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The Region of the Parotid Gland

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nerves. The motor infra-orbital nerves are comparatively of larger size, and consist of superficial and deep branches which pass forward over the masseter muscle to be distributed to the muscles beneath the lower margin of the orbit and about the mouth. The superficial branches supply the superficial muscles of the face and form sensory connections with the nasal and infra-trochlear nerves along the nose. The deep branches pass beneath the zygomaticus and levator labii superioris muscles, which they supply, and establish sensory connections with the infra-orbital branches of the superior maxillary nerve, forming the infra-orbital plexus, already mentioned. The cervico-facial nerve is joined within the parotid gland by sensory filaments from the auricularis magnus branch of the cervical plexus of nerves. It descends toward the angle of the jaw, and divides into the buccal, supra-maxillary, and infra-maxillary nerves. The motor buccal nerves pass over the masseter muscle to supply the buccinator and orbicularis oris muscles. They join with filaments of the infra-orbital motor nerves, and form sensory connections with the buccal branch of the inferior maxillary nerve. The supra-maxillary nerves pass beneath the platysma and depressor anguli oris muscles, which they supply. They establish sensory communications with the mental branch of the inferior maxillary nerve. The infra-maxillary nerves consist of several arching branches beneath the platysma muscle, which they supply, between the jaw and the hyoid bone. One of these branches is joined by the superficial cervical nerve from the cervical plexus (Plate 19, No. 27).

THE REGION OF THE PAROTID GLAND.

The parotid gland, so called because it is near the ear (Plates 13 and 18), is the largest of the salivary glands. It weighs from half an ounce to an ounce in different individuals, and is lodged in a pyramidal bed upon the side of the face, below and in front of the ear. Its external surface is firmly bound down by an extension of the fascia from the masseter muscle, which is here called the parotid fascia, and which serves to conceal the form of the gland from external view. The tough and unyielding nature of this fascia accounts for the intense pain often experienced in cases
THE REGION OF THE PAROTID GLAND.

of abscesses involving the gland, or in parotitis (mumps), from pressure upon the sensory nerves within the gland. From the inner layer of the parotid fascia prolongations extend into the substance of the gland, which partition off and support the lobules, the gland being of the compound racemose variety. The lobules consist of aggregations of small cæcal dilatations (the *alveoli*) of fine canals, which are lined with a layer of epithelial cells, and supported by the connective tissue which is continued inward from the surface of the gland, as above mentioned. The perilobular tissue contains lymph-spaces, which are in relation to the capillary vessels and ultimate nerve filaments which preside over the nourishment and secretory functions of the glandular structure. The canals are the excretory ducts of the lobules, which empty into the main duct of the gland, called the *duct of Stenson*, which leaves the gland at its anterior border on the masseter muscle. Stenson's duct is a firm white tube, the size of a goose-quill, and takes a parallel course to the zygoma in close relation to the transverse facial artery, on a line drawn from the external auditory meatus to a point midway between the ala of the nose and the angle of the mouth (Plate 18, No. 10). About the middle of this line the duct, after passing over the facial vein, turns abruptly inward around the anterior border of the masseter muscle and penetrates the buccal fat and the buccinator muscle, to open upon the mucous membrane of the mouth, opposite the second molar tooth of the upper jaw, by a narrow orifice. The saliva secreted by the parotid gland is an alkaline, watery fluid, which aids in the mechanical disintegration of the food and also possesses the property of converting starch into dextrin and grape sugar.

The space which the gland occupies is bounded above by the zygoma, below by the sterno-mastoid and digastric muscles, behind by the external auditory meatus and the mastoid process of the temporal bone. The gland is prolonged anteriorly over the ramus of the jaw and masseter muscle to a variable extent. It is often continuous with the structure of the submaxillary gland, but is usually separated from it by a fold of the deep cervical fascia, called the *stylo-maxillary ligament*. There is also an extension of the deep cervical fascia which is connected with the sheaths of the pterygoid muscles and the pterygoid process of the sphenoid bone.
PLATE 19.

The parotid gland removed from the left side of the face to show the branches of the facial nerve, and the fascia removed from the posterior cervical triangle to show more clearly the superficial cervical plexus of nerves.

1. The frontal muscle and branches of the frontal artery and supra-trochlear nerve.
2. The supra-orbital artery and nerve.
3. The anterior branch of the temporal artery.
4. The angular artery.
5. The compressor naris muscle.
6. The lateral nasal artery and vein.
7. The levator anguli oris muscle.
8. The zygomaticus major muscle.
9. The transverse facial artery.
10. The masticator muscle.
11. The superior coronary artery.
12. The inferior coronary artery.
13. The facial artery and vein.
14. The depressor anguli oris muscle.
15. The carotid artery covered by its sheath.
16. The transverse cervical nerve, passing beneath the external jugular vein.
17. The sternohyoid muscle.
18. The interspace between the sternal and clavicular portions of the sternomastoid muscle.
19. The posterior branch of the temporal artery.
20. The auriculo-temporal nerve.
21. The temporal branches of the facial nerve.
22. The temporal artery.
23. The remains of the parotid gland, dissected away to show the relations of the facial nerve, and the pes anserinus.
24. The vessels and nerves to the buccinator muscle.
25. The splenius capitis muscle.
26. The auricularis magnus nerve.
27. The cervical branch of the facial nerve.
28. The occipital artery.
29. The trapezius muscle.
30. The occipitalis minor nerve.
31. The spinal accessory nerve.
32. The descending cervical nerves (sternal, clavicular, and acromial branches).
33. The scalenus medius muscle.
34. The external jugular vein.
35. The supravclavicular fossa, occupied with fat and superficial veins.

N. B.—The transverse facial artery in this instance supplies the coronary arteries which usually arise from the facial artery proper.
The gland is therefore in a measure enclosed in a fascial envelope. This is normally very thin over the deeper parts, but when the gland is affected with any chronic morbid enlargement it is thickened, and may be then more properly regarded as a sac. There is, furthermore, a peculiar invagination of the deep cervical fascia between the anterior surface of the styloid process and the posterior border of the external pterygoid muscle, which reaches to the wall of the pharynx, so that in post-pharyngeal abscess there is often an external swelling in the parotid region. In several cases in the author's experience, where the pharyngeal abscess was so large that it was feared the evacuation of the pus through direct incision by the mouth might lead to suffocation by its entering the glottis, external drainage was established by careful dissection down to the stylo-maxillary ligament and tapping the space above referred to just below the lower border of the parotid gland.

The dimensions of the space occupied by the gland vary with the movements of the lower jaw, and with the changes in its angle peculiar to infancy and to old age. In the two latter instances it is naturally increased at its lower part, owing to the obliquity of the angle, and it is also increased when the head is extended and the jaw moved forward. When the head is flexed it is diminished.

The relations of the parotid gland are of the greatest importance from a surgical point of view, as its removal, when diseased, is one of the most difficult and hazardous of surgical undertakings. The skin and superficial fascia over this region are loose and movable, and contain some fibres of the platysma muscle in the lower part. In the connective tissue between the superficial fascia and the deep or parotid fascia there are a few branches of the superficial cervical plexus of nerves, and several lymphatic glands, which receive the lymphatic vessels from the neighboring portion of the scalp and the superficial tissues of the face (Plate 16). These are the extra-parotid lymphatic glands, the enlargement of which by disease constitutes a form of false parotid tumor. There is another species of lymphatic tumor in this region which is very difficult to distinguish from enlargement of the gland itself, owing to the involvement of the intra-parotid lymphatic glands. These are usually two or three in number, though sometimes
only one, and receive the lymph from the deep temporal and maxillary structures accompanying the vessels into the interlobular spaces within the gland.

The deep surface of the parotid gland is very irregular, consisting of projections of its substance which fit into the spaces between the subjacent parts. These projections, which extend from the main body of the gland, are known respectively as the glenoid lobe, which is received into the portion of the glenoid fossa of the temporal bone not occupied by the condyle of the lower jaw, and limited anteriorly by the Glaserian fissure and posteriorly by the vaginal process; the pterygoid lobe, which projects behind the ramus of the jaw, between the two pterygoid muscles and internal to the internal maxillary artery; the carotid lobe, which is in relation to the base of the styloid process, and interposed between the external carotid artery and the internal carotid artery and internal jugular vein; and the masseteric lobe, or socia parotidis, which is of variable size, and lies upon the masseter muscle, usually above Stenson's duct, into which it opens by a separate duct.

The external carotid artery, at the angle of the jaw, gives off the posterior auricular artery and continues upward under the parotid gland for about two-thirds of its extent, and opposite the neck of the jaw it enters the gland, and, tunnelling through its substance, emerges at the upper border, where it is called the temporal artery. Just before quitting the gland the external carotid gives off the internal maxillary artery, which passes behind the ramus of the jaw; while the temporal artery in immediate relation with the upper border of the gland sends off the transverse facial branch (Plate 18, No. 9). The lower part of the internal surface of the gland is separated from the external carotid artery by the confluence of the temporal and internal maxillary and posterior auricular veins, which empty into the external jugular vein at its commencement in the neighborhood of the angle of the jaw. The upper part of the gland, through which the external carotid artery passes, is in immediate relation with the internal carotid artery and the internal jugular vein (Plate 22, Fig. 2), and interior to these vessels are the pneumogastric, spinal accessory, hypoglossal, and glosso-pharyngeal nerves (Plate 36). The facial nerve
enters the parotid gland at its posterior border, on a line with the entrance of the external carotid artery, and divides into the temporo-facial and cervico-facial nerves, which, branching between the lobules of the gland, form the *pes anserinus*, and emerge at the superior and anterior borders, to be distributed to the region of the face (page 129). The auriculo-temporal branch of the inferior maxillary nerve penetrates the gland behind the neck of the jaw, and the auriculo-parotidian branch of the auricularis magnus nerve, from the cervical plexus, enters it near the lobe of the ear (Plate 19, No. 20). Both of these nerves supply sensation and form connections with the facial nerve within the substance of the gland; and in rapidly-growing tumors of the gland, not only is facial paralysis apt to occur from pressure on the facial nerve, but the pain is often referred to the parts supplied by the auriculo-temporal nerve, viz.,—the pinna, the temple, the meatus, and the temporo-maxillary joint.

From the above description it will be understood that it is the upper part of the gland which extends most deeply toward the base of the skull and involves structures of vital importance.

In some dissections the inward projections of the gland have been found to reach such a depth, and their adhesions to be so general to hard and soft structures alike, that an enucleation or extirpation of the entire glandular mass would seem to be a well-nigh impossible task; but it has not proved such in the hands of some bold enough to undertake it, and their success has been due to the most exact knowledge of this complex region, alike in its normal condition and in the possible changes which disease may occasion in the parts, a precision of knowledge which is probably required by no other operation in surgery. The tendency of most morbid growths of the gland is outward, in spite of the resistance of the parotid fascia, and the deep portion, although the fascia over it may be thickened by inflammation, is apparently drawn forward. This statement is based upon the author's clinical observation, and the opportunity afforded him of examining a scirrhous parotid on the dissecting-table. The cavity of the wound after complete extirpation of the parotid was found to be larger at the bottom than at the surface. The styloid process, quite uncovered by the removal of the little muscles which are attached to it, projected
into the back part of the cavity; and the internal carotid artery and internal jugular vein, with the hypoglossal, glosso-pharyngeal, and pneumogastric nerves, were at the bottom of the wound, covered by a thin layer of fascia.

THE DEEP STRUCTURES OF THE FACE.

The deep structures of the face, included in the pterygo-maxillary and superior maxillary regions, are of great surgical interest, owing to the importance of their relations and connections. The external landmarks of the pterygo-maxillary region (Plates 1 and 28) are the prominences of the zygoma and lower jaw. Within the mouth the finger can detect, through the mucous membrane, the contour of the ramus of the jaw and its coronoid process and their relations to the external pterygoid plate of the sphenoid bone. The zygoma is subcutaneous, and its prominence depends upon the development of the malar bone, the buttress of the cheek. The attachment of the superficial and deep fibres of the masseter muscle to the under and inner surface of the zygomatic arch have been described (page 122), as have also the relations of the transverse facial artery, the duct of Stenson, and the branches of the facial nerve, which radiate from the anterior border of the parotid gland (page 131). Under these parts, surrounded by some loose fat, is the coronoid process of the lower jaw, with the insertion of the temporal muscle (page 14). The sigmoid notch separates the coronoid process from the condyle of the jaw, which articulates with the anterior portion of the glenoid cavity of the temporal bone, forming the temporo-maxillary joint. This is an arthrodial joint, and is provided with an inter-articular fibro-cartilage, which is of oval form and thicker at its margin than at its centre. Between the fibro-cartilage and the glenoid cavity there is a pouch of synovial membrane, and interposed between the fibro-cartilage and the condyle of the jaw is another, smaller pouch of synovial membrane. Sometimes these pouches are connected through a deficiency in the centre of the fibro-cartilage. The fibro-cartilage serves as a buffer to prevent shock in the violent closing of the jaws and thus ward off injury to the brain through the thin bony plate of the glenoid cavity.