, Shehata Fakhry Mekhaeel; Protasov, Vitalevitch Andrey. Obtaining the clinical data and images: Salem, Mohamed Ahmed Eissa Sameh; Taha, Nada Ahmed Mohamed; Elshliby, Abdelrahman Gomaa Zaky. Review and finalization: Salem, Mohamed Ahmed Eissa Sameh; Mekhaeel, Shehata Fakhry Mekhaeel; Protasov, Vitalevitch Andrey.

### Data Availability Statement

Data sharing does not apply to this article as no datasets were generated or analyzed during the current study.

### Financial Support and Sponsorship

Nil.

### Conflicts of Interest Statement

There are no existing financial arrangements and conflict of interest between the authors and any company or organization related to the submitted manuscript.

## REFERENCES

1. Ellis R, Ellis C. Dog and Cat Bites. *Am Fam Physician*. 2014; 90(4): 239-43. Available from: <https://www.aafp.org/pubs/afp/issues/2014/0815/p239.html>.
2. Zakharova OI, Liskova EA. Patterns of animal rabies in the Nizhny Novgorod region of Russia (2012-2022): the analysis of risk factors. *Front Vet Sci*. 2024; 11: 1440408. doi: <https://doi.org/10.3389/fvets.2024.1440408>.
3. Chen T, Karim M, Grace ZT, et al. Surgical management of facial dog bite trauma: A contemporary perspective and review. *World J Otorhinolaryngol Head Neck Surg*. 2023; 9(2): 123-30. doi: <https://doi.org/10.1002/wjo2.75>.
4. Nehru S, Thangaraju P, Cibee N, Velmurugan H. Dog Bite Injury: Rusk Became a Risk - A Case Report. *Infect Disord Drug Targets*. 2024; 24(6): e250124226174. doi: <https://doi.org/10.2174/0118715265277314231211045515>.
5. Ali SS, Ali SS. Dog bite injuries to the face: A narrative review of the literature. *World J Otorhinolaryngol Head Neck Surg*. 2022; 8(3): 239-44. doi: <https://doi.org/10.1016/j.wjorl.2020.11.001>.

6. Sameh S, Mekhaeel M, Andrey P, Nada T, Mohamed A, Noureldin S. Outcomes of a Pediatric Facial Fracture Reconstruction. Case Report. *Archiv EuroMedica*. 2024; 14(6): 5. doi: <https://doi.org/10.35630/2024/14/6.604>.
7. Tam B, Matsushima K, Chiba H, et al. Nationwide Analysis of Dog Bite Injuries: Different Age Groups, Different Injury Patterns. *Am Surg*. 2021; 87(10): 1612-15. doi: <https://doi.org/10.1177/00031348211024657>.
8. Lackmann GM, Draf W, Isselstein G, Töllner U. Surgical treatment of facial dog bite injuries in children. *J Craniomaxillofac Surg*. 1992; 20(2): 81-6. doi: [https://doi.org/10.1016/s1010-5182\(05\)80472-x](https://doi.org/10.1016/s1010-5182(05)80472-x).
9. Khan K, Horswell BB, Samanta D. Dog-Bite Injuries to the Craniofacial Region: An Epidemiologic and Pattern-of-Injury Review at a Level 1 Trauma Center. *J Oral Maxillofac Surg*. 2020; 78(3): 401-13. doi: <https://doi.org/10.1016/j.joms.2019.11.002>.
10. Miranda-Rius J, Brunet-Llobet L, Lahor-Soler E, Mendieta C. An unexpected presentation of a traumatic wound on the lower lip: a case report. *J Med Case Rep*. 2014; 8: 298. doi: <https://doi.org/10.1186/1752-1947-8-298>.
11. Available from: <https://img.medscapestatic.com/pi/meds/ckb/56/41956tn.jpg>.
12. Wang J, Liu H, Yang Z, Wang H. Surgical treatment of mammalian bites----experience in the management of facial wounds by dog and cat bite in China. *Int J Burns Trauma*. 2024; 14(6): 115-24. doi: <https://doi.org/10.62347/gofz6734>.
13. Septelici D, Carbone G, Cipri A, Esposito S. Management Strategies for Common Animal Bites in Pediatrics: A Narrative Review on the Latest Progress. *Microorganisms*. 2024; 12(5): 924. doi: <https://doi.org/10.3390/microorganisms12050924>.
14. Fukumasa H, Tsuda M, Ninomiya R, et al. Parotid gland atrophy after conservative treatment of a post-traumatic parotid fistula in a two-year-old boy. *Int J Pediatr Otorhinolaryngol*. 2020; 138: 110326. doi: <https://doi.org/10.1016/j.ijporl.2020.110326>.
15. Mekhaeel MSF, Sameh SMAE, Andrey PV, Elsayed TNAM, Zaky EAG. Pediatric Facial Wolf Bite Involving Stenson's Duct: Consequences and Management. *Asian Journal of Case Reports in Surgery*. 2025; 8(1): 147-54. doi: <https://doi.org/10.9734/ajcrs/2025/v8i1614>.