

BELL'S PALSY

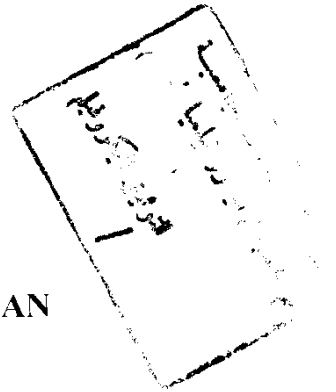
An essay

Submitted for partial fulfillment of
the Master degree in
Otorhinolaryngology

By

MOHAMMED FAYK HASSAN

(M.B., B. Ch.)



61314

617.52
M. F.

Supervised by

Prof. Dr. **ABD EL-REHEM SARWAT**

Professor of otorhinolaryngology

Faculty of Medicine

AIN SHAMS University



Dr. **HASSAN WAHBA**

Lecturer of otorhinolaryngology

Faculty of medicine

AIN SHAMS University



1994

الله

سُبْحَانَكَ اللَّهُمَّ الْحَمْدُ

الحمد لله الذي هدانا لهذا
وما كنا لنهتدي لولا أن هدانا الله

صدق الله العظيم

سورة الأعراف
من الآية "٤٣"

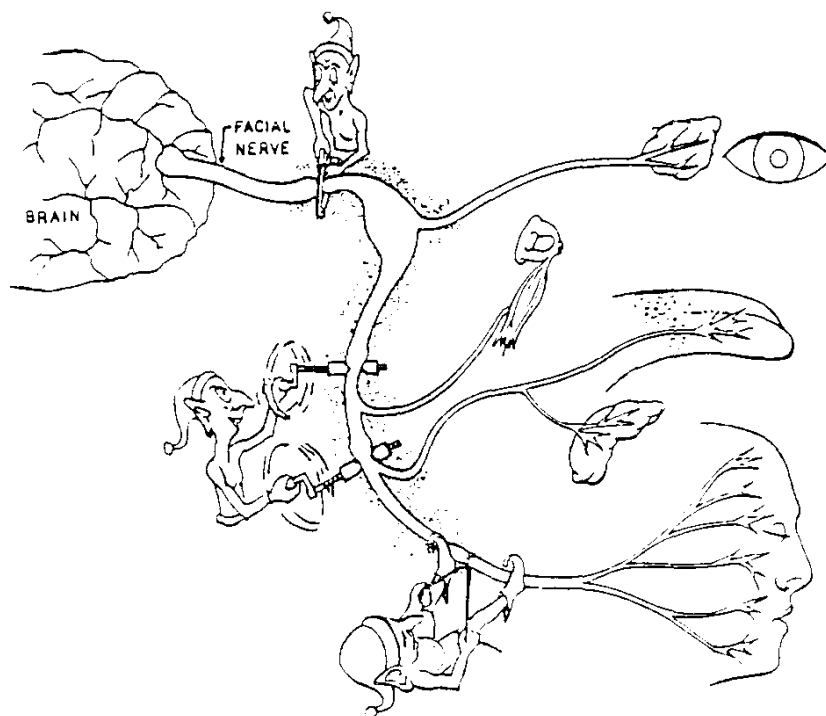


ACKNOWLEDGEMENT

I would like to express my deepest gratitude to professor Dr. ABD EL-REHEM SARWAT, Professor of Otorhinolaryngology, Faculty of Medicine, Ain Shams University , for his kind supervision, generous guidance and valuable advices.

I am also most grateful to Dr. HASSAN WAHBA, Lecturer of Otorhinolaryngology, Faculty of Medicine, Ain Shams University , whose tolerant guidance and constructive criticism have been of much help and value in the preperation of this work.

Fayek . M.



"To decompress or not to decompress, that is the question"

(Marsh and Coker, 1991)

Contents

. Introduction and Aim of the Essay -----	1
. Embryology of the Facial Nerve -----	3
. Anatomy of the Facial Nerve -----	6
. Normal Variations of the Facial Nerve -----	26
. Surgical Landmarks of the Facial Nerve -----	30
. Microanatomy of the Facial Nerve -----	33
. Neuropathology of the Facial Nerve -----	37
. Causes of Facial Paralysis -----	46
. Diagnostic Criteria of Bell's Palsy -----	48
. Electrodiagnostic Tests of Bell's Palsy -----	62
. MRI of Bell's palsy -----	87
- Future Imaging of the Facial Nerve -----	98
. Histopathology of Bell's Palsy -----	101
. Aetiology of Bell's Palsy -----	105
. Medical Managment of Bell's Plasy -----	114
. Future Medical Mangement of Facial Paralysis -----	117
. Surgical Management of Bell's Plasy -----	120
. Rehabilitation of the Paralyzed Face -----	131
. Summary and Conclusion -----	145
. Reference -----	148

List of Tables

Table No.		Page
1	Numbers and Percent of Different Causes of Facial Paralysis.	46
2	The Six Point Grading System of House.	58
3	Conversion of the Movement Score to The Six Point Grading System.	59
4	The Forty Full Mark Grading System.	61
5	Correlation Between Injury, Pathology, EEMG Response, and Expected Recovery of Facial Paralysis.	75
6	Hydrogen Concentration in Body Tissues.	90
7	Review of the Medical Literature as Regards the Histopathologic Reports of the Facial Nerve in Bell's Palsy.	102
8	Polyneuropathy in Bell's Palsy.	106
9	Criteria of Middle Cranial Fossa Decompression of the Facial Nerve in Bell's Palsy.	128

List of Figures

Figure No.	Page
1 Temporal Bone of Premature Infant.	5
2 Divisions of the Facial Nerve.	7
3 Fundus of the Internal Auditory Canal.	10
4 Schematic Diagram of the Course of the Facial Nerve.	13
5 Vertical Segment of the Facial Nerve.	17
6 The Facial Nerve at Its Exit from the Stylomastoid Foramen.	20
7 Pes Ansirinus and the Terminal Branches of the Facial Nerve.	23
8 Location of the Bony Dehiscences of the Facial Canal.	27
9 Classification of Nerve Injury.	42
10 Types of Nerve Injury in Bell's Palsy.	45
11 Causes of Facial Paralysis.	47
12 A 17 Years Old Patient with Bell's Palsy.	51
13 Natural History of Bell's Palsy.	57
14 Measurment of Facial Movements.	60
15 The Various Diagnostic Tools for Location of Facial Nerve Lesions.	63
16 Site of Stimulation and CAP of ENoG.	72
17 The Expected Recovery of Bell's Palsy in Relation to Rate of Degeneration.	74

Figure No.		Page
18	Antidromic and Orthodromic Action Potentials.	81
19	Axial View on MRI of the Facial Nerve in Bell's Palsy.	95
20	Coronal View on MRI of the Facial Nerve in Bell's Palsy.	96
21	Three Dimentional Image of the Facial Nerve.	99
22	Normal Fibres Within the Facial Nerve.	104
23	Histopathologic Picture of the Facial Nerve in Bell's Palsy.	104
24	Transmastoid Decompression of the Facial Nerve.	122
25	Middle Cranial Fossa Decompression of the Facial Nerve.	124
26	Cross Facial Nerve Grafting.	134
27	The Hypoglossal Facial Cross-Over.	136
28	Temporalis Muscle Transposition.	139
29	Masseter Muscle Transposition.	141
30	Gold Weight for Facial Reanimation.	143

*INTRODUCTION
AND
AIM OF THE ESSAY*

INTRODUCTION AND AIM OF THE ESSAY

Bell's palsy is a continuously vivid area for research, with continuous new ideas, theories and trends for management.

In fact, Bell's palsy is still a problem facing otologists all over the world because of the fact that the exact site and pathology of the lesion is not clearly determined and its management is still controversial (*Mattox, 1991*).

Therefore, updating of this disease is extremely necessary for the proper understanding, diagnosis and management.

The aim of this study is to discuss the following items:

1- The anatomy of the facial nerve:

The course of the facial nerve from its origin in the human brain stem to its end fibres in the muscles of the face, will be reviewed in detail.

The surgical landmarks which are used to lead the surgeon safely to the facial nerve will also be discussed.

2- Pathology of Bell's palsy:

There are many theories and ideas regarding the pathology and pathogenesis of Bell's palsy.

Nowadays, there are evidences that verify the hypothesis that the disease results from a viral geniculate ganglionitis (*Adour, 1991*).

3- Clinical picture of Bell's palsy:

The clinical picture of Bell's palsy and related conditions will be reviewed, the focus will be on the differentiation of other causes of acute facial palsy from Bell's palsy.

4- Management of Bell's palsy:

A) Proper diagnosis:

The diagnosis no longer needs to be one of exclusion, we now are capable of establishing a positive diagnosis (*Adour, 1991*).

B) Medical treatment:

The different treatment philosophies will be discussed, with focus on corticosteroids and antiviral therapy.

C) Surgical treatment: Disregarding the numerous theoretic causes, many evidences show that, entrapment of the nerve occurs at the meatal foramen of the fallopian canal resulting in ischemia and degeneration (***Marsh; Cocker, 1991***).

This essay will review the various ideas regarding the benefits of facial nerve decompression.

D) Rehabilitation of the paralyzed face:

A wide range of surgical techniques exist for establishing partial rehabilitation of facial expression and motion. These techniques will be reviewed as well.

*EMBRYOLOGY
OF
THE FACIAL NERVE*

EMBRYOLOGY OF THE FACIAL NERVE

Embryologic studies of the facial nerve help to determine the aberrant course that the facial nerve may take in patients who have congenital anomalies.

Knowledge of the embryology helps to understand these anomalies which can be found in any patient during otologic surgery (*Sataloff, 1990*).

The facial nerve develops within the second pharyngeal arch during the time that the adjacent derivatives of the first arch, first pharyngeal cleft and first pharyngeal pouch are forming the external and middle ear regions.

Therefore, anomalies of the facial nerve within the temporal bone should be anticipated whenever there is an associated malformation of the external or middle ear.

For example, if the stapes or the incus is deformed the surgeon should be on guard for a possibly misplaced or exposed facial nerve (*May, 1987*).

The development of the facial nerve can be studied in two parallel lines, the facial nerve itself and the facial canal.

Development of the facial nerve:

Early in the intrauterine life, the facial nerve starts its development by collection of neural crest cells which can be identified by the end of the third week of gestation.

Two weeks later, the facial motor nucleus appears, and by that time the chorda tympani nerve and the greater superficial petrosal nerve are identifiable.

The geniculate ganglion appears during the seventh week, the nerve to stapedius and the extracranial branches of the facial nerve appear during the eighth week.

Finally, by the end of the eighth week, all the rest of the terminal branches of the facial nerve develops (*May, 1987*).

Development of the facial canal:

The labyrinthine portion of the facial canal is formed by the cartilagenous otic capsule which starts ossification during the sixteenth week.

By that time, the facial nerve lies in a shallow sulcus on the lateral "Tympanic" aspect of the otic capsule. This sulcus is the primordium of the facial canal. The nerve is then enclosed by the growth of the capsule, creating the facial canal (*Wright, 1987*).

In close observation, the first portion of the canal is completed in the human fetus of eighteen weeks of age by the completion of the bony internal auditory meatus (*Richany, 1972*).

The second portion of the facial canal is completed in the human fetus of thirty five weeks of age by the growth of the otic capsule (*Bast et al, 1956*).

The third portion (the mastoid portion) starts development one year after birth. By that time the mastoid part of the temporal bone is flat and the stylomastoid foramen with the facial nerve lies on the external surface behind the tympanic bone (**Fig.1**).

With the development of air cells in the mastoid, its lateral portion grows downwards and forwards, so that the stylomastoid foramen is carried on to the undersurface of the bone and the facial nerve canal is elongated (*Wright, 1987*).