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A Literature Survey to Study about Tongue, Its Function and Clinical Consideration

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ABSTRACT –Thanks to a special organ which allow us to taste various flavors, the tongue.
The aim of this review is to perceive the knowledge about a unique organ, the tongue. This paper focuses on the functions, features, anatomical landmarks, muscles, blood supply and nerve supply of the tongue. The various papillae present on the dorsum of tongue are briefed about. The tongue is of great importance and so are its clinical considerations which are briefly explained further.

Key Words: Tongue, Dorsum, Fungiform, Foliate

I. INTRODUCTION

The tongue is a solid conical muscular organ covered partially by the mucous membrane [7]. It is attached to the hyoid bone below, to the palate above, to the mandible in front and to the styloid process behind by means of muscles [8]. It is divided into:

A) An oral part (anterior 2/3rd)

B) A pharyngeal part (posterior 1/3rd) by a faint V- shaped groove, the sulcus terminalis which meets at a median pit , named foramen ceacum [4].

The tongue is the unique organ in which the stratified squamous non- keratinized mucosa closely covers a mass of striated muscle [8].

II. FUNCTIONS AND FEATURES OF TONGUE

It is interesting to study the function and features of tongue. This gives the brief idea about the tongue and will be helpful in understanding the same.

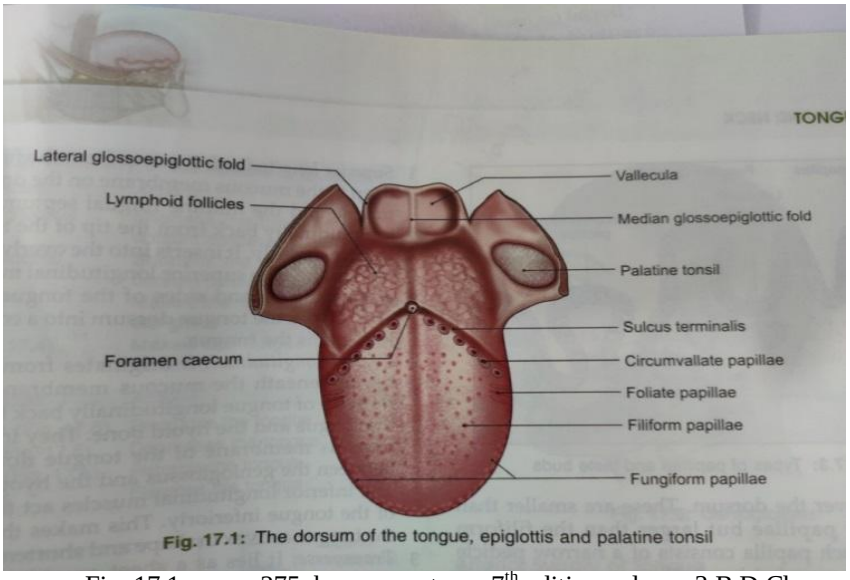
2.1 Functions of tongue:

a) It acts as an organ of taste and helps in mastication, deglutition and speech [7].
b) It is sometimes utilized in gestures and postures of facial expressions [7].
c) It helps in moistening lips and acts as a damping ground for placing the postage stamp [7].
d) Sometimes tongue prints displaying the pattern of lingual papillae are used in medico legal purposes for personal identification [7].
e) Clinically, it acts as a mirror in various disturbances of alimentary tract [7].

2.2 External features of tongue:

Tongue has a root, an apex, a curved dorsum and an inferior surface [1].

a) Root – it is attached to the mandible and soft palate above and hyoid bone below. Because of these attachments we're not able to swallow the tongue itself [5].
b) Apex / tip – it is directed forward in contact with the incisor teeth [9].
c) Dorsum – the dorsum is generally convex in all directions at rest [1]. It consists of numerous papillae.



Picture source: Fig. 17.1 pg no. 275, human anatomy 7th edition volume-3,B.D.Chaurasiya[12]

d) Ventral surface – a small midline septum of mucous membrane (lingual frenulum) unites it to the floor of mouth. Lateral to this, deep lingual vein can usually be seen through the mucosa (the lingual artery and nerve that are near it are not visible), and further laterally still is another fold of mucosa, the fimbriated fold [6].

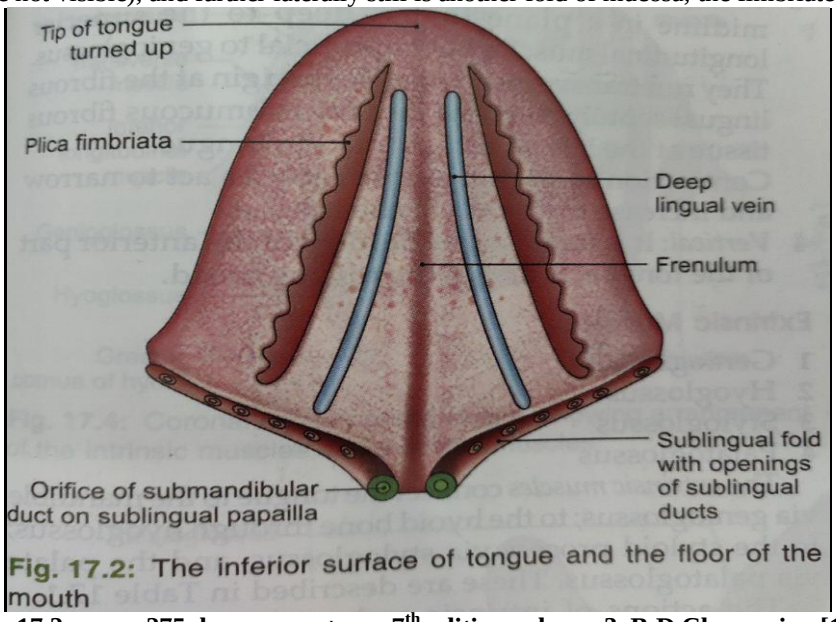


Fig.17.2 pg no. 275, human anatomy 7th edition volume-3, B.D.Chaurasiya [13]

III. TYPES OF PAPILLAE ON THE DORSAL SURFACE OF TONGUE

1. **Vallate /circumvallate papillae** –

They're large in size 1-2mm in diameter and are 8-12 in number. They're situated immediately in front of sulcus terminalis. Each papilla is a cylindrical projection surrounded by a circular sulcus. The walls of papilla are raised above the surfaces [5].

2. **Fungiform papillae –**

They're present at the apex and along the sides of tongue [10]. They're rounded reddish elevations containing taste buds [9].

3. **Foliate papillae-**

They're present on the posterior part of lateral margin of tongue; they're vertical folds that are called the foliate papillae. They are not true papillae. [10]

4. **Filiform papillae –**

They cover the presulcal area of dorsum of tongue and give it a characteristic velvety appearance. They are smallest, and most numerous of the lingual papillae. Each is pointed and covered with keratin; the apex is often split into filamentous process [5].

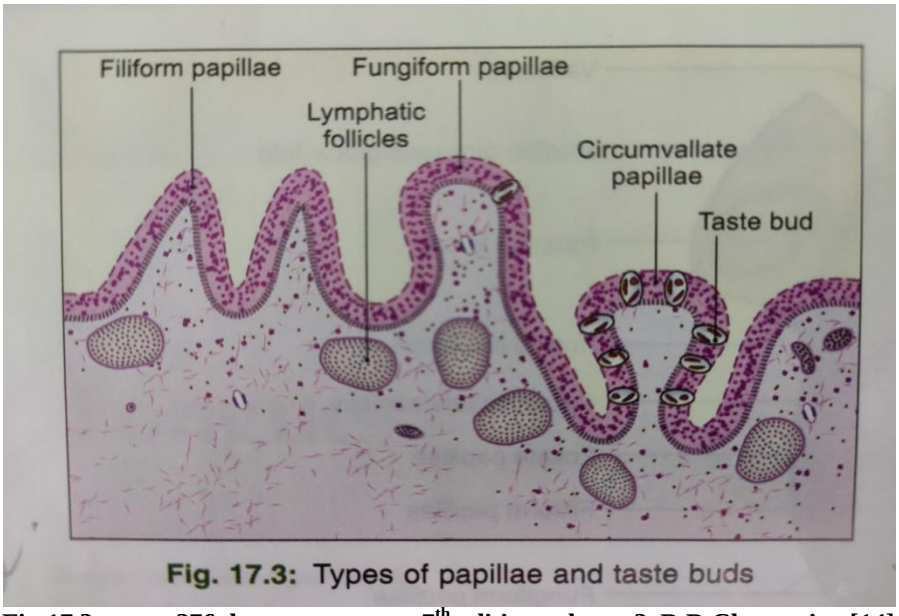


Fig.17.3 pg no. 276, human anatomy 7th edition volume-3, B.D.Chaurasiya [14]

IV. MUSCLES OF TONGUE

The muscles of tongue are divided as intrinsic and extrinsic muscles.

a) Intrinsic muscles of tongue [11]:

b) Extrinsic muscles of tongue [11]:

Muscles of the tongue		Cranial nerve supply	Main action
Intrinsic	Superior longitudinal	Hypoglossal nerve	Elevates tongue tip and lateral border, shortens the tongue
	Inferior longitudinal	Hypoglossal nerve	Depresses tongue tip down, shortens the tongue
	Transverse	Hypoglossal nerve	Elongates and narrows the tongue
	Verticalis	Hypoglossal nerve	Widens and flattens the tongue
Extrinsic	Genioglossus	Hypoglossal nerve	Protrusion of the tongue, depresses the central part of the tongue
	Hyoglossus	Hypoglossal nerve	Retrudes and depresses the tongue
	Styloglossus	Hypoglossal nerve	Retracts and elevates the tongue
	Palatoglossus	Pharyngeal plexus (pharyngeal branch of vagus)	Elevates the posterior part of the tongue, depresses the soft palate. It moves palatoglossal fold toward the midline

V. ARTERIAL SUPPLY [3]

a) Lingual artery (chief artery of tongue), branch of external carotid artery supplies tongue through:

i. Profunda lingual artery – it supplies oral part of tongue

ii. Dorsal lingual artery – it supplies pharyngeal part of tongue

b) Facial artery through:

i. Ascending palatine

ii. Tonsillar branch

c) Ascending pharyngeal branch of external carotid artery [3].

VI. VENOUS DRAINAGE

The arrangement of the veins is variable. Two venae comites accompany the lingual artery and one vena comite accompanies the hypoglossal nerve. Deep lingual vein is the largest and principle vein of the tongue. It is visible on the inferior surface of the tongue. All veins unite at the posterior border of the hypoglossal to form the lingual vein which ends either in the common facial or internal jugular vein [4].

VII. LYMPHATIC DRAINAGE

Lymph vessels from the tip of tongue drain bilaterally into submental nodes .The central lymph vessels from either side of midline passes vertically downward through the substance and end bilaterally in the jugulodigastric nodes. The lymphatics from the lateral part of anterior 2/3rd reach unilaterally to the submandibular nodes. The lymphatics from the posterior 1/3rd pass bilaterally to the jugulodogastric and jugulo-omohyoid nodes [8].

VIII. NERVE SUPPLY

8.1 Motor nerve supply

All the muscles of the tongue, except the palatoglossus, are supplied by the hypoglossal nerve [2]; whereas, the palatoglossus is supplied by the cranial part of accessory nerve via pharyngeal plexus.

8.2 Sensory nerve supply

a) From anterior 2/3rd: general sensation by lingual nerve and special sensation for taste except the vallate papillae by chorda tympani nerve [9].

b) From posterior 1/3rd: both general and special sensation is by the glossopharyngeal nerve [2].

c) From posterior most part: by the vagus nerve through the internal laryngeal branch [5].

IX. APPLIED ANATOMY OF LYMPHATIC DRAINAGE

a) Malignancy in the tip and posterior 1/3rd of the tongue is more dangerous since it drains bilaterally [3].

b) Lymph vessels piercing mylohyoid are often related to the periosteum of mandible accounting early spread to the bone [3].

X. CLINICAL CONSIDERATIONS OF TONGUE

a) The loss of taste sensation in the anterior 2/3rd and vallate papillae is seen due to the lesion of facial nucleus in Pons and nucleus of tractus solitaries in medulla oblongata respectively [8].

b) Injury to the hypoglossal nerve produces paralysis of the muscles of the tongue on the side of lesion. If the lesion is infranuclear there is hemiatrophy or gradual atrophy of the affected half of the tongue [5].

c) Glossitis is usually a part of generalized ulceration of mouth cavity or stomatitis. In certain anaemias, tongue becomes smooth due to atrophy of the filiform papillae [5].

XI. CONCLUSION

The above survey is about strong muscular organ of the oral cavity, the tongue. Its features, functions, muscles, blood supply, nerve supply, and clinical considerations are very well briefly described. Thus, this might help and open the doors for the further levels of deeper study.

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