Original Article

Dog Bites Injury of the Face: Management & Reconstructive Options

Firdous Khan, Babar Tanoli and Tehmas Ahmed Khan

ABSTRACT

Objective: To share our experience of managing facial dog bite injuries in terms of reconstruction presented to our unit.

Study Design: Descriptive case series study

Place and Duration of Study: This study was conducted at the Department of Plastic Surgery & Burns, Ayub Medical Complex, Abbottabad from March 2022 to April 2023.

Methods: All those cases of dog bite injuries involving head & neck region of all age & sex groups with duration of less than 2 weeks and those received already tetanus immunization and rabies vaccines were included in the study.

Results: A total no. of 18 patients was enrolled in the study period. Mean age of the patients were 4.5 years. There were 11 male patients and 7 females. Children age less than 10 years of age was victim of dog bite injuries in 9 cases. Most common areas of face involved were lips (09) cases, nose (04) cases, cheeks (03) cases and forehead (02) cases. Main reconstructive options were wound primary closure (08 cases), local advancement and rotation flaps (06 cases) and full thickness skin graft (03 cases).

Conclusion: Our study concludes that children are the major victims of dog bite injuries compared to adults. Most of the dogs were known to the patients and lips was the commonest area of face involved followed by nose and cheeks. Majority of these wounds were reconstructed mainly by primary closure and local advancement flaps.

Key Words: Face, dog bite, animal bite, injuries.

Citation of article: Khan F, Tanoli B, Khan TA. Dog Bites Injury of the Face: Management & Reconstructive Options. Med Forum 2024;35(4):78-81. doi:10.60110/medforum.350417.

INTRODUCTION

Dog bite wounds are mostly full thickness injuries contaminated with multiple micro organisms[1]. Bite injury due to animals is a major public health problem in our country as well as in the other countries of the world. Most common mammalian injuries are dog bite followed by cat and human bites[2]. Animal bite injury constitutes 1% of all cases presented to emergency & trauma units[3]. Most common sites involved are face & neck in 36% cases, lower limbs in 31% cases, upper limbs in 19% and thorax in 14% cases[2,4]. In dog bites of the face, lips are the most common sites followed by cheeks and nose[3]. Children are the most common affected victims as compared to adults[3]. In children, these injuries involve the face area in 78% of cases while in adults, 10% of cases involve the face area[4,5].

Wound infection is the most common complication following dog bites due to presence of both gram positive and gram negative flora in the dog's saliva[2]. Emergency treatment of these dog bites are wound irrigation, debridement, tetanus immunization and prophylactic antibiotics[4,6,8]. Reconstructive procedures for these injuries are wound closure primarily in cases with no loss of soft tissues while in those cases with loss of tissue are designing local or advancement flaps, full thickness or split thickness skin grafts[7,8]. Bite injury of face causes significant trauma to the patients both physically and psychologically[2].

Department of Burns & Plastic Surgery Unit, Ayub Medical Complex, Abbottabad, Pakistan.

Correspondence: Dr. Firdous Khan, Assistant Professor, Burns & Plastic Surgery Unit, Ayub Medical Complex, Abbottabad, Pakistan.
Contact No: 0321-9099363
Email: drfirdouskhanpsu@gmail.com

Received: May, 2023
Accepted: August, 2023
Printed: April, 2024

METHODS

Study was conducted at the Department of Plastic Surgery & Burns, Ayub Medical Complex, Abbottabad from March 2022 to April 2023. Informed written consents were taken from all the participants after explaining the nature of the study to them.

Inclusion criterion: All those cases of dog bite injuries involving head & neck region of all age & sex groups with duration of less than 2 weeks and those received already tetanus immunization and rabies vaccines were included in the study.

Exclusion Criteria: Dog bites with duration of more than 2 weeks, bites with other concomitant injuries & co morbid factors, bites with wounds infection and uncooperative patients were excluded from the study.

RESULTS

A total no. of 18 patients was enrolled in the study period. Mean age of the patients were 4.5 years. There

were 11 male patients and 7 females. Children age less than 10 years of age was victim of dog bite injuries in 9 cases. Eleven patients arrived in less than 3 hours of bite injury, 5 patients presented more than 3 hours after dog bite and 2 cases presented late and came at 7th day of bite injury. These 2 cases were initially seen by local doctor and only oral medications for infection were given to them. The average time lapsed from the onset of bite injury to emergency department was 1 and a half hour.

Table No. 1: Site of face affected & Reconstructive procedures performed.

Reconstructive Procedure	Site affected	No. of pts.
Primary closure	Lip & cheeks	6
Debridement & Skin graft	Nose	4
	Lip	3
Debridement & Lip rotation flap	Forehead	2
	Temple	2
Debridement & Advancement flap	Cheek	1
Debridement & Rhomboid flap		
Debridement & delayed closure		

Figure No. 1: Dog bites of forehead in a 6 years old child & Reconstruction with H Shaped forehead advancement flap.

The patients were initially managed in the emergency department by giving them intravenous broad spectrum antibiotics, tetanus prophylaxis and anti rabies vaccine. When the patients were stabilized, only then they were shifted to Plastic Surgery department for their bite wound management. All these bite patients underwent surgical procedure in plastic surgery OT after admission. 10 patients were operated in less than 24 hours of admission, 4 patients in less than 12 hours and 4 cases were operated within 6-8 hours.

Figure No. 2: Dog bites injury upper lip in a young girl with loss of central lip & reconstruction with lip advancement and rotation flap.

Figure No. 3: Dog bites injury upper lip in a young boy with loss of full thickness upper lip & reconstruction with lip rotation and advancement flap.

The commonest site of bite was lip (09) cases, followed by nose (04) cases, cheeks (03) cases and forehead (02) cases. 11 cases were of partial thickness wounds and 6

cases were of full thickness wounds with loss of tissue and in 4 cases, the wounds were communicated with the buccal cavity. Fortunately, no involvement of the facial nerve and parotid duct were found in these bites. Also there was no fracture of any face bones. The surgical procedures undertaken were thorough irrigation of the wounds with normal saline and pyodine solution. The wounds dead & crushed edges were debrided surgically. Main reconstructive options were wound primary closure (08 cases), local advancement and rotation flaps (06 cases) and full thickness skin graft (03 cases). In 2 of our patients, there was loss of midline upper lip tissue and reconstruction was done by local flaps. Mean hospital stay was 3 days. Patients were discharged on the 7th day after admission and then called on for follow-up after 1 week for wound examination & suture removal. Our results are shown in the following tables & figures.

DISCUSSION

Children are most commonly affected population bitten by dogs due to their small body size, fear and less defense mechanism[6,9,10]. In our study, children were affected more like other studies in the past[3,10]. These dog bite injuries involved mostly the face & neck region[4]. In our study, middle third including lips and nose were the most commonly bitten areas as also shown by similar studies[2,11]. Teeth of dogs are sharp enough to penetrate into the soft tissue and produce extensive force to tear away a fleshy piece of soft tissue[12]. The most common region affected in our study was lips and the reason behind it probably the habits of playing and kissing with dogs and other animals. In our study, males were affected by dog bites as compared to females which is similar to other studies in the past[2,13]. As face has got rich blood circulation, these face bite wounds are less commonly infected compared to other body area[2,13].

The saliva secreted by dogs while biting contains multiple microorganisms like Staphylococci, Streptococci, Pasteurella and anaerobes[2,12]. Some of these facial bites have got intraoral communication and in these cases, there is definitive involvement of human flora as well[14]. Most of these bite wounds were treated with oral antibiotics Amoxicillin & Clavulanic acid due to their good efficacy and less price and easy use because most of dog bite floras are sensitive to it[5,4]. Intravenous broad spectrum antibiotics were used in those cases whose initial presentation was more than 24 hours to our unit.

There were 4 patients in our study who has got loss of full thickness defects of lips with intra oral communication and 8 patients suffered from extensive tissue tearing & lacerations. We treated most of these cases by repairing primarily after thorough wound irrigation & debridement. Wound healing was excellent in all these cases with no infection and we achieved good aesthetic outcome.

In 2015, Rothe K, et al. conducted a study and they gave recommendation of delay closure of these face bites due to higher infection rate in their population study[15]. In 2022, Kang DH, et al. also adopted this late wound closure policy because of greater wound infection rate in their study[16]. There are multiple studies claiming that primary repair of these face bite wounds gives excellent results both functionally and aesthetically[2]. We also used the primary closure protocol for managing face bite wounds. We thoroughly irrigated these wounds with 1 liter of normal saline to decrease load of microorganisms. In cases where gross volume of tissue loss or tissue avulsion occurred, we exercised the options of flap or graft. The different reconstructive procedures included were local advancement and rotation flaps, split thickness skin grafts and full thickness skin grafts.

CONCLUSION

Our study concludes that children are the major victims of dog bite injuries compared to adults. Most of the dogs were known to the patients and lips was the commonest area of face involved followed by nose and cheeks. Majority of these wounds were reconstructed mainly by primary closure and local advancement flaps.

Author's Contribution:

Concept & Design of Study:	Firdous Khan
Drafting:	Babar Tanoli, Tehmas Ahmed Khan
Data Analysis:	Tehmas Ahmed Khan
Revisiting Critically:	Firdous Khan, Babar Tanoli
Final Approval of version:	Firdous Khan

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: AMC/RC-2022/008 dated 18.02.2022

REFERENCES

1. Van Derhoef K, Jeffery PL. Current concepts: Pediatric dog bite injuries. In: Mauricio AC, Alvites RD, Gonul M, editors. Wound Healing - Recent Advances and Future Opportunities. Intech Open 2022. DOI:10.5772/intechopen.102329.
2. Ali SS, Ali SS. Dog bite injuries to the face: A narrative review of the literature. World J Otorhinolaryngol Head Neck Surg 2022;8:239-244.
3. Sreeramaraju V, Babu VS, Sharma MK, Jha MK, Bhattacharya S. A Retrospective observational studies of facial dog bite injuries and its

Management in a Tertiary Care Centre. Indian Journal of Plastic Surgery 2023; 56(4): 367-372.
4. Maurer M, Schlipkoter C, Gottsauner M, Waiss W, Meier JK, Fiedler M, et al. Animal bite injuries to the face: A retrospective evaluation of 111 cases. J Clin Med 2023; 12: 6942.
5. Chen T, Karim M, Grace ZT, Magdich AR, Carniol EC, Benson BE, et al. Surgical management of facial dog bite trauma: A contemporary perspective and review. World J Otorhinolaryngol Head Neck Surg 2023;9:123-130.
6. Piccart F, Dormaar JT, Coropcluc R, Schoenaers J, Bila M, Politis C. Dog bite injuries in the Head and Neck Region: A 20- Year Review. Cranio-maxillofac Trauma Reconstr 2019;12:199-204.
7. Chavez- Serna E, Andrade- Delgado L, Martinez-Wagner R, Altamirano-Arcos C, Espino- Gaucin I, Nahas-Combina L. Experience in the management of acute wounds by dog bite in a hospital of third level of plastic and reconstructive surgery in Mexico. Cir Cir 2019; 87: 528-539.
8. Aydin O, Aydin Goker ET, Arslan ZA, Sert HM, Teksam O. Clinical features and management of animal in an emergency department: A single center experience. Postgrad Med 2023; 135: 31-37.
9. Macedo JL, Rosa SC, Queiroz MN, Gomes TL. Reconstruction of face and scalp after dog bites in children. Rev Col Bras Cir 2016; 43: 452-457.
10. Selvi F, Stanbouly D, Stanbouly R, Baron M, Francois K, Halsey J, et al. Early Childhood (0 to 5 years) presents the greatest Risk for Facial Dog Bites. J Oral Maxillofac Surg 2022; 80: 1633-1640.
11. Agrawal A, Kumar P, Singhal R, Singh V, Bhagol A. Animal bite injuries in children: review of literature and case series. Intl J Clin Pediatr Dent 2017; 10 (01): 67-72.
12. Stanbouly D, Stewart SJ, Harris JA, Chaung SK. Risk factors associated with infection in patients sustaining dog bites to the face. J Oral Maxillofac Surg 2023; 27: 305-311.
13. Toure G, Angoulangouli G, Meningaud JP. Epidemiology and classification of dog bite injuries to the face: A perspective study of 108 patients. J Plast Reconstr Aesthet Surg 2015; 68(05): 654-658.
14. Guo HQ, Yang X, Wang XT, Ji AP, Bai J. Risk factors for infection of sutured maxillofacial soft tissue injuries. Surg Infect 2022; 23: 298-303.
15. Rothe K, Tsokos M, Handrick W. Animal and human bite wounds. Dtsch Arztebl Int 2015; 112(25): 433-443.
16. Kang DH, Choi JY, Choi WS, Jang JH, Cho JS, Hyun SY. Age group analysis of patients with dog bite injuries who visited a single regional emergency medical centre and factors affecting wound infections. J Trauma Inj 2022; 35: 84-91..