

## Identifying Some of the Physiological Changes Associated With Fasting Ramadan and Their Effect on Some of the Physical Changes for Throw Competitions Juniors

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### Abstract

*this research aims to identify some physiological changes associated with fasting Ramadan and their effect on the physical changes for 21 junior throw athletes; boys and girls during fasting Monday of the fourth week of Ramadan (20th Ramadan 1431). A group of physiological, physical, and neural measurements were taken for the research sample individuals (blood sugar accumulation rate / urine acetone rate / simple reaction time / reaction time consistency / Functional efficiency of the nervous system / throwing (3k – 4k- 5k) medical balls in front and behind the body / throwing distance from a still position and moving with legal tools / sprints time for 10m x 4 / running time for 40m ) distributed on 4 periods during the day starting from 12 pm till 6 pm (with fixed time breaks; i.e., every 2 hours)*

*The most important results were as follows:*

*Not using fats as an energy production source for competitors during fasting Ramadan day– there are some differences in the blood sugar accumulation rate measurements - the lack of meaningful differences for each of these measurements ( reaction - reaction consistency – Functional efficiency of the nervous system) and the speed measurements and still and moving throwing measurements which proves that there are no effective physiological changes associated with fasting different from the previous measurements of the research sample individuals.*

### Introduction

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During Ramadan which is about 30 days yearly, all Muslims around the world (billions of Muslims) with its different climates stop eating and drinking from dawn till sunset daily, approximately 14: 15 continuous hours. Umid Karli and others (2007) (15:490) Temizhan and others (1999) (14-149).

as a result of commitment to Islamic rules of fasting, the change in nutritional habits and daily behavior patterns, internal physiological effects may happen to fasting Muslims, and as the Muslim athletes train continuously and participate in sporting competitions as planned by the unions that may occur during Ramadan so some of the Muslim athletes may suffer from training burdens during fasting Ramadan. Since

there is a lack of information about the form and the nature of the physiological changes associated with Juniors Fasting, from a certain age to another, therefore affecting the physical efficiency during a fasting day, so it becomes difficult to form the training burden and choose its kind during fasting Ramadan for the throwing juniors in athletics competitions with this lack of information.

### Research Questions

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- Is there any effect of the physiological changes associated with fasting on the nervous system for throwing juniors in athletics competitions?
- Is there any effect of the physiological changes associated with fasting on the physical ability of the throwing juniors in athletics competitions?

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## Research Purpose

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The recognition of the physiological changes associated with fasting that may occur and their effect on the physical ability of the throwing juniors in athletics competitions.

## Research Procedures

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Use the descriptive method during the training season 2010/2011 in Alexandria Smouha club.

## Research Sample Specifications

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## Research Sample

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a premeditated sample was chosen that included 21 throwing juniors, both boys and girls, distributed as follows:

(10 competitors under the age of 16 - 6 competitors under the age of 18 - 5 competitors under the age of 20) of shot put – discus throwing – javelin throwing competitors.

*Table (1)  
arithmetic means and standard deviations of sample individuals' weight.*

Variables	Age	Arithmetic mean	Standard deviation
	Under 16 years	57 K	12.64
	Under 18 years	89.33 K	28.01
	Under 20 years	85.2 K	8.49
	Sample combined	72.95 K	22.97

*From table (1) we see research sample individuals under 18 have the highest arithmetic mean in weight.*

## Research Measurements

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### First: Physiological Measurements

- Measuring blood sugar accumulation rate (using ACCU-CHEK)
- Measuring urine acetone accumulation rate. (using DIGI-GNOST 3B)

### Neural Measurements

1. Measuring simple reaction speed.
2. Measuring reaction time consistency.
3. Measuring functional efficiency of the nervous system.

### Second: Physical Measurements

- measuring the throwing distance of a medical ball of ( 3 kilograms for individuals under 16 years – 4 kilograms for individuals under 18 years – 5 kilograms for individuals under 20 years) in front of the body
- measuring the throwing distance of a medical ball of ( 3 kilograms for individuals under 16 years – 4 kilograms for individuals under 18 years – 5 kilograms for individuals under 20 years) behind the body
- Measuring the throwing distance of legal tools (javelin – shot put - discus) 3 tries from still position.

- Measuring the throwing distance of legal tools (javelin – shot put - discus) 3 tries while moving.
- Sprints time for 10m \* 4 distance.
- Running time for 40 m distance.

## Research Procedures

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The research measurements were taken during fasting Monday "20 Ramadan 1431" --"30th of august 2010," of which fasting hours: 14 hours and 44 minutes (fasting was from 4.2 am till 6.26 pm)

1. Measurements were executed on 4 stages at (12 pm – 2 pm – 4 pm – 6 pm)
2. Each stage is preceded by a warming up session (400 m run – arm stretching exercises - torso – legs) for 6 minutes.
3. measurements started from 12 pm to reach a minimum of 8 fasting hours for the research sample individuals since the Sohour of the internal medicine departments staff members (2007) (13:61) and also the date of holding the official tournaments, with a constant time break every 2 hours till the body reaches its original state before repeating each research measurement.

The following groups of measurements were repeated:

- The first measure at 12 pm: all research measurements are taken.
- The second measure at 2 pm: measurements of (blood sugar accumulation rate, Sprints time for 10m \* 4 distance, running time for a 40 m distance) were taken.
- The third measure at 4 pm: all research measurements were taken.
- The fourth measure at 6pm: measurements of (blood sugar accumulation rate, urine acetone accumulation rate, Sprints time for 10m \* 4 distance, running time for a 40 m distance, measuring simple reaction speed, measuring

reaction time consistency, measuring the functional efficiency of the nervous system)

- Throwing measurements were taken twice during measuring periods, as (training – holding official tournaments) times were alike, and as the throwing competitor may be subjected to throw in 2 stages in official throwing competitions through 3 play-offs attempts, then another 3 attempts in the final round during the fasting Ramadan days.

**Statistical Processing:**

Arithmetic mean – standard deviation – "T" test for differences – one way ANOVA using SPSS program "F"

**Results**

**First: Physiological Measures**

*Table 2*  
*The Arithmetic means and standard deviations of measuring the blood sugar accumulation rate for the research sample combined.*

Measurements	Arithmetic mean	Standard Deviation + -
The 1st measure of blood sugar accumulation rate mg/dl	103.52	6.28
The 2nd measure of blood sugar accumulation rate mg/dl	101.62	7.37
The 3rd measure of blood sugar accumulation rate mg/dl	96.05	5.42
The 4th measure of blood sugar accumulation rate mg/dl	100.43	5.54

\* → sig. at 0.05

From table 2 we can find that the gradual decrease in the blood sugar accumulation rate average between the 1st, 2nd and 3rd measures

then the increase in the 4th measure and also the fluctuation in the standard deviation values.

*Table (3)*  
*Analyzing the differences between the 4 stages measures of blood sugar accumulation rate for the research sample combined*

Measures	Sum of squares	df	Mean Square	Value of 'F'
Between groups	633.95	3	211.32	* 5.49
Within groups	3076.25	80	38.45	
Total	3710.24	83		

\* → sig. at 0.05

From table 3 we can find that there are differences of significance between the 4

measures of the blood sugar accumulation rate of the research sample individuals.

**Table (4)**  
**The value of LSD between the averages of the 4 measures of the blood sugar accumulation rate of the research sample combined**

Measures	1st	2nd	3rd	4th
1st	-----	1.90	7.47 → *	3.09
2nd		-----	5.57 → *	1.19
3rd			-----	*4.38 ↑
4th				-----

\* → sig. at 0.05

From table 4 we can find that there are differences of significance between (the 1st measure – the 3rd measure) and (the 2nd – the 3rd) and (the 3rd – the 4th) whereas the differences were for the 1st, 2nd, and 4th measures, and the 3rd measure has the lowest arithmetic mean in all 4 i.e., the lowest blood

sugar accumulation rate and that is confirmed by table (2) results.

Acetone measurement: the change in the acetone strips color after soaking in the urine samples of the 2 measures doesn't indicate that there is a usage of fats as an energy source during fasting.

**Second: Physical Measures**

**Table (5)**  
**'T' test between the 1st and 2nd measures for (throwing a medical ball in front of the body- throwing a medical ball behind the body) – (throwing tools from a still position- throwing tools while moving) for the research sample**

Measure type	1st measure		2nd measure		Value of 'T'
	Arith. mean	Standard dev.	Arith. mean	Standard dev.	
throwing ball in front of the body	7.85	2.65	7.37	2.85	* 3.88
throwing ball behind the body	8.78	3.49	7.72	3.82	* 6.19
throwing tools from still position	17.37	7.38	16.74	7.75	*2.21
throwing tools while moving	18.72	8.65	18.68	8.71	0.07

\* → sig. at 0.05

From table 5 we can find that there are differences of significance between the 2 measures of (throwing the ball in front of the body-throwing the ball behind the body-

throwing tools from still position) and there are no differences of significance between throwing tools while moving.

**Table (6)**  
*The arithmetic mean and the standard deviation for (Sprints time for 10m \* 4 distance, running time for a 40 m distance) measurements for the research sample combined.*

Measures	Arithmetic mean	Standard dev.
1st measure of sprints time for 10m X 4	13.71	0.94
2nd measure of sprints time for 10m X 4	13.87	1.28
3rd measure of sprints time for 10m X 4	14.17	1.86
4th measure of sprints time for 10m X 4	14.5	1.96
1st measure of running time for 40 meters	8.18	1.42
2nd measure of running time for 40 meters	8.04	1.15
3rd measure of running time for 40 meters	8.5	1.4
4th measure of running time for 40 meters	8.85	1.53

From table (6) we can find that there is a measure of running time for 40 meters was gradual increase, and inconsistency in the lower in the arithmetic mean and the standard increase of sprints time for 10m \* 4. The 2nd deviation for the research sample.

**Table (7)**  
*ANOVA test (f) for measuring (sprints time for 10m \* 4 - running 40 meters) between the four measures of the research sample.*

Measure type	Measurements	Sum of squares	df	Mean Square	Value of 'F'
sprints time for 10m X 4	Between groups	7.65	3	2.55	1.04
	Within groups	195.9	80	2.45	
	Total	203.55	83		
running time for 40 meters	Between groups	8.21	3	2.74	1.43
	Within groups	153.04	80	1.91	
	Total	161.25	83		

\* → sig. at 0.05

From table (7) we can find that there are no measures of (sprints time for 10m \* 4 – running differences of significance between the four 40 meters) for the research sample.

**Third: The Nervous System Measures**

**Table (8)**  
*The arithmetic mean and the standard deviation of (simple reaction – consistency of simple reaction time – the functional efficiency of the nervous system) measurements for the research sample.*

Measures	1st		2nd		3rd	
	Arith. mean	Stand. Dev.	Arith. mean	Stand. Dev.	Arith. mean	Stand. Dev.
Simple reaction	24.88	5.68	24.24	5.37	21.74	4.43
Consistency of simple reaction time	6.7	4.75	7.65	5.26	6.33	3.97
Efficiency of nervous system	33.76	26.83	39.26	28.12	35.31	23.01

From table (8) we can find that the 3rd measure was less in the arithmetic mean and the standard deviation of the simple reaction time – while the 2nd measure reached the highest value of the arithmetic mean and the standard deviation in measuring (consistency of reaction time – efficiency of the nervous system) for the research sample.

**Table (9)**  
**Analyzing the differ (f) for measuring (simple reaction) – (simple reaction time consistency) – (efficiency of the nervous system) for the research sample.**

Measure type	Measurements				Value of 'F'
Simple reaction	Between groups	115.41	2	57.71	2.14
	Inside groups	1615.99	60	26.93	
	Total	1731.4	62		
Consistency of simple reaction time	Between groups	19.6	2	9.8	0.45
	Inside groups	1318.42	60	21.97	
	Total	1338.02	62		
Efficiency of nervous system	Between groups	337.66	2	168.83	0.248
	Inside groups	40792.672	60	679.88	
	Total	41130.331	62		

\* → sig. at 0.05

From table (9) we can find that there are no differences of significance between the 3 measures of (simple reaction) – (simple reaction time consistency) – (efficiency of the nervous system) for the research sample.

### Discussion of the results

The best usage of the different types of the trainings whether it is physical or skillful for a throwing junior during fasting Ramadan is still unknown to trainers considering the physiological changes that might occur to the competitors as a result of fasting ahmed Bahammam and others (2010) (4:426.)

as Soliman Mostwe (2010) (2:1) mentioned that the fasting person stops drinking fluids and eating any thing for almost 14 hours daily so the question now is what the different changes that might occur to a throwing junior as a result of fasting are.

from the results of tables (2), (3), it's clear that there are differences of significance  $P < 0.002$  at sig. 0.05 between the 12 pm measure and the 4 pm measure, and the 2 pm measure and the 4 pm measure; whereas the differences were in favor to 12pm and 2 pm measures for the sugar accumulation rate, i.e., the blood sugar accumulation rate decreased at the 4pm measure as a result of the physical activity exerted, as the average of sugar accumulation rate at 12 pm (measure 103.52, standard deviation  $\pm 6.28$ ) and at the 2 pm measure (101.62 with a standard deviation  $\pm 7.37$ ) and at the 4 pm measure (96.05 with a standard deviation of  $\pm 5.42$ .)

Whereas there were differences of significance between 4pm and 6pm measures in favor to

6pm measure (arithmetic mean for the 6pm measure 100.43 with a standard deviation of  $\pm 5.54$ )

As there were no differences of significance between 12pm, 2 pm and 6pm measures which proves that the blood sugar accumulation rate has increased again at the 6pm measure and reached the same rate during the 12pm and 2pm measures after it has decreased at 4 pm measure,

Which is confirmed by Fereidoum Azize and Benhnam Siahkolah (2010) (8-1); blood glucose rate decreases as a result of sugar burning in blood then the blood insulin concentration rate decreases then liver glycogen transforms into blood sugar again to maintain the natural limits of blood glucose.

All increasing and decreasing values of sugar accumulation rate were clearly within the natural limits of blood sugar ratios for healthy fasting people. this is confirmed by Salah Ibrahim (2004) (11:157.) The blood sugar rate of the fasting person is bigger than 100 mg/dl and smaller than 126 mg/dl. Through testing for acetone in urine, there was no change in the strip's color in both 12 pm and 6 pm measures which indicates that there is no fat consumption as an energy production source during the measuring, which agrees with Ait Saada and others (2008) (7-111), Momen and others (2007) (9-14) –AL Hourani and Atoum (2007) (5 -909) of whose previous studies was found that carbohydrates, proteins, fats and sugar rates didn't change before and during Ramadan despite the decrease in eating times during Ramadan.

Despite tables (2), (3), (4) results that are related to identifying blood sugar accumulation rate,

tables (8), (9) results indicate that there are no differences of significance between the 3 measures of (simple reaction time) – (consistency of simple reaction time) – (the functional efficiency of the nervous system) as the sig. value reached at 0.05 for measuring reaction time was  $P < 0.126$  and for the consistency of the reaction time was  $P < 0.642$  and for the functional efficiency of the nervous system

$P < 0.781$  between the 1st, 3rd, and 4th measures, despite the decrease in blood sugar accumulation rate for the 3rd measure then that it almost returns to the same rate in the 4th measure.

However, that change didn't affect the mental measurements for the players ( reaction time – reaction time consistency– the functional efficiency of the nervous system) which is confirmed by the results of table(5) which declares that there are no differences of significance between the 4 measures for throwing the tools while moving where the technical performance relies on the functional efficiency of the nervous system of the competitors as Abu El – Ela Abd El – Fattah and Ahmed Nasr El Dein(2003) (1 :17) said, that the functional analysis of the physiological operations performed by the human body is considered one of the fitness components, and the efficiency of the vital systems depends on the amount of physiological changes as a result of playing sports. Abd El –Rahman Zaher (2001) (2:239)

And through the physiological changes mentioned before to which fasting people are exposed, and mentioned by Umid and Others (2007) (490:490) Seyed Tayebi and Others (2010) (12:1) about the decrease of body fluids and their consumption during the continuous hours of fasting relative to measures of ability of (throwing the ball in front of the body-throwing the ball behind the body- throwing the tools from a still position.)

as these measures depend on using the competitor's physical competence, where the results of the table (5) shows that there are no differences of significance between the 1st & 2nd measures in favor to the 1st measure during the 1st period from 12 to 4 pm, the trainers could use those exercises (throwing the ball in

front of the body- throwing the ball behind the body- throwing the tools from a still position) early, i.e., during 12 pm ( of fasting Ramadan) as Kamal Mansi confirms (2007) (10:595) that the change in the nutritional habits during fasting is considered as one of the reasons of differences of significance in metabolism in muscles and the shortage of training, as well as the rates of some blood components. Whereas there were no differences of significance between the 1st and 3rd measures within the same table in the measure of throwing tools while moving because of the skill performance great reliance on the competence and the efficiency of the nervous system in performing the required movement skill.

This is confirmed by the results of tables (8) , (9) which show no differences of significance in the efficiency of the nervous system between the 1st and 3rd periods.

As the results of table (7) show that there are no differences of significance between the measures of sprints time (4\* 10 meter) and the running time (40 meters) during the 4 measures, which agrees with what is said by Umid and Others (2007) (15:497) , Youv Meckel and Others (2008) (16:651) that fasting Ramadan has no effect on running competitions specially the measure of the sprints 4 \* 10 m. as this is because running these distances depends on the energy source ATP- PC (Adenosine triphosphate and phosphocreatine)

As this energy source is formed by the body and is self-compensated. It doesn't depend on the rate of blood sugar, so the throwing juniors' trainers can use speed exercises at any time during the fasting period.

## Conclusions

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Through designing this study and its measuring ways, the researcher figured:

1. There are differences in the physical measurements (throwing the medical ball – throwing the tools from a still position) during the research measures and the differences were in favor to the 1st measure.
2. There were no differences in the throwing tools while moving measurements whether

spinning, crawling or getting closer by the research sample.

3. There were no differences in the measurements of the speed during the research measures.

4. Blood glucose accumulation rate during the last 1/3 of the fasting day i.e., at about 4 pm decreases then it comes up again as a result of the transforming of the glycogen from the muscles and the liver during the last 1/3 of the fasting day i.e., at about 6 pm which might be a reason restoring physical activity, the endurance of hunger and thirst and the happiness right before breakfast.

5. Fats weren't used as an energy production source for the players of the research sample during fasting Ramadan day.

6. There are no differences of significance in the measures of (reaction –reaction consistency - the functional efficiency of the nervous system) during the research measures.

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