BALANCE DISTURBANCE IN PATIENTS WITH MULTIPLE SCLEROSIS

Thesis

Submitted in Partial Fulfillment of Requirements for Medical Doctorate Degree In **Neurology**

By

Mohammed Ibrahim Abd El Samie Oraby
M.B., B.Ch. (Cairo University)
M.Sc. (Neuropsychiatry)

Supervised by

Prof. Dr. **Ahmed Talaat Al Ghoniemy**
Professor and Head of Neurology Department
Cairo University

Prof. Dr. **Randa Shawky Deif**
Professor of Neurology
Cairo University

Dr. **Rasha Hassan Soliman**
Assist. Professor of Neurology
Bani Suif University

Faculty of Medicine
Cairo University
2008

بسم الله الرحمن الرحيم

قالوا سبحانك لا علم لنا إلا ما علمتنا إنك أنت العليم الحكيم

صدق الله العظيم

الآية 32 من سورة البقرة

ACKNOWLEDGMENT

*First of all, I would like to thank **ALLAH,** the Merciful and Compassionate for making this work possible and for granting me with the best teachers, family, friends and colleagues that many people would dream to have.*

*I would like to express my deep thanks and appreciation to Prof. Dr. **Ahmed Talaat** professor and head of Neurology department, Cairo University for his kind supervision, support, and valuable observations. I am deeply indebted to him.*

*Words fail to express my feelings and gratitude towards Prof. Dr. **Randa Deif** professor of Neurology, Cairo University; what she done for me can not be translated into words; her endless effort, her Kind and valuable advices will always be engraved with my memory.*

*I am greatly thankful to Dr. **Rasha Hassan** Assistant professor of Neurology, Bani Suif University, who was the heart of this thesis, for her ideas, support and guidance throughout the work.*

*I would like also to express my thanks to **Dr. Mohammed El Sayed** Assistant professor of Neurology, Cairo University, for his kind help and advices during the preparation of this work.*

I wish also to thank all my professors and colleagues in the Neurology department, Cairo University for their support and encouragement through the work.

Finally, but certainly not last, I am indebted to my family for all they have done for me.

Mohammed Ibrahim Oraby
2008

TABLE OF CONTENTS

List of Abbreviations

ADT:	Adaptation test.
AFO:	Ankle-foot orthosis.
BAEP:	Brain stem auditory evoked potentials.
SSEP:	Somatosensory evoked potentials.
CPG:	Central pattern generator.
BBS:	Berg balance scale.
BOS:	Base of support.
CDMS:	Clinically definite Multiple sclerosis.
CDP:	Computerized dynamic posturography.
CIS:	Clinically isolated monophasic syndromes.
CNS:	Central nervous system.
COG:	Center of gravity.
COM:	Center of mass.
COP:	Center of pressure.
CSF:	Cerebrospinal fluid.
CTSIB:	Clinical test of sensory interaction on balance.
DC:	Directional control.
EAE:	Experimental autoimmune encephalomyelitis.
EC:	Eye closed.
EDSS:	Expanded disability status scale.
ENG:	Electronystagmography.
EO:	Eye opened.

EPE:	Endpoint excursion.
GABA:	Gamma amino butyric acid.
IgG:	Immunoglobulin G.
IL:	Interleukins.
LFA:	Lymphocyte function-associated antigen.
LOS:	Limits of stability.
MBP:	Myelin basic protein.
MCT:	Motor control test.
MHC:	Major histocompatibility complex.
MMSE:	Mini-Mental State Examination.
MRI:	Magnetic resonance imaging.
MS:	Multiple sclerosis.
MVL:	Movement velocity.
MXE:	Maximum excursion.
NAA:	N-Acetyl-Aspartate.
NMO:	Neuromyelitis optica.
OGB:	Oligoclonal bands.
PPMS:	Primary progressive Multiple sclerosis.
PRMS:	Progressive relapsing Multiple sclerosis.
PSP:	Progressive supranuclear palsy.
RRMS:	Relapsing remitting Multiple sclerosis.
RT:	Reaction Time.
SOT:	Sensory Organization Test.
SPMS:	Secondary progressive Multiple sclerosis.

TCR: T-cell receptor.

TNF: Tumor necrosis factor.

VEP: Visual evoked potentials.

List of Figures

List of Tables

Abstract

Multiple sclerosis (MS) is a serious neurological disease which affects patients and their environment negatively. Movement, balance and walking impairments related to demyelination, axonal damage and the formation of sclerosis plaques in cerebral hemispheres, brain stem and spinal cord are wide spread in Multiple sclerosis patients. This study was designed to assess postural stability and gait abnormalities in patients with multiple sclerosis and included forty MS patients and forty control subjects, which were subjected to laboratory and radiological investigations, clinical balance scales and posturography tests. The performance of MS patients relative to control was poor in all balance scales and posturography tests. Among MS patients, relapsing remitting form was better in performance than the progressive forms.

Key words: Multiple Sclerosis, Balance, Gait, Posturography.

INTRODUCTION