

Gross Anatomy of the Tongue in Male Ostrich

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Abstract: There are significant structural differences between the tongue of birds and Mammals. The tongue is supported caudally by the hyoid bone in birds. It is in different shape which is rooted in the pharynx and developmentally has a pharyngeal origin. It is covered with a thick stratified squamous epithelium. Six male adult ostriches were used to study the tongue macroscopically. This study revealed that, the floor of the ostrich's mouth presents a concave depression between the rami of the lower beak and accommodates the tongue in its caudal third portion. In the ostrich the beaks are spoon-shaped and the tongue is characterized by a short, broad and semicircular form. The tongue is divided into round apex, a base and a body and connected to floor of mouth by ferenum. Hyoid system contains basihyoid, urohylea, ossified and cartilaginous rami.

Key words: Tongue · Ostrich · Gross Anatomy

INTRODUCTION

There is some literature on the macroscopic and microscopic anatomy of the tongue in domestic birds [1]. Study the anatomy of the mandibles, tongue and alimentary tract of kakapo and kaka [2], morphology of beak and tongue of partridge [3], tongue in the little tern pallas [4], white tailed eagle [5], cormorant [6] and tongue in penguin [7], were also recorded. Since the information on the gross anatomy of tongue of ostrich is scanty, this study was carried out to determine the anatomical details of tongue in the oropharyngeal cavity of ostrich.

MATERIALS AND METHODS

Six heads from healthy male ostriches (1.5-2-year-old), immediately after killing, were collected from slaughterhouse. All the heads were cut off at the level of the second cervical vertebra. A piece of wood was put between upper and lower beaks and the samples were kept submerged in the % 10 formalin for 72 h. To open the mouth cavity wider, the beak's angles were incised. Measurements were carried on tongue by a ruler then the tongue was cut off. For seeing the entoglossal bone, a transverse section was done in the apex of the tongue.

The anatomical position and shape of the tongue were studied in details. In addition, hyoid apparatus were dissected to determine the different segments of hyoid.

RESULTS

The tongue in ostrich is semicircular, short and quite thick, 1.92 ± 0.15 cm length and 2.92 ± 0.29 cm width. It contains the unpaired broad intraglossal bone which articulates with the basihyoid bone, a blunt round apex, a base and a body. The base consists of a wide "V" shape notch and 2 caudal processes that extend toward larynx. It attaches to the rostral floor of mouth by a thick and short stalk-like fold. The body has dorsal and ventral surfaces. The papillae are not visualized on the tongue (Figs. 1-4). The tongue is supported caudally by the hyoid bone. The hyoid bone in ostrich consists of an unpaired basihyoid bone, a paired hyoid rami and a urohyle bone. The basihyoid bone is short, flat and cartilaginous which its rostral and caudal extremities are relatively wide and compressed laterally. It articulates caudally with urohyle bone in a synarthrosis and on each side of its caudolateral aspect there is an articular surface for the rami. The urohyle bone is a rod-like cartilaginous process which is attached to the ossified plate of cricoids cartilage

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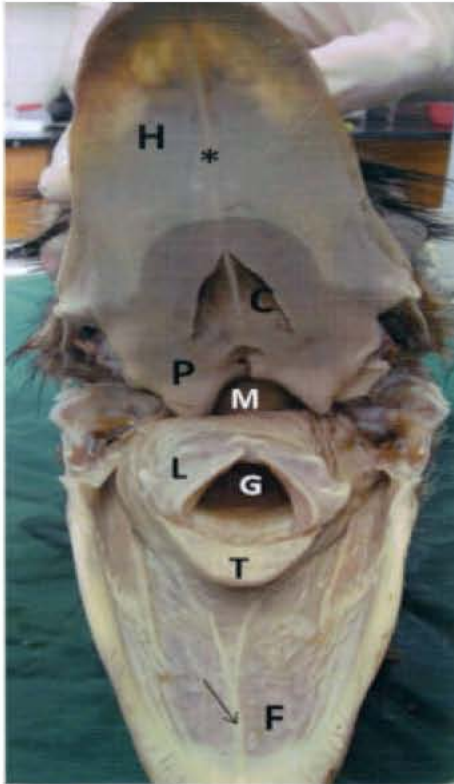


Fig. 1: Ostrich's head:Opened wide mouth showing oropharyngeal cavity.H)hard plate with a prominent median longitudinal mucosal fold (*). C) choanal slits.P)pharynx with infundibular cleft. F) floor of the mouth with median longitudinal fold (arrow).T) tongue.L) Larynx with glottis(G)

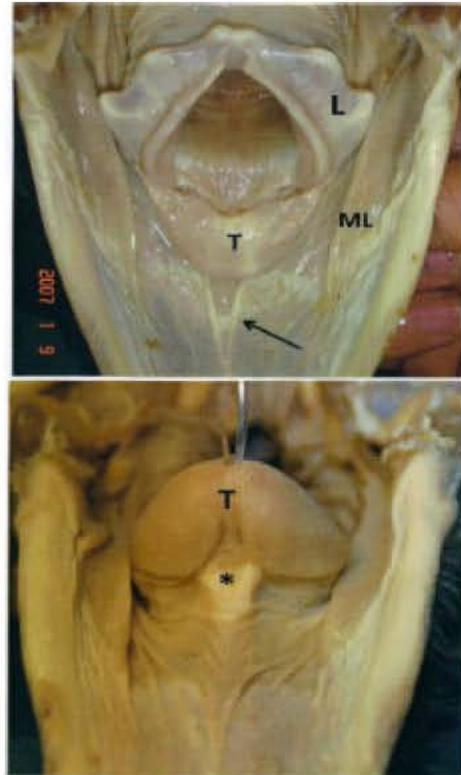


Fig. 2 : Showing the floor of the oropharyngeal cavity in the adult male ostrich.

L. Larynx T. Tongue. Moucosal fold
ML. Moucosal lamina
• Bifurcation of the median longitudinal fold

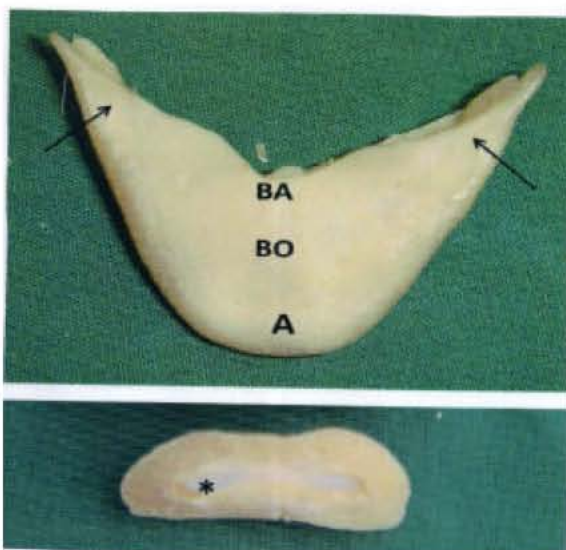


Fig. 3: The tongue of adult male ostrich
A. Apex BA. Base BO. Body ↘. Caudal process * . Entoglossal bone



Fig.4: The beaks of ostrich.1) upper beak with plate (*) 2) lower beak with plate (*)

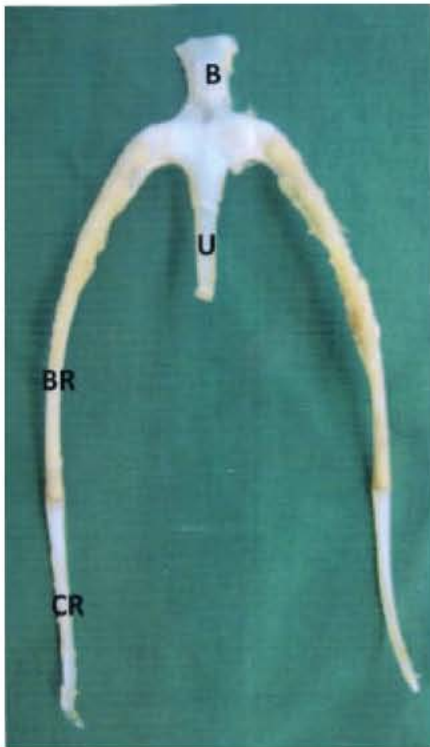


Fig. 5: The hyoid bone of ostrich. B) basihyoid bone. U) urohyal bone. BR) bony part of hyoid ramus. CR) cartilaginous part of hyoid ramus

of larynx. The rami of hyoid bone laterally and each hyoid ramus consists of a bony part which joints with the basihyoid rostrally and a curved cartilaginous part which forms terminal segment (Fig. 5).

DISCUSSION

The general appearance of the tongue in ostrich is different from the other domestic birds. In the ostrich the tongue is semicircular, short and broad with 1.92 ± 0.15 cm length and 2.92 ± 0.29 cm width. It's base is attached to rostral floor of pharynx by a short stalk-like mucosal fold and the papillae are not visualized. These features are confined to the transportation and swallowing of food, but not to the prehension of it. Whereas in the pigeon the tongue is narrow and in fowl it is broad, lancet-shaped and does not extend to the full limit of the lower beak. In lamelliostres, it completely fills the floor of mouth and is only slightly narrower apically. In fowls and pigeons the transition between the base of the tongue is marked by a transverse row of upright, backward directed lingual papillae. In the duck and goose, in addition to this row of lingual papillae, there is another row of upright, horney

papillae situated at the edges of the tongue. They point towards the pharynx and the gaps between them are occupied by thread-like papillae. This acts as a filter which actively supplements the lamellae of the lateral edge of the beak [1]. In penguins, the whole tongue is covered by large, spine-like and caudally lingual filiform-like papillae, which are adapted to hold the slippery prey [7]. Also Jackowiak and Godynicki [5] reported that the tongue of the white tailed eagle is elongated with a sharp-ended apex and it's length is 6 cm. There is a deep median sulcus on the surface of the body of tongue, giving the tongue the shape of a drain pipe, while in the posterior part of the tongue there is a row of large, conical papillae with sharp tips. These features indicate the adaptation of the tongue to the swallowing of consumed food. A similar morphology of the tongue was observed in the little tern, but in the anterior part of the tongue there is a median line and the apex of the tongue is slightly bifurcate [4]. The tongue of the cormorant is a small, fixed structure with a length of 1.4 cm, situated in the middle part of the elongated lower bill. The uniquely shaped tongue resembles a mushroom, with a short base and an elongated dorsal part with sharpened anterior and posterior tips. A median crest can be observed on the surface of the tongue [6]. The tongue in partridge is characterized by a triangular form with mean length of 1 cm for both sexes and sharp extremity. It is located in the caudal portion of the oral cavity and presents a flat surface. The lingual papillae are not visualized macroscopically [3]. The tongue of the kakapo is relatively short and wide, whereas the tongue of kaka is comparatively long and narrow [2]. Similar to duck and goose, basihyoid bone in ostrich is flattened whereas in fowl and pigeon it is rod-like. It carries an articular surface for the rami on each side and at rostral end there is another articular surface for the intraglossal bone which is single in the ostrich, double in the fowl and shovel-like in the duck and goose [1].

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