# CONGENITAL SYNDROMES WITH MENTAL RETARDATION

ESSAY

SUBMITTED IN THE PARTIAL FULLFILMENT FOR MASTER DEGREE IN PHONIATRICS

PRESENTED BY

AMAL SALAH ELDIN AMIN DARWISH

SUPERVISED BY

PROF. DR. MOHAMED NASSER KOTBY

HEAD OF PHONIATRICS UNIT OF E.N.T DEPARTMENT

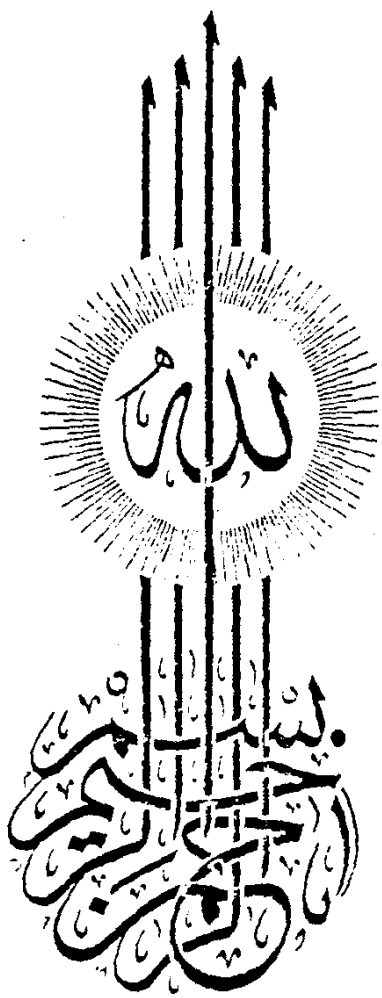
DR. MOHAMED ALI SAAD BARAKA

ASS. PROF. OF PHONIATRICS UNIT OF E.N.T DEPARTMENT

FACULTY OF MEDICINE

AIN SHAMS UNIVERSITY

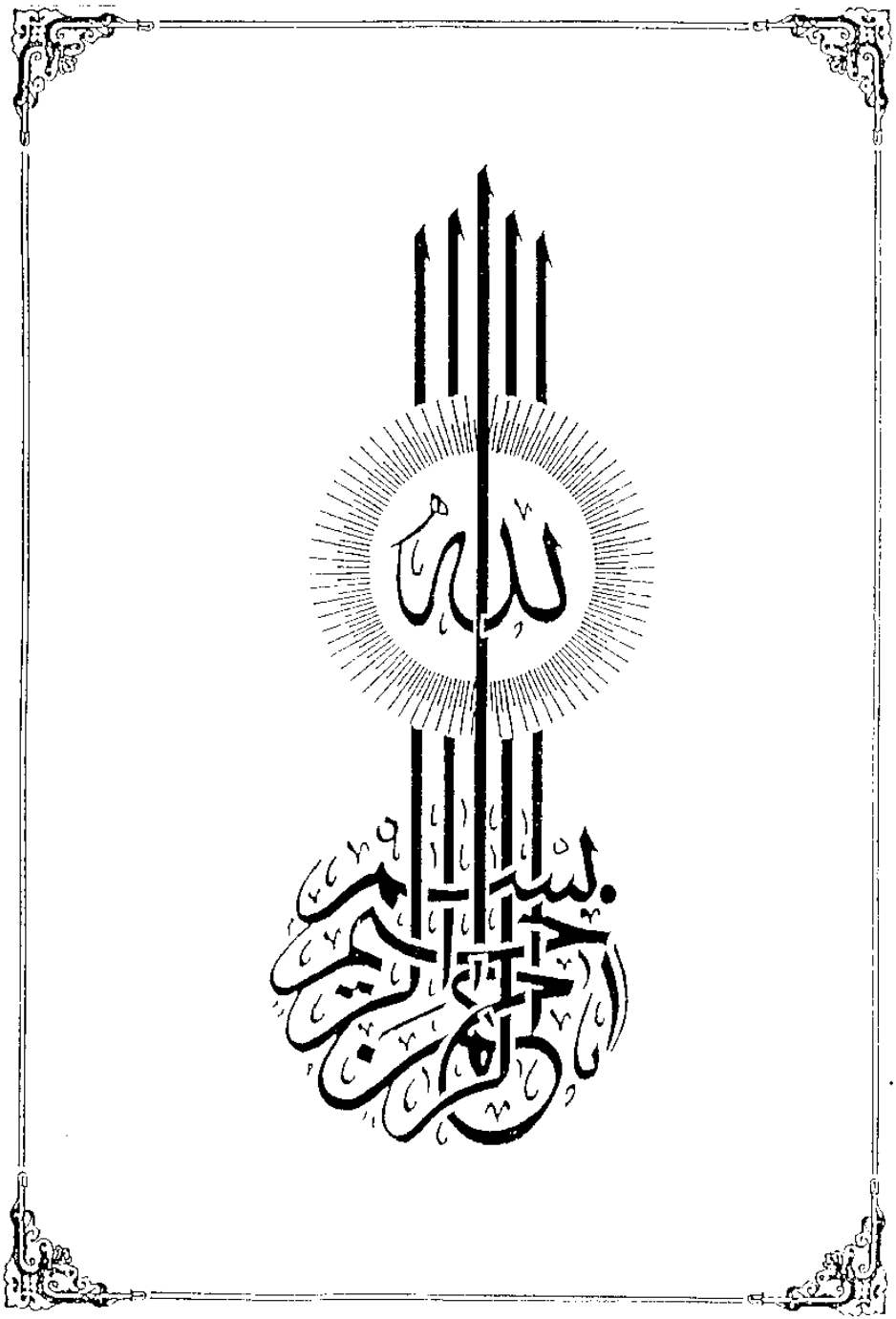
1993




# "علم الإنسان ما لم يعلم"

صدق الله العظيم

سورة العلق آية ٥



# ACKNOWLEDGMENT

I wish to express my deepest gratitude, and sincere thanks to ***Prof. Dr. Mohamed Nasser Kotby*** Head of phoniatrics unit for his generous help, moral support, valuable remarks and unlimited effort throughout the steps of this work.

I would also be honored to express my gratitude to ***Dr. Mohamed Ali Saad Baraka,*** Assistant prof of phoniatrics unit for his precious advise, support and unlimited kindness throughout the steps of this work

I wish to express my sincere appreciation, and gratitude to my senior staff members in the phoniatrics unit for their kind help and support.

# CONTENTS

# INTRODUCTION AND AIM OF THE WORK

# *INTRODUCTION*

Mental retardation is a subject of great concern to large segment of society, It is one of the main causes of delayed language development. Mental retardation is defined as intellectual inadequacy that originates duiring the developmental period, and may impair the independent social adjustment, ***[Garham, 1982]*** .

Mental retardation appears as one of the clinical features in some congenital syndromes. Congenital syndromes are also defined as syndromes present at birth with a group of morphological disorders due to genetic or non-genetic causes, ***[Hafez, 1981]***.

Congenital syndromes could be classified according to the etiology into two main categories :

***I. Congenital syndromes with genetic background.***

a) Single mutant gene.

b) Chromosomal abnormalities.

c) Multifactorial inheritance (polygenic inheritance).

***II. Non-genetic congenital syndromes (enviromental).***

a) Prenatal.

b) Perinatal.

There are many ways to classify mental retardation, as this is a multi-disciplinary problem. The American Association of Mental Defeciency (A.A.M.D) approved to use the following medical terms. Classifications depend on the mental level such as "high", "middle" and "low" intelligence, or such as "educable", "trainable", "severe" and "profound" retardation, or the presently accepted terminology of borderline (I.Q 60 - 85), mild (I.Q 52 - 59), moderate (I.Q 36 - 51), severe (I.Q 20 - 35), profound (I.Q less than 20) and nonespecified.

***Etiology of mental retardation :***

In a carefull epidemiological study, ***Kenth (1988)*** gave the following classification :

1. Acquired conditions in prenatal and perinatal periods
   - Infections.
   - Prematurity.
   - Trauma.
   - Toxins.
2. Chromosomal abnormalities. (19%)
   - Trisomy 21 (17%)
   - Others. (2 %)
3. Multiple congenital malformatios syndromes. (6 %)
4. Central nervous system malformations. (5 %)
5. Metabolic and endocrine disorders. (3 %)
6. Degenerative diseases. (1 %)

7. Psychosis and neurocutaneous syndromes. (3 %)
8. Unclassified. (37%)

***Clinical picture of mental retardation :***

The clinical picture varies according to the degree of retardation.

1. Gross physical deformities are sometimes present as a result of the mental defect, e.g. hydrocephalus, spasticity, naevi, and various deposites of lipoids or carbohydrates in various organs.
2. The defective child is not always recognizable at birth. They are falling behind their developmental landmarks, and later contrast with other children at the same age would reveal the differences.
3. The awareness of the defective child is limitted, their tolerance to frustratton is poor, they fail to deal with more than one subject at once, or to percieve the social significance of the behaviour or to plan for long term satisfaction.
4. The emotional control is slow to develop in the retarded child but they can make personal relationship and this certainly can be used to encourage them to learn some skills.
5. The intelligence (I.Q) of the defective child could be measured to reveal the degree of their disabilities.

# AIM OF THE WORK

This essay will discuss the congenital syndromes known to be associated with mental retardation and communicative problems, in order to help the involved clinicians to design the suitable multi-disciplinary management program.

# CHAPTER I

## SINGLE MUTANT GENE

- AUTOSOMAL DOMINANCE
- AUTOSOMAL RECESSIVE
- SEX LINKED INHERITANCE

## *(1) a) SINGLE MUTANT GENE*

To talk about humen genetics it is important to know that human chromosomes are 46 chromosomes arrenged in 23 pairs, 22 pairs of them are autosomes (identical in both males and females), the chromosomes in the remaining pair are called sex chromosomes, it determine the sex of the human. One member of each pair is received from the mother and the other received from the father. Each pair of autosomes are very similar (homollogous; carry the same genetic informations). In the females the two sex chromosomes are also very similar and called XX chromosomes. But in the male the sex chromosomes are differ from each others (heterogenous; carry different genetic informations) and called XY chromosomes. It is also important to mention that chromosomes are the elements inside the nucleus, which carry the genetic information, and have some roles in inheritance.

***Modes of inheritance [Hafez. M. 1981] :***

Chromosomes carry thouthands of genes. Each gene has a position- or locus- on the chromosome. The two genes occupying specific loci on the two homologus chromosomes are called (alleles), the estimated structural genes till now are 30000. When the two alleles are identical, the individual is homozygous for this alleles and if the two alleles are not identical, he is heterozygous. As the X

chromosome is bigger than the Y, the genes on the X which have no alleles on Y result in hemizygous state of the zygote.

Each of the two identical alleles transcribe 50% of the polypeptide chain or enzyme. A mutant gene will result in 50% abnormal polypeptide chain in addition to the 50% normal ones. If the mutant gene is in heterozygous state and present itself by abnormal phenotype it is called dominant gene. While if the mutant gene can not expresss itself in the presence of the other alleles which is normal, the individual will be phenotypically normal, and the gene called recessive. The effect of recessive gene can be evident only when it is in the homozygous state.

A triat which is determined by a gene on an autosome is called autosomal trait, and that determined by the gene on one of the sex chromosomes is said to be sex linked.

***Autosomal inheritance***

***a) Autosomal dominant inheritance.***

The pedigree pattern of autosomal dominant inheritance is charactrised by the following features :

1. Each affected individual has an affected parent, up to the generation where mutation started.
2. Each offspring of one affected and one unaffected parents, have a 50 : 50 chance of being affected.
3. Unaffected relatives of affected persons will not have affected offspring.

The following is a list of autosomal dominant abnormalities with mental retardation.

***1. Craniofacial dysostosis. (Crouzon's syndrome)***

The patient exhibits cranial synostosis, exophthalamos external strabismus, low set ears, optic nerve defects, hypertelorism, parrot nose and projection of the lower jaw. They have a dishface appearance. The metopic, coronal, and saggital sutures close early, surgery is often helpfull.

***2. Cranial stenosis, craniosyntosis. or (stenocephaly)***

Prenatally and in the newborn, the sutures are open and skull growth takes place at the age of each of the skull bones over a varying number of years after birth. The head enlarged by this process to double its birth size by one year of the age and triples its birth size by five years. At speciefic time these bones meets and fuse. In this syndrome however, there is a premature closure of any or all suture line or lines that close early. The various types may cause many different abnormalities of skull shape and frequently produce mental retardation by distorting or preventing the formation of the normal brain tissues. The degree of retardation depends on the amount of the neurological involvement. Premature closure of suture line may be caused by many things. Some types are genetics in nature and these usually the severest type. Closure may be secondry to other things such as trauma, ricketes, infections, following shunt

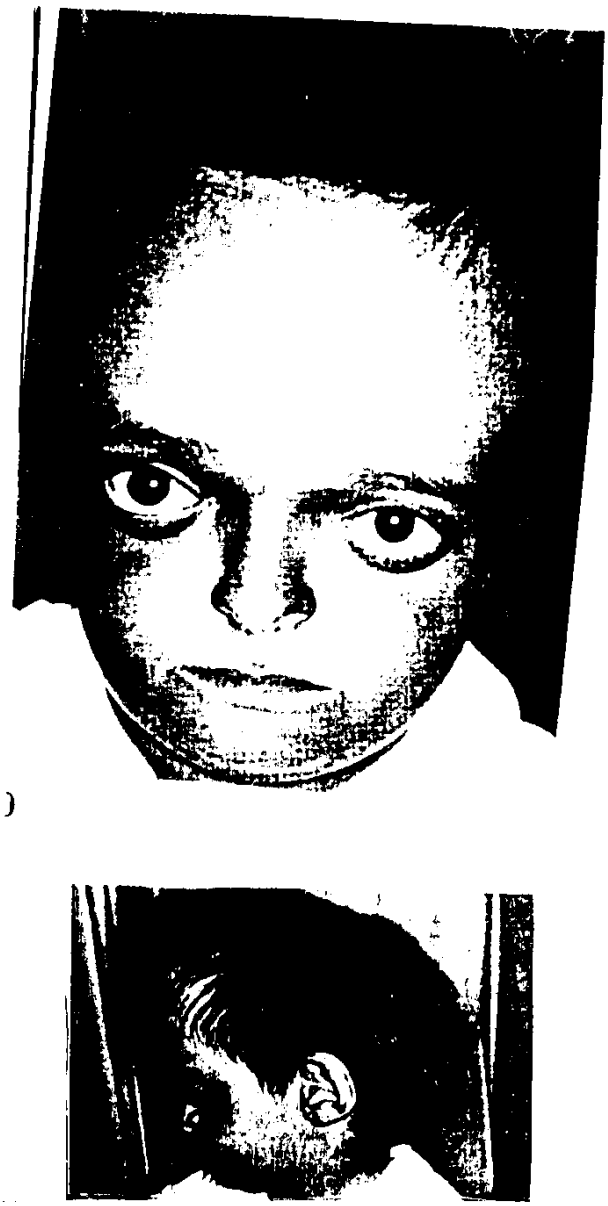




*Fig.1 Cranio-facial Dysostois (Crouzon's syndrome)*

(EL-SERAFY SH, 1983)