



قَالَ لَوْلَا تُسَبِّحُونَ
لَا إِلَهَ إِلَّا اللَّهُ

لَا إِلَهَ إِلَّا اللَّهُ
لَا إِلَهَ إِلَّا اللَّهُ

لَا إِلَهَ إِلَّا اللَّهُ
لَا إِلَهَ إِلَّا اللَّهُ

صدق الله العظيم

سورة البقرة (الآية ٣٢)

Assessment of Pelvic Floor
Muscles After Labour By Electromyography

Thesis

Submitted for partial fulfillment
Of Master Degree
In Obstetrics and Gynecology

By

Mohamed Shehab El Din El Bealy

M.B; B.CH

*Resident of Obstetrics and Gynecology
Kafr El- Sheikh General Hospital*

Supervisors

Prof. Dr. Alaa El Din Abd El Aziz El Guindy

*Prof. Of obstetric and Gynecology
Faculty of medicine
Ain Shams University*

Prof. Dr. Naglaa Ali Gad Allah

*Prof. Of physical medicine, Rheumatology and
Rehabilitation
Faculty of medicine
Ain Shams University*

Dr. Mohamed Ahmed El Kadi

*Assistant Professor of Obstetrics and Gynecology
Faculty of medicine
Ain Shams University
2009*

تقييم عضلات الحوض بعد الولادة الطبيعية
عن طريق جهاز رسم العضلات الكهربائي
(*EMG*)

رسالة توطئة للحصول على درجة الماجستير فى علم التوليد وأمراض
النساء

مقدمة من

طبيب / محمد شهاب الدين الببلى

بكالوريوس الطب والجراحة العامة

طبيب مقيم أمراض النساء والتوليد بمستشفى كفر الشيخ العام

تحت إشراف

الأستاذ الدكتور / علاء الدين عبد العزيز الجندى

أستاذ علم التوليد وأمراض النساء

كلية الطب - جامعة عين شمس

الأستاذة الدكتورة / نجلاء على جاد الله

أستاذ الطب الطبيعي والروماتيزم والتأهيل

كلية الطب - جامعة عين شمس

الأستاذ الدكتور / محمد أحمد القاضى

أستاذ مساعد علم التوليد وأمراض النساء
كلية الطب - جامعة عين شمس
كلية الطب
جامعة عين شمس - القاهرة
٢٠٠٩

تقييم عضلات الحوض بعد الولادة الطبيعية
عن طريق جهاز رسم العضلات الكهربائي
(EMG)

رسالة توطئة للحصول على درجة الماجستير فى علم التوليد وأمراض النساء

مقدمة من

طبيب / محمد شهاب الدين البيلى

بكالوريوس الطب والجراحة العامة

طبيب مقيم أمراض النساء والتوليد بمستشفى كفر الشيخ العام

تحت إشراف

الأستاذ الدكتور / علاء الدين عبد العزيز الجندى

أستاذ علم التوليد وأمراض النساء

كلية الطب - جامعة عين شمس

الأستاذة الدكتورة / نجلاء على جاد الله

أستاذ الطب الطبيعى والروماتيزم والتأهيل

كلية الطب - جامعة عين شمس

الدكتور / محمد أحمد القاضى

مدرس علم التوليد وأمراض النساء

كلية الطب - جامعة عين شمس

٢٠٠٩

Assessment of Pelvic Floor Muscles After Labour By Electromyography

Thesis
Submitted for partial fulfillment
Of Master Degree
In Obstetrics and Gynecology

By

Mohamed Shehab El Din El Bealy

M.B; B.CH

SUPERVISORS

Prof. Dr.

Alaa El Din Abd El Aziz El Guindy

Prof. Of obstetric and Gynecology

Faculty of medicine

Ain Shams University

Prof. Dr.

Naglaa Ali Gad Allah

Prof. Of physical medicine, Rheumatology and Rehabilitation

Dr. Mohamed Ahmed El Kadi

Lecturer of obstetric and gynecology

Faculty of medicine

Ain Shams University

Ain Sahms University

Faculty of medicine

2006

Acknowledgement

I'd like to express my respectful thanks and profound gratitude to **prof. Alaa Eldeen Abd El Aziz El Gendy**, professor of obstetrics & Gynecology, Ain Shams University, for giving me the honor and great advantages of working under his supervision.

My sincere thanks and utmost appreciation are humbly presented to **prof. Nagla Ali Gad Allah**, professor of physiotherapy & rehabilitation, Ain Shams University, for her meticulous supervision, professional experience and tremendous assistance. I really appreciate her patience and support.

I am deeply grateful to **Ass. Prof. Dr. Mohamed Ahmed El Kady**, Assistant prof. of obstetrics & Gynecology, Ain Shams University, for his guidance and kind assistance helped bring this work to completion.

My deepest gratitude I extend to my whole family who offered me support and motivation.

Contents

Review of literature	
Anatomy of the rectum	1
<i>Blood Supply</i>	6
<i>Lymph drainage</i>	8
<i>Nerve supply</i>	8
Anatomy of the Anal region	9
<i>Anal canal</i>	9
<i>External anal sphincter</i>	10
<i>Internal anal sphincter</i>	10
<i>Mucous membrane</i>	11
<i>Blood supply</i>	13
<i>Lymph drainage</i>	15
<i>Nerve supply</i>	15
The Levator Ani Muscle	16
The Effect of Vaginal Delivery on Anal Function	20
<i>The Community Prevalence of Faecal Incontinence</i>	21
<i>The Incidence of Faecal Incontinence After Childbirth</i>	22
<i>The effect of pregnancy on anal sphincter function</i>	24
The Effect of Vaginal Delivery on Anal Sphincter Function	25
<i>Neurophysiology</i>	26
<i>Anal ultrasound</i>	29
Role of levator dysfunction in defecation disorders	35
<i>EMG findings</i>	39
<i>Manometric Findings</i>	41
<i>Defecation disorders</i>	41
<i>Mechanism of levator dysfunction in the parous woman</i>	43
<i>Levator-ani muscle and pudendal canal syndrome</i>	46
<i>Defecation disorders in the parous woman</i>	47

Anal Incontinence Before, During and After Pregnancy	50
<i>Prevalence and Incidence of Anal incontinence in women</i>	51
<i>Risk Factors in the Primigravida, Primipara, and Beyond</i>	52
<i>Planning for a Second Delivery</i>	54
<i>Treatment of Anal Incontinence</i>	54
Rectal Problems	56
<i>Hemorrhoids</i>	56
<i>Anal fissure</i>	58
<i>Anal Abscess or and Anal Fistula</i>	59
<i>Fecal Incontinence</i>	60
<i>Rectal Pain</i>	62
<i>Rectal prolapse</i>	62
Continence anatomy and pathophysiology	67
Current clinical and epidemiological studies	72
Current investigation defining the role of elective	81
Patients and methods	87
Results	96
Discussion	108
Summary	116
Conclusion	117
Recommendations	118
References	119
Arabic Summary	

List of Abbreviations

List of Abbreviations

LAM	Levator ani muscle
EAS	External anal sphincter
PR	Puborectalis muscle
EMG	Electromyography
PNTML	Pudendal nerve terminal motor latency
ACT	Activity
A/T	Amplitude / turn
T / S	Turn / second
NVD	Normal vaginal delivery
CS	Cesarean section

List of Figures

Figure 1 : Anatomy of the rectum	2
Figure 2 : Peritoneal relation of the rectum	3
Figure 3 : Anatomic feature of the rectum	4
Figure 4 : Diagram illustrating the crural patterns	18
Figure 5 : Diagram illustrating the levator ani muscle and its role at defecation	37
Figure 6 : EMG activity of the levator ani muscle in the nulliparous women	38
Figure 7 : EMG activity of the levator ani muscle in the multiparous women	40
Figure 8 : Effect of increased intra-abdominal pressure on the levator ani muscle	45
Figure 9 : Mechanism of pudendal nerve stretch	49
Figure 10 : Toennis version 1.5 EMG device	91
Figure 11 : Medium sized and large sized concentric needle electrodes with their cable	92
Figure 12 : A disposable hypodermic EMG needle electrode with 60 cm lead wire	94
Figure 13 : A disposable hypodermic EMG needle electrode during its insertion in the puborectalis muscle	94

list of figures

	Figure 14 : Botulinum toxin injection in the puborectalis muscle.	95
	Figure 15 : Mean of activity and mean of turn per second of external anal sphincter during rest by electromyography (EMG).	101
	Figure 16 : Mean of activity and mean of turn per second of external anal sphincter during squeeze by electromyography (EMG).	102
	Figure 17 : Mean of activity and mean of turn per second of external anal sphincter during strain by electromyography (EMG).	102
	Figure 18 : Mean of activity and mean of turn per second of puporectalis during rest by electromyography (EMG).	103
	Figure 19 : Mean of activity and mean of turn per second of puporectalis during strain by electromyography (EMG).	103
	Figure 20 : Mean of amplitude per turn of external anal sphincter during rest by electromyography (EMG).	104
	Figure 21 : Mean of amplitude per turn of external anal sphincter during squeeze by electromyography (EMG).	104
	Figure 22 : Mean of amplitude per turn of puporectalis during strain by electromyography (EMG).	105

list of figures

	Figure 23 : Mean of amplitude per turn of puporectalis during rest by electromyography (EMG).	105
	Figure 24 : External anal sphincter muscle during strain by electromyography (EMG) at Ain-Shams Special Hospital.	106
	Figure 25 : External anal sphincter muscle during squeeze by electromyography (EMG) at Ain-Shams Special Hospital.	106
	Figure 26 : Puborectalis muscle during squeeze by electromyography (EMG) at Ain-Shams Special Hospital.	107
	Figure 27 : Puborectalis muscle during strain by electromyography (EMG) at Ain-Shams Special Hospital.	107

list of tables

	Table 1 : The results of PNTML for the women having vaginal and Caesarean section	30
	Table 2 : The LA EMG activity at rest	38
	Table 3 : The rectal and anal canal pressures at rest	40
	Table 4 : Defecation disorders and pelvic pain in the nullipara , Primipara and multipara.	42
	Table 5 : Demography of the cases.	97
	Table 6 : Defecation disorders and pelvic pain in the studied cases .	97
	Table 7 : : External anal sphincter during rest.	98
	Table 8 : External anal sphincter during strain.	98
	Table 9 : External anal sphincter during squeeze.	99
	Table 10 : Puporectalis muscle during rest.	99
	Table 11 : Puporectalis muscle during strain.	100
