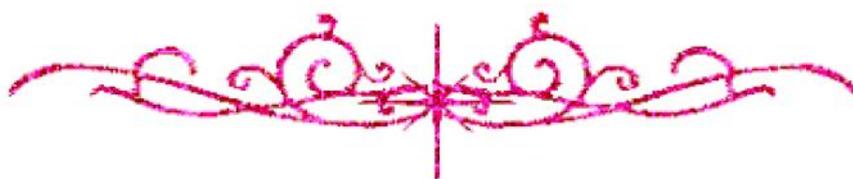


hossam maghraby



شبكة المعلومات الجامعية

بِسْمِ اللّٰهِ الرَّحْمٰنِ الرَّحِیْمِ



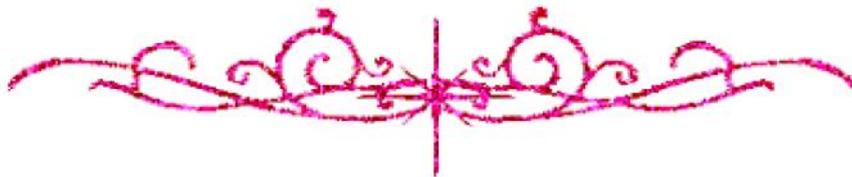
hossam maghraby



شبكة المعلومات الجامعية



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



hossam maghraby



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

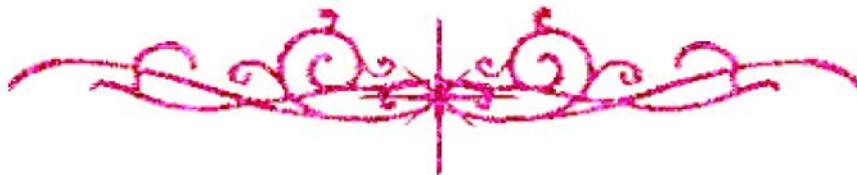
قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



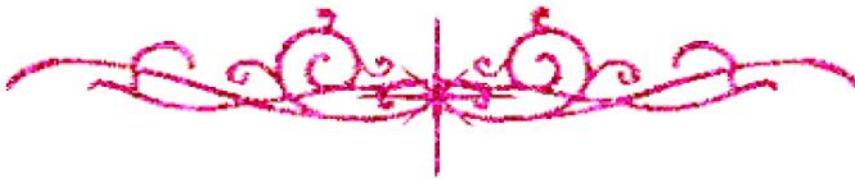
hossam maghraby



شبكة المعلومات الجامعية



بعض الوثائق الأصلية تالفة



hossam maghraby

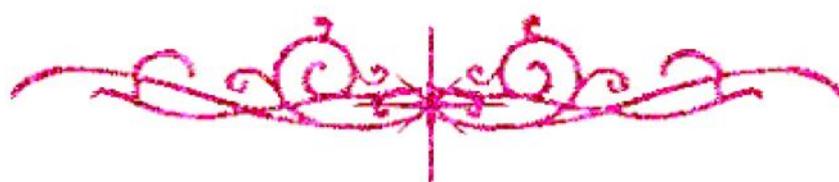


شبكة المعلومات الجامعية



بالرسالة صفحات

لم ترد بالأصل



**ASSESSMENT OF VENTILATORY FUNCTION
IN PATIENTS WITH DIFFERENT CAUSES
OF CHRONIC LOW BACK PAIN**

B17757

Thesis

*Submitted for partial Fulfillment of the Requirements of the
Master Degree in Physical Therapy for Cardiopulmonary
Disorders and Geriatrics department*

BY

GIHAN SAMIR MOHAMED

*B.Sc in physical Therapy (2000),
Cairo University*

*Faculty of Physical Therapy
Cairo University
2007*

Supervisors

Dr. Azza Fekry Ismail

**Assistant Professor of Physical Therapy for
Cardiopulmonary Disorders and Geriatrics**

**Faculty of Physical Therapy,
Cairo University.**



Dr. Al Sayed A. Shanb

**Assistant Professor of Physical Therapy for
Cardiopulmonary Disorders and Geriatrics**

**Faculty of Physical Therapy,
Cairo University.**

Dr. Ali S. Rafea

*Consultant of Chest Disease,
General Organization of Teaching Institutes & Hospitals,
El-Mataria Teaching Hospital.*

ACKNOWLEDGMENT

Praise and thanks be to ALLAH, the most merciful for assisting and directing me to the right way.

*I would like to thank **Dr. Azza Fekery Ismail** Assistant Professor of Cardiopulmonary Disorders and Geriatrics, Faculty of Physical Therapy, Cairo University, for her great support and advice that gave me the confidence and encouragement to start and complete this study.*

*My deepest thanks to **Dr. Al Sayed A. Shanb** Assistant Professor of Cardiopulmonary Disorders and Geriatrics, Faculty of Physical Therapy, Cairo University, for his constant supervision and advice to complete this work.*

*My gratitude appreciation wishes to **Dr. Ali S. Rafea** Consultant of chest diseases, El Mataria Teaching Hospital, for his sincere supervision, valuable advice, constructive criticism and continuous support*

*My deepest thanks to **Dr. Rokia Mostafa Mahmoud** Assistant Professor of Physical Therapy, El-Mataria Teaching Hospital, for her kind cooperation and technical help.*

*My deepest thanks to **Dr. Inas fawzy** for her great support and for assisting me to complete this work.*

Finally I'm very grateful to all participants who shared in this study. Without whom this work wouldn't have been possible.

Assessment of Ventilatory Function in Patients With Different Causes of Chronic Low Back Pain /Gehan Samir Mohamed Mousa/ Department of Physical Therapy for Cardiopulmonary Disorders and Geriatrics, Faculty of Physical Therapy, Cairo University, 2007, Master **Abd El Hameed Shanb** Assistant Professor of Physical Therapy for Cardiopulmonary Disorders and Geriatrics, Faculty of Physical Therapy, Cairo University. **Dr. Ali Saad Rafea.** Consultant of Chest Disease El Mataria Teaching Hospital.

Abstract

Study objective: the purpose of this study was to assess the effect of chronic low back pain with different causes on ventilatory function. **Setting and participants:** One hundred and fifty patients with chronic low back pain. Their age ranged from 30 to 50 years old. Their BMI < 30 Kg/ m². The patients were selected from the out patient clinics` of El-Matariaia Teaching Hospital. They were assigned into three equal groups I, II and III according to their diagnosis(lumber spondylosis, lumber disc prolapse and sacroiliac dysfunction)and fifty normal control subjects. Clinical assessment was done to exclude any other pathological conditions. Evaluation of participants included body mass index, waist circumference and Visual analogue scale. Assessment of ventilatory functions were done by using spirometry.

Results: The results showed that all groups of chronic low back pain a statically significant decreased in all ventilatory parameters.

Conclusion: These results suggested a reduction of respiratory function in lumbar disc prolapse group more than other two groups. Because of pain and muscle spasm.

Keywords: Ventilatory functions. Spirometry. Visual analogue scale. Chronic low back pain.

Dedication

*To my family
and my sons,
Wessam and Yousef*

CONTENTS

List of abbreviations.	
List of tables.	
List of figures.	
Chapter (I): Introduction.	1
Chapter (II): Literature Review.	5
Anatomical structure of lumbar spine.	5
Muscles of the back.	9
Muscles of respiration.	12
Muscles of abdominal wall.	14
Muscles of thoracic wall.	17
Mechanism of respiration.	18
Low Back Pain causes and its classifications	20
Ventilatory Functions	31
Low back pain and ventilatory functions.	43
Chapter (III): Subjects, Material and Methods.	49
Subjects.	49
Materials	51
Methods	55
Chapter (IV): Results.	61
Chapter (V): Discussion.	91
Chapter (VI): Summary and conclusion.	98
Recommendations.	101
References.	102
Appendices.	
Arabic summary	

LIST OF ABBREVIATIONS

ASLR	Active straight leg raising
BMI	Body mass index
BTPS	Body temperature , pressure, saturated with water vapour
C ₂	2 nd cervical nerves
C ₃	3 rd cervical nerves
C ₄	4 th cervical nerves
C ₇	7 th cervical nerves
C _{3,4,5}	3 rd , 4 th ,and 5 th cervical nerves
CLBP	Chronic low back pain
CIII	At the level of third cervical vertebra
CM	Centimeter
CV	At the level of fifth cervical vertebra
CVI	At the level of six cervical vertebra
FEF	Forced expiratory flow
FEV ₁	Forced expiratory volume in first second (L/sec)
FEV ₁ %	Forced expiratory volume in first second (L/sec)*100
FEV ₁ /FVC	forced expiratory volume in first second – forced vital capacity
Fig.	Figure
FVC	Forced vital capacity
GET	Graded exercise test
HZ	Hertz
Kg	Kilogram
Kg/M ²	Kilogram Per meter square
L	Liter
L ₁	1 st lumbar vertebra

L ₄	4 th lumbar vertebra
L ₅	5 th lumbar vertebra
L/min	Liter per minute
L/m ²	Liter per meter square
L/S	Liter per second
LBP	Low back pain
M ²	Meter square
M/F	Male or female
ml/year	Milliliter per year
mmHg	Millimeter mercury
MVV	Maximum voluntary ventilation
PEF	Peak expiratory flow
PEFR	Peak expiratory flow rate
RV	Residual volume
RV/TLC	Residual volume / Total lung capacity
S ₁	1 st sacral vertebra
SIJ	Sacroiliac joint
SIJP	Sacroiliac joint pain
T ₃	3 rd thoracic vertebra
T ₇	7 th thoracic vertebra
T ₉	9 th thoracic vertebra
T ₁₁	11 th thoracic vertebra
T ₁₂	12 th thoracic vertebra
TLC	Total lung capacity
VC	Vital capacity
V _t	Tidal volume
VAS	Visual analogue scale
VO _{2max}	Maximum oxygen consumption

LIST OF TABLES

<i>Table. NO.</i>	<i>Title of Table</i>	<i>Page</i>
1	Anthropometric characteristic for control group according to the sex.	62
2	The mean values of ventilatory functions for control group.	65
3	Characteristic of patient with lumbar spondylosis group.	67
4	The mean values of ventilatory functions for lumbar spondylosis group.	69
5	The correlation coefficient for lumbar spondylosis group.	72
6	Characteristic of patient with lumbar disc prolapse group.	73
7	The mean values of ventilatory functions for lumbar disc prolapse group.	76
8	The correlation coefficient for lumbar disc prolapse group.	78
9	The characteristic for sacroiliac dysfunction group.	79
10	The mean values of ventilatory functions for sacroiliac dysfunction group.	82
11	The correlation coefficient for sacroiliac dysfunction group.	84
12	The mean values of ventilatory function, among study groups.	86
13	The mean values of pain intensity on VAS, among study groups.	90

List of figures

<i>Fig. No.</i>	<i>Title of figure</i>	<i>Page</i>
1	Lumbar spine and normal lumbar vertebrae.	6
2	Ligaments of the lumbar spine.	7
3	Posterior view of the back muscles.	11
4	Superficial Muscles of posterior neck and upper Back.	16
5	Chest wall muscles.	16
6	Superficial Muscles of Back.	16
7	Anterior view of chest and abdominal muscles.	17
8	Mechanics of respiration	20
9	Normal spirometric flow diagram.	39
10	Schiller Spirovit spirometer.	51
11	Height and weight scale.	52
12	Tape measurement.	53
13	Visual analogue scale.	54
14	Measuring body weight and height.	56
15	Measuring of waist circumference.	57
16	Measuring ventilatory function.	58
17	Characteristics of the control group.	63
18	The mean values of FVC and FEV ₁ between males and females for control group.	65
19	The mean values of PEFR and FEF _{25-75%} L/sec between males and females for control group.	66
20	The mean values of FEV ₁ /FVC% between males and females for control group.	66
21	The mean values of MVV between males and females for control group.	66
22	Characteristics of the lumbar spondylosis group.	68
23	The mean values of FVC and FEV ₁ between males and females for lumbar spondylosis group.	70
24	The mean values of PEF and FEF _{25-75%} L/sec between males and females for lumbar spondylosis group.	70
25	The mean values of FEV ₁ /FVC% between males and females for lumbar spondylosis group.	71
26	The mean values of MVV between males and	71