DIAGNOSTIC PROCEDURES OF FACIAL NERVE PALSY

ESSAY

Submitted in Partial Fulfilment for the Master Degree

in

E. N. T.

By

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ERRATUM

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Contents	infratempora	infratemporal
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15	tympanic	tympani
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69	eniculate	geniculate
75	synkynesia	synkinesia
76	very	vary
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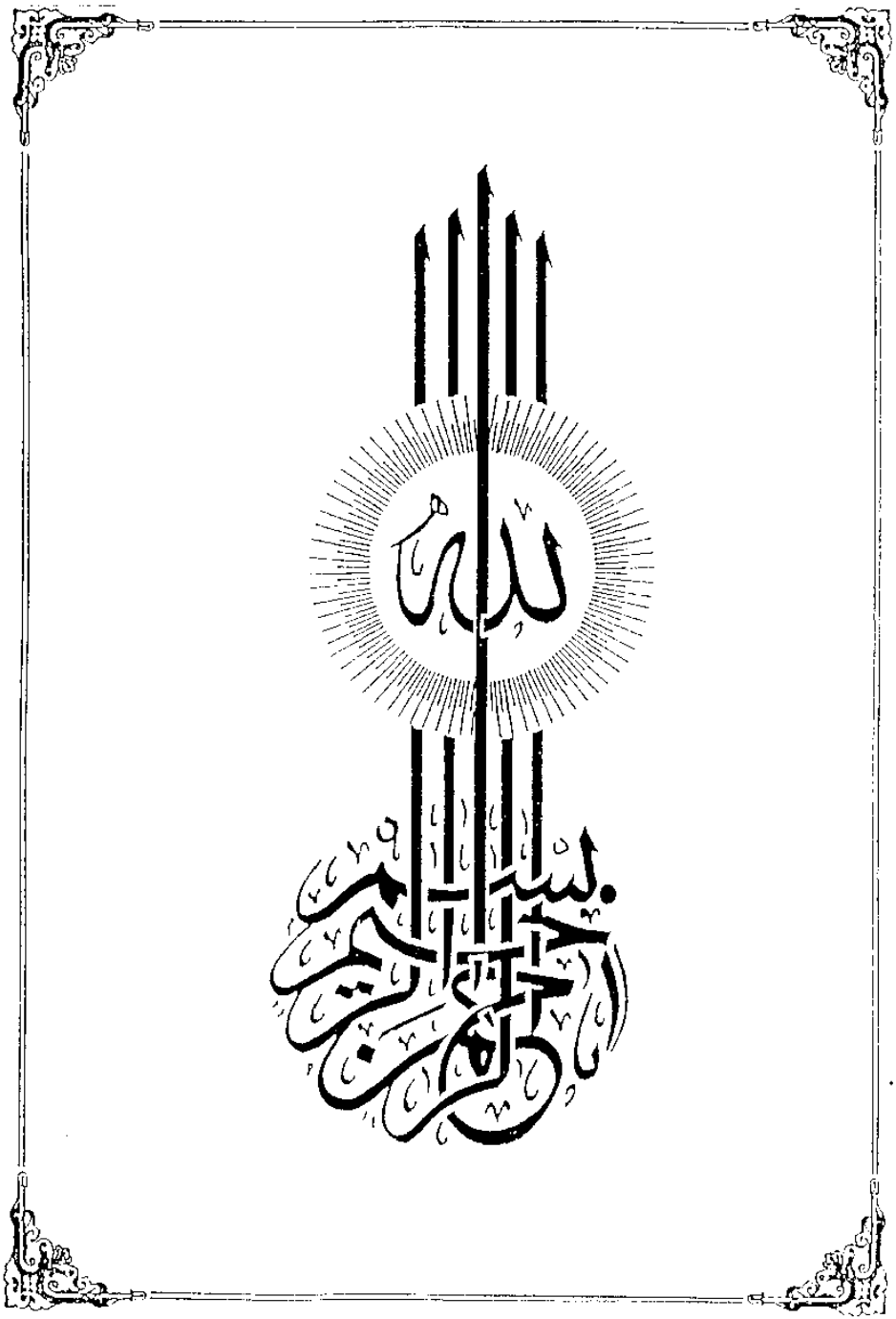

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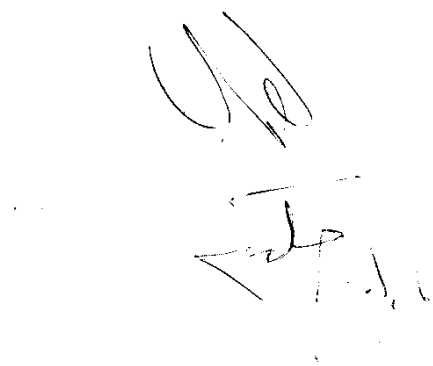

C O N T E N T S

INTRODUCTION

I N T R O D U C T I O N

Facial nerve palsy is one of major problems facing an E.N.T. practitioners, especially in evaluation of cases as regard, etiology, patnology, localization of the site of lesion, management and prognosis.

In this Essay we try to give spot lights on the recent tecnnical methods for early diagnosis of facial nerve palsy so that we can determine the best line of treatment, whether conservative or surgical.

ANATOMY OF THE FACIAL NERVE

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General Consideration.

The anatomy of facial nerve is particulary interesting because this nerve has the longest and most tortuous course in bone of any cranial nerve, and also because it subserves a variety of functions, these functions have been the subject of discussion over the years and some areas of uncertainty still persist (Diamond, 1979).

Bell (1829) established the distinction between the sensory nerve of the face (fifth nerve) and the motor nerve of the face (seventh cranial nerve), and he held the view that facial nerve function was principally respiratory, and called it respiratory nerve of the face. By establishing that the principal function of the nerve was motor, he helped to end the practice prevalent at that time of cutting the facial nerve for relief of tic douloureux.

Embryological Consideration.

The embryological development of facial nucleus explains the complex arrangement of motor fibres in the pons. Grosby and De Jonge (1963), described cells of nucleus as being clustered or grouped along the intra pontine part of facial nerve.

Topographically the facial motor nucleus is a complex of small nerve cell groups, lateral, intermediate and medial, which have been identified in various mammals including man (Papez and Comp, 1927). The nucleus initially lies in the floor of the fourth ventricle cephalic to sixth nerve nucleus, after establishing of the fibres it undergoes a migration first caudally and dorsally to the abducent nucleus, and then ventrally to reach its final position, this migration was explained by neurobiotaxis theory, according to this theory the nucleus tend to remain as close as possible to its predominant source of stimulation and will migrate in the direction from which the greatest density of stimuli originate.

On this basis the facial nucleus is attracted towards the spinal tract of trigeminal and its nucleus. The abducent nucleus is drawn forwards towards the position occupied by the other eye muscle nuclei and it carries the facial root fibres in front of it as it advances. The jend is formed in this way (Droogy and De Jonge, 1903). (Fig. 1)

Branchial Arch System.

The nucleus of facial expression originates from the second (hyoid) arch, and the nerve of the second arch is the facial nerve.

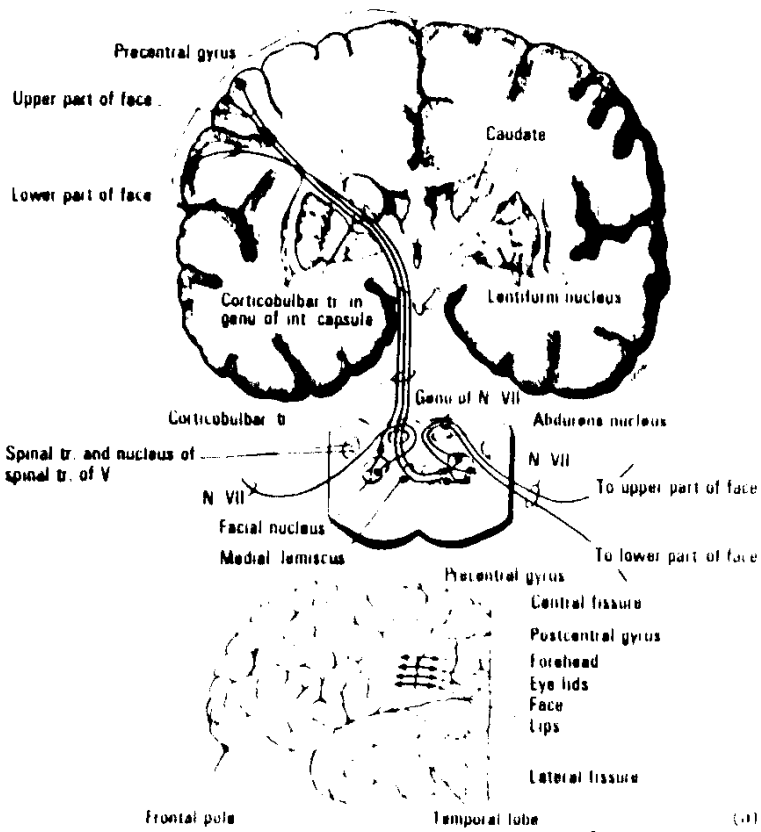

Fig. 1 : Supranuclear pathways: (a) Diagram illustrating the corticobulbar pathway from the motor 'face' area of the cerebral cortex to the facial nucleus. The projection (largely by way of intercalate neurones) is bilateral to the lower part of the facial nucleus, which innervates the muscle of the upper part of the face. The projection is unilateral (contralateral) to the upper part of the facial nucleus, which innervates the muscles of the lower part of the face

The diagram of the lateral wall of the hemisphere (which is in the lower part of the figure) shows the motor areas in the precentral gyrus and sensory areas in the postcentral gyrus associated with the different parts of the face. (Crosby and De Jonge 1963)

Each arch also receives a branch from the nerve of the arch caudal to it, and this branch is called pretrematic branch. The chorda tympani nerve is the pretrematic nerve of the first arch and Jacobsen's nerve (tympanic branch of glossopharyngeal) is the pretrematic nerve of the second arch.

This explains why in the adult the chorda tympani nerve leaves the facial nerve to loop over the tympanic cavity (which incorporates the first pouch) to join the lingual division of the mandibular nerve (Last, 1973).

Relationship to the Parotid Gland.

Bailey (1947) reported that the parotid gland is a simple bilobed structure united by a single isthmus, which contains all the ducts that pass between the two lobes, the temporofacial and the cervicofacial trunks embrace the isthmus and no part of the facial nerve runs actually in the gland substance, instead all the branches lie in a plane between the two lobes.

This arrangement of the nerve in the gland was described by Bailey as "the meat in a parotid sandwich".

He stated that the anatomical classics are inaccurate in their descriptions of the facial nerve, and that the nerve

does not sink into the main body of the gland and then divides within the parenchymus. He was supported by the anatomists Hamilton and Harrison (1971). If this was true, then surgical removal of the parotid gland with preservation of the facial nerve ought to be a very simple matter. However, Patey and Ranger (1957) found no evidence to support the bilobar concept of the parotid gland.

McKenzie (1948) demonstrated by injection of ducts, that these ducts passed between the superficial and deep parts of the gland through several gaps in the facial nerve plexus, he concluded that the gland interdigitates with the nerve in an inconstant manner.

He also suggested that the terms "superficial and deep portions" of the parotid were more appropriate (these terms have now been accepted by Nomina Anatomica (1966), if Mc Kenzie is correct, Parotidectomy with preservation of the facial nerve becomes a more difficult surgical problem.

Gasser (1970) in his embryological studies of the parotid gland and its development around the facial nerve reinforce the work of McKenzie. He reported that a complete cleavage plane through the gland primordium with

a single mass of ductules (single isthmus) was never observed. The main branches or ducts generally passed superficial to the facial nerve and its cervicofacial division but deep to temporofacial division, further subdivision of the gland ducts took place between the terminal branches of the facial nerve with which they interwined. (Fig. 2).

Upper Motor Neurons.

The primary motor cortex for the face is in front of the central fissure in the precentral gyrus, fibres from these cortical cells pass without synapse in the corticobulbar tracts to the motor nucleus in the pons (Fig. 3), the majority of these fibres descend and cross the midline to synapse in the contralateral motor nucleus, some fibres descend without crossing to innervate the sub nuclei responsible for the periorbital and frontalis muscles, the subnuclei for the lower half of the face receive contralateral corticobulbar fibres only (Last, 1973).

There are a number of additional cortical motor areas to the facial nucleus which contain numerous synapses, some of these synapses are located in the hypothalamus basal ganglia and mid-brain tegmentum, (Fig. 4).