



شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم



شبكة المعلومات الجامعية
@ ASUNET



شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

قسم

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



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة

بالرسالة صفحات لم ترد بالاصل

29978

**NORMATIVE ISOKINETIC DATA OF TRUNK
MUSCLES PERFORMANCE
IN ADOLESCENTS**

A Thesis

Submitted for Partial Fulfillment for the Requirements of
Doctoral Degree in Physical Therapy

By

MAGDA GAID SEDHOM GUIRGUIS

M.Sc. in Physical Therapy (2007)

Supervisor

أ.م.ع. كاتبة

Prof. Dr. OMAIMA MOHAMED ALY KATTABEI

Professor of Physical Therapy,
Chairman of Basic Science Department
Faculty of Physical Therapy
Cairo University

Faculty of Physical Therapy
Cairo University

2011

Normative Isokinetic Data of Trunk Muscles Performance in Adolescents/ Magda Gaid Sedhom Guirguis. Supervisors; Prof. Dr. Omaina Kattabei, Basic Science department, Faculty of Physical Therapy, Cairo University (Egypt): Faculty of Physical Therapy- Basic Science department, Doctoral thesis; 2011.

Abstract

The Purpose: of this study was to provide physical therapy field with normative objective data of abdominal and back muscles performance in adolescents who are typically developing, and to establish reference data of isokinetic measurement of both muscles. **Subjects and method:** two hundred adolescents (100 males and 100 females), from 15 to 18 years old were participated in this study. They were classified into eight groups of equal number and were assessed using Biodex system 3 Pro isokinetic dynamometer to measure the peak torque, work, power, abdominal to back muscle ratio in concentric mode at two angular velocities (60 and 180°/sec) and peak torque in isometric mode at upright position.

Results: The study revealed that the back muscle produces a greater torque than the abdominal muscle at each of the two test velocity. A significant difference demonstrated between the two speeds; at the higher velocity, peak torque of abdominal ms. increased significantly, while peak torque of back ms. decreased significantly during concentric contractions. There was significant difference between males and females trunk muscles performance in concentric mode of test in favor to males. There was significant difference between males and females trunk muscles performance in isometric mode of test in favor to males. Abdominal to back torque ratios increased significantly at the higher speed during concentric activity. **Conclusion:** On basis of the present data, it is possible to conclude that there was significant increase in peak torque with decreasing angular velocity. Males have greater muscle performance either in concentric or isometric mode than females' adolescents.

Key Words: Normative- Isokinetic- Abdominal- Back muscles- Adolescent.

ACKNOWLEDGMENT

First and above all, I pray thanking **GOD** for his blessing and giving me the patience and effort to complete and achieve this work.

I am deeply grateful and honored to thank **Prof. Dr. Omaima Kattabei**, professor of physical therapy, Chairman of Basic Sciences Department, Faculty of Physical Therapy, Cairo University, for her supervision, patience, support, valuable consultation, close and sincere comments which helped me a lot to complete this work and I appreciate her willing to devote her time and expertise to make this better thesis.

No expression could ever reveal my deep appreciation and thanks to **Dr. Nagui Sobhi Nasif**, Lecturer of Physical Therapy, Biomechanics Department, Faculty of Physical Therapy, Cairo University, for his help in setting the apparatus which facilitated the collection of data with appreciable accuracy at the isokinetic laboratory.

My deep sincere gratitude to my colleagues, and to students of Faculty of Physical Therapy, Cairo University who volunteered as subjects in this study.

CONTENTS

	Page
Abstract	I
Acknowledgement.....	II
Contents	III
List of Tables.....	V
List of Figures.....	VIII
List of Abbreviation.....	XIII
CHAPTER I	
INTRODUCTION.....	1
Statement of the problem.....	3
Purpose of the study.....	4
Significance of the study.....	4
Delimitations.....	5
Limitations	5
Basic assumption	6
Hypothesis	6
Definition of Terms	6
CHAPTER II	
LITERATURE REVIEW.....	7
Anatomical structure of the trunk	7
Muscular strength.....	24
Motor development and adolescent.....	34
Measurement of muscular strength.....	42
Summary.....	53
CHAPTER III	
MATERIALS AND METHODS.....	55
Design of the study.....	55
Characteristics of Subjects	56
Instrumentations	57
Evaluation procedures.....	60
Data collection and statistical analysis	65
CHAPTER IV	
RESULTS.....	66
Subjects characteristics	66
Normative data for abdominal and back muscles in adolescents ages 15-18 years.....	67
Effect of gender on isokinetic parameters adolescents	101

CHAPTER V	
DISCUSSION.....	124
 CHAPTER VI	
Summary.....	136
Findings	137
Conclusion	138
Implementation	138
Recommendation for further studies	139
 References.....	140
 Appendices	153
 Arabic summery	

List of Tables

No.	Title	Page
Table (1)	Physical Characteristics of the investigated adolescents	66
Table (2)	Comparison between the mean values of peak torque, power and work for group I at 60°/sec. and 180°/sec.....	68
Table (3)	Comparison between the mean values of abdominal to back torque ratio for group I at 60 °/sec. and 180 °/sec.	70
Table (4)	Comparison between the mean values of isometric peak torque of abdominal to back muscles for group I.	71
Table (5)	Comparison between the mean values of peak torque, power and work for group II at 60°/sec. and 180°/sec.	72
Table (6):	Comparison between the mean values of abdominal to back torque ratio for group II at 60 °/sec. and 180 °/sec.	74
Table (7):	Comparison between the mean values of isometric peak torque of abdominal to back muscles for group II.	75
Table (8):	Comparison between the mean values of peak torque, power and work for group III at 60°/sec. and 180°/sec.	77
Table (9):	Comparison between the mean values of abdominal to back torque ratio for group III at 60°/sec. and 180°/sec..	79
Table (10):	Comparison between the mean values of isometric peak torque of abdominal and back muscles for group III.	80
Table (11):	Comparison between the mean values of peak torque, power and work for group IV at 60°/sec. and 180°/sec.	81
Table (12):	Comparison between the mean values of abdominal to back torque ratio for group IV at 60 °/sec. and 180 °/sec.	83
Table (13):	Comparison between the mean values of isometric peak torque of abdominal to back muscles for group IV.	84
Table (14)	Comparison between the mean values of peak torque, power and work for group V at 60°/sec. and 180°/sec.	86
Table (15)	Comparison between the mean values of abdominal to back torque ratio for group V at 60°/sec. and 180°/sec.	88
Table (16)	Comparison between the mean values of isometric peak torque of abdominal and back muscles for group V.	88
Table (17)	Comparison between the mean values of peak torque, power and work for group VI at 60°/sec. and 180°/sec.	90
Table (18)	Comparison between the mean values of abdominal to back torque ratio for group VI at 60°/sec. and 180°/sec.	92

No.	Title	Page
Table (19):	Comparison between the mean values of isometric peak torque of abdominal and back muscles for group VI.	93
Table (20):	Comparison between the mean values of peak torque, power and work for group VII at 60°/sec. and 180°/sec.	94
Table (21):	Comparison between the mean values of abdominal to back torque ratio for group VII at 60°/sec. and 180°/sec.	96
Table (22):	Comparison between the mean values of isometric peak torque of abdominal and back muscles for group VII.	97
Table (23):	Comparison between the mean values of peak torque, power and work for group VIII at 60°/sec. and 180°/sec.	98
Table (24):	Comparison between the mean values of abdominal to back torque ratio for group IV at 60°/sec. and 180°/sec.	100
Table (25):	Comparison between the mean values of isometric peak torque of abdominal and back muscles for group VIII.	101
Table (26):	Comparison between the mean values of peak torque for 15 year old males and females.	102
Table (27):	Comparison between the mean values of power for 15 year old males and females.	103
Table (28):	Comparison between the mean values of maximum repetition total work for 15 year old males and females.	104
Table (29):	Comparison between the mean values of ratio of abdominal to back muscles for 15 year old males and females.	105
Table (30):	Comparison between the mean values of isometric peak torque for 15 year old males and females. ...	106
Table (31)	Comparison between the mean values of peak torque for 16 year old males and females.	107
Table (32):	Comparison between the mean values of power for 16 year old males and females.	108
Table (33):	Comparison between the mean values of maximum repetition total work for 16 year old males and females.	109
Table (34):	Comparison between the mean values of ratio of abdominal to back muscles for 16 year old males and females.	110
Table (35):	Comparison between the mean values of isometric peak torque for 16 year old males and females.	111
Table (36):	Comparison between the mean values of peak torque for 17 year old males and females.	112
Table (37):	Comparison between the mean values of power for 17 year old males and females.	113