ULTRASONOGRAPHY OF THE SALIVARY GLANDS

Thesis

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Of Master Degree in Radiodiagnosis

By
Sahar Farouk Shaaban
M.B.,B.Ch.

Supervisor
Prof. Dr. Mamdouh Ghoneem
Assist. Prof. of Radiodiagnosis
Faculty of Medicine
Ain Shams University

FACULTY OF MEDICINE
AIN SHAMS UNIVERSITY
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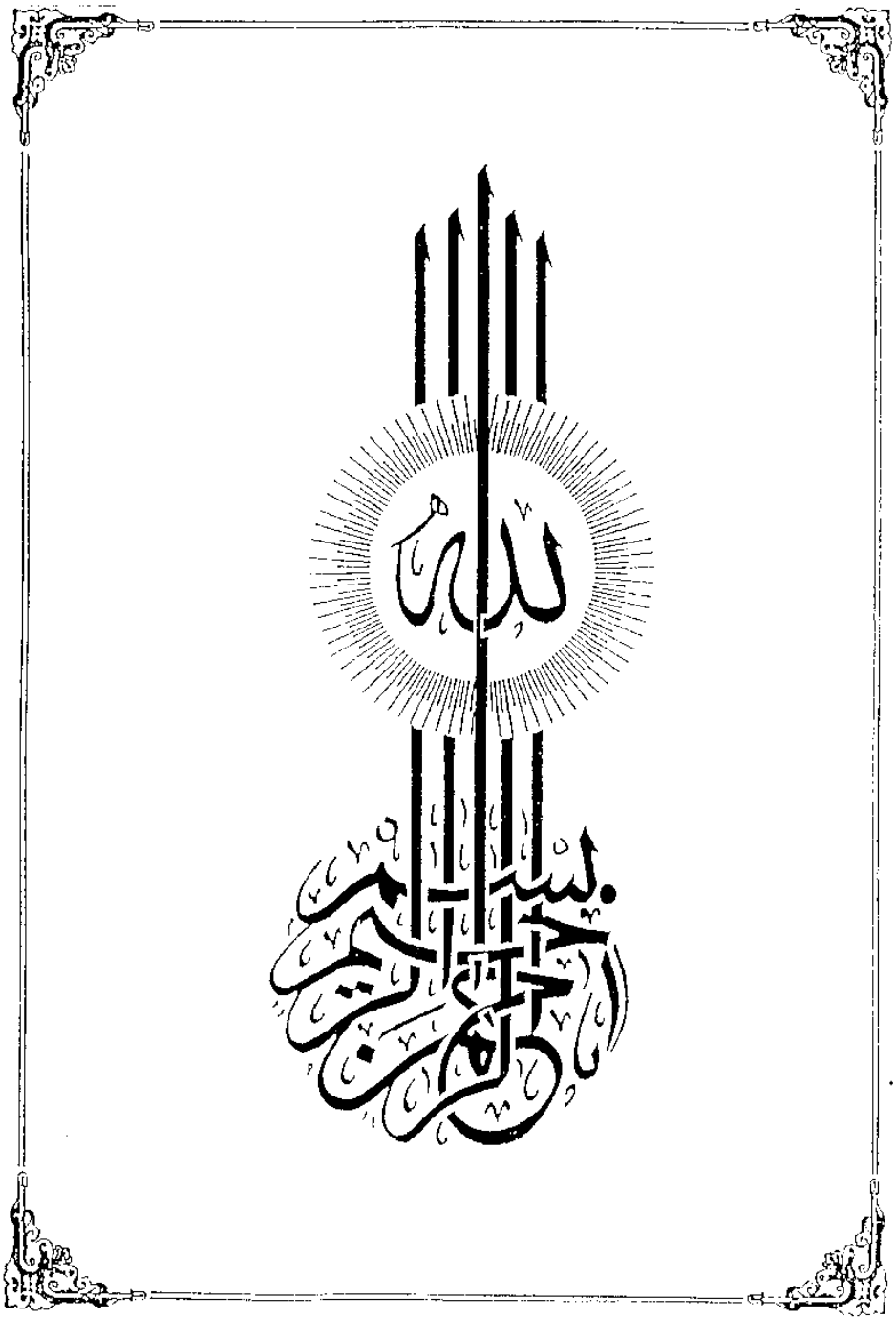

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Introduction and Aim of Work

INTRODUCTION AND AIM OF WORK

Sonography is a method of investigation that is non invasive, simple and of low cost in comparison to other methods as C.T. or M.R.I.

Since the salivary glands lie close to the surface, sonography is particularly usefull in the assessement of diseases of these organs that include neoplasms, inflammatory diseases, auto immune diseases and sialolithiasis ***(Zbaren, et al., 1989)***.

Recent reports suggest that the technique is an effective tool for diagnosis of these diseases. For example, sonography is of great importance in the diagnosis of neoplastic diseases as it provides an information about the nature of the tumor and its extent.

Also it has an important role in diagnosis of inflammatory disorders especially in cases of abscess formation (***Som,et al., 1981)***

In sialolithiasis US can define the location of stones with relation to glandular prenchyma ***(Wittich, et al., 1985)***.

The aim of this work is to assess the role of sonography in diagnosis of varios salivary gland diseases.

Anatomy

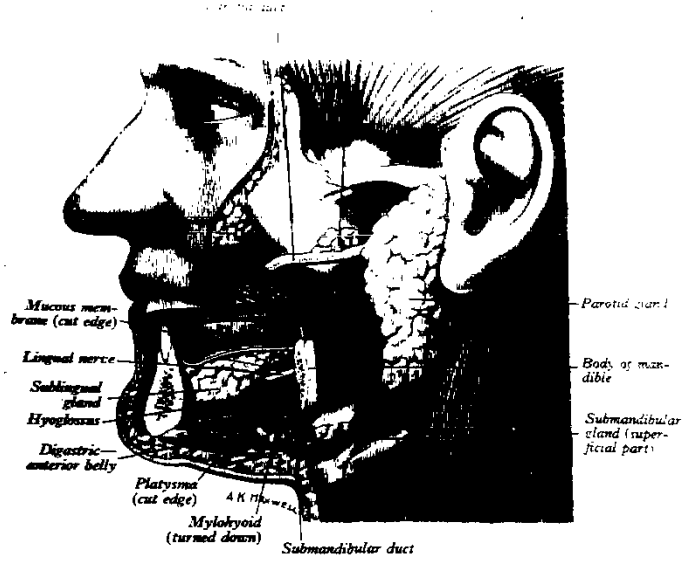


Fig. (l): A dissection showing the salivary glands of the Lt. side. The cranial region of the superficial part of the submandibular gland has been excised and the cut mylohyoid has been turned down to expose a portion of the deep part of the gland (Quoted from Gray's anatomy, 1989).

Gross anatomy of the salivary glands

The salivary glands comprise three large paired masses ***(Fig. 1)***: The parotid, submandibular and sublingual glands - also the anterior lingual glands and numerous small glands in the mucous membrane of the tongue and numerous small labial, buccal and palatal glands in relation to mucous membrane of the lips, cheek and roof of the mouth respectively ***(Williams, et al, 1989)***.

1. *The parotid gland:*

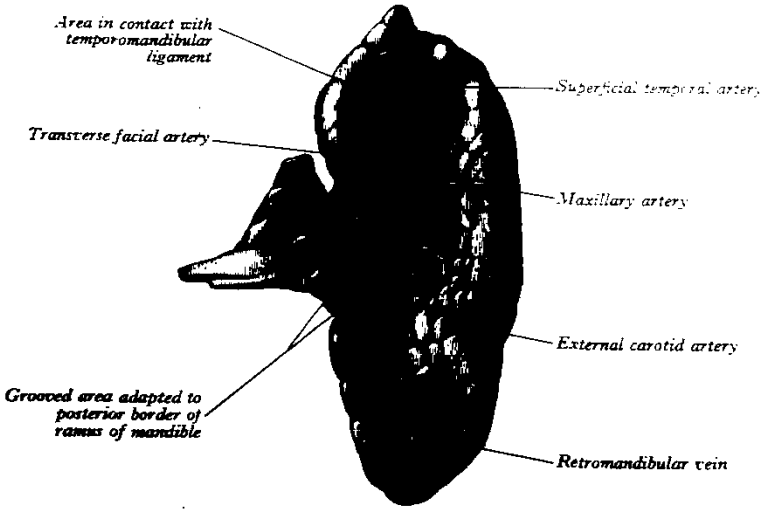
Is the largest of the three major salivary glands and is enclosed within a capsule which is part of the deep cervical fascia. ***(Hiatt, et al., 1982)***.

Surface anatomy:

The parotid gland is like an inverted flattened three sided pyramid, it presents a small superior surface, and superficial, antero medial and postero medial surfaces. The lower part of the gland tapers to a blunt apex.

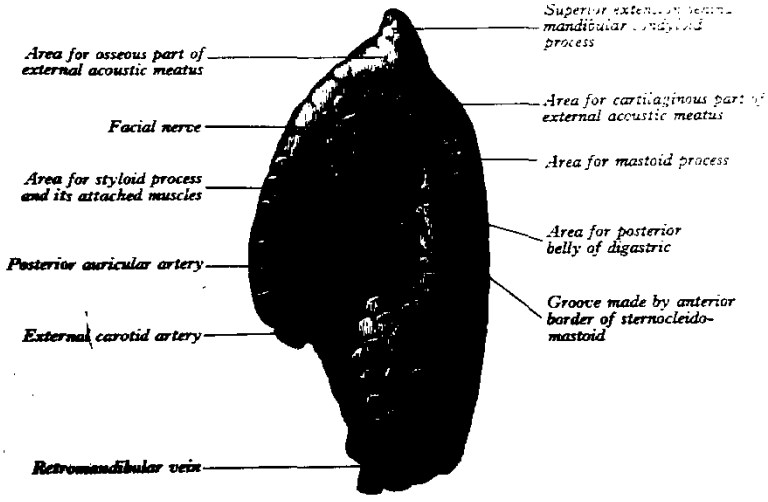
1. *The superior surface:*

It is concave and is related to the cartilagenous part of the external acoustic meatus, and to the posterior surface of the tempromandibular joint.



1290 **8.45B The right parotid gland: anteromedial aspect.**

Fig. (2): The right parotid gland; anteromedial aspect (Quoted from Gray's anatomy, 1989).



8.45A The right parotid gland: posteromedial aspect.

Fig. (3): The right parotid gland; posteromedial aspect (Quoted from Gray's anatomy, 1989).

The apex of the gland overlaps the posterior belly of the digastric and the carotid triangle to a variable extent.

2. ***The superficial surface:***

It is covered with the skin and superfacial fascia which contains the facial branches of the great auricular nerve, the superficial parotid lymph nodes and posterior border of the platysma. It extends upwards to the zygomatic arch, backwards to overlap slightly the anterior border of the sternomastoid, downwards to its apex behind and below the angle of the mandible and forwards across the superficial surface of the masseter below the parotid duct ***(Fig. 1).***

3. ***Antero medial surface*** *(Fig. 2)*

It is grooved by the posterior border of the ramus of the mandible. It covers the posteroinferior part of the masseter. The lateral aspect of the tempromandibular joint and the adjoining part of the mandibular ramus, and passes forwards on the deep aspect of the ramus to reach pterygoid. The branches of the facial nerve emerge on the face from undercover of the anterior margin of this surface. ***(Williams, et al., 1989).***

4. ***The postero medial surface*** ***(Fig. 3)***

It is moulded to the mastoid process and the sternocleidomastoid, and to the posterior belly of the digastric, the styloid process and the styloid group of muscles. The external carotid artery grooves this surface before it enters the substance of the gland. The internal carotid

artery and the internal jugular vien are separated from the gland by styloid process and the styloid muscles. The antero medial and postero-medial surfaces meet along a medial margin which may project so deeply as to be in contact with the side wall of the pharynx ***(Williams, et al., 1989).***

Contents of the parotid gland

Within the gland are a number of non glandular structures, most of which traverse it or even branch within its substance.

1. ***The external carotid artery*** enters the lower part of the postero medial surface of the gland. It divides into maxillary and superficial temporal branches. The former leaves the antero medial surface of the gland and passes forewards through the infratemporal fossa. The latter leaves the superior surface and passes into the temporal region ***(Smith, et al., 1983).***

2. ***The retro mandibular vein*** formed in the upper part of the gland by the union of the maxillary and superficial temporal veins. it emerges from the gland behind its inferior extremity and joins the posterior auricular vein to form the external jugular vein. ***(Williams, et al., 1989).***

3. ***The auriculotemporal nerve*** enters the gland through the upper most part of its anteromedial surface and, after a short intraglandular course, leaves the superior surface for the temporal region.

4. *The facial nerve* enters the upper part of the postero-medial surface of the parotid gland. Here it divides into branches which radiate through the gland superficial to the retromandibular vein and external carotid artery. They leave the anterior border and lower pole of the gland to supply muscles of expression in the face and neck *(Smith, et al., 1983).*

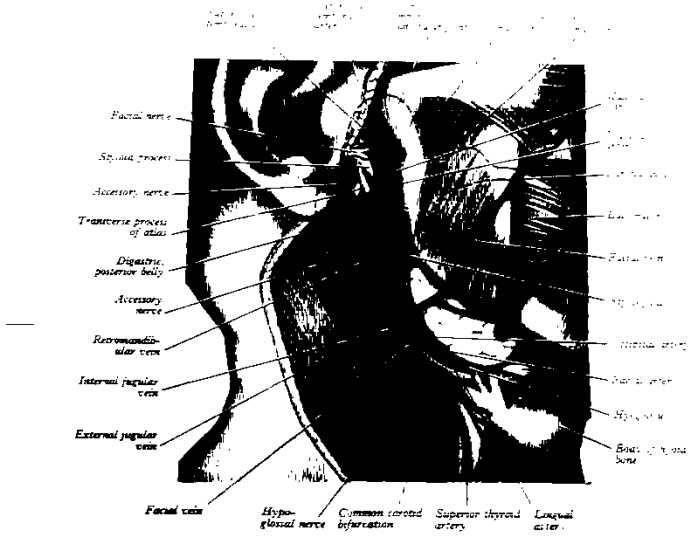
The parotid duct (Stensen's duct)

It is about 5 cm long. It begins by the confluence of two main branches within the anterior part of the gland, crosses the masseter and at the anterior border of this muscle turns inwards nearly at a right angle and pierces the buccinator, it then runs for a short distance obliquely foreward between the buccinator and mucous membrane of the mouth, and open upon a small papilla on the oral surface of the cheek opposit the crown of the second upper molar tooth. *(Williams, et al., 1989).*

Vascularization:

The posterior auricular artery, arising from the external carotid artery within the substance of the gland, provides branches which vascularize the gland.

Additional small glandular branches from superficial temporal and transverse facial arteries also supply the gland, venous drainage is



rwing of a dissection to show the principal immediate deep rela- he parotid gland. The outline of the parotid gland is indicated by spaced black line.

Fig. (4): A dissection to show the principal immediate deep relations and vascularization of the parotid gland, the outline of the parotid gland is indicated by the interrupted black line (Quoted from Gray's anatomy, 1989).

via the tributaries passing through the gland which empty into the external jugular vein *(Fig. 4)*.

Lymphatics:

Lymph nodes located superficially and within the substance of the gland drain the lymphatics into superficial and deep cervical lymph nodes *(Hiatt, et al., 1982)*.

Innervation:

Is of sensory and autonomic function. General sensation is provided by branches of the great auricular nerve.

The sympathetic component of autonomic system reaches the gland via post ganglionic fibers of the carotid plexus, which travel on the external carotid artery and its branches in the gland. Sympathetic innervation to the parotid gland mediate vasoconstriction within the gland. Parasympathetic innervation is distributed to the gland by the auriculo-temporal nerve. Parasympathetic innervation to the gland mediates secretomotor functions *(Hiatt, et al., 1982)*.

II. ***Submandibular gland:*** *(Fig. 1)*

The submandibular gland consists of a larger superficial part and a smaller deep part, which are continous with each other around the posterior border of the mylohyoid.