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# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم





شبكة المعلومات الجامعية

# جامعة عين شمس

التوثيق الالكتروني والميكرو فيلم

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# **VARIATION IN SHOULDER ROTATORS TORQUE PRODUCTION IN THE SCAPULAR AND FRONTAL PLANES**

By

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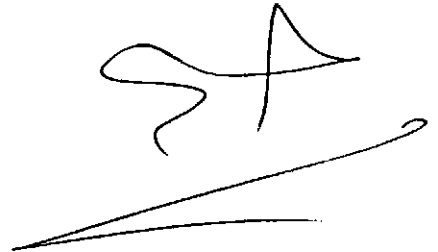
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## *Dedication*

To my family , Without their support  
and love , I could not complete  
this work



# Acknowledgement

Above all and before all thanks to GOD

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

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### Abstract

**Background:** Isokinetic dynamometry has been employed for assessing the performance of voluntarily contracting muscle. Isokinetic testing may produce a variety of different muscle performance data. For example, torque , peak torque, work and power. Peak torque is the most representative and widely used parameter to evaluate muscle function. **The purpose:** To compare torque production in the scapular and frontal planes during isokinetic testing of shoulder rotators and to determine the most efficient position for strength training and therefore rehabilitation of shoulder rotators. **Design and subjects:** Single repeated measurement design was used. Thirty healthy female of physical therapy students and employees participated in this study, their age ranged between 18-32 years. **Methods:** All testing was performed by a single investigator and all subjects were tested both in the scapular and frontal planes for each rotational movement. Subjects were randomly assigned to either plane for initial testing. Each subject performed 3 trials of concentric isokinetic shoulder internal and external rotation in the frontal and scapular planes. The mean peak torque of the three trials was measured. Paired t-test was used to distinguish between shoulder rotators torque production in the scapular and frontal planes. **Results:** The results revealed that there was significant difference in shoulder internal rotators torque in the scapular and frontal planes. The torque generated by the shoulder internal rotators was significantly greater in the scapular than in the frontal plane ( $p < 0.014$ ) and there was also significant difference in shoulder external rotators in the scapular and frontal planes. The torque generated by shoulder external rotators was significantly greater in the scapular plane than in the frontal plane ( $p < 0.0001$ ). **Discussion and conclusion:** The findings revealed that torque generated by shoulder internal and external rotator muscles during concentric isokinetic contraction varies according to shoulder joint testing position and isokinetic shoulder strengthening and testing should be performed in the scapular plane.

**Key Words :** Isokinetic, Shoulder rotators , Torque

## LIST OF ABBREVIATIONS

<b>APM</b>	Angle of peak moment
<b>ATP</b>	Adenosin triphosphate
<b>CON</b>	Concentric
<b>ECC</b>	Eccentric
<b>GHI</b>	Glenohumeral joint
<b>ICC</b>	Intraclass correlation coefficient
<b>IPA</b>	Isometric preactivation
<b>IROM</b>	Isokinetic range of motion
<b>LOA</b>	Limits of agreement
<b>MAP</b>	Moment angular position
<b>MVIC</b>	Maximum voluntary isometric contraction
<b>N.M</b>	Newton.Meter
<b>PAV</b>	Preset angular velocity
<b>PM:AM</b>	Peak to average moment ratio
<b>PT</b>	Peak torque
<b>SIG</b>	Significance
<b>TMO</b>	Transient moment oscillations



# List of tables

Table	Page
1      Anatomy of the muscles that affect shoulder movements-----	17
2      Physical criteria of the subjects-----	53
3      Mean values of shoulder internal rotators peak torque in the frontal planes-----	55
4      Paired t-test for shoulder internal rotators peak torque in the Scapular and frontal planes-----	56
5      Person correlation of shoulder internal rotators torque measurement in the scapular and frontal planes-----	57
6      Mean values of shoulder external rotators peak torque in the scapular and frontal planes-----	58
7      Paired t-test for shoulder external rotators peak torque in the scapular and frontal planes-----	59
8      Person correlation of shoulder external rotators torque measurement in the scapular and frontal planes-----	60

# List of figures

Figure		Page
1	Anterior view of the glenohumeral joint-----	8
2	The glenoid labrum-----	11
3	Ligaments of the shoulder complex-----	14
4	Rotator cuff muscles-----	18
5	The three major phases of an isokinetic repetition plus velocity overshoot-----	23
6	Damp setting and moment overshoot phenomena-----	24
7	Length-tension relationship-----	33
8	Force-velocity relationship-----	34
9	Force-time relationship-----	35
10	Architectural patterns of myofibrils-----	36
11	Biodex isokinetic system -----	48
12	Isokinetic testing of shoulder rotators in the scapular plane--	50
13	Isokinetic testing of shoulder rotators in the frontal plane----	51
14	Physical characteristics of subjects-----	54
15	Mean peak torque of shoulder internal rotators in the scapular and frontal planes -----	55
16	Correlation of shoulder internal rotators torque measurement	

	in the scapular and frontal planes-----	57
17	Mean peak torque of shoulder external rotators in the scapular and frontal plane-----	58
18	Correlation of shoulder external rotators measurement in the scapular and frontal planes-----	60



# Contents

	Page
List of abbreviations-----	i
List of tables-----	ii
List of figures-----	iii
 <b>Chapter(I) Introduction-----</b>	 <b>1</b>
1-Statement of the problem-----	2
2-Purpose of the study-----	3
3-Significance of the study-----	3
4-Hypothesis-----	4
5-Delimitations and limitation-----	4
6-Basic assumption-----	4
7-Terminology-----	5
 <b>Chapter (2) Literature review-----</b>	 <b>6</b>
1-Anatomy and stability of shoulder joint-----	6
- Anatomy of shoulder complex-----	6
- Static stabilizers of the shoulder joint-----	7
- Dynamic stabilizers of the shoulder joint----	16
2- Isokinetics-----	21
- Input parameters of isokinetic testing-----	22
- Output parameters of isokinetic testing--	26
- Advantages of isokinetic testing-----	26
3- Muscle strength-----	29
- Length-tensio relationship-----	32
- Force-velocity relationship-----	33
-Force-time relationship-----	34
-Effect of muscle moment arm-----	35
-Effect of skeletal muscle architecture-----	36
-Effect of muscle fiber types-----	37
-Effect of prestretching-----	37
-Effect of temperature-----	38
-Effect of fatigue-----	38
4- Peak torque-----	40
5- Planes of movements-----	43