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## Morphology and Morphometric Analysis of Parotid Gland.

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### ABSTRACT

The parotid gland is the largest of the salivary glands and secretes saliva via the parotid duct into the oral cavity to facilitate mastication and swallowing. It is located in the parotid space. The parotid gland is wrapped around the mandibular ramus and extends to a position anterior and inferior to the ear within the parotid facial space. Morphology and Morphometric analysis of parotid gland were done in Department of Anatomy, Madras Medical College, Chennai. This valuable data is more useful in maxillofacial surgeries like parotid, gland surgery, parotid duct surgery and some facial cosmetic surgeries.

**Keywords:** Parotid gland, Parotid duct, Parotid space., cosmetic surgeries.

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## INTRODUCTION

The parotid gland is a major salivary gland in humans. It is named after Nicholas Steno [1638–1686], a Danish anatomist credited with its detailed description in 1660. It is a bilateral structure, and the largest of the salivary glands. It is wrapped around the mandibular ramus, and secretes saliva through the Stensen duct (or parotid duct) into the oral cavity, to facilitate mastication and swallowing and to begin the digestion of starches. The parotid glands are a pair of mainly serous salivary glands located inferior and anterior to the external acoustic meatus draining their secretions into the vestibule of oral cavity through Stensen duct or parotid duct.[1] Each gland lies posterior to the mandibular ramus and anterior to the mastoid process of temporal bone. The gland is effectively palpated bilaterally. Start anterior to each ear, move to the cheek area, and then inferior to the angle of the mandible.[2] The gland is roughly wedge shaped when seen superficially and is also wedge shaped when seen on horizontal sections. The parotid duct or Stenson duct is a long excretory duct that emerges from the anterior border of the gland, superficial to the masseter muscle. The duct pierces the buccinator muscle, then opening up into the oral cavity on the inner surface of the cheek, usually opposite the maxillary second molar.[4] The parotid papilla is a small elevation of tissue that marks the opening of the parotid duct on the inner surface of the cheek.[3] The gland has four surfaces superficial or lateral, superior, anteromedial and posteromedial. The gland has three borders anterior, medial and posterior. The Parotid gland has two ends: superior end in the form of small superior surface and an inferior end (apex). [1]

1. Superficial or lateral relations: The gland is situated deep to the skin. Superficial fascia, superficial lamina of investing layer of deep cervical fascia and Great auricular nerve (anterior ramus of C2 and C3).
2. Anteromedial relations: The gland is situated posterolaterally to the mandibular ramus, masseter and medial pterygoid muscles. A part of the gland may extend between the ramus and medial pterygoid as the pterygoid process. Branches of facial nerve and parotid duct emerge through this surface.
3. Posteromedial relations: The gland is situated anterolaterally to mastoid process of temporal bone with its attached Sternocleidomastoid and digastric muscles, styloid process of temporal bone with its three attached muscles (Stylohyoid, Stylopharyngeus and Styloglossus) and carotid sheath with its contained neurovasculature (Internal Carotid artery, Internal Jugular vein, 9th, 10th, 11th and 12th cranial nerves)[5].
4. Medical relations: The parotid gland comes into contact with the superior pharyngeal constrictor muscle at the medial border where the anteromedial and posteromedial surfaces meet. Hence there is a need to examine the fauces in parotitis.[6] These are from lateral to medial: (1) Facial nerve (2) Retromandibular vein (3) External Carotid artery (4) Superficial temporal artery (5) branches of the great auricular nerve[4].

## MATERIAL AND METHODS

A study of parotid gland was done in 15 cadavers in department of anatomy, Madras Medical College and Hospital, Chennai. The cadavers were numbered. The dissection of the parotid gland was done as per the anatomy manual on both the side. A vernier calliper was used to take measurements. Following parameters were noted: 1, shape 2, height in cms 3, width in cms, 4, from the angle of the mandible in cms-vertical and oblique 5, presence of accessory parotid gland 6, number of parotid duct. The vertical measurement of the apex of the gland from the angle was measured.

## OBSERVATION

The overall shape of the parotid gland is variable. In 70% of cases it is roughly triangular in outline when viewed from lateral side. In 30% cases the gland is more or less of even width throughout and the upper and lower poles are rounded. Usually it is inverted pyramidal form.

Table -1 showing the measurements of parotid glands in the cadavers. Table -1 shows that the parotid glands in cadavers 2, 3, and 4 were larger. The parotid glands in the remaining cadavers were normal. The right

parotid gland on the specimen 3 was the longest with 7.5cms. The left parotid gland in the specimen 6 was the widest- 5.4cms. The left parotid gland in the specimen 3 was maximally thick-3.55cms.

The presence of accessory parotid gland was looked for in all the cadavers. It was noticed in only one of the specimens. It was present unilaterally and below the parotid duct. Double parotid duct was present in a 35 year old female on right side. In left side only a single duct is seen.

**Table 1: showing the measurements of parotid glands in the cadavers.**

s.no	Height in cms		Width in cms		From the angle of the mandible in cms				Presence of Accessory parotid gland		Number of parotid duct	
	RT	LT	RT	LT	VERTICAL		OBLIQUE		RT	LT	RT	LT
1	4.2	5.2	3.6	3.3	0.42	1.3	1.19	1.5	Absent	Absent	1	1
2	4.3	5.1	3.5	3.2	0.41	1.2	1.18	1.4	Absent	Absent	1	1
3	4.9	5.8	3.9	3.8	0.48	1.8	1.29	1.9	Absent	Absent	1	1
4	5.8	7.5	3.81	4.0	1.0	2.01	1.62	1.5	Absent	Absent	1	1
5	4.72	5.73	3.9	3.8	0.95	0.5	1.2	1.31	Absent	Absent	1	1
6	5.6	6.0	6.1	5.5	0.96	1.0	1.1	1.32	Absent	Absent	1	1
7	5.92	6.7	4.7	4.5	1.8	1.7	1.1	1.32	Absent	Absent	1	1
8	4.1	5.1	3.8	3.4	0.46	1.6	1.23	1.2	Absent	Absent	1	1
9	4.2	5.2	3.6	3.3	0.42	1.3	1.19	1.5	Absent	Absent	1	1
10	4.2	5.0	3.4	3.3	0.40	1.1	1.18	1.4	Present	Absent	2	1
11	4.5	5.7	3.8	3.9	0.48	1.6	1.24	1.8	Absent	Absent	1	1
12	5.2	6.2	4.6	4.3	0.47	1.5	1.25	1.7	Absent	Absent	1	1
13	4.7	5.6	3.9	3.6	0.48	1.4	1.22	1.7	Absent	Absent	1	1
14	4.4	5.4	3.4	3.4	0.45	1.4	1.24	1.8	Absent	Absent	1	1
15	4.5	5.5	3.7	3.6	0.46	1.5	1.25	1.9	Absent	Absent	1	1

**DISCUSSION**

According to Juan Rosai [2004] lipoma rarely involves the parotid salivary glands. Levin PA et.al [1980], described in seven young women, the eating disorder of Bulimia and its association with benign, bilateral, painless parotid enlargement. Similar gland enlargement can be seen in person starving and coming to normal diet.[Sir James Watt,1977].As per the observations made by Chidananda KV et.al [2000], lipoma of the parotid gland constitute around 5% of all parotid tumors. A rare case report of lipoma of the parotid gland has been described by V.Srinivasan et.al [1996]. Zsuzsanna Suba et.al.[2005] stated that benign enlargements of the parotid gland have been associated with type 2 diabetes mellitus. Parotid enlargement has a wide differential given the significant breadth of pathology that can affect the parotid gland.[3] These can be separated by the standard surgical sieve approach into infective, inflammatory, immune, neoplastic, infiltrative and congenital causes. Infection- Mumps, tuberculosis, cat-scratch fever, syphilis, parotid abscess secondary to acute bacterial sialadenitis (acute parotitis), and HIV parotitis. Inflammatory - chronic recurrent sialadenitis, sarcoidosis, and benign lymphoepithelial lesions. Immune mediated - Sjogren syndrome (myoepithelial sialadenitis) and Mikulicz syndrome. Miscellaneous-sialolithiasis and sialosis. Neoplastic- benign -pleomorphic adenoma,Warthin tumour[8] (commonest bilateral tumour),parotid lipoma,[10]benign lymphoepithelial lesions (may be multiple and bilateral),facial nerve neurofibroma, parotid oncocytoma, parotid haemangioma and angioliipoma[9]. Oncocytic neoplasms comprise a group of rare tumours of the parotid glands, and their incidence represents approximately 1% of parotid neoplasms [7]. Oncocytomas are a rare group of neoplasms of the parotid gland which have been correlated to various viral infections.

**CONCLUSION**

From the above discussion, it can be concluded that the parotid gland and its duct variations study is more useful to surgeons and radiologists. Also this valuable data is more useful in maxillofacial surgeries like parotid gland surgery, parotid duct surgery and some facial cosmetic surgeries.



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