

Anatomy of the Mandibular Ramus of the Facial Nerve-based upon a study of 126 cervicofacial halves

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This paper presents the anatomical data relating to the mandibular ramus of the facial nerve, studied by gross meticulous dissection on 126 cervicofacial halves of cadavers, of either sex and of age groups of 30-75 years, made available in the Department of Anatomy, Govt. Medical College, Patiala, India. While reviewing, the anatomy of this nerve, it was observed that the description given in the standard text books of anatomy, including those of surgical anatomy, is rather fragmentary and inadequate and is not in conformity with the present data. The ramus and the body of mandible is a locale of varied surgical manoeuvres, and as such the easy vulnerability of this nerve results in a most pathetic facial deformity, affecting both the physical and psychological make up of the individual, due to the paralysis of these groups of muscles that act upon the lower lip, namely, the mentalis, the depressor labii inferioris, the depressor anguli oris and the orbicularis oris, which in additions to this nerve, also derives motor filaments from the lower deep division of the buccal branch of facial nerve. Further, the facial disfigurement is also manifested on the healthy side, when

the patient speaks, laughs or smiles as the undamaged muscles acting as sphincter or dilator groups of oral orifice are devoid of restraining influence exerted by the opposite paralysed muscles. To correct these deformities various reconstructive techniques that aim in producing moderation of those groups of muscles innervated by this ramus, as well as by buccal branch, through denervation, muscular resection or a combination of both these procedures are contemplated. However, in recent years, an emphasis is being laid that a direct approach to the depressor labii inferioris and the resection of nerve fibres that lie superficial to it achieves the object. The significance of this nerve ramus marginalis mandibularis may be further noted in fractures involving the ramus and body of mandible and in the operative procedure of meloplasty which aims in the removal of redundancy of the skin of face. In view of these facts, this study has been undertaken and is hoped findings thus worked out will lay a sound foundation of anatomical data for the benefit of specialists handling the facio-maxillary injuries and the problems of facial palsy.

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Observation

The course and relations of nerve can be studied under the following headings :-

1. Derivation :

Topographical relation of facial nerve, as it emerges from the stylomastoid foramen in company with the stylomastoid branch of posterior auricular artery is fairly constant, as it is situated between the base of styloid process and the tip of mastoid process. Here the nerve presents glistening white appearance, the diameter of which varies from 1.5mm. to 4. mm. with an average of 1.75 mm. Immediately on its exit, it gives off three branches which are distributed to auricularis posterior, occipital belly of occipito-frontalis, posterior belly of digastric and stylohyoid muscles. The precise origin and course of these branches is variable and shall be presented in the next communication. Then it curves forward and laterally around the lateral aspect of the styloid process to enter the postero-medial aspect of parotid gland, where it typically bifurcates into division : temprofacial and cervicofacial. These divisions branch in the substance of gland in variable fashion, producing terminal nerve distributions. The study points out that not uncommonly the ramus is contributed by the cervicofacial division.

2. Relation at angle of Mandible :

Almost invariably (79%) it is placed below and behind the angle of mandible, the distance varying from 0.5 cm. with an average of 0.75 cm. In this situation it lies superficial to the stylo-mandibular ligament close to its attachment to the gonion. The

ligament can be well recognized and forms an important topographical relation in intervening between the two salivary glands parotid and submandibular. In 4% of the series it was just abutting the angle while in the remaining series (17%) it was masked by the gonion, when angle was characteristically everted. The study reveals that in great majority of cases (84%) it is represented by a single fasciculus, while in the remaining series, it be double (8%) triple (6%) or quadruple (2%). Thus the classical description that it is represented by a solitary fasciculus is not substantiated by the investigation.

3. Relation with Retromandibular Vein :

The retromandibular vein issuing from the lower pole of parotid gland forms a relation of great practical importance, as in the operative field this vessel can be easily identified. In 72% of specimen, the ramus, crosses the superficial aspect of the vein, while in the remaining series it was deep to it in 18% and embraced it in 10% of specimens.

4. Relation with Inferior Border of Mandible

When the ramus is represented by a solitary fasciculus, it commonly strikes lower border (84%). However, when there are more than one fasciculus one usually lies on the external surface of mandible at a distance of about 0.5 cm. from its inferior margin and the other usually loop down for a variable distance in the digastric triangle before ascending upwards to cross the mandible at the antero-inferior angle of masseter muscle.

5. Relation at the antero Inferior Angle of Masseter :

Here the ramus divides in to number of of branches, that insinuates between the facial artery and its corresponding anterior facial vein and lie both superficial and deep to these vessels. Further, its terminal twigs pass and deep to the depressor anguli oris and superficial to depressor labii inferioris and mentalis muscles. It has been observed the terminal ramifications may lie on, above or below the mental foramen, which itself presents significant variations in its appearance, number and situation. The study reveals that there is no anastomosis between the terminal ramification of this ramus with that of the buccal branch of facial nerve, which could provide an alternative path of innervation to the musculature of the lower lip in the event of injury to the mandibular ramus. The anatomical data, thus worked out are not influenced by age or sex and the presentations are not bilaterally symmetrical.

Summary :

This paper presents the anatomical data relating to the mandibular ramus of facial nerve studied by meticulous dissection on 126 cervicofacial halves of cadavers. While reviewing the applied anatomy of this nerve

it was observed that the description given in the standard text books of Anatomy including those of Surgical Anatomy is rather fragmentary and inadequate and is not in conformity with the present data. The nerve is constantly a branch of cervicofacial division of facial nerve and has been invariably found a little below and behind the gonion. However, it was observed abutting the angle or even placed deep to it when the angle is everted. The ramus is not a solitary fasciculus but is made up of a number of filaments inter-communicating with each other before converging to form a single, a double or even triple twigs. In relation to the external surface of body of mandible, it may lie either on the outer surface just above the lower border or all along its inferior border and sometimes even looping down in the diagastric triangle with its terminal part ascending upward to enter the facial region at the antero-inferior angle of the masseter muscle. Here it is closely related to facial artery and its accompanying anterior facial vein, with its ramifications in between these structures to end in the muscles acting on the lower lip.

The variation in the anatomical data thus worked out will add to the knowledge of those dealing with problems like facial palsy and like wise the specialists handing the facio-maxillary injuries.