

Survey study on soft tissue affections of the oral cavity in dogs

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Abstract

Oral cavity affections become more widely distributed among pet animals including both dogs and cats all over the world. In our study, the incidence of orodental affections in examined dogs of different sexes and ages (693) were (78.8%). Soft tissue affections were recorded in (28) cases represented (5.5%) from the total affected cases (504) and represent (6.8%) from the recorded acquired affections (411). The recorded cases related to the soft tissue were oro-nasal fistula (10.7%), gingivostomatitis(14.2%), wound(17.8%), ulcers(14.2%) and foreign bodies(10.7%) of the oral cavity, some oral tumors (17.8%), epulis (7.1%), and salivary mucoceles (7.1%).

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Introduction

Incidence of oral diseases become more prevalent during recent years and widely distributed between pet animal including both dogs and cats (Kyllar & Witter, 2005; Tarafd & Samad, 2010 and Javdani & Nikousefat, 2011). Oral soft tissue includes lips, tongue, cheeks, soft and hard palate and salivary glands. Affections related to the oral soft tissue were previously studied as individual affections and no available literature concerning with the prevalence and distribution of these affections and the affected breeds were recorded.

Soft tissue parts of the oral cavity are exposed to different types of lesions that differ in shape and treatment according to the cause (Fossum et al., 2007). Oronasal fistula (ONF) is a pathologic tract between the mucosal surface of oral and nasal cavities (Tutt,2006 and Lobprise,2007). There are many causes for this condition, periodontal disease is the main and most important one(Wiggs & Lobprise ,1997 and Smith,2000). Periodontally-induced ONFs are most common in older, small sized breed dogs. The most common tooth involved is the maxillary canine followed by palatal root of the maxillary fourth premolar (Holmstrom et al., 1998; Marretta, 2001 and Marretta & Smith, 2005).The most suitable way of management are extraction of the tooth and closing the defect with a full thickness mucoperiosteal flap (Harvey & Emily,1993; Hennes,2001; Marretta & Smith,2005 and DeBowes,2011).

Gingivostomatitis is a clinical descriptive term indicating inflammation of the gingiva and oral mucosa (Lyon,2005) specifically, inflammation associated with the caudal mouth (mucocitis) which is the differentiating factor between caudal stomatitis and periodontal disease (Debowes,2011 and Niemiec, 2013). The etiology of this disease process is currently unknown but there are some factors that help in disease occurrence like change immune status of the animal and inflammatory response to bacterial plaque (Lyon, 2005; Debowes, 2011 and Niemiec, 2013). Several treatments have been suggested, including: extraction, chronic immunosuppressive treatments.Nutritional support is recommended in severe inflammation (Debowes, 2011 and Niemiec, 2013).

Caustic burns of the oral cavity is defined as oral damage caused by an exogenous toxin, usually an acid or base following an accidental ingestion of a caustic agent, but can also occur due to chewing on an object (i.e. battery) (Wiggs and Lobprise,1997). Alkalis cause more extensive damage than acids, due to the liquefaction necrosis which occurs, which continues until the agent is removed or neutralized (Debowes, 2011). Do not induce emesis in any case of caustic (acid/base) ingestion. In addition, do not give neutralizing acids or bases, as this can worsen the damage due to the exothermic reaction (Harvey & Emily 1993 and Gieger et al.,2000). The key to therapy is lavage of the area to reduce concentration. Fluid therapy, nutritional support, and other supportive care should be administered as needed. Water or milk are considered the liquids of choice (Howell,1986 and Debowes,2011) .

Foreign bodies are frequently seen in dogs on the top or sides of the tongue. While they can be found lodged in any other parts of the oral cavity like hard palate and between the teeth. These injuries can be localized burns or generalized systemic injuries. Patient stabilization is necessary prior to definitive treatments of focal lesions. These lesions have included tongue burns, lacerations, macerations, and punctures.

Oral Neoplasia includes those neoplasms that arise from the gingiva, buccal mucosa, labial mucosa, tongue, tonsils, or dental elements (Debowes, 2011). Oral tumors represent the fourth most common malignancy in dogs and cats (Fossum et al., 2007). The most common malignant canine tumors are malignant melanoma, squamous cell carcinoma (SCC), and fibrosarcoma (Fossum et al., 2007). Epulis is the most common benign tumor of the oral cavity arising from the periodontal ligament that do not metastasize ,accounting for 30% of all canine oral neoplasm. Mean age about 7-8 years. Benign tumors are of low prevalence in the oral cavity (Lobprise,2007; Fossum et al.,2007 and Debowes,2011). Treatment options for all malignant tumors include surgery, chemotherapy, immunotherapy and radiation therapy. Complete en bloc surgical excision with 1.5–2 cm margins of ‘normal’ tissue is the treatment of choice for the majority of oral tumors, especially those located in the rostral oral cavity (Felizzola, Stopiglia & de Araujo, 2002; Lascelles, et al.,2003; Lobprise,2007 and Niemiec, 2011).

Sialoceles , Sialoliths and salivary neoplasia are the recorded affections of the salivary glands. Sialoceles (Salivary mucoceles, salivary cysts, honey cysts) are cavities or retention cysts filled with saliva that has leaked from a damaged salivary gland or duct. They are not true cysts (pseudocysts) as they lack an epithelial lining (Bellenger & Simpson,1992 and Lobprise,2007). Sialoceles are the most common problem associated with the salivary gland in dogs (Waldron and Smith,1991). The most common clinically evident mucoceles seen are ranulas (sublingual) (Niemiec,2011) which are typically found under the tongue or on the floor of the mouth (Neville et al. ,2002). Commonly affected breeds are like Dachshunds, Poodles, Australian Silky Terriers and German Shepherds (Bellenger and Simpson,1992). The surgical technique of choice for large mucoceles especially the ranula is surgical excision of the cyst along with the salivary glands that are feeding the lesion (De Visscher et al.,1989; Peeters,1991; Waldron & Smith,1991; Neville et al.,2002; Zhao & Jia, Jia ,2005 and Fossum,et al.,2007). Other treatment is marsupialization and drainage of the remaining fluid and filling the cavity rather than removal is preferred (Dunning,2003).

The aim of the present work is to record the prevalence and incidence of soft tissue affections of the oral cavity, diagnose of affected cases using the different and suitable tools and determine the most suitable treatment methods for each case.

Material and Methods

A total number of (639) dogs were admitted at the following locations: the surgery clinic of the faculty of veterinary medicine, Cairo University, Egypt; the Military Veterinary Hospital in Nasr city, Cairo, Egypt and some private clinics in Cairo. Admitted cases were investigated for the different oral cavity affections. Each case was subjected to clinical investigations: general clinical examination and specific Orofacial examination including any outer changes, skull and jaw types and any swellings or masses (Verstraete & Terpak ,1997; Mulligan *et al.*,1998 and Niemiec, 2011). Intraoral examination involved four stages: evaluation of the oral mucosa, dental tissues, periodontal tissues and internal soft structures. This was done in the presence of oral recording charts that served as an essential clinical record, aided in the treatment. Examination under general anesthesia was applied on needed cases. The patient was placed in dorsal recumbency and a suitable sized mouth gag was used to open the mouth as it helps maintaining the open mouth position and deflecting the tongue.

Medicinal treatment was applied for affected cases (28) that differ from local antiseptic and mouth wash as chlorohixidine products like as Hexitol 0.125% ® and Antiseptol 0.1%®, other products reduce gingival inflammation like Oracure® and Jogel®.

Surgical treatment: Anesthesia: All cases were pre-medicated with s/c injection of atropine sulphate 0.05 mg /kg (Atropine sulfate® 1 mg/ml). Anaesthesia was induced immediately through I.V injection of a xylazine 1mg / kg.b.wt (Xyla-Ject® 2%) then I.V. injection ketamine 10 mg/ kg.b.wt (Ketalar® 5%) and the anaesthesia was maintained with 25 mg/ kg.b.wt 2.5% solution of Thiopental sodium, I.V (Thiopental®).

Results

The present study was conducted on (639) dogs of different breeds. From all examined cases, (135) were normal (free of oral cavity affections) which represented 21.1% and (504) were affected which represented 78.8%. Diseases related to the oral soft tissue were recorded in (28) case represented (5.5%) from the total affected cases(504) and represent (6.8%) from the recorded acquired affections (411). Table (1) represented the different soft tissue affections in dogs.

Table (1): Number of admitted cases showing diseases of the oral soft tissue

affections	Dogs
Oro-nasal fistula	3(10.7%)
Stomatitis (gingivostomatitis)	4(14.2%)
Wound of the oral cavity	5(17.8%)
Ulcers of the oral cavity	4(14.2%)
Foreign bodies in oral cavity	3(10.7%)
Epulis	2(7.1%)
Oral Neoplasia	5(17.8%)
Salivary mucoceles	2(7.1%)
Total	28(100%)

Oronasal fistula were recorded in 3 dogs that represented (10.7%) from the total cases related to the oral soft tissue (28). All recorded cases were males of the small breeds (2 male Griffon 3&8 years and 1 male 8 years Chihuahua). Cases were admitted suffering from an open wound oozing blood or

purulent material that differ in place according to the affected teeth, fig.(1). Two cases were in the maxilla (related to the maxillary 4th premolar teeth) and one cases was in the chin (related to the mandibler canine). Recorded cases were due to periodontal diseases. In the 3 cases, extraction of the affected teeth were refused by the owners.



Fig. (1): Radiographic picture of a 3 years old Griffon showing radiolucent space above the 4th premolar teeth, (the circle).

Four cases showed stomatitis in dogs that represented (14.2%) from the total cases related to the oral soft tissue (28). One case belonged to medium sized breeds (Cocker Spaniel), three cases were seen in large sized breeds (1 Golden Retriever and 2 Rottweiler),table(2). The cases were characterized by severe redness in all parts of the oral mucosa with ulcers in some severely affected parts. The cases received medicinal treatment with suitable antibiotic and oral antiseptic but the primary cause of the diseases should be treated. Fluid therapies were applied for the animals with bad health condition as supportive treatment.

Table (2): Relation between stomatitis and dogs breed with sex, age and recorded cause

breeds	sex	age	Cause	Total
Cocker Spaniel	female	5 years	Due to untreated PD	1
Golden Retriever	male	6 months	Biting hard objects	1
Rottweiler	male	10 years	Oral tumor	2
	female	5 months	Biting hard objects	

Wounds in the oral cavity were recorded in 5 dogs that represented represented (17.8%) from the total cases related to the oral soft tissue parts (28). Recoded wounds were in the different parts of the oral cavity. Two cases were seen in medium sized breeds (Pit Bull) , 3 cases were seen in large sized breeds (2 German shepherd and 1 Dalmatian).The main causes for the wounds were either fighting of the animals with each other or biting on hard objects ,fig.(2,3). Cases were always admitted as recent wounds that needed immediate treatment. All cases were treated as follows: 2 cases received suturing to close the open wound by absorbable suture material with interrupted stitches followed by antibiotic course and suitable oral antiseptic. Other cases treated medicinally by oral gels to help mucosa repair.

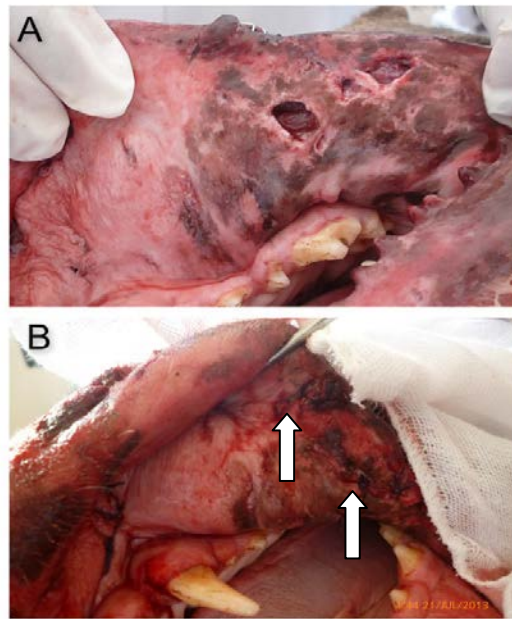


Fig.(2): Intra oral picture of 3.5 years old Pit Bull showing a fighting recent wound in the cheeks and lips.

A: before treatment. **B:** after treatment by suturing with interrupted stitches with absorbable material (white arrow).



Fig.(3): intra oral picture for 11 months old male German Shepherd showing severe injury in the mucosa of the hard palate at the level of the 4th upper premolars due to wooden stick lodged in and removed under anesthesia(white arrows).

Ulcers in the oral cavity were recorded in 4 dogs that represented (14.2%) from the total of found cases related to the soft tissue parts (28). All cases were seen in large sized (1 German shepherd , 2 Golden Retriever and 1 Rottweiler). The cases treated by applying suitable fluid therapy to reduce the toxicity signs and apply suitable oral gel to reduce inflammation, fig.(4).



Fig. (4) :intraoral picture for 2.5 years old male golden retriever showing ulcers on different parts of the oral cavity due to poisoning by rat poison. Notice different ulcers shape of the in the parts of the oral cavity.

Three cases showed forgine bodies in oral cavity that represented (10.7%) from the total of found cases related to the soft tissue parts (28),(Table ,3).Two cases were seen in small sized breeds (1 Griffon and 1 Pekingese) ,1 case was seen in large sized breeds (German shepherd) ,(Table,3). The treatment for all cases was directed to remove the forgine body that lodged in the oral cavity under general anesthesia, fig. (5,6).

Table (3): relation between Forgine bodies in the oral cavity and dogs breed with sex, age and recorded cause

species	sex	age	Cause	Total
Griffon	male	1 years	Swallowing of a needle that pass through the tongue	1
Pekingese	male	14 months	Needle Swallowing.	1
German shepherd	male	10 months	Wooden stick in between the upper 4 th premolar.	1

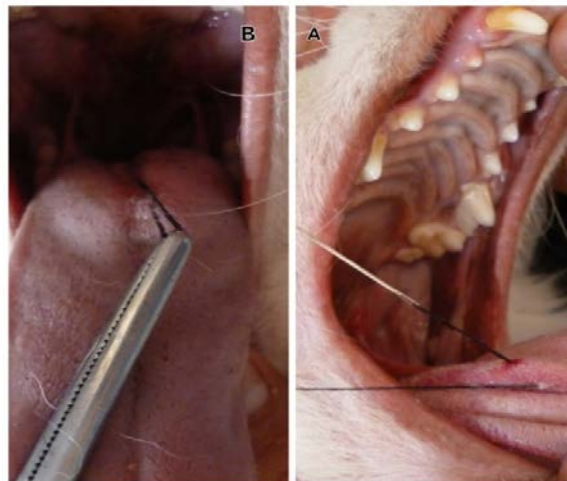


Fig. (5):A one year old male Griffon showing swallowing of a needle.

A: Notice that the needle was penetrating the tongue causing injury to it. **B:** the same case while pulling of the needle from inside the mouth under general anesthesia.



Fig.(6):A 11 months old male Rottweiler showing a ring lodged around his tongue.

A: before removing. **B:** after removing under general anesthesia. Notice the cyanotic part formed due to the ring compressing the tongue.

Two cases showed Epulis that represented (7.1%) from the total of found cases related to the soft tissue parts (28) .The 2 found cases was 1 cocker spaniel and 1 case was German shepherd,fig.(7). None of the cases went for surgical removal. Oral neoplasia were recorded in 5 cases that represented (17.8%) from the total cases related to the oral soft tissue (28), (table, 4),(fig.8,9,12).

Table (4): relation between Oral Neoplasia and dogs breed with sex, age and recorded place

breeds	sex	age	place	Total
Griffon	male	7 years	In the mandible	1
German shepherd	male	5 months	In the right maxillary cheek teeth	3
	male	2.5 years	In the maxilla due to bone eating	
	female	3.5 years	In the mouth angle	
Rottweiler	female	10 years	In the mouth angle	1

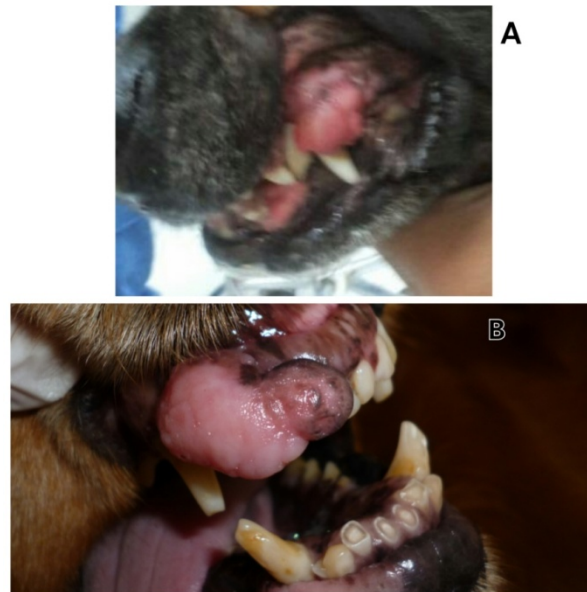


Fig.(7): Epulis in dogs.

A: a 6 years old male German shepherd showing Epulis over the maxillary left canine tooth (white arrow) **B:** a 13 years old cocker spaniel showing Epulis originating from the maxillary incisors(white arrow).

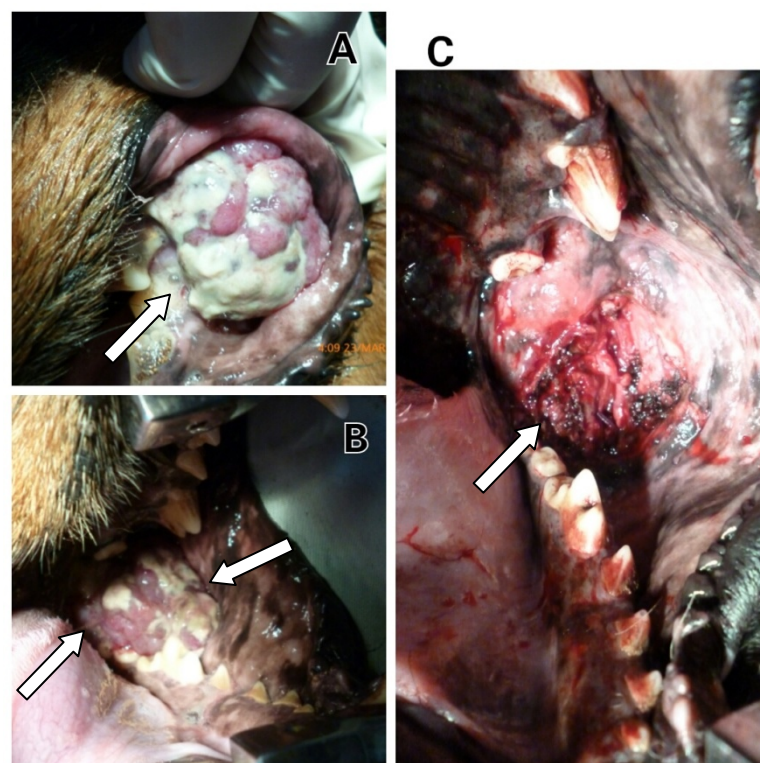


Fig.(8):A 10 years old female Rottweiler showing Oral tumor.

A&B: Intra oral picture showing the shape of the lesion before excision .notice the accumulation of purulent material on the outer surface of the lesion (White arrow). The lesion was located in the mouth commesure **C:** After surgical excision of the tumor .notice the origin of the tumor from the mucosa of the caudal mouth part (white arrow).



Fig.(9):A 2.5 years old male German Shepherd showing maxillary oral tumor.

A: Intra oral picture showing the shape of the tumor before surgical excision. **B:** Same case after surgical removal. All the tumor had been removed with part of the surrounding healthy tissue. **C:** Recurrence of the tumor after 1 months of the operation. The tumor had reappeared again as a small red mass on the same place. **D:** Recurrence of the tumor After After 3 months of the first operation. The tumor increased in size in comparing with the previous picture that indicate rapid growth and covered the underling teeth. The mass was soft with harder borders.

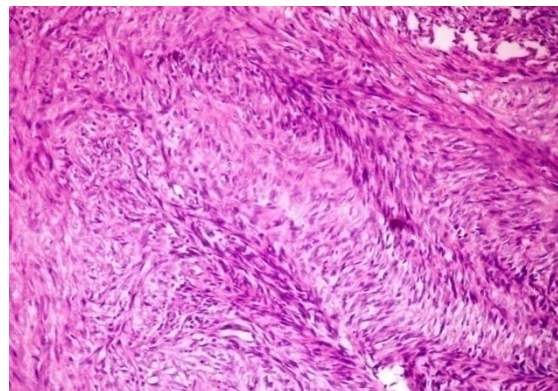


Figure (10): A tumor mass of 2.5 years male German Shepherd showing herring-bone pattern of neoplastic cells (pathognomonic lesion of fibrosarcoma). (H&E, X200).

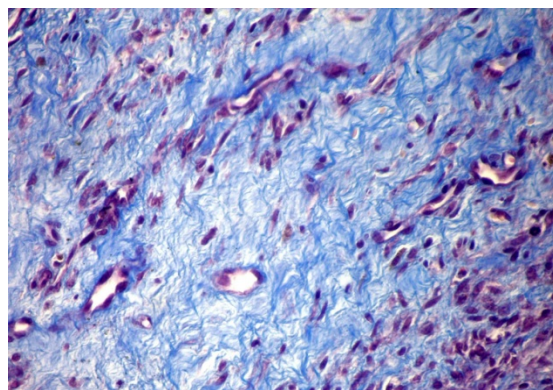


Figure (11): tumor mass of 2.5 years male German Shepherd showing blue stained dense collagenous stroma (Masson's Trichrome, X400).



Fig.(12): A 5 months old male German Shepherd showing oral mass in the cheek teeth. A: intra oral picture for the mass. B: intra oral picture after surgical excision and suturing of it with absorbable suture materials.

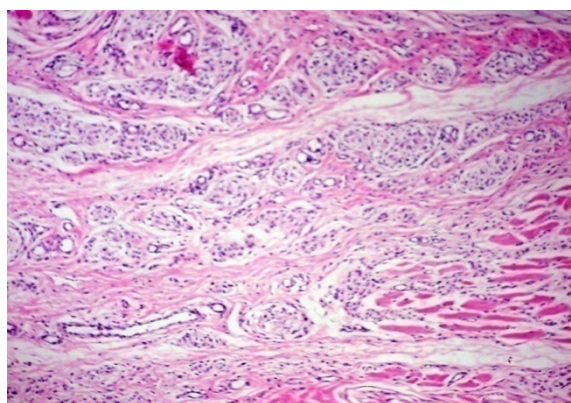
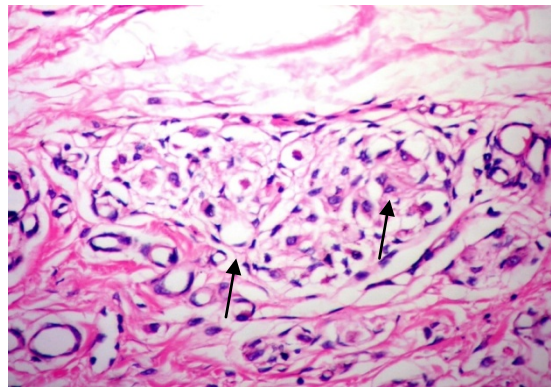


Figure (13): A 5 months old male German Shepherd showing lobular pattern of neoplastic cells that replace muscle fibers of the cheek and surrounded by collagen fibers (H&E,X100).



Figure(14): A 5 months old male german shepherd showing variable mature multi- and univacuolar lipoblasts with numerous signet-ring type (arrow) (pathognomonic lesion of liposarcoma) (H&E,X400).

Two cases showed salivary mucoceles, represented (7.1%) from the total of cases related to the soft tissue parts (28). Recorded cases were a 3 years old male German Shepherd and a 5 years old female Golden Retriever,(fig.15,16). Cytological examination of the aspirated fluid from the ranula revealed diffuse eosinophilic protein rich exudates mixed with multifocal aggregation of bacterial colonies and leucocytes mostly macrophages , lymphocytes and fibroblast. The bacterial colonies consisted mostly of bacilli and appeared either free or inside macrophage, fig. (17,18).

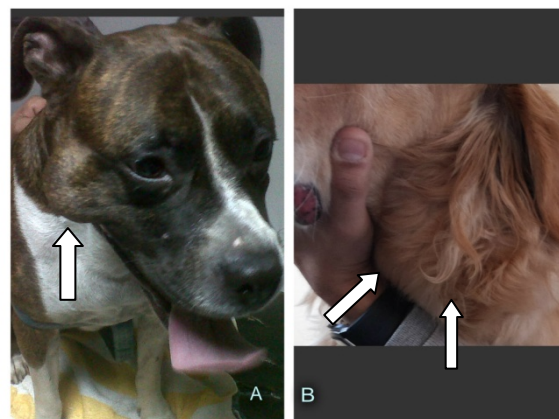


Fig.(15): Showing Parotid mucocele in different dogs.

A: a three years old male Pit bull showing parotid mucocele that located Angle of the jaw, ventral to ear. **B:** a 5 years old female Golden Retriever showing Parotid mucocele that located at the angle of the jaw, ventral to ear (arrow).



Fig.(16):Surgical operation showing ranula in a 3 years old male German shepherd before and after treatment.

A: Ranula in base of the tongue (black arrow). **B:** Surgical opening of the mucosa covering the ranula at the lower part of the tongue. **C:** Widening of the incision to allow reflecting of the mucosa. **D:** Marsupialization operation after it's finishing as the mucosa has reflected and sutured by absorbable materials to the surrounding structure. **E:** gross picture of the aspirated fluid from the ranula (Thick dark reddish fluid).

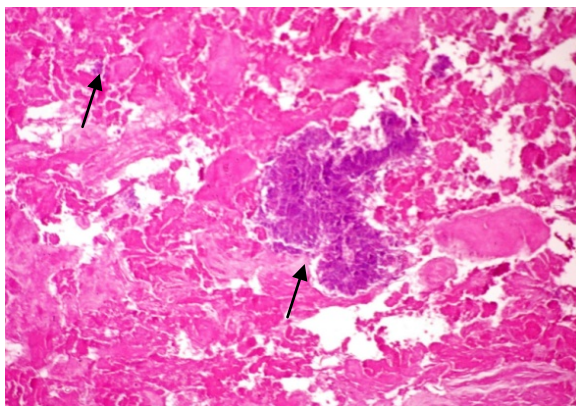


Figure (17): Cytological section of a 3 years old male German shepherd showing diffuse eosinophilic protein rich exudates mixed with multifocal aggregation of bacterial colonies (arrows) (H&E, X100)

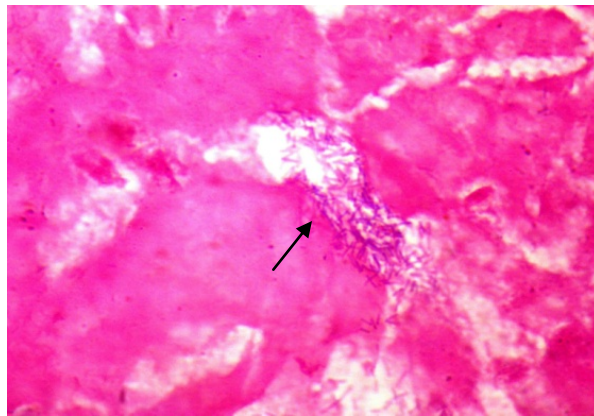


Figure (18): same cases shows cytological section a 3 years old male German shepherd showing free bacterial bacilli (H&E, X1000).

Discussion

Oral lesions in pets are typically not recognized unless acute injury results in bleeding or the inability to eat food normally. Few cases related to the soft tissue of the oral cavity were found representing (6.8%) from the total recorded acquired affections. The recorded cases related to the soft tissue were Oro-nasal fistula, gingivostomatitis, wound, ulcers and foreign bodies of the oral cavity, some oral tumors, epulis, and salivary mucoceles. This result agreed with Verhaert and Van Wetter (2004); Kyllar and Witter (2005); Lobprise (2007) and Niemiec (2011).

In the current work, oronasal fistula (ONF) was recorded in dogs with low incidence. All recorded cases were older than three years old and they were of the small sized breeds. This result agreed with Wiggs and Lobprise (1997) and Niemiec (2011), they noted that, ONFs were most common in older, small breed dogs. However, any breed and age in dogs can be affected. All the recorded cases occurred secondary to periodontal diseases. This result agreed with Wiggs and Lobprise (1997); Lobprise (2007) and Niemiec (2011). It was originated from the 4th premolar or molar teeth in all recorded cases that disagreed with Holmstrom et al.(1998); Marretta (2001); Marretta and Smith (2005); Lobprise (2007) and Niemiec (2011), they reported that, the most common tooth involved was the maxillary canine .

In the present work, most of dogs stomatitis cases were due to biting of hard objects that leads to the injury of the oral mucosa so the treatment was depending on healing of oral mucosa , prevent spread of the infections and maintaining the animal till complete recovery. Recorded wound in the oral cavity was due to fighting, playful and aggressive dog's behaviour so it was mainly recorded in Pit Bull, German shepherd and Dalmatian. Recorded cases with oral ulcers were due to different reasons. It was related to chemicals eating or drinking specially cleaning stuff and secondary to bad health condition or associated with other oral illness. These results were in the same side with Greene and Chandler (1998); De la Rosa et al. (2004) and Niemiec (2011).

From the obtained results, epulis tumours were recorded to be originated from maxilla. This result was in the same side with Lobprise (2007); Fossum et al. (2007) and Niemiec (2011). Recorded cases were 6 years old and 13 years old. These were in the same average range mentioned by Lobprise (2007) and Fossum et al. (2007). Oral tumour were recorded in different parts of the oral cavity. Two cases were subjected to histopathological examination, which revealed that, presence

liposarcoma and fibrosarcoma. Most of cases (60%) of the cases were males. Malignant oral tumors have a higher relative risk of occurring in male than in female dogs. The identified case of fibrosarcoma recorded in the maxilla. This result agreed with Lobprise (2007); Fossum et al. (2007) and Niemiec (2011) and the recorded liposarcoma was in the cheeks. Surgical excision was the method of treatment and this method of treatment as also mentioned by Lobprise (2007); Fossum et al. (2007) and Niemiec (2011).

Two cases of salivary mucoceles were recorded. It was the only the recorded affection of the salivary gland. This result were in the same side with Waldron and Smith (1991) and Niemiec (2011), they said that, salivary mucoceles were the most common problem associated with the salivary gland in dogs. All recorded cases were males. This result agreed with Fossum et al. (2007) and Lobprise (2007), they said that, there was a slight predisposition for males to be affected. Ranulas were treated by marsupialization and drainage of the remaining fluid and this way of treatment recommended also by Dunning (2003) and Niemiec (2011). Examining these animals in dorsal recumbence allows the mucocele to gravitate to the affected side. It is the technique of choice because it has the best chance of cure with the first surgery. Due to the fact that, the mandibler gland and its ducts are intimately related to the sublingual, it is recommended to remove both of them and this does not appear to affect the salivary flow negatively. This result agreed with Dunning (2003); Fossum et al.(2007) and Niemiec (2011).

Conclusion

Pet owners need to be aware those toys and other products like large treats and do unfortunately result in tongue and oral injuries. Dogs with access to plants, caged, or those are used for hunting can develop lesions and wounds due to trauma or foreign body penetration as plants, electric mixing appliances and direct trauma.

Other than malignant (life threatening) tumours or electrical injuries; pet oral lesions are typically not life threatening. The tongue and oral mucosa has excellent vascular supply and the majority of injuries heal rapidly and very well. Careful clinical observation is very helpful in identifying the cause and establishing of a definitive diagnosis for the lesions. Many oral lesions heal without treatment however; surgical intervention is often helpful to speed the healing process or to remove masses or foreign bodies except for the large cutting wounds that must be sutured to keep the normal continuity of the tissue.

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