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Review Article

Salivary Gland: A Short Review

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ABSTRACT

Salivary gland is an exocrine gland, there are three types of salivary gland which is located in and around the mouth and throat, it is divided into major and minor salivary glands which produces mucous, serous and mixture of mucous and serous salivary secretions. Histologically salivary gland consist of mucous acini, serous acini, myoepithelial cells and ducts. parotid gland is an ectodermal origin, whereas sublingual and submandibular is endodermal in origin.there are many clinical considerations of the salivary gland which include mumps, Frey's syndrome,etc.

Keywords: Salivary gland,mucous salivary gland,serous salivary gland,mixed salivary gland.

INTRODUCTION

The salivary gland is an exocrine gland it is present in and around the mouth and throat, it produces saliva which moisten mouth, this helps the food to go down the throat to stomach, initiates digestion and prevent tooth from decay, they also secrete enzyme amylase which coverts starch into maltose[1]. Two types of salivary glands are major salivary gland and minor salivary gland. Types of major salivary gland are mucous salivary gland. Eg: sub-lingual salivary gland, serous salivary gland. Eg: parotid gland and mixed salivary gland. Eg: sub-mandibular salivary gland[4].

Secretions of the salivary gland

Mucous salivary gland-it secrete saliva which is mucous in nature, Serous salivary gland-it produces serous secretions, Mixed salivary gland-it produces a mixture of mucous and serous secretions[3].

Location of major salivary glands

Mucous salivary gland-lies in sublingual fossa on the base of mandible .Serous salivary gland-in relation to external ear, angle of mandible, mastoid process. Mixed salivary gland-lies in the submandibular fossa close to the angle of mandible[4]. Mucous salivary gland has 10-12 ducts open on sublingual fold in the floor of mouth. Serous salivary gland opens in vestibule of the mouth opposite 2nd upper molar teeth. Mixed salivary gland opens into papilla in sublingual fold in the floor of the mouth**.**

Types of minor Salivary gland

Labial and buccal salivary gland, glossopalatine salivary gland and lingual salivary gland[5].

Location of minor salivary gland

It is found in the lips, inner cheek area (buccal mucosa), and extensively in other linings of your mouth and throat[2].

Histology of salivary glands

Compound exocrine glands with ductal and acinar portions Acinar portion is serous, mucinous or mixed. Acini are lined by luminal cells, which are enclosed by myoepithelial cells.

Serous acini:

Dense, basophilic, PAS+ intracytoplasmic secretory granules containing amylase.

Have central lumen that is rarely visible by H&E.

Mucous acini

Larger than serous acini.

Irregular pattern.

Cells have abundant cytoplasm with clear mucin, well-rounded, basal nuclei, and are arranged around empty lumina.

Produce acid (positive for Alcian blue and mucicarmine) and neutral (PAS+) sialomucins. Myoepithelial cells: Surround acini and intercalated ducts and mediate contraction.

Have both epithelial and mesenchymal structures and functions, and are important in the morphology of most salivary gland tumors. Myoepithelial cells surrounding intercalated ducts are more spindled and have fewer processes than those surrounding acini.

Ducts

Either intercalated, striated or interlobular, all with outer basal cells and inner luminal cells. Intercalated ducts have reserve cells that regenerate acinar tissue and terminal duct system.

All epithelium is PSA+.

Sebaceous glands are attached to parotid and submandibular ducts, and are considered part of normal holocrine differentiation [holocrine secretions are produced within the cell, then are released into the lumen after rupture of the plasma membrane], based on the occurrence of salivary tumors with sebaceous differentiation

Histology of major salivary glands

Parotid gland

Serous acini only; contains numerous basophilic zymogen granules; nuclei are uniform, round and in basal half of cell.

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Intercalated ducts are long but small in comparison to acini and striated ducts.
Striated ducts are larger than intercalated ducts, 3-6x size of acinus; striations are due to folds in basal plasma membranes.
Contains small lymph nodes near or within the gland, which arise from interstitial lymphocytes.
Resembles pancreatic tissue, but parotid gland has adipocytes and pancreatic tissue has islets and centroacinar cells.
Submandibular/submaxillary gland
Predominantly serous but also has mucinous acini.
Sublingual gland
Predominantly mucinous but also has serous acini[6].
Histology of minor salivary glands
Von Ebner's glands of tongue (posterior, dorsal and lateral): serous acini only.
Palate, base and lateral border of tongue: predominantly mucous acini.
Lip, cheek, apex of tongue: mixed serous and mucous acini[6].
Anatomy of salivary glands
Parotid gland
It is the largest salivary gland and it weighs about 25gms , Irregular lobulated mass lying mainly below the external acoustic meatus between mandible and sternomastoid. On the surface of the masseter, small detached part lies between zygomatic arch and parotid duct-accessory parotid gland or 'socia parotidis'
Parotid capsule
Derived from investing layer of deep cervical fascia. Superficial lamina is thick, closely adheren it sends fibrous septa into the gland. Deep lamina is thin attached to styloid process, mandible, tympanic plate, Stylomandibular ligament.
External features
Resembles an inverted 3 sided pyramid.
Four surfaces
Superior(Base of the Pyramid), Superficial, Anteromedial, Posteromedial Separated by three borders.
Borders
Anterior, Posterior, Medial.
Relations
Superior Surface
Concave Related to Cartilaginous part of ext acoustic meatus, Posterior aspect of temperomandibular joint, Auriculotemporal Nerve, Superior Temporal vessels, Apex Overlaps posterior belly of digastric and adjoining part of carotid triangle.
Superficial Surface
Covered by Skin, Superficial fascia containing facial branches of great auricular Nerve, Superficial parotid lymph nodes and posterior fibers of platysma.
Anteromedial Surface
Grooved by posterior border of ramus of mandible ,Related to Masseter , Lateral Surface of temperomandibular joint, Medial pterygoid muscles, Emerging branches of Facial Nerve.
Posteromedial Surface
Related to mastoid process with sternomastoid and posterior belly of digastric. Styloid process with structures attached to it. External Carotid Artery. which enters the gland through the surface Internal Carotid artery which lies deep to styloid process.
Anterior border
Separates superficial surface from anteromedial surface. Structures which emerge at this border Parotid Duct Terminal Branches of facial nerve Transverse facial vessels.
Posterior Border
Separates superficial surface from posteromedial surface Overlaps sternomastoid
Medial Border
Separates anteromedial surface from posteromedial surface Related to lateral wall of pharynx.
Structures within Parotid Gland
External carotid Artery, Retromandibular Vein, Facial Nerve ,Superficial temporal Artery, Maxillary Artery, PoteriorAuricular Artery, Superficial temporal Vein, Maxillary Vein, Posterior auricular Vein, External jugular vein, Common Facial Vein, Facial Nerve and its branches temporal, buccal, mandibular, cervical, zygomatic.
Parotid or Stensan's duct
It is 5 cm in length, appears in the anterior border of the gland, runs anteriorly and downwards on the masseter between the upper and lower buccal branches of facial Nerve.
At the anterior border of masseter it pierces buccal pad of fat, buccopharyngeal fascia, buccinator muscle. It opens into the vestibule of mouth opposite to the second upper molar.
Surface anatomy of parotid duct
Corresponds to middle third of a line drawn from lower border of tragus to a point midway between nasal ala and upper labial margin.
Blood supply
Arterial branches of External Carotid Artery.
Venous drainage
External Jugular Vein.
Lymphatic drainage
Upper Deep cervical nodes via Parotid nodes
Nerve supply
Parasymapthetic Nerve: Secretomotor via auriculotemporal Nerve.
Symapathetic Nerve: Vasomotor Delivered from plexus around the external carotid artery.
Sensory Nerve: Reach through the Great auricular and auriculotemporal Nerve.
Sub mandibular salivary gland
It is Irregular in shape. Larger superficial and smaller deeper part. continous with each other around the posterior border of mylohyoid .Superficial Part Situated in the digastric triangle wedged between body of mandible and mylohyoid.
Surfaces
3 surfaces Inferior,Medial,Lateral.
Capsule derived from deep cervical fascia.
Superficial Layer is attached to base of mandible, Deep layer attached to mylohyoid line of mandible.

Relations

Inferior surface

covered by Skin, Supeficial fascia, containing platysma and cervical branches of facial Nerve, Deep Fascia, Facial Vein, Submandibular Nodes.

Lateral surface

Related to submandibluar fossa on the mandible, Mandibular attachment of Medial pterygoid, Facial Artery.

Medial surface

Anterior part :it is related to myelohyoid muscle,nerve and vessles.

Middle part: Hyoglossus, styloglossus, lingual nerve, submandibular ganglion, hypoglossal nerve and deep lingual vein.

Posterior Part: Styloglossus, stylohyoid ligament, 9 th nerve and wall of pharynx.

Deep part

It is Smaller in size, Lies deep to mylohyoid and superficial to hyoglossus and styloglossus, Posteriorly continuous with superficial part around the posterior border of mylohyoid.

Submandibular or Whartons duct

It is 5 cm long, Emerges at the anterior end of deep part of the gland, Runs forwards on hyoglossus between lingual and hypoglossal Nerve, At the anterior Border of hyoglossus it is crossed by lingual nerve, Opens in the floor of mouth at the side of frenulum of tongue.

Blood Supply

Arteries: Branches of facial and lingual arteries. Veins drains into the corresponding veins

Lymphatics

Deep Cervical Nodes via submandibular nodes

Nerve Supply

Branches from submandibular ganglion, through which it receives Parasymapthetic fibers from chorda tympani, sympathetic fibers from plexus on facial Artery,

sensory fibers from lingual branch of mandibular nerve.

Sub lingual salivary gland

It is the smallest of the three salivary glands, it weighs about nearly 3-4 gm, lies beneath the oral mucosa in contact with the sublingual fossa on lingual aspect of mandible.

Relations

Above :Mucosa of oral floor, raised as sublingual fold.

Below: Mylohyoid Infront

Anterior: end of its fellow.

Behind: Deep part of Submandibular gland.

Lateral: Mandible above the anterior part of mylohyoid line.

Medial: Genioglossus and separated from it by lingual nerve and submandibular duct.

Duct of Rivinus: There are about 8-20 ducts. Most of them open directly into the floor of mouth but few of them join the submandibular duct.

Blood supply

Arteries: sublingual and submental arteries.

Venous drainage: corresponds to the arteries.

Nerve Supply: Similar to that of submandibular glands that is through lingual nerve, chorda tympani and sympathetic fibers(7).

Development of salivary gland

They originate from oral epithelial buds invading the underlying ectomesenchyme. The origin of epithelial buds: Ectodermal in parotid and minor salivary gland, Endodermal in submandibular and sublingual glands .The connective tissue stroma and blood vessels origin from the mesenchyme. Gland Location during IU life: Parotid gland- Corner of stomodium during 6th week ,Sub mandibular gland- Floor of mouth at End of 6th week, Sub lingual gland- Lateral to sub mandibular primordium during 8th week, Minor salivary glands- Buccal epithelium during 12th week.

Stages of development:

STAGE I: Induction of oral epithelium by underlying mesenchyme.

STAGE -II Formation and growth of epithelial cord.

STAGE III: Initiation of branching in terminal parts of epithelial cord and continuation of glandular differentiation.

STAGE IV: Dichotomous branching of epithelial cord and lobule formation.

STAGE V: Canalization of presumptive ducts.

STAGE VI: Cytodifferentiation[7].

Clinical considerations

Mumps

It is most common in children , here there is the swelling if parotid gland.

Mucocele

This is caused by rupture of salivary gland duct and mucin spillage into the connecting tissue.

Ranula

When mucocele occurs in the mouth it is said to be ranula.

Nicotinic stomatitis

It is caused by the heat from tobacco use or hot liquid consumption this leads to inflammation in the ducts openings of the minor salivary gland of the palate.

Frey's syndrome

It is a neurological disorder resulting from damage to parotid gland which makes saliva and also due to damage to auriculotemporal nerve during surgery.

Necrotizing sialometaplasia

A lesion that usually arises from a minor salivary gland on the

palate. It is due to vascular infarction of the salivary gland lobules. It is often mistaken for oral cancer, but the lesion is not neoplastic.

Sarcoidosis

There may be parotitis alone or uveoparotitis (inflammation of both the parotid and the uvea of the eyes), which occurs in Heerfordt's syndrome.

Cheilitis glandularis

This is inflammation of the minor salivary glands, usually in the lower lip, eversion and swelling of the lip.

Chronic sclerosing sialadenitis is an IgG4-related sclerosing disease[8].

Salivary gland stones

It is formed from the chemicals in the saliva it can sometimes crystallize into stones that can block the salivary duct the salivary gland stone is sometimes called as siololith or salivary calculus[9].

Mucoepidermoid carcinoma
It is the most common type of salivary gland cancer.they Mostly start in the parotid glands. They develop less often in the submandibular glands or in minor salivary glands.. These cancers are usually low grade, but they can also be intermediate or high grade[10].

CONCLUSION

Salivary gland is very essential to our body because saliva which is produced by the salivary gland helps in lubricating and swallowing of the food,protects teeth from bacterial decay,it also has antimicrobial function,sense of taste and it also contain hormone gustin which helps in the development of taste buds and also as a disinfectant.

CONFLICT OF INTEREST

Nil.

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