

L'enseignement de l'anatomie des appareils digestif, urinaire et génital par l'utilisation de vidéos d'anatomie 3D en anglais, intérêts pédagogiques par rapport aux méthodes classiques d'enseignement



***SALIVARY
GLANDS***

I. INTRODUCTION

The salivary glands are exocrine glands annexed to the oral cavity. They produce saliva that contains enzymes, mucus and immunoglobulins very useful for mastication and, thus, digestion as well as the protection of the oral cavity from the pathogens of the external environment.

Two categories of salivary glands are distinguished salivary glands and main salivary glands.

A- SALIVARY GLANDS

The salivary glands are small glands scattered in the oral mucosa and submucosa. They directly open in the oral cavity through a small duct and ensure a continuous excretion of saliva.

The labial glands are situated in the internal surface of labia.

The molar glands lie towards molar teeth.

The buccal glands are scattered in the internal surface of cheeks.

The palatine glands are localised in the submucosa of soft palate.

The lingual glands lie in the submucosa of inferior surface of the tongue.

They are serous, mucous and seromucous glands.

The serous glands are scattered around the tongue when the mucous glands are situated on the palate and the lateral borders and the base of the tongue and the seromucous glands on the upper surface of the tongue and the labia.

B- MAIN SALIVARY GLANDS

The main salivary glands are localised way from the oral cavity. They are characterized by their own excretory duct and capsule. Unlike the salivary glands, the main salivary glands ensure a discontinuous excretion of saliva.

They are three paired glands. Namely, the parotid glands, the submandibular and the sublingual glands. They are situated round the mandible.

II. DESCRIPTIVE ANATOMY

A- PAROTID GLAND

The parotid gland is superficial. It fills in the gap between, forwards, the ramus of the mandible and the muscles attached to it, medially, the styloid process, backwards, the mastoid process, upwards, the external acoustic meatus and temporomandibular joint and, downwards, the angle of the mandible and posterior belly of digastric muscle.

The parotid gland is irregular pyramid-shaped.

Its lateral surface is flat and is prolonged forwards by the accessory parotid gland.

Its anterior surface is U-shaped clasping the ramus of the mandible with an outer edge meeting the lateral surface of the mandible. The anterior border of the anterior surface is convex and constitutes the zone where emerges the parotid duct. Its inner edge meets the posteromedial surface of the parotid its medial deep border is convex.

Its posteromedial surface is deep.

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Its superior surface is small and concave and constitutes the base of the pyramid.

The apex of the latter is inferior and rounded, it overhangs the submandibular gland.

The parotid gland is yellowish in colour and represents the largest of the main salivary glands with a weight of 25 grams.

The parotid duct of Stensen is the proper excretory duct of the parotid gland. It is five centimetres long. It passes forwards across the masseter in a duplication of the masseteric fascia and turns around its anterior border, crosses the buccal fat pad, pierces the buccinator further back, runs forwards beneath the mucous membrane and opens on the mucous membrane of the cheek opposite the second upper molar tooth. It has at its opening, the parotid papilla, a valvular flap of mucous membrane.

The surface marking of the parotid duct is the line between the intertragic notch of the auricle and the midpoint of the philtrum and has a major clinical and surgical interest. The parotid duct is palpable over the clenched masseter muscle.

B- SUBMANDIBULAR GLAND

The small deep part of the submandibular gland is situated between mylohyoid and hyoglossus muscle under the mucous membrane of the floor of the mouth.

The large superficial part is situated in the submandibular fossa of the mandible between, downwards, the investing layer of deep cervical fascia, laterally, the internal surface of the angle of mandible, medially, mylohyoid muscle.

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The two parts of the submandibular gland are continuous with one another round the free posterior margin of mylohyoid.

The submandibular gland is irregular in shape, weighs seven grams and is yellowish in colour. Two parts of the submandibular gland are distinguished, small deep and large superficial. Its small deep part is where emerges the submandibular duct.

The submandibular duct is five centimetres long. It emerges from the deep part of the gland near the posterior border of mylohyoid, runs forwards first between mylohyoid and hyoglossus, then, between the sublingual gland and geniohyoid muscle. It, then, overcrosses the lingual nerve from inside to outside and opens into the floor of the mouth beside the frenulum of the tongue.

C- SUBLINGUAL GLAND

The sublingual gland is situated on the floor of the mouth beside the frenulum of the tongue. It lies between, backwards, the anterior border of hyoglossus muscle, forwards and downwards, the mylohyoid muscle, upwards, the floor of the mouth raising the sublingual fold, laterally, the sublingual fossa of the mandible and, medially, the genioglossus muscle.

The sublingual gland is almond-shaped, yellowish in colour and weighs three grams. It is flattened sagittally with lateral and medial surfaces and upper and lower borders. The sublingual gland is not drained by a single proper excretory duct but by fifteen. Half of the latter open directly in the submandibular duct. The remainder open separately on the sublingual fold.

III. STRUCTURE

The salivary glands are arranged in lobules separated by septa. They have a tubuloalveolar architecture. Their secretion consists of seromucous substance. The tubules drain into interlobular ducts that flow into the excretory duct of the gland. The glands are lined by a double-layer epithelium made of columnar cells and myoepithelial cells.

The parotid has the particularity to contain predominant serous acini, many ducts and fat cells.

The submandibular contains few ducts.

The sublingual gland contains exclusively mucous acini and few ducts.

IV. ANATOMICAL RELATIONS

A- PAROTID GLAND

The parotid gland is surrounded by the parotid sheath. It is derived from the investing layer of deep cervical fascia and continuous with the masseteric fascia.

The lateral surface of the parotid gland is superficial, almost subcutaneous; it is overlaid by deep and superficial lymph nodes within the parotid sheath under the skin of the parotid region.

The apex of the parotid gland lies on the posterior belly of digastric muscle just above the angle of mandible.

Its anterior surface moulds by its concavity the posterior border of the ramus of the mandible with the masseter muscle below its lateral side and the external surface of the temporomandibular joint below its medial side.

Its posteromedial surface is bounded by the mastoid and styloid processes, respectively, at the front and at the back. It stands beneath the stylohyoid, styloglossus, stylopharyngeal and digastric muscles forming the styloid diaphragm separating the parotid from the retrostyloid parapharyngeal space containing the internal carotid artery, the internal jugular vein and the glossopharyngeal and hypoglossus nerves.

The medial border of the parotid gland is prolonged towards the pharynx and stands between medial pterygoid muscle forwards and stylomandibular ligament backwards.

Its superior surface, the base of the parotid gland, is in contact with the external acoustic meatus and temporomandibular joint medially.

The fact that the parotid gland is crossed by vessels and nerves makes its dissection a harder surgical exercise.

Indeed, the facial nerve forms a plexus after dividing inside the gland. It splits the parotid into two lobes.

The veins are contained in the deep lobe of the parotid gland. The superficial temporal vein meets

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the maxillary vein at the base of the parotid forming the external jugular vein. The latter is joined by the retromandibular vein at the apex of the gland.

The arteries that travel the deep lobe of the gland are the external carotid artery which enters the gland at its posteromedial surface, divides into the superficial temporal artery and the maxillary artery after giving its posterior auricular branch inside the gland.

Lymph nodes are contained in the gland as well.

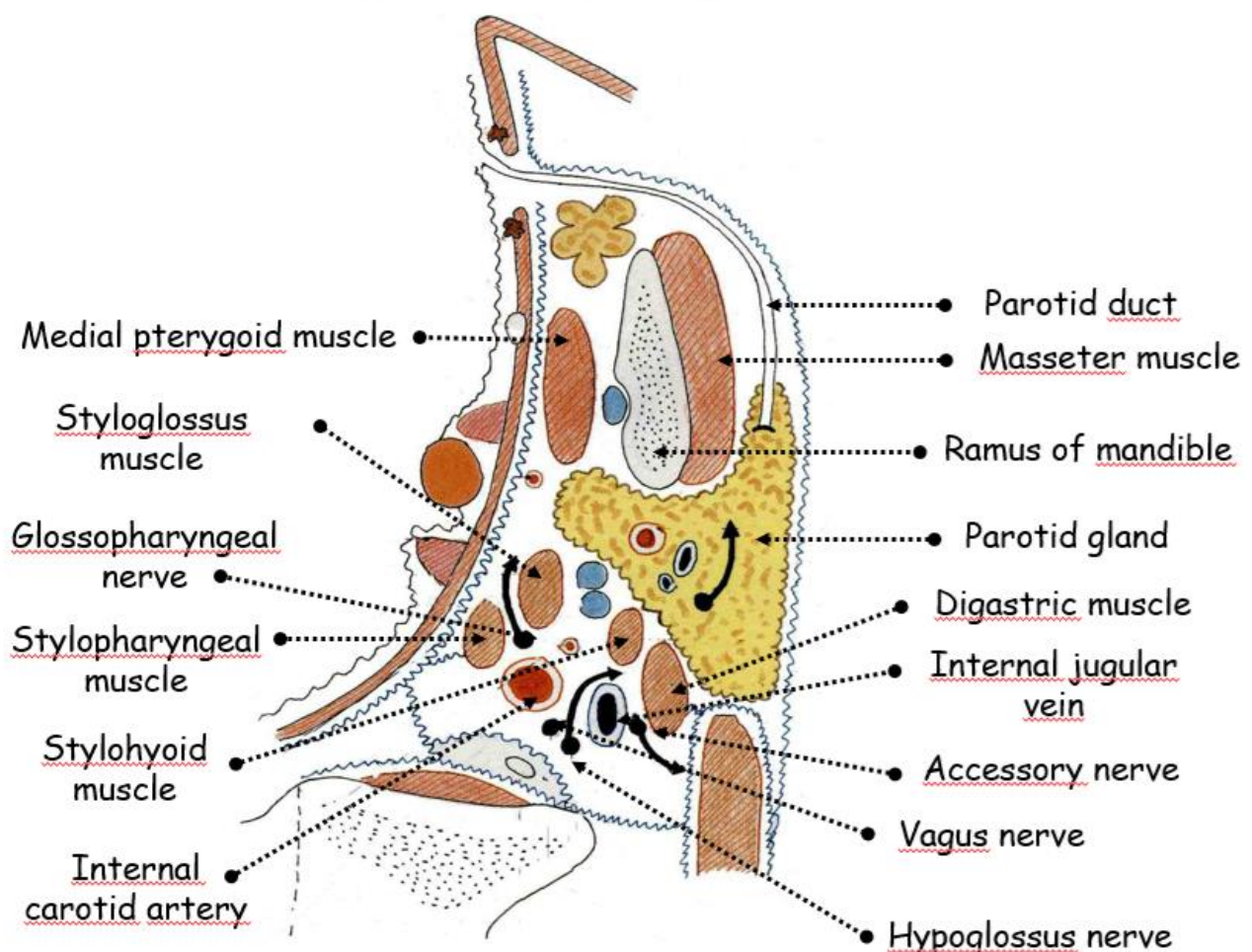


Figure 1: Horizontal section of the face at the level of the axis showing the parotid region

B- SUBMANDIBULAR GLAND

The lateral surface of the submandibular gland stands beside the attachment of the medial pterygoid muscle at the submandibular fossa on the medial surface of the angle of the mandible and the facial artery running at its superior posterior part and around the inferior border of the mandible.

The medial surface is prolonged behind and inside the posterior border of mylohyoid muscle and stands between, forwards, the anterior belly of digastric muscle, the hyoglossus and mylohyoid muscles, backwards, the styloglossus muscle, the stylohyoid ligament, the pharyngeal wall, the lingual vein and artery and the hypoglossus nerve, upwards, the lingual nerve and submandibular ganglion.

The inferior surface lies above the facial vein, submandibular nodes inside its capsule and cervical branch of the facial nerve. It is overlaid by the platysma and the skin of the neck.

C- SUBLINGUAL GLAND

The medial surface of the lingual nerve is in contact with the hypoglossus nerve, the lingual artery and its branches, the deep lingual and the genioglossus and inferior longitudinal muscles. The lateral surface is bordered by the mylohyoid muscle.

V. BLOOD SUPPLY; LYMPH DRAINAGE AND NERVE SUPPLY

A- PAROTID GLAND

The arterial supply of the parotid gland is held by branches from the external carotid artery.

The venous flow is ensured by the retromandibular vein flowing into the external jugular vein.

The lymph drainage of the parotid gland is ensured by nodes within the parotid sheath, thence with the external carotid artery to nodes of the upper group of deep cervical nodes.

Secretomotor fibres of arise from cell bodies in the otic ganglion and reach the gland by hitch-hiking along the auriculotemporal nerve. The preganglionic fibres arise from cell bodies in the inferior salivary nucleus in the medulla, and travel by way of the glossopharyngeal nerve, its tympanic branch, the tympanic plexus and the lesser petrosal nerve to the otic ganglion. Sympathetic vasoconstrictor fibres reach the gland from the superior cervical ganglion by way of the plexus on the external carotid and middle meningeal arteries. The gland itself receives sensory fibres from the auriculotemporal nerve, but the parotid fascia receives its sensory innervation from the great auricular nerve at C2 level.

B- SUBMANDIBULAR GLAND

The blood supply of the submandibular gland is ensured by the facial and submental vessels.

Its lymph drainage is held by the submandibular nodes.

Secretomotor fibres to the gland have their cell bodies in the submandibular ganglion with a few in small ganglionic masses on the surface of the gland itself. The preganglionic fibres pass from cell bodies in the superior salivary nucleus in the pons by way of the nervus intermedius, chorda tympani and the lingual nerve. Sympathetic vasoconstrictor fibres come from the plexus around the facial artery.

C- SUBLINGUAL GLAND

The arteries of the sublingual gland are the lingual artery and branches of the submental artery.

The venous flow is held by the deep lingual vein.

The submandibular nodes ensure its lymph drainage.

The lingual nerve through the sublingual ganglion ensures its nerve supply.

VI. SURGICAL APPROACH

A- PAROTID GLAND

The removal of the parotid gland, parotidectomy, is an exercise in dissection of the facial nerve. An S-shaped incision is made from in front of the ear, backwards to the mastoid process and then downwards and forwards below the angle of the mandible. The skin incision includes platysma. The gland is retracted forwards from sternocleidomastoid to expose the posterior belly of digastric and stylohyoid and the cartilage of the external meatus. The trunk of the facial nerve is approached along a plane in front of the anterior margin of the cartilage, above stylohyoid and digastric. The stylomastoid branch of the posterior auricular artery is slightly more superficial than the facial nerve and is a guide to its proximity. The cartilage in this region has a slight arrow-headed projection that conveniently points towards the nerve, which can be followed forward from here along its various branches as gland tissue is dissected away. The parotid duct is divided at the anterior border of the masseter. For total as distinct from superficial parotidectomy which has been described so far, further tissue is dissected away with ligation of the external carotid, superficial temporal and maxillary arteries and adjacent veins. The styloid process may have to be fractured and the stylomandibular ligament divided.

B- SUBMANDIBULAR GLAND

The superficial part is easy to expose under platysma, but the skin incision must be made about four centimetres below the mandible to avoid the marginal mandibular branch of the facial nerve which may lie over the gland.

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Removal of the gland requires ligation of the facial artery and vein above and below it, and the gland is dissected away from the lingual nerve, with ligation of the duct as it lies on hyoglossus.

The removal of a stone from the duct is carried out from within the mouth by incising the duct over the stone; the duct does not need to be sutured.

VII. CONCLUSION

The salivary glands are main and scattered glands. They secrete saliva. They have several vascular and nervous relations a rich blood supply and a lymph drainage ensured by deep cervical nodes.
