



A STUDY ON BILOBED PATTERN OF THE PAROTID SALIVARY GLAND IN FOETUSES.

¹Dr. K. Yesupadam and ²Dr. K.V.N. Geetha Devi

¹Associate Professor, Anatomy Department, Guntur Medical College, Guntur.

²Associate Professor, Anatomy Department, ACSR Govt Medical College, Nellore, AP, India.

*** Corresponding Author: Dr. K.V.N. Geetha Devi**

Associate Professor, Anatomy Department, ACSR Govt Medical College, Nellore, AP, India.

Article Received on 24/05/2016

Article Revised on 15/06/2016

Article Accepted on 06/07/2016

ABSTRACT

The parotid glands are paired salivary glands having complex structure because it is traversed by a number of structures and the facial nerve which forms a plane between the two lobes. The neurovascular bundle may get compressed between the two lobes when it is effected by infections like suppurative parotitis. Mumps is the most common viral infection that effect these salivary glands which is a severe painful condition. Sialoliths blocks the parotid duct leads stagnation of saliva, which in turn causes pressure on the structures within the substance of the gland. The above conditions, the benign and malignant growths need surgical treatment. The parotid surgeries require special attention because the surgical procedure which may damage the facial nerve, the 7th cranial nerve and it is traversed between the superficial and deep lobes of the gland. The study taken for its clinical importance and the surgeries on parotid glands for the infections, salivary stones & growths warrants the surgeons for the facial nerve injury which in turn results in paralysis of facial muscles. **Materials and Methods:** The study conducted in 50 foetal glands belongs to 25 dead fetuses which are formalin fixed specimens. The incisions given according to the Cunningham's practical manual of anatomy and the glands exposed, Capsule removed to observe the extent of gland and the structures radiating from it. The superficial lobe reflected back along the anterior border of the gland, the plane of facial nerve observed, the presence of deep lobe observed and the sizes noted. The number of isthmi observed and tabulated. The presence (or) absence of isthmus between superficial and deep lobes noted. **Results:** The present study all the 50 parotid glands consists superficial and deep lobes in between the facial nerve and its terminal branches traversed.

- 100% of foetal specimens shown lobar pattern with intervening facial nerve
- The larger deep lobe observed in 6 fetuses on both sides.
- The larger superficial lobe observed in 3 fetuses on both sides.
- The equal size lobes observed in 16 fetuses on both sides.
- Isthmi of the gland: 46 foetal glands out of 50 glands shown the single isthmus between the cervico facial & temporo-facial divisions.
- Presence of 2 isthmi on both sides in 2 foetal specimens noticed.

Conclusion:

100% of foetal glands presented lobar pattern.
24% of foetal glands presented with larger deep lobe.
12% of glands presented with larger superficial lobe.
64% of glands with nearly equal sized lobes.
The foetal glands shown 2 isthmi in 8% of specimens.
The foetal glands shown single isthmus in 92% of specimens.

KEYWORDS: Parotid glands, Superficial lobe, deep lobe, Isthmi.

INTRODUCTION

The parotid gland is the largest of the salivary glands, lobulated and yellowish brown in colour. It is a serous type of racemose gland. It is situated in a fossa bounded in front by the ramus of the mandible with masseter and medial pterygoid muscles, behind by the mastoid process of the temporal bone and a sternomastoid

muscle, above by the external auditory meatus below by the stylohyoid and posterior belly of digastric and medially by the styloid process of temporal bone. It is roughly pyramidal in shape. The gland is pyramidal in shape. The gland as a whole comprises of a superficial and a deep part connected by a narrow isthmus which

passes between two divisions (Cervicofacial and temporo-facial) divisions of the facial nerve.^[1]

The parotid gland shaped like an inverted pyramid and is about 25 grams in weight. It is invested by inner true and outer false capsules. The presenting parts are an apex (or) lower end; a base (or) upper surface, three surfaces superficial, anteromedial, postero-medial and three borders anterior, posterior and medial. The structures passing through the gland from outside to inside (a) Facial nerve and its branches, (b) Retro-mandibular vein and (c) external carotid artery. The gland is divided into superficial and deep parts (or) lobes by the branches of facial nerve. The lobes are connected by isthmus of glandular tissue so that the gland appears 'H' shape in coronal section, the branches of the nerve lie in the middle layer of parotid sandwich. This subdivision helps the surgeon to remove a parotid tumour leaving the nerve intact.^[2] Within the gland the branches of facial nerve run in different directions with their destinations and they do in different planes. There is no specific, developmentally determined plane in which the facial nerve branches pass between superficial and deep lobes of the gland; the parotid is an integral gland, not divided into lobes.^[3] The parotid salivary gland is wrapped around the ramus of the mandible divided into superficial and deep lobes by branches of the facial nerve.^[4] The gland divided by the facial nerve into superficial and deep parts and the parotid tumours should be removed by anatomical dissection of the gland leaving the nerve intact.^[5] The gland enclosed with in a capsule derived from the deep cervical fascia. Because the fascia is thick, dense and compactly encircling gland and the neurovascular structures get compressed by the swellings of the parotid gland caused by viral infections Eg:- mumps, bacterial infections, suppurative parotitis and produces severe pain.

The parotid duct is a thick walled tube which carries secretions of parotid gland to the oral cavity. parotid abscesses are more common in persons with bad oral hygiene and the infections are transmitted through parotid duct by retrograde mechanism. Parotid duct may get obstructed by sialoliths and the repeated obstructions can lead to parotid fistulas. The fistulas are more common due to external injuries to the gland and ductal system. The obstructions, strictures and the growths of the gland and duct can be identified by sialography. The study on parotid gland started about a century ago, Luscha 1862 placed emphasis on the topographic anatomy of the parotid area with details concerning the borders of the parotid gland, surrounding structures and the manner in which the facial nerve was to run through the substance of the parotid gland.^[6] Henle -1873 stated that the main divisions of facial nerve and its lesser branches become imperfectly split between an unusually deep lobe and a large superficial lobe.^[7] Testus- 1912 gave a stereotype description of the nerve in relation to the gland and stated that the branches attained more superficial position as they approached the periphery, the

primary divisions were said to be lodged in the deep part of the gland.^[8] Gregore -1912 established bilobed structure and believed that deep and superficial lobes were joined at the superior border.^[9] McWhorter -1917 confirm the bilobed nature of gland, but found the connecting isthmus situated not superiorly but centrally, being embedded above and below by two primary divisions of facial nerve.^[10] Previous accounts described the superficial lobe being larger of the two, 1946 Hurford states that in approximately half of his specimens the deeper lobe was found larger.^[12] Hamilton Bailey 1937, during surgery after coming across its superficial lobe, came to conclusion that the gland was a bilobed structure and the facial nerve lay not in the gland but between two lobes.^[11] Guidetti - 1947 in his study on surgical anatomy of parotid gland stresses on bilobed nature of the gland.^[13] Byans- 1952 stated that embryologically the parotid gland consists of two lobes the nerve lying between them.^[14] Becker. W. Brunson. H. 1958 while describing the microscopical structure of the gland confirmed the bilobed nature of the parotid gland.^[15] Gasser-1970 suggested the terms superficial and deep positions of the glands are appropriate than the terms superficial and deep lobes.^[16] 1985 Wang et. al operated 422 patients with parotid tumour and described the superficial and subfacial planes of the gland, enucleation of the gland is possible with these planes.^[17] In 2002 Jurkovic R, et al stated parotitis caused by salmonella choleraesuis varieties.^[18] Tanuja Shet. Et. Al 2006 studied 6 aspirates from 5 cases of acinar cell carcinoma and concluded Acinar cell carcinoma - papillary cystic variant carcinomas which are cystic in nature can be diagnosed by fine needle aspiration biopsy.^[19] The diseases of the parotid gland like parotid abscesses, benign growths i.e, Warthin's tumour, pleomorphic adenomas, malignant growths i.e., acinar cell carcinomas, salivary fistulas need surgical interventions and the surgical procedures may cause injury to facial nerve. The study regarding bilobed nature of the gland and the plane of facial nerve gives thorough knowledge for the surgeons to conduct parotid surgeries.

MATERIALS AND METHOD

The present study conducted in 50 parotid glands of 25 dead fetuses (15 male + 10 female). The dead fetuses collected from the Department of Obstetrics and Gynecology, Government General Hospital, Guntur over a period of 1 year 6 months. After brought to the department they were numbered 1-25 and they were injected with embalming fluid. They were preserved in the 10% formalin tank for about 3 months. After getting permission from the ethical committee work started, Incisions given according to the practical manual of Anatomy Cunningham's, exposed the gland, Capsule removed. The superficial lobe size observed and noted, the superficial part of the gland reflected laterally from the anterior border to observe the plane of facial nerve, then the deep lobe sizes were noted. During resection the number of isthmi noted and recorded.

RESULTS

All the 50 foetal glands presented with superficial & deep lobes, the facial nerve and the terminal branches traversed between the two lobes. The larger deep lobe observed in 12 foetal glands – 24%. The larger superficial lobe presented in 6 glands of 3 fetuses – 12%. The rest of 16 fetuses the 32 glands shown equal sized lobes – 64%.

Regarding Isthami

46 glands out of 50 glands shown single isthamus – 92%. The 4 foetal glands shown 2 isthami on both sides – 8%.



Figure No. 1 Showing Equal Sized Lobes



Figure No.2 Showing Larger Deep Lobe



Figure No.3 Showing Larger Superficial Lobe

TABLE – I: SUPERFICIAL AND DEEP PARTS AND SIZES OF THE LOBES

Specimen Number		Presence Of SL Small / Large	Presence Of DL Small / Large	Equal Sizes SL / DL
F1	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F2	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F3	R	Present / Small	Present / Large	--
	L	Present / Small	Present / Large	--
F4	R	Present / Small	Present / Large	--
	L	Present / Small	Present / Large	--
F5	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F6	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F7	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F8	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F9	R	Present / Small	Present / Large	--
	L	Present / Small	Present / Large	--
F10	R	Present / Small	Present / Large	--
	L	Present / Small	Present / Large	--
F11	R	Present	Present	Equal Size
	L	Present	Present	Equal Size

F12	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F13	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F14	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F15	R	Present / Large	Present / Small	--
	L	Present / Large	Present / Small	--
F16	R	Present / Large	Present / Small	--
	L	Present / Large	Present / Small	--
F17	R	Present / Large	Present / Small	--
	L	Present / Large	Present / Small	--
F18	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F19	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F20	R	Present / Small	Present / Large	--
	L	Present / Small	Present / Large	--
F21	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F22	R	Present / Large	Present / Small	--
	L	Present / Large	Present / Small	--
F23	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F24	R	Present	Present	Equal Size
	L	Present	Present	Equal Size
F25	R	Present	Present	Equal Size
	L	Present	Present	Equal Size

R – Right
L – Left
P – Present
S – Single
D – Double

TABLE – II: ISTHAMUS OR ISTHAMI BETWEEN SUPERFICIAL AND DEEP PARTS

Specimen No.		ISTHAMUS P / A	No. of Isthami
F1	R	Present	Single
	L	Present	Single
F2	R	Present	Single
	L	Present	Single
F3	R	Present	Double
	L	Present	Double
F4	R	Present	Single
	L	Present	Single
F5	R	Present	Single
	L	Present	Single
F6	R	Present	Single
	L	Present	Single
F7	R	Present	Double
	L	Present	Double
F8	R	Present	Single
	L	Present	Single
F9	R	Present	Single
	L	Present	Single
F10	R	Present	Single
	L	Present	Single
F11	R	Present	Single

	L	Present	Single
F12	R	Present	Single
	L	Present	Single
F13	R	Present	Single
	L	Present	Single
F14	R	Present	Single
	L	Present	Single
F15	R	Present	Single
	L	Present	Single
F16	R	Present	Single
	L	Present	Single
F17	R	Present	Single
	L	Present	Single
F18	R	Present	Single
	L	Present	Single
F19	R	Present	Single
	L	Present	Single
F20	R	Present	Single
	L	Present	Single
F21	R	Present	Single
	L	Present	Single
F22	R	Present	Single
	L	Present	Single
F23	R	Present	Single
	L	Present	Single
F24	R	Present	Single
	L	Present	Single
F25	R	Present	Double
	L	Present	Double

R – Right
 L – Left
 P – Present
 S – Single
 D – Double

DISCUSSION

The bilobed pattern of parotid gland is described by Indian authors TS Ranganathan & AK Dutta etc and the facial nerve lies between the two lobes. Last's text book of anatomy described the facial nerve branches passes in different directions to reach their destinations not in a specific plane. But in the present study it was observed the facial nerve and its terminal branches traversed through a plane between superficial and deep lobes. Ernest W. April text book of Anatomy, Lee Mc Gregor's Synopsis of surgical anatomy described about the superficial and deep lobes. Henle stated that the nerve passed between a unusual small deep lobe and larger superficial lobe. The present study shown 12% with larger superficial lobes which coincide with the study. Gregoire established the bilobed nature, Mc Whorter. G.L. confirmed it. Hurford stated that he found half of his specimens with larger deep lobe. Present study shown 24% foetal specimens shown the larger deep lobe. Hamilton Bailey 1937, Guidetti 1947, Byans 1952, Becker W. Brunnon H. 1958 & Gasser 1970 confirmed bilobed nature of parotid gland. The present study coincides with the statements of the above authors.

Regarding Isthmus

Gregoire established bilobed nature and believed that the deep and superficial lobes were joined at the superior border. Mc Whorter confirmed bilobed nature of gland but found the connecting isthmus situated not superiorly but centrally. The present study shown isthmus was centrally and it is confirmed the statement of Mc Whorter. Asim Kumar Dutta, TS Ranganathan text books described the isthmus is the glandular tissue which connects the superficial and deep lobes between the cervicofacial & temporo-facial divisions of facial nerve. The present study observed a single isthmus in 92% of specimens, 8% shown 2 isthami.

CONCLUSION

The present study 100% foetal parotid glands are bilobed in nature. 24% with larger deep lobes, 12% with larger superficial lobes, 64% with equal sized lobes. 92% glands are with single isthmus and 8% are with 2 isthami.

REFERENCES

1. T.S. Ranganathan – Text book of Human Anatomy 6th edition., 2005; 489–494.
2. Asim Kumar Dutta – Essentials of Human Anatomy Volume II. 4th Edition, 2005; 138–141.
3. Last's Anatomy Regional and applied – Chummy S. Sinnatamby 10th edition – Reprint 2001; 349–352.
4. Ernest. W. April – 1990 Anatomy – 2nd edition, 1990; 503.
5. Lee Mc Gregor's Synopsis of Surgical Antomy – 12th edition 3rd Indian Reprint, 1999; 367.
6. Luscha 1862 cited by Rcihard A. Davis, Rarry R. J. Anson, John. M. Budinger and Leroy L. E. Kurth 1956) – Emphasis on the Topographic Anatomy of Parotid area & Parotid gland.
7. Testus 1912 (cited by R.A. Davis 1956) gave a stereotype description of the nerve in relation to gland.
8. Henle 1873 cited RA Davis, RJ Anson J.M. Budinger and L.E Kurth 1956 stated that the divisions of facial nerve passes between superficial & deep lobes.
9. Gregoire 1912 (cited by RA Davis 1956) – Superficial and deep lobes joined by isthamus at superior border.
10. Mc. Whorter. G.L Anat. Rec. The relations of the superficial and deep parts of the gland to the ducts and to the facial nerve, 1917; 12: 149 – 154.
11. Hamilton Bailey 1937 – Come to Conclusion for bilobed pattern.
12. Hurford FR The surgical anatomy of the parotid gland BJS, 1946; 34: 186 – 187.
13. Guidetti – 1947 – Stressed bilobed nature of parotid gland.
14. Byans – 1952 – Stated that embryologically the parotid gland consists of two lobes, the nerve lying between them.
15. Becker. W and Brunnon H. 1958 – While describing microscopic structure of the gland confirmed bilobed nature of the parotid gland.
16. Gasser – 1970 – Suggested the terms superficial and deep positions of the gland are more appropriate than the terms superficial and deep lobes.
17. Wang et al – 1985 – Operated 422 glands with parotid tumour and described the superficial and deep planes of the gland, enucleation is possible with these planes.
18. Jurkovic, Guvan V, Satk I, Klokocnikova L. Parotitis caused by Salmonella Cholerasis varieties, 2002.
19. Tanujashet, Ratna Prabha G Hodke, Shubda Kane and Roshni Chinoy Au 2006 studied 6 aspirates from 5 cases of acinic cell carcinoma and concluded Acinic cell carcinoma -Diagnosed by fine needle aspiration biopsy.