

## **CROSS AND RADIOLOGICAL STUDIES OF THE SALIVARY GLAND IN CATTLE**

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### **ABSTRACT**

The present work includes morphological and radiological studies of the salivary gland , saliva is the mixed secretion of these gland the secretion of saliva in ruminants is continuous ,it has been moistest oral mucosa, provide medium for dissolved food and control bacterial flora of the oral cavity , the aim of present work to report more detailed information about the salivary gland and duct in cattle which may be help in both anatomy and surgery aspect, for value impartment can easily removal all salivary gland tissue during surgical operation, the large salivary ducts occasionally cannulated to remove obstructions or to inject a contrast medium for radiographic examination and to be able to palpate the parotid and mandibular salivary gland and different the mandibular salivary gland from lymph nodes ,to be able to trace the ducts of the salivary glands and palpate the parotid duct in the cheek of cattle , to be extirpate the mandibular and monostomac sublingual salivary glands . Collected from (6) fresh preserved heads were used in this study, there were equally divided into two groups : first group to study of shape ,position and relation of major salivary gland also study the morphology of the minor salivary gland and second group study morphological and radio graphical of parotid , mandibular and sublingual duct in cattle.The study revealed that the three major paired salivary glands(parotid ,mandibular and sublingual gland ) in addition four minor salivary glands ( buccal ,lingual ,palatine and labial gland ) into the oral cavity and oropharynx in cattle the mandibular gland ,unlike that of other domestic animals , the mandibular salivary gland is larger than the parotid ,distinctly lobulated and lies in the curve along the medial side of the angle of the mandible and which divides into superficial and deep loop, is easily palpate in the inter mandibular space, the duct open in the sublingual caruncle , the parotid gland has been described having (5) processes ( three superficial and two deep ) ,sublingual gland this is smallest of the major salivary gland , sometimes consists of two parts (compact and diffuse ) it is the almond shaped gland lies deep to the floor of mouth ,un like the parotid and mandibular gland the sublingual gland has no true facial capsule also it has a single duct.Un like the major salivary gland, the minor salivary gland lack a branching network of draining ducts , buccal glands are well developed and arranged in three

groups (dorsal, middle and ventral )in cattle , the lingual gland are small lobules under the mucosa and embedded in the musculature, the caudal third of the hard palate is not ridged and bears numerous orifice of the palatine gland ,the labial glands a compact mass near the angle of the mouth , the most commonly occurred radiological findings using surface landmarks parotid duct lies mid way between the facial tubercle and corner of the mouth ,the ducts of the mandibular and compact (monostomatic) sublingual glands open on the floor of the mouth at the sublingual caruncle, they run below the mucous membrane that connects the side of the tongue with the gums.

## **INTRODUCTION**

The study of the salivary gland forms an important link between the anatomy and surgery ,however available literatures lake any information about the surgical anatomical characters of the salivary gland. The salivary glands and ducts may be affected by inflammation ,calculus formation ,rupture or neoplasia .Sialoadenitis is commonly associated with salivary mucoceles, the recognition and treatment of these lesions depend on an adequate knowledge of anatomy (1,2). The morphology of the gland and duct was studied as regard to the shape ,position and relation as well as the more diffuse layers of glands in the well of mouth and pharynx, in the ruminant salivary secretion has an additional important function) when a duct is damaged ,saliva may escape to form a large submucosal swelling (runula) to the tongue (3,4) it is essential to microbial digestion in the rumen from microbial fermentation (5) ,as food is chewed it is mixed with salivary secretion that facilitate swallowing, saliva may have evaporative cooling functions, depending on the species (6). Most mammals have at least three pairs of salivary glands ,the parotid glands, which lie just under the ear and behind the vertical rams of the mandible ,the mandibular glands ,which are in the intermandibular space ,and the sublingual gland at the base of tongue each of these glands drains into a main duct that has a single opening into the mouth,in addition to these major gland there are minor gland in the tongue and buccal mucosa (7,8) .

## **MATERIALS AND METHODS**

Six heads from cattle dromedaries of same sex and form (3-5) years old ranging in weight between (550-720) kg were collected from the slaughter house of Mosul used for this study, four heads were preserved in 10 % formalin solution , than were studying the morphology of the major and minor salivary gland in relation to other structures, The others heads were used to the radiographic picture were injected the contrast medium through the duct gland by hand using (20) ml syringe with conray (480) sodium lothalamate (80) w|v performed in lateromedial (90°) and caudocranial (180°) direction, the values used were (85) KVP (14 )m AS and (0.6) sec the morphological picture was fully described after examination of the films, the nomenclature used was adopted by Nomina Anatomica Vetreerinarian (2005).

## **RESULTS**

The cross anatomy of the parotid salivary gland is club-shaped in some sample and is a long triangular shaped in another samples and the lobules of the parotid gland are visible to the naked eye , it has been described having five processes (3 superficial and 2 deep) ,the color of the gland alight red than the adjacent skeletal muscles fig (1,2), the parotid gland has true facial capsule , with a wide thick dorsal end which is not notched to ft the base of the ear as in other species , the rostral border is concave and the small ventral end is turned rostral fig (1,2) the gland lies ventral to the ear along the caudal border of the masseter were it partly covers the parotid lymph node , the duct runs rostrally on the medial side of the ventral border of the mandibular in cattle but the duct arises from the superficial to the masseter muscle fig (3,4) then turns medially to pierce the cheek opposite the fifth upper cheek tooth where it opens on to the buccal vestibular fig (5) accompanied by the ventral buccal branch of facial nerve ,the facial artery and vein , the parotid gland is highly vascular ,receiving branches from all the underlying arteries ,the parotid branches are given off the facial artery and the masseteric branch of the lingo facial trunk ,the veins drain to the maxillary and external jugular veins , sympathetic fibers reach the gland in the vascular plexuses also with branches Of the auricular temporal nerve and buccal nerve . Mandibular salivary gland was elongated rectangle shape , is larger than the parotid in cattle , it is alight red than the adjacent skeletal muscles fig (1,2), lobulated and lies in the curve along the medial side of the angle of the mandible is easily palpate in the inter mandibular space, also which divides into superficial and deep loop, the mandibular gland true facial capsule fig (1,2) , and the pointed.

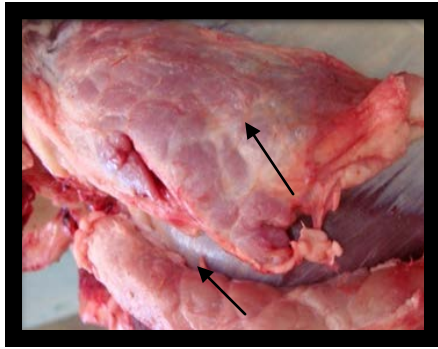


Fig (1) show the parptid and mandibular (superficial and deep part).

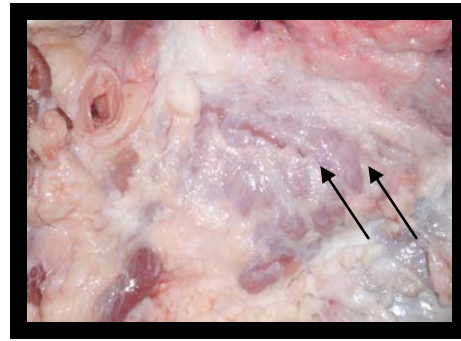


Fig (2) show the parptid (3superficial and 2 deep ) proceses.

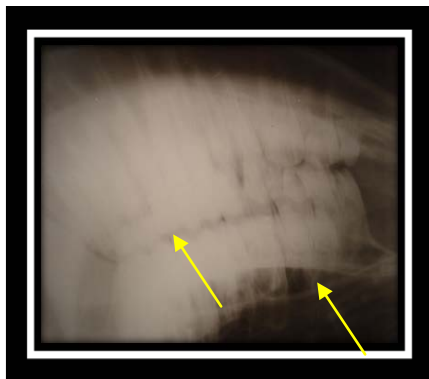
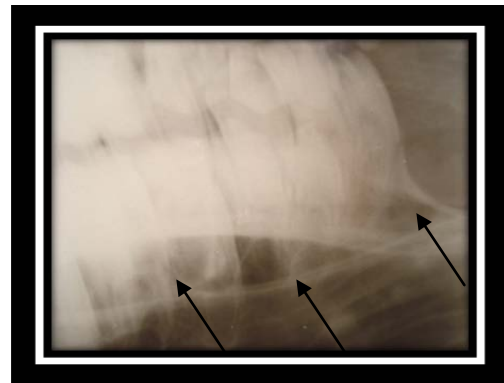


Fig (3) show the ,mandibular and sublingual duct by X -ray.



Fig(4)show the parptid , mandibular and sublingual duct by X -ray.



Fig (5) show the opining of the parptid duct.



Fig(6) show the sublingual caruncles.

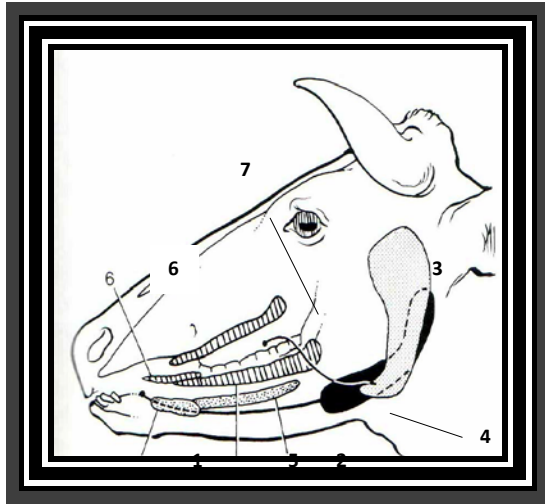


Fig (7) show 1,2 (compact and diffuse ) parts of sublingual gland, 3-parptid 4- mandibular 5,6,7 (dorsal ,middle and ventral) buccal gland.



Fig (8) show (compact and diffuse ) parts of sublingual gland.

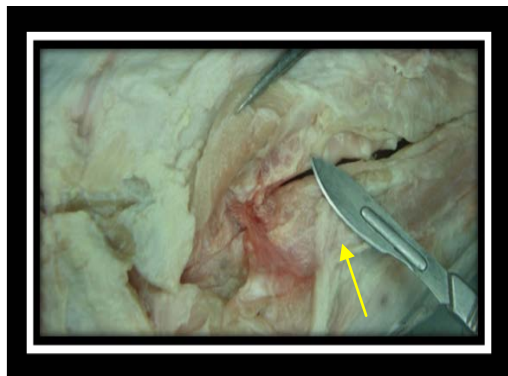


Fig (9) show the (dorsal ,middle and ventral) parts of the buccal gland and duct.

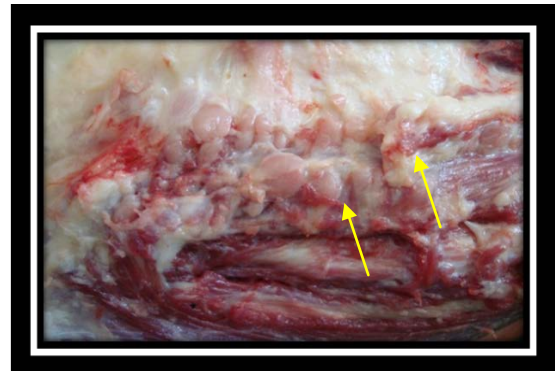


Fig (10) show the (dorsal and middle ) parts of the buccal gland.

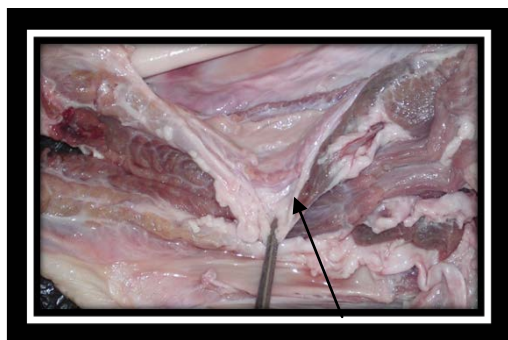


Fig (11) show the lingual gland.

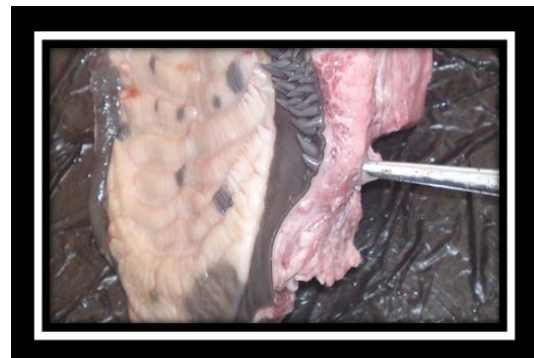


Fig (12) show the labial glands



Fig (13) show the labial gland at the upper and lower lip

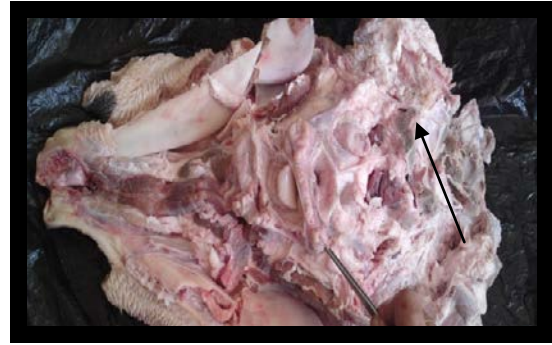


Fig (14) show the palatine gland

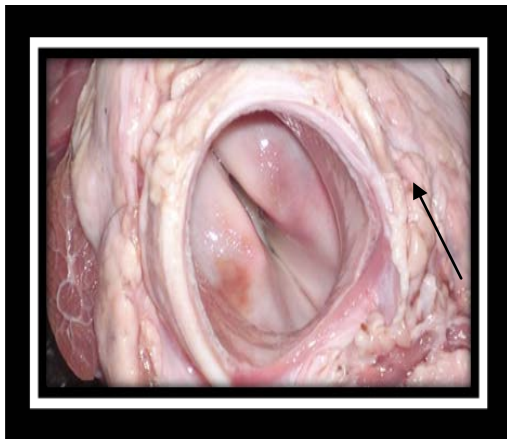


Fig (15) show the opening of the palatine gland near the laryngeal cavity.

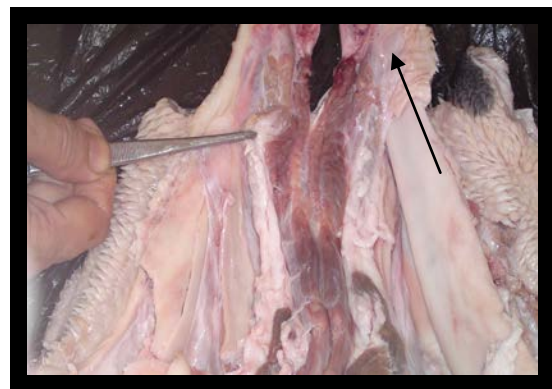


Fig (16) show the palatine gland at the ventral parts of the soft palate.



Dorsal end is near the wing of the atlas and the large, rounded ventral end the lateral surface is related to the parotid gland, facial and maxillary vein, mandibular lymph node and sternomandibular muscle the medial surface is related to the lateral retropharyngeal lymph node, common carotid artery, pharynx and larynx, the mandibular duct leaves the middle of ventral border by the ventral radical cross the medial to the sublingual salivary gland fig (3,4), The ducts of the mandibular and compact (monostomatic) sublingual glands open on the floor of the oral cavity at the sublingual caruncles fig (6), they run below the mucous membrane that connects the side of the tongue with the gums, several branches from the facial and lingual arteries supply the gland in the cattle, the veins join the linguofacial and facial veins, the nerve fibers from the facial nerve run back to the gland along the mandibular duct.

sublingual gland is longitudinal round shape and the gland was cream colored in fresh condition cattle and the sublingual gland has no true facial capsule Fig (7,8) commonly consist of two parts, compact part draining by a single duct (monostomatic), the other diffuse part opening by several small ducts (polystomatic), lie under the mucosa of the lateral sublingual recess and of the lateral surface of the tongue, the polystomach gland is dorsolateral to the monostomatic gland, the two parts of the glands extended together from the palatoglossal arch to the symphysis of the mandible Fig (7,8), the vessels supply of these glands via sublingual artery, nerve and vein.

The buccal glands are located either between mucosa and the musculature or between the buccal muscles, these glands are well developed and are arranged in three groups, dorsal ventral also middle buccal glands Fig (9) can be distinguished, the dorsal buccal glands extended from the angle of the mouth to the maxillary tuber, the ventral buccal gland reaches from the angle of the mouth to a point a short distance under the masseter muscle, the middle buccal glands are loosely arranged lobules in the buccinator muscle and deep to it Fig (10) the ducts of the buccal glands open into the buccal vestibule Fig (9), innervated by the buccal nerve

The lingual glands are small lobules under the mucosa, there lobules are arranged in a U-shaped band fig (11), which is open rostrally, this band extended from the face of the tongue on the other, those associated with the vallate papillae, the excretory ducts of these glands open mainly of the lateral surface of the tongue, glands are also present in the glossoepiglottic fold and of each side of it deep posterior lingual glands (Van Ebners gland) of cattle well located under the circumvallate papillae as large groups among the lingual skeletal muscles, lingual vessels usually arises from these glands

The labial glands, found in the mucosa are especially well developed near the angle of the mouth, others that raise, depress, and retract the lip, the glands are scattered between the muscles bundles below the mucosa, especially toward the

angles ( commissures ) where the two lips meet Fig (12) , and are often imbedded between bundles of the labial muscles Fig (13).

The palatine glands are found in the ventral part of the soft palate are consist mainly of close packed salivary glands Fig (14) , and the caudal third of palatine is not ridged and bears numerous orifices of the palatine glands Fig (15,16), the thick venous plexus that forms cushion in the hard palate is supplied by the major palatine artery from the maxillary artery and drained by veins that enter the facial and maxillary veins.

## **DISCUSSIONS**

In all species the parotid gland ,being molded around the ventral part of the auricular cartilage , the gland is larger and extends rostrally to the masseter muscle ,ventrally toward the angle of the jaw and caudally toward the atlantic fossa (10) in the present work the parotid salivary gland is club- shaped in some sample and is a long triangular shaped in another samples and it has been described having five processes (3 superficial and 2 deep) , in all species it is enclosed with in a facial covering that sends trabeculae inward to divide the gland into obvious lobules (7,11) in the large domestic animals the duct takes the longer but more protected route medial to the angle of the jaw and winds, in sheep and goats the parotid salivary gland is rectangular and largest salivary gland, the course of the duct is variable but usually run across the lateral surface of the masseter muscle about (3)cm dorsal to the ventral border (12).In cattle the mandibular gland ,unlike that of other domestic animals ,is larger than the parotid ,distinctly lobulated and lies in the curve along the medial side of the angle of the mandible (8) the obtained results revealed that which elongated rectangle shape in cattle divides into superficial and deep loop, in sheep and goat the gland is roughly triangular and lacks the pendant rostroventral portion( 13,14 ,15). The present study showed the mandibular and sublingual gland each of these glands drains into a main duct that has a single opening into the mouth , the general agreement with (15) show also report the mandibular and sublingual gland was correlated with the development of the surrounding organs . In our study the sublingual gland is longitudinal round shape and the gland was cream colored in fresh condition cattle while is longitudinal and more slender shape and pale yellow in buffalo( 16).The minor salivary glands have been mentioned as features of lips , cheeks and tongue , others are present in the soft palate are provide the necessary moisture for the area in which they are found (16,17), salivary glands are regulated by the parasympathetic nervous system, the rate of secretion is controlled by the innervation, the salivary gland receive both sympathetic and parasympathetic supplies ,the latter being vastly more important (5) . The present investigation revealed that the deep posterior lingual glands were located under the circumvallate papilla similar to that observed in the deep posterior lingual glands (Van Ebners gland) of bovine (18) .The labial glands are concentrated in the vicinity of the angle of the mouth ,and the short lips and oral cleft make both inspection of the caudal part of the oral



cavity and oral surgery difficult ,even when the animals mouth is fully opened (19,20 ).

The finding of the present work revealed that ,un like the major salivary gland, the minor salivary gland lack a branching network of draining ducts , the buccal glands are well developed and arranged in three groups (dorsal, middle and ventral )in cattle , the lingual gland are small lobules under the mucosa and embedded in the musculature , the caudal third of the hard palate is not ridged and bears numerous orifice of the palatine gland ,the labial glands a compact mass near the angle of the mouth ,agree with those reported by(16,17,21).

## دراسة عيانية وشعاعية للغدد اللعابية في الابقار

سمية الساعدي

فرع التشريخ والانسجة ، كلية الطب البيطري ،جامعة الموصل ،الموصل ،العراق

### الخلاصة

استهدفت هذه الدراسة اعطاء وصف للصورة التشريخية والشعاعية للغدد اللعابية وقنواتها ولاهمية اللعاب واستمرار افرازه عند المجترات حيث يعمل على ترطيب الفم وتجهيز وسط لاذابة الغذاء وله اهمية وقائية في السيطرة على الفلورا في التجويف الفمي ونظرا للأهمية الإكلينيكية للغدد اللعابية تمت دراستها بالتفصيل لمعرفة أشكالها وتحديد مواقعها وعلاقتها بالتركيب المجاورة ومدى امكانية ازالة النسيج الغدي اللعابي كقطعة واحدة اثناء العمليات الجراحية ولدراسة القنوات اللعابية شعاعيا اهمية كبيرة في حالات ادخال القسطرة لازالة الانسدادات او لادخال المواد المشعة اثناء الفحص الشعاعي وللتعرف بصورة دقيقة على الغدد اللعابية وتفريقها عن الغدد للمفاوية المجاورة لها وكذلك لتتبع مسار القنوات اللعابية في الشدق وكذلك عند استئصال الغدد اللعابية تحت اللسانية والفكية . وقد استخدمت لهذا الغرض ( 6 ) راس من الابقار وقسمت عينات البحث الى مجموعتين : المجموعة الاولى درست شكل و موقع وعلاقات الغدد اللعابية الكبيرة وكذلك اشكال ومواقع الغدد اللعابية الصغيرة وعلاقتها والمجموعة الثانية درست عيانيا وشعاعيا القنوات اللعابية للغدد الكبيرة خارج الغدة ومواقعها في التجويف الفمي وبينت الدراسة وجود ثلاث غددا لعابية كبيرة (النكفية ،الفكية و تحت اللسانية ) بالاضافة الى اربعة غددا لعابية صغيرة (الشدقية ،اللسانية ،الحنكية ،والشفوية ) في التجويف الفمي والحنجري0

والغدد اللعابية الفكية اكبر من الغدد اللعابية النكفية عند الابقار على خلاف ماموجود في الحيوانات المجتررة الاخرى وهي غدد مفصصة وتقع بانحراف على طول الجهة الانسية لزاوية الفك وتقسم الى جزئين سطحي وغائر وتفتح قنواتها تحت شكل اللسان في الحلمة تحت اللسانية اما

الغدد اللعابية النكفية تتصف بوجود ( 5 ) فصوص (ثلاثة سطحية واثنان غائرة) والغدد تحت اللسانية هي اصغر الغدد اللعابية الكبرى وحيانا تتكون من جزئين (صلد ومنتشر) ولها شكل يشبه اللوزة وتقع غائرة في قاع الفم ولا تغطي بمحفظة و لا تشبه بذلك الغدة النكفية والفكية . وللغدد اللعابية الصغيرة شبكة متفرعة للتصريف اللعابي ولاتشابهه الغدد اللعابية الكبيرة والتي تمتلك قناة واحدة خاصة لكل غدة وتعد الغدد الشدقية متطورة عند الابقار تقسم الى ثلاثة اجزاء (ظهري واوسط وبطني) ، وتقع غالبية الغدد اللسانية السطحية عند السطح الظهري والوحشي لجذر اللسان وهي عبارة عن فصوص صغيرة مضمورة في عضلات اللسان . ولوحظت الغدد الشفوية العليا والسفلى ملتصقة بزواوية الفم اما عند الثلث الخلفي للحنك الصلب تمت ملاحظة فتحات الغدد الحنكية و من خلال الصور الشعاعية لوحظت القناة النكفية خارج الغدة والتي تكونت من اتحاد عدة جذور وتفتح قنواتها النكفية ما بين الحذبة الوجنية وزاوية الفم وتعد علامة سطحية مميزة جراحيا ، بينما تسير قناة الغدة الفكية مع قناة الغدة تحت اللسانية (الجزء الصلد) وتفتح في قاع الفم عند اللحيمة اللسانية وتسير القناة في الغشاء المخاطي ما بين اللسان والثة

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