Anatomical, Histological and Histochemical Investigation of Soft Palate in Cat (Felis Catus Domesticus.L)

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Abstract

Objectives: The aim of this study was to evaluate the normal structure and provide distribution for palatine glands in cranial and caudal part of soft palate. Also, afford information to be useful for both surgical interventions and pathological disease. **Method/:** Sixth healthy cats were caught in Iraq farms. All experimental animals euthanized by intramuscular injection of ketamine (0.5 cc) and xylazine (0.5 cc), Sections were stained by H&E and combined AB+PAS stain 2.5 pH. **Results:** The soft palate was triangular in shape, the dimensions was (2.8, 2) cm in length and width respectively. Also, had two surface; nasopharyngeal surface lined by psuedostratified columnar epithelial ciliated and **o**ropharyngeal surface lined by stratified squamous epithelia. The palatine glands appeared magenta in color during staining by AB+PAS combined stain due to neutral secretion. **Conclusion:** The palatine glands variance in distribution between dorsal and ventral surface of soft palate, most of these glands constricted in oropharyngeal surface.

Keyword: *Histological, Soft palate, Cat.*

Introduction

Usually, the normal of anatomical characteristic supports in diagnosis and successful treatment of many intricate cases. Apart from evaluation of clefts, diversity in radiographic appearance of soft palate has remained unrecognized. Enumerates of studies [1,2] have been done in past towards the dimensional analysis of the soft palate and its surrounding structures, but there are not many studies regarding normal variants of soft palate morphology and configuration[3]. The dimensional analysis of the soft palate and its surrounding structures, especially the velar length and width has been studied; on the other hand, the variety of velar morphology which is the most logical cause of different dimensions on the soft palate has been frequently overlooked [4] . The soft palate is one from main structures in oral cavity, musculo-membranous part, separating the digestive tract and respiratory system. It extends caudally to the hard. The two system's working is extremely important because it requires both swallowing and breathing. In fact, soft palate disorder is involved in the pathogenesis by well-recognized respiratory syndromes, including such obstructive sleep apnea disease in human patients and intermittent soft palate displacement in farm animals [5,6]. The morphological incongruity of the soft palate plays a vital anatomic role in functional rehabilitation of speech, breathing, hearing, and managing patients with cleft lip-palate, obstructive sleep apnea, skeletal craniofacial malocclusion and oral submucosa fibrosis[7]. The aim of this study to provide date for normal structure of soft palate for supported other sciences as histopathology, surgical study and clinical examination.

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Materials and Method

Specimens of soft palate taken from (6) adult cats. The average weight of the animals was (1,8) kg. Anaesthetized with an intramuscular injection of ketamine (0.5 cc) and xylazine (0.5 cc) [8]. The Anatomical study of the soft palate included shape, length, and width. These measurements were recorded in centimeter (mm) using a calibrated scale. The weight was recorded in gram (g) using the sensitive electronic balance. For histological dedications the samples were fixed in 10%

neutral buffered formaldehyde and sectioned serially at 5 µm. Sections were stained with H &E and combined AB+ PAS, 2.5 pH 19.

Result & Discussion

Morphologically, the soft palate in domestic cats was appeared as triangular- shape, base of this triangular located cranially but pointed part caudally toward epiglottis. There are two surface of soft palate; dorsal surface or (naso-pharyngeal part) and ventral surface (oro-pharyngeal part), the ventral surface was smoothly and don't have any papillae, most of oral papillae located in hard palate (Fig,1, 2). The dimensions of soft palate was (2.8) cm in length, width in base of palate was (2) cm (Fig, 3). This result disagreement with [9] who stated that the soft palate have well-developed papillae in oral pharyngeal part.

Histologically: the **nasopharyngeal** surface lined by psuedostratified columnar ciliated epithelia without goblet cells (Fig,5), rested on the thick layer of collagen fibers, with numerous of infiltrated lymphatic cells. Also, continuous between lamina propria and submucosa, lacking a lamina muscularis. The palatine salivary glands in nasopharyngeal side fewer in numbers, located close to basement membrane (Fig,6). These results akin partially with [10] who stated that the soft palate in dogs have two side; oral and nasopharyngeal, the later side lined by psuedostratified columnar ciliated epithelia but there are no glands underneath mucosa.

The **oropharyngeal** surface lined by thicker stratified squamous epithelial non-keratinized, wavy in shape, rested on the thick layer of collagen fibers. The submucosa was loose connective tissue, undistinguished line between lamina propria and submucosa. The palatine salivary glands in this part was crowded, intermingled as groups or aggregated in many lobes, each lobe had numerous of branch mucous glands, separated from others by collagen fibers. [11] Whoever describe the palatine salivary glands in the oropharyngeal surface as being heavy for mucosal coat lubrication is necessary to prevent injury during consumption of food. The caudal part of soft palate or muscular part consists of numerous of glands intermingled between longitudinal skeletal fibers, lacking to epithelial layer this part. This is the thickest layer of the soft palate. The mucous acini are of the usual pattern, separated by thin connective tissue septa. These results disagree with [12] who stated that the deep of soft palate of albino rat had a dense collagen layer, there is a lack of skeletal muscle other than at the caudal part. In addition these results disagreement with [13] who describe that the thick glandular layer gradually becomes thinner towards the posterior part of the soft palate

The epithelial lining of the interlober glandular ducts duct lined by simple squamous epithelia while main duct located near to the basement membrane and lined by stratified cuboidal epithelia. These finding variance partially with [14] who stated that the glandular epithelial of main duct lined by stratified cuboidal while the interlober duct lined by simple cuboidal epithelia.

Histochemical study of soft palate in cats during staining with combined with (AB+PAS at pH 2.5) appeared strong reaction, the acini of glands was seemed magenta in color due to secreted neutral type (Fig, 9, 10). These results akin with [15] who stated that the histochemical affinity of the palatine glands was homogeneous, independent of their localization and positive reaction with combined with AB+PAS stain.

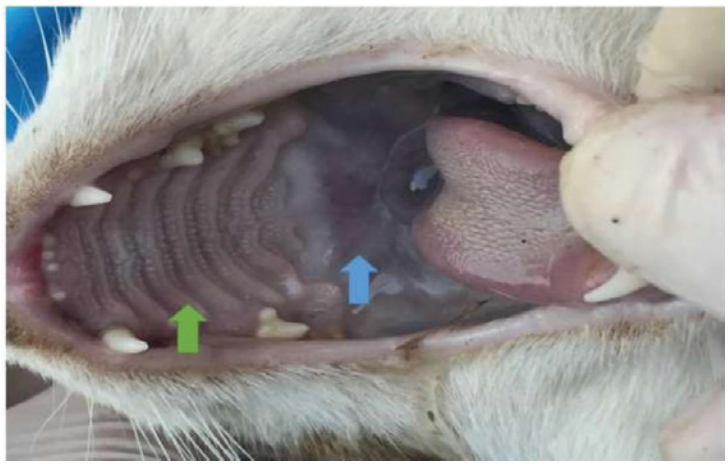

Figure 1: Oral cavity showing, hard palate (green arrow) and soft palate (blue arrow).

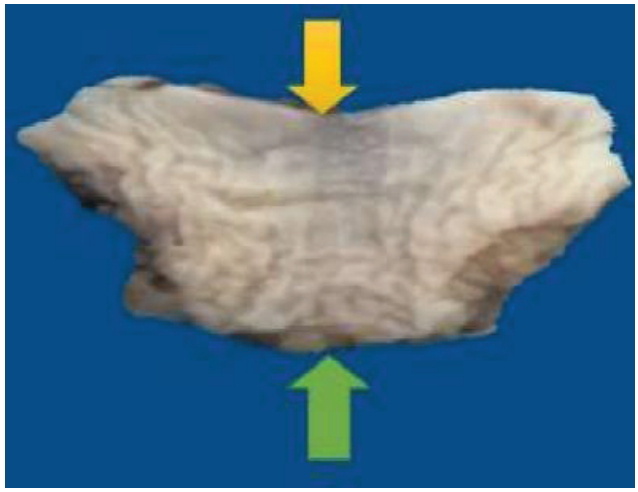

Figure 2: Soft palate in cat appeared as triangular in shape consist of cranial part (yellow arrow) and caudal part (green arrow).

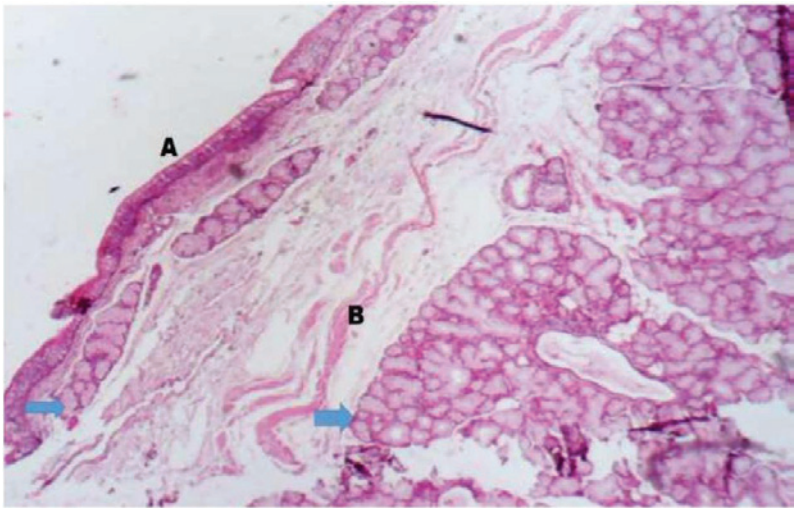

Figure 3: Nasopharyngeal part of soft palate showing A- Mucosa and B- Submucosa had loose connective tissue. Salivary glands were little amounts and close with nasopharyngeal part (blue arrow). H&E stain.40X.

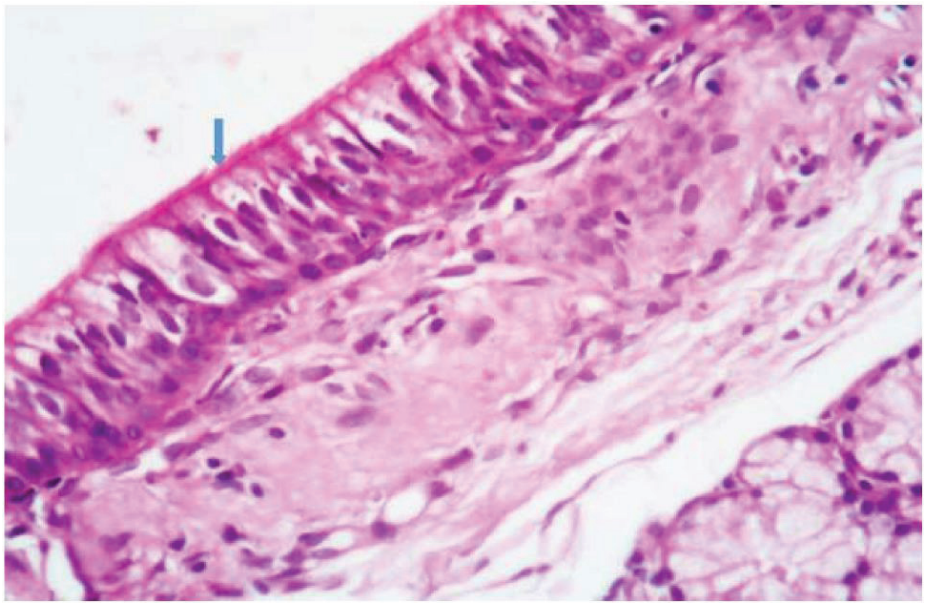

Figure 4: Soft palate in cat showing nasopharyngeal part lined by psuedostratified columnar ciliated. H&E stain.400X.

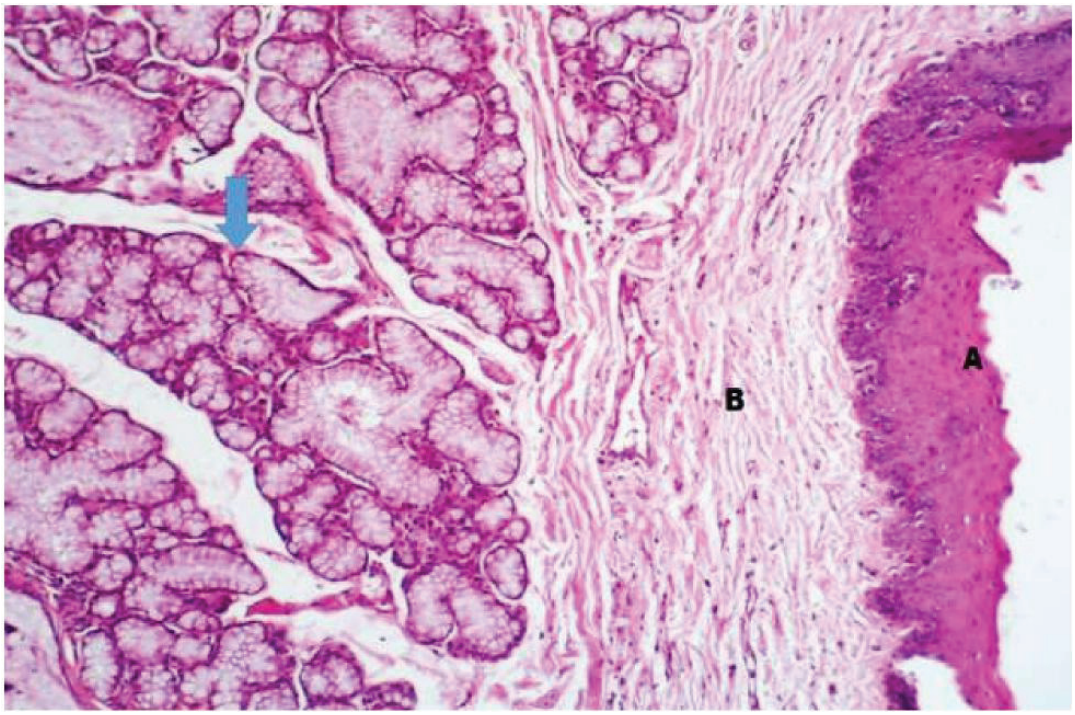

Figure 5: Soft palate of cat showing oropharyngeal part lined by stratified squamous epithelial non keratinized (A) rested on thick layer of submucosa (B) with heavy layer of salivary glands (Blue arrow).H&E stain.100X.

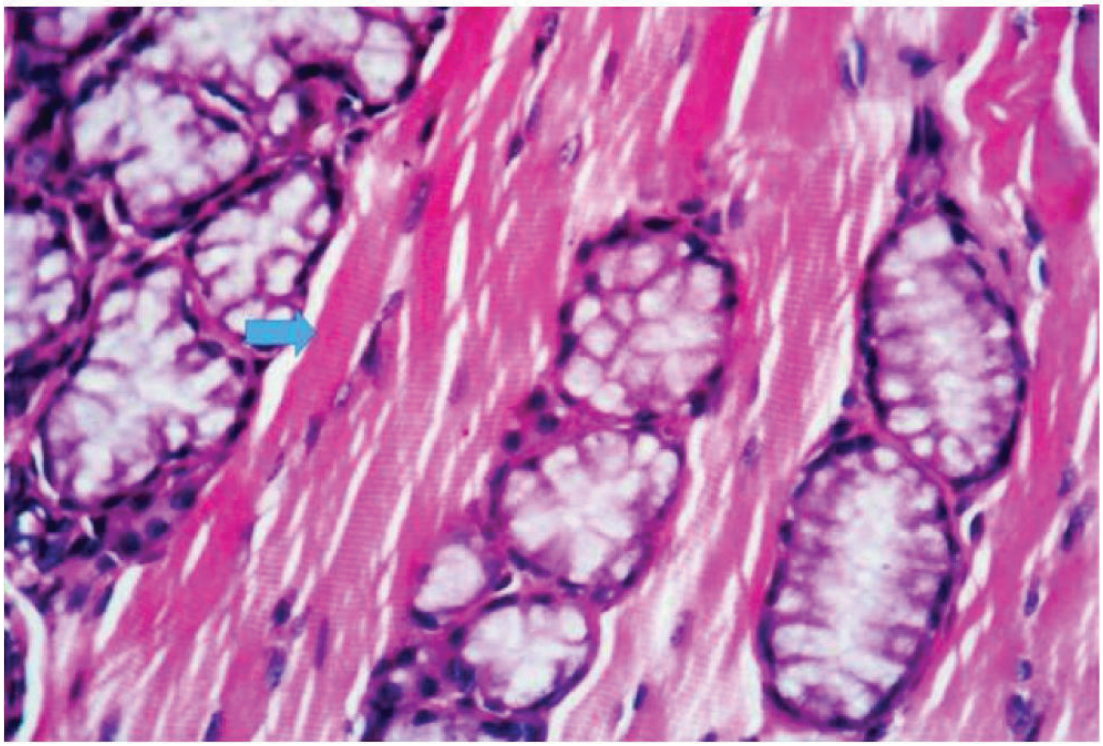

Figure 6: Caudal part of soft palate showing the salivary gland separated by striated muscle fibers (blue arrow). H&E stain.400X.

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Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Medicine and all experiments were carried out in accordance with approved guidelines.

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