

**Effect of saq drills on specific co-ordination abilities,  
some kinematic stride variables and record level for  
110 m/ hurdles contestants**

**Dr/ motaz mohamed nagib eleryan<sup>(\*)</sup>**

**Dr/ Ahmed Gamal Abd Elmonem sheair<sup>(\*)</sup>**

This study aimed to identifying Effect of saq drills on some specific co-ordination abilities, and kinematic stride variables and record level for 110 m/ hurdles contestants. Experimental method was used, (10) contestants registered in Eldakahlia Area in Egyptian Athletic Federation and were taken as purposive sample. saq drills were applied during the specific preparation phase of training with duration of 10 weeks (4) training units per week for (90)minutes .After program end some specific co-ordination abilities, and kinematic stride variables and record level for 110 m/ hurdles contestants were carried out. A Statistical Data Analysis was carried out. Through results presentation and discussion it was possible to conclude saq drills method leads to improve specific co-ordination abilities of the sample under study. These abilities include The ability to accelerate ,The ability to changing direction The rhythm ability, The contribution ability, exert effort ability, ability to equilibrium . As well as saq drills method leads to improve some of kinematic stride variables of the study sample for 110 m/ hurdles contestants. Recommendations, In light of the research findings, the researchers is recommended to, **Applying saq drills** within training programs for the 110meter/ hurdles race, **Applying saq drills** in other studies on other variables, different races, sports and other age stages and on both sexes.

**Key words: saq drills - specific co-ordination abilities- kinematic stride variables - record level for 110 m/ hurdles.**

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<sup>(\*)</sup> Corresponding Author: Lecturer, Sports motion department, Faculty of Physical Education, Mansora University

<sup>(\*)</sup> Corresponding Author: Lecturer, Sports training department, Faculty of Physical Education, damitta University

**Introduction:**

Sport training has developed through scientific studies and research which included various aspects of preparing the various aspects of the contestants such as the physical, technical, psychological and mental aspects, which led to the development of sports performance over the years steadily and amazingly in various sports activities.

The field and track competitions are one of the most successful races that have benefited from this development. This has been evident in the development of the record levels of roadblocks. This scientific progress has contributed to the development of performance and the achievement of new records in both world and Olympic competitions.

Will Freeman (2015) points out that the general road races and the 110 meter / hurdle race require many special qualities for the contestants, whether those are anthropometric or physical. If the contestant has these qualities, he can control the

technique. It is difficult to perform as it is one of the enemy competitions in which speed represents an important and important aspect as the speed of starting from the beginning until the first hurdle, as well as the skill and speed to overcome the hurdles and the enemy between the hurdles until the end of the race (34: 144)

According to Abdel Rahman Zaher (2009), the phases of the hurdle stride are divided into three phases (elevation - flight - landing) and differ from the normal flight stride in the length of the flight which requires a different dynamic system than what happens in this normal running stride in addition to repeating 10 times along The race, with a commitment to the best technical performance according to the abilities of each rider and the enemy between the hurdles at almost constant stride (9: 96)

Bastouisi Ahmed (1997) points out that hurdle racers have special requirements such as high physical fitness, the ability to cross the hurdle with both feet, muscular

compatibility, balance after skidding, fluid flow, muscular compatibility, balance before, during and after hurdles, and the ability to distribute the voltage along the raceway and the excess flexibility in the pelvis to facilitate crossing the hurdle. (9:179)

According to Mohammed Ahmed Ramzi (2001), the contestant must compensate for the lost speed by crossing the hurdle in good preparation to overcome the next hurdle, which affects the dynamic and temporal rhythm of the sprint stride between the hurdles and the hurdle.

Will Freeman (2015) states that the advanced hurdle racer raises the center of his body weight as low as possible above the hurdle so that he does not lose more than 0.2 second to pass the single hurdle and the time it takes to cut the distance without hurdles, so the fastest way to cross the hurdle is the way the center rises. The weight of the rider is as low as possible above the hurdle and this means that the rider needs only two seconds to cross the ten hurdles in addition to the enemy's time (34: 146)

According to Vladimir Liakh (2001), the level of interoperability is linked to the technical performance in the various sports activities will be determined as the rider who has a high level of compatibility capabilities can achieve an advanced level of technical performance. (33: 103)

Hazem Al-Zaki (2014) states that compatibility capabilities are technical performance requirements, differ in their dynamic direction. Co-ordination capabilities do not appear as individual capabilities but are always linked to each other in order to serve in their content the overall structure of the movement in a consistent manner. Achievement of mathematical, physical, skill, planning and psychological abilities. If coordinated between these capabilities, the highest level of general motor compatibility required for the performance of precise motor skills and motor control was achieved. (16: 301)

Hazem Al-Zaki (2014) believes that the compatibility abilities are the most important indicators for the competitors'

experiences of motor kinetics related to the kinetic program of the brain as well as the vital indicators of kinetic activities and the sense of movement through distance, time and ability to focus and their association with the physical and technical aspect. In terms of the level of performance, which stems from the qualitative analysis of the activity practiced and reflect their development and development in a way that serves the technical aspect of "performance technique". (16: 300)

While Mohammed Lotfi (2006) found that the availability of compatibility capabilities at a good level for competitors leads to the economy performance of motor skills, energy saving, and upgrading the level of technical performance and if coordinated work between these capabilities could achieve the highest level of general motor compatibility required to perform outstanding motor skills Exactly the motor control (24: 124)

Assam Abdel-Khaleq (2005) points out that consonant abilities do not

appear as individual abilities but are always linked to other conditions of achievement, and if coordinated, the highest level of motor compatibility can be achieved. Sports levels (12: 171)

Abdulkhaliq Mohammed (2014) points out that harmonized capabilities are divided into three main capacities: "motor learning ability, motor guidance and adaptive capacity", and seven special consensual capacities that are interrelated, interlinked, (Spatial orientation), motor bonding ability, ability to exert appropriate effort (motor muscular excellence), ability to maintain balance, rhythmic ability, ability to fast motor responses, ability to adapt to changing situations. (3 : 11)

The search for the best modern training methods that help to develop the speed of movement and the ability to change the status of the body of the contestants and work on the permanent development of the record levels of track races is a reason for the attention of those involved in the training process to find effective ways to improve the speed and form

of technical performance, and help the contestants to achieve this goal.

Mario Jovanovic et al. (2011) states that SAQ is derived from the initial characters of both Speed, Agility, Quickness, and Saq . A modern training system that results in integrated effects of many physical abilities within the training program . (20:1285)

Zaki Hassan (2015) states that training of the saq is an expression to training that helps to develop speed, agility and speed of starting and can be applied in many sports activities that depend on these capabilities, including field and track races, especially 110 meters / hurdles.(36:24)

Amani Ibrahim and Gehad Nabia (2009) explains that saq training has many benefits, including increased horizontal and vertical speed, reduced reaction time, and increased muscular capacity.(5:5)

Zaki Hassan (2015) explains that the training of the saq has many benefits that are shown by applying to improve the speed and increase the nerve signal and muscular ability. The training of the saq can be

applied through any emerging sport through different applications. SAQ training is a system of gradual drills aimed at developing Basic motor abilities to enhance the ability of athletes to be more skilled at higher speeds and helps to improve the mechanics of running, improve arm movement and improve the push and reduce the time of pushing.(36:5.151.149.23.24)

Mohammed Ramzi (2001) and Abdulrahman Zaher (2009) agree on the importance of studying the kinetic analysis of the kinetic variables for the stages of the hurdle stride performance during the pre-hurdle damping phase and after the hurdle and determining the extent of the lack of performance of the contestants, thus improving the technical performance (22:167)(2:97)

Thus, it is important to have the compatibility capabilities of the competitors in the 110 meters / hurdles to a large extent. During the enemy to the beginning of the first hurdle, the opponent must change the enemy's rhythm gradually until the optimal speed of the upgrade is achieved. The

hurdle allows for a strong and fast throttle performance.

In the opinion of the researchers that the specific co-ordination abilities of the competitors of 110 meters / hurdles is important in the accumulation of forces acquired throughout the race as well as during the stride of the hurdle in the balance of motion and the ability to change the body position during the enemy between the hurdles or the motor rhythm of the contestant as well as the interconnect between them during the technical performance in a coherent and streamlined and sequentially. And the ability to balance the movement is of great importance in helping the contestants to overcome the hurdles consistently without defect in the motor track of the high center of gravity over the Hurdles and needed by the contestant before, during and after overcoming the hurdle, Vtumeitha increases the adjustment and control operations in motor performance also increases the ability to use all influential forces in the performance away from the motor disorders which

may hinder the performance of it is one of the most important perfection and installation kinetic factors.

And through the theoretical readings and the reference survey of many previous studies (1) (3) (8) (9) (11) (14) (18) (20) (21) (22) (23) (28) (33) In the light of the exploratory study conducted by the researchers (1) on the number of (3) runners in the 110 meters / hurdles at the Youth Center of Mansoura Stadium and registered with the Egyptian Federation of Athletics under 20 years. A decrease in the level of some specific co-ordination abilities, as well as in certain kinetic parameters of the stride of the hurdle (total displacement of the stride of the hurdle, the time of the stride, the time of the front loading, The height of the center of gravity at the moment of entry, the height of the center of gravity on the hurdle, the horizontal speed of the center of gravity, the vertical velocity of the center of gravity), which leads to a lower record level, prompting the researchers to attempt to design and implement some. The special preparation of their

training program and their effect on the specific co-ordination abilities and some kinematic variables of the hurdle stride in the 110 meter / hurdle.

**Search aims:**

The aim of the research is to identify the effect of the training of the saq on the specific co-ordination abilities and some kinetic variables for the stride of the hurdles and the record level of 110 meters / hurdles by identifying:

1. The effect of the saq drills on the specific co-ordination abilities of the 110 meters / hurdlers.
2. Effect of saq drills on some kinetic variables for the hurdle stride in the 110 meters / hurdles.
3. Effect of saq drills on 110 meters / hurdles.

**Research hypotheses:**

- 1- Saq drills positively affect the specific co-ordination abilities of 110 meters / hurdlers.
2. The Saq drills positively affect some kinematic variables for the hurdle stride of 110 meters / hurdles.
3. Saq drills affect the record level in 110 meters /

hurdles.. through the following sub-objectives.

**Search procedures:**

**Research Methodology:**

The researchers used the experimental approach using the experimental design of two groups, one control and the other experimental, applying the telemetry measurement, in order to suit the nature of the research:

Community and Sample Search:

The research community consisted of 110 meters / hurdles for the Dakahlia area. The sample was randomly selected from 110 meters / hurdles and enrolled in the Dakahlia Athletics Zone and registered with the Egyptian Athletics Federation under 20 years. The sample size was 10 contestants divided into two groups (5) contestant and (3) contestant for the exploratory study.

-Sample Selection Conditions:

-All members of the sample should be close to the age of training and the record level.

-The age of the rider ranges between (18-20) years.

-All members of the sample of the competitors of the 110 meters / hurdles and registrants

and participants in the Athletics Championships for the season 2018/2019 advanced centers.

-All candidates are ready to participate in the training.

-To be subject to the program under the supervision of researchers and assistants.

Means and tools for data collection:

Reference survey:

Through the two researchers conducted a survey of reference to many of the research and references Arab and foreign have reached the most appropriate tests and measurements that achieve the goal of research.

-Physical measurements, tests, and kinetic variables for the stride of the hurdle under study: Attachment (2)

(1)(2)(3)(6)(7)(11) the specific compatibility capabilities under study were determined and determined how to measure them.

-Basic and specific measurements of the characterization and homogeneity of the research sample:

-Age (for the nearest half year)

- Weight (for nearest kg) -

Length (for nearest centimeter)

-Training age (for the nearest half year).

-Special co-ordination capacity measurements under consideration:

-The ability to exert effort: the left foot - the right foot.

-The ability to the motor contraction: the time of the third part of the left, 3 right of the distance of 15 m - the time of the third wave left, 3 right for a distance of 10 m.

-rhythmic ability: sense of time - sense of distance - rhythm.

-The ability to balance: Stand on the balance left foot and right for the longest time.

-The ability to change the body's position: burpe (10sec).

-The ability to start speed: the time of 30 meters of low start.

-Kinematical variables for the hurdle stride for the competitors 110 meters / hurdles:

( $\checkmark$ ) The kinetic variables of the hurdle stride were determined for 110 meters / hurdles and were represented in: (1) (1) (2) (6) (11) (12) (13)

-the length of the stride displacement (centimeter), the offset of the stride before the hurdle, the displacement of the centimeter, the displacement of

the stride after the centimeter, the stride time (second), the time of the front (second), the time of the back (second) The height of the center of gravity at the moment of entry, the height of the center of gravity at the centimeter, the horizontal speed of the center of gravity

(meters / second), the vertical velocity of the center of gravity (m / sec), the sum Horizontal speed of the center of gravity (m / s).

- Record level of the 110 meters / hurdles: the record level of the 110 meters / hurdles

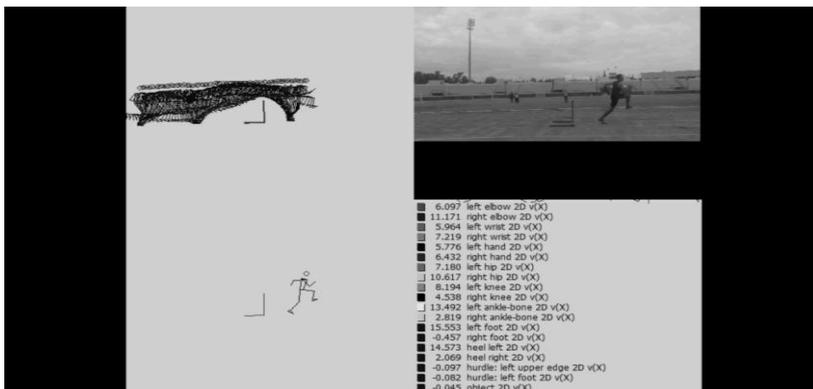


Chart (1) kinetic analysis of the kinetic variables of the fifth hurdle of the contestants 110 meters / hurdles.

### Tools and devices used in search:

The researchers used the following tools and tools in the training and measurement process in the research:

-Restameter for measurement of length, weight, tape measure.

-Five Sony digital cameras with 120 cadres / second, 3-way cameras with water balance, computer, simi motion software, video conversion software, CDs.

"-Casue Stopwatch" stop times are measured in seconds (1/100 sec).

-Co-ordination ladder, multi-height hurdles, ground signs, dishes, cones.

-Names of assistants. Annex (2)

-Data recording form for anthropometric measurements, measurements, tests, compatibility capabilities, and kinetic variables for the stride of the hurdle and the record level. Annex (3)

-Anthropometric measurements, physical tests, special compatibility and kinetic variables for the hurdle stride for 110 meters / hurdles under study. ANNEX (4)

-Models for training warm-up and calm. Annex (5)

-The training program applied by the researchers . Annex (6)

Selection of Assistants:

The assistants were selected from the teachers and assistant teachers from the Faculty of Physical Education in Damietta and the trainers of the road races in Dakahlia area in Mansoura Stadium Clubs, the Sinbillawin and the Sinbillawain Youth Center. The researchers used them to organize and prepare the candidates for the research sample while conducting the tests and measurements under consideration and implementing the training program and their data. Annex (2)

### **Research studies:**

The researchers conducted several studies in the period from 1/9/2018 to 20/9/2018 in order to select the content and design of a training program for the training of the saq and to verify the validity of the tools and devices used as well as to organize and control the process of photography and animation analysis.

### **The first survey:**

The study was conducted during the period from 1/9/2018 to 9/9/2018 to select and determine the content of the training program of the experimental research group and to determine the appropriate extent of the content of his training for the sample, as indicated by the specialized scientific references and previous studies. For the sample of the study under study by applying several of his training on some of the youth outside the sample of the research, which reached (3) beginners at the advanced level in 110 meters / hurdles.

### **Second survey:**

The second exploratory study was conducted during the period from 10/8/2018 to 7/9/2018 in order to ascertain the validity of the tools and equipment used in the training program as well as the rationing of the training units and determining the content of the training program of the experimental group. The most important results of the second survey were the contents of the training program of the experimental group, the control, and some drills were proposed to a group of contestants to ascertain the validity of the performance of these drills.

### **Third Survey Study:**

The study was conducted on 9/8/2018 to

12/8/2018 on a sample of (2) riders from outside the research sample of the advanced level in the competition of 110 meters / barriers outside the sample of the research in order to regulate and control the process of photography, by wearing the appropriate clothes (5 cm) from the middle of the fifth barrier and the height of the camera lens from the ground is the same as the height of the barrier from the ground (91 cm). The lateral level shows the performance of the rider for the step of the fifth barrier and recording the numbers of the contestants in accordance with their order of performance , After recording the skill and recording it on the card And the conversion of the film from

the tape format to the digital AVI format so that it can be analyzed, and the film is cut into separate attempts for easy analysis, and the value of the drawing scale is determined on the program., and a set of kinetic variables (Stride length, stride time, height center of gravity entry moment, height center of gravity at the hurdle, displacement of the stride before the hurdle, displacement of the stride after the hurdle, angle of the trunk at the hurdle, pelvic angle, horizontal velocity of the center of gravity, Vertical velocity of center of gravity, sum of horizontal speed of center of gravity, time of front-loading Left gel, posterior time of right leg).

**Measurements:**

**Homogeneity of the sample:**

**Table (1)**  
**Statistical characterization of study sample in basic variables**  
**(under study) n = 10**

variables		mesurment unit	Aveg	median	Stev	skew
Basic variables	age	year	19.41	19.45	0.17	-0.71
	length	cm	183.9	183.5	3.11	0.39
	weight	kgm	78	78	2.58	0
	Lower limb length	cm	107.4	107.5	2.17	-0.14
	training years	year	4.42	4	0.82	1.54

Table (1) show the basic variables for study sample are normally distributed.

**Table (2)**  
**Statistical characterization of study sample in specific**  
**coordination variables (under study) n = 10**

specific coordination variables	mesurment unit	Aveg	median	Stev	skew	
The ability to accelerate	30 m from crouch start	sec	4.41	4.39	0.04	1.5
The ability to changing direction	Burpe 10sec	num	13.6	13.5	1.65	0.18
The rhythm ability	Time perception	sec	0.42	0.41	0.05	0.6
	distance perception	cm	0.45	0.44	0	0.05
	rhythm	sec	1.48	1.53	0.11	-1.36
The contribution ability	Time of hoping 10 m	sec	3.2	3.2	0.04	0
	Time of hoping 15 m	sec	4.32	4.26	0.1	1.8
Ability to exert effort	Left foot	cm	23.65	23.5	1.37	0.33
	right foot	cm	26.47	26	0.88	1.6
Ability to equilibrium	Standing on platform with left foot	sec	44.4	44.5	0.97	-0.31
	Standing on platform with right foot	sec	37.55	37.5	1.16	0.13

Table (2) show the specific coordination for study sample are normally distributed.

**Table (3)**  
**Statistical characterization of study sample in some kinematic**  
**variables for hurdle stride variables (under study) n = 10**

kinematic variables for hurdle stride	measurements unit	Aveg	median	Stev	skew
Total displacement for hurdle stride	cm	306.3	306	0.95	0.95
entrance Displacement for hurdlestide	cm	215	214	1.69	1.78

**Follow Table (3)**  
**Statistical characterization of study sample in some kinematic variables for hurdle stride variables (under study) n = 10**

<b>kinematic variables for hurdle stride</b>	<b>measurements unit</b>	<b>Aveg</b>	<b>median</b>	<b>Stev</b>	<b>skew</b>
Displacement after hurdle stride	cm	92	92	0.81	0
Stride hurdle time	sec	0.42	0.42	0.01	0
time of anterior pivot	sec	0.18	0.17	0.11	0.27
time of posterior	sec	0.13	0.13	0.01	0
Angle of core on	Degree	53.9	53.5	1.29	0.93
Angle of pelvis on	Degree	117	117	1.76	0
Center of gravity height during	cm	101.5	101.5	1.29	0
Center of gravity height on hurdle	cm	22.7	23	0.82	-1.1
Horizontal velocity of center of gravity	m/sec	7.46	7.24	0.45	1.47
Vertical velocity of center of gravity	m/sec	1.02	1.02	0.01	0
The sum of the velocity of the	m/sec	8.34	8.34	0.28	0

Table (3) shows the kinematic variables for hurdle stride for study sample are normally distributed.

**Table (4)**  
**Statistical characterization of study sample record level for 110m/hurdle (under study) n = 10**

<b>Record level for 110m/hurdle race</b>	<b>measurement unit</b>	<b>Aveg</b>	<b>median</b>	<b>Stev</b>	<b>skew</b>
Record level for 110m/ hurdle race	Sec	15.92	15.8	0.51	0.71

Table (4) shows the record level for 110m/hurdle for study sample are normally distributed.

**Table (5)**  
**Valence to experimental and control groups in pre –**  
**measurements of the basic variables under study n 1 = n 2=5**

variables	mesurment unit	experimental group			control group			U value	Z value
		aveg	rank aveg	rank sum	aveg	rank aveg	rank sum		
age	year	19.42	5.8	29	19.4	5.2	26	11	0.32
length	cm	185	6.6	33	182.8	4.4	22	7	1.16
weight	kgm	77.8	5.3	26.5	78.2	5.7	28.5	11.5	0.21
Lower limb length	cm	108.2	6.7	33.5	106.6	4.3	21.5	6.5	1.27
training years	year	4.59	6.6	33	4.24	4.4	22	7	1.23

Z-score value at Significance level 0.05 = 1.96

Table (5) shows that there are no statistically significant differences between the pre measures of the experimental and control groups in the basic measurements, (under study), indicating the equivalence of the control and experimental groups. Were greater than their tabular value at a significance level of 0.05.

**Table (6)**  
**Valence to experimental and control groups in pre –**  
**measurements of the specific coordination variables under study**  
**n 1 = n 2=5**

specific coordination variables	Measurements unit	experimental group			control group			U value	Z value	
		Aveg	rank aveg	rank sum	aveg	rank aveg	rank sum			
The ability to accelerate	30 m from crouch start	sec	4.68	4.7	23.5	4.7	6.3	31.5	8.5	0.84
The ability to changing direction	Burpe 10sec	num	14	6.2	31	13.2	4.8	24	9	0.75
The rhythm ability	Time perception	sec	0.41	4.6	23	0.42	6.4	32	8	0.96
	distance perception	cm	0.43	4.4	22	0.44	6.6	33	7	1.21
	rhythm	sec	1.47	4.8	24	1.5	6.2	31	9	0.73
The contribution ability	Time of hoping 10 m	sec	3.19	4.5	22.5	3.21	6.5	32.5	7.5	1.06

**Follow Table (6)**  
**Valence to experimental and control groups in pre –**  
**measurements of the specific coordination variables under study**  
**n 1 = n 2=5**

specific coordination variables	Measurements unit	experimental group			control group			U value	Z value
		Aveg	rank aveg	rank sum	aveg	rank aveg	rank sum		
Time of hoping 15 m	sec	4.31	4.6	23	4.33	6.4	32	8	0.94
Ability to exert effort	Left foot	24.2	6.8	34	23.1	4.2	21	6	1.37
	right foot	27	4.2	21	25.94	6.8	34	6	1.37
Ability to equilibrium	Standing on platform with left foot	44.8	6.6	33	44	4.4	22	7	1.205
	Standing on platform with right foot	38.1	6.8	34	37	4.2	21	6	1.396

Z-score value at Significance level 0.05 = 1.96

Table (6) shows that there are no statistically significant differences between the pre measures of the experimental and control groups in the specific coordination variables

measurements, (under study), indicating the equivalence of the control and experiment groups. Were greater than their tabular value at a significance level of 0.05.

**Table (7)**  
**Valence to experimental and control groups in in some kinematic variables for hurdle stride variables under study n 1 = n 2=5**

kinematic variables for hurdle stride	Measurements unit	experimental group			control group			U value	Z value
		aveg	rank aveg	rank sum	aveg	rank aveg	rank sum		
Total displacement for hurdle stride	cm	214.6	4.9	24.5	215.4	6.1	30.5	9.5	0.67
entrance Displacement for	cm	92.2	6.2	31	90.8	4.8	24	9	0.78

**Follow Table (7)**  
**Valence to experimental and control groups in in some kinematic variables for hurdle stride variables under study n 1 = n 2=5**

kinematic variables for hurdle stride	Measurements unit	experimental group			control group			U value	Z value
		aveg	rank aveg	rank sum	aveg	rank aveg	rank sum		
Displacement after hurdle stride	cm	306.8	7	35	305.8	4	20	5	-1.643
Stride hurdle time	sec	0.42	5	25	0.43	6	30	10	-0.643
time of anterior pivot	sec	0.14	4.1	20.5	0.13	6.9	34.5	5.5	-1.565
time of posterior pivot	sec	0.17	4.3	21.5	0.18	6.7	33.5	6.5	-1.269
Angle of core	degree	53.8	5.3	26.5	54	5.7	28.5	11.5	-0.218
Angle of pelvis on	degree	117.8	6.8	34	116.2	4.2	21	6	-1.383
Center of gravity height during entrance second	cm	101.2	4.8	24	101.8	6.2	31	9	-0.745
Center of gravity height on hurdle	cm	23	4.6	23	22.4	6.4	32	8	-1.063
Horizontal velocity of center of gravity	m/sec	7.5	6.6	33	7.43	4.4	22	7	-1.152
Vertical velocity of center of	m/sec	1.03	6.9	34.5	1.01	4.1	20.5	5.5	-1.504
The sum of the velocity of the center of gravity	m/sec	8.33	6.7	33.5	8.36	4.3	21.5	6.5	-1.273

Z-score value at Significance level 0.05 = 1.96

Table (7) shows that there are no statistically significant differences between the pre measures of the experimental and control groups in the specific coordination variables measurements, (under study), indicating the equivalence of the control and experimental

groups. Were greater than their level of 0.05.  
 tabular value at a significance

**Table (8)**  
**Valence to experimental and control groups in record level for 110m/hurdle under study n 1 = n 2=5**

record level for 110m/hurdle	measurement unit	experimental group			control group			U value	Z Value
		aveg	Ranks aveg	Ranks sum	aveg	Ranks aveg	ranks sum		
record level for 110m/hurdle	sec	15.85	5.2	26	15.98	5.8	29	11	0.32

Z-score value at Significance level 0.05 = 1.96

Table (8) shows that there are no statistically significant differences between the pre measures of the experimental and control groups in the specific coordination variables measurements, (under study), indicating the equivalence of the control and experimental groups. Were greater than their tabular value at a significance level of 0.05.

**Designing of the training program:**

The study content was selected and selected according to the analysis of the scientific studies and training programs for the 110 meters / hurdles and the scientific studies that dealt with the saq training. (3) (4) (5) (15) (20) (25) Using a training program for a period of (10) weeks, the number of

(4) weekly training units with a time of 90 minutes. The training program included the training of the Saq for 110 meters / hurdles.

**Foundations of the training program:**

- The program should achieve the objectives for which it was developed.
- Perform the drills as quickly as possible.
- Similar drills with motor activity practiced in terms of form and muscle work.
- The researchers used high frequency training.
- Graduation in increasing the training load.
- Taking into account the principle of ripple in the degree of pregnancy.
- Consider the characteristics of the Sunni stage and the individual differences between the sample members.

-Flexibility of the program to the extent appropriate during its application period.

**Pre measurement:**

The researchers conducted a pre measurement of some of the specific co-ordination abilities and some kinematic stride variables and record level for 110 m/ hurdles contestants competitors of the control and experimental research groups on 1/9/2018 to 2/9/2018.

**main study:**

**Applied Procedures for saq Training Program: attached (4)**

(6) (5) (15) (20) (25) To identify the elements of the training program attached (6) The duration of the program - the number of weekly training units - the time of the training unit - the load cycle - the appropriate loads of the program. The researchers reached some points in which the training program could be developed in improving some specific co-ordination abilities and kinetic variables for the stride of the hurdle and the level of record achievement for the 110 meters / Hurdles in search of all units For training as follows:

-The training program was implemented in the special preparation phase of the training season. The duration of the training program was 10 weeks with 4 training units.

The training time was 90 minutes.

-The training time for the saq within the training unit ranges from 30-45 minutes.

-The training intensity of load was (60-85%).

-The training volume 6 rips and 4 set, 2 minute drill density.

-saq drills were applied in the special preparation part of the training unit.

**Application of the training program:**

The researchers applied the training program during the period from 3/9/2018 to 10/11/2018 for ten weeks.

**post measurements:**

After completing the training of the saq for the sample of the research during the special preparation period, the post measurements were carried out on 11-12 / 11/2018 with the same stride of pre measurement.

**Statistical Processes:**

The researchers used statistical programs (SPSS & Excel) to process data for search variables. The statistical treatment plan included the following:

The researchers used the following statistical treatments using SPSS 25 statistical mean, standard deviation, torsion factor, Mann-Whitney test, Wilcoxon Test, change rate.

**Results and discussion**

**First present**

**Table (9)  
Significance of differences between the pre and post  
measurements in the specific coordination variables values of the  
sample of the study for the control group n = 5**

specific coordination variables	measurement unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Change rate
				Average ranks	ranks sum	Average ranks	ranks sum			
The ability to accelerate	30 m from crouch start sec	4.7	4.4	3	15	0	0	2.03*	0.04	0.45
The ability to changing direction	Burpe 10sec num	13.2	15	0	0	3	15	2.04*	0.04	13.64
The rhythm ability	Time perception sec	0.42	0.38	3	15	0	0	2.03*	0.04	13.01
	distance perception cm	0.44	0.35	0	0	3	15	2.02*	0.04	19.45
	rhythm sec	1.5	1.46	0	0	3	15	2.03*	0.04	2.41
The contribution ability	Time of hoping 10 m sec	3.21	2.8	3	15	0	0	2.03*	0.04	13.01
	Time of hoping 15 m sec	4.33	3.75	3	15	0	0	2.02*	0.04	13.34
Ability to exert effort	Left foot cm	23.1	17.2	0	0	3	15	2.03*	0.04	25.54
	right foot cm	25.94	23.6	0	0	3	15	2.02*	0.04	9.02
Ability to equilibrium	Standing on platform with left foot sec	44	48.6	0	0	3	15	2.03*	0.04	10.45
	Standing on platform with right foot sec	37	38.4	0	0	3	15	2.12*	0.03	7.57

\*Statistically significant at 0.05  
Table (9) indicates that there are statistically significant differences between the pre and post measurements of the control group in in the specific coordination variables values for the favor of post

Z value at 0.05= 1.96  
measurement as the calculated value of error coefficient was less than 0.05. This is confirmed by the calculated Z value since it was higher than the table value at 0.05.

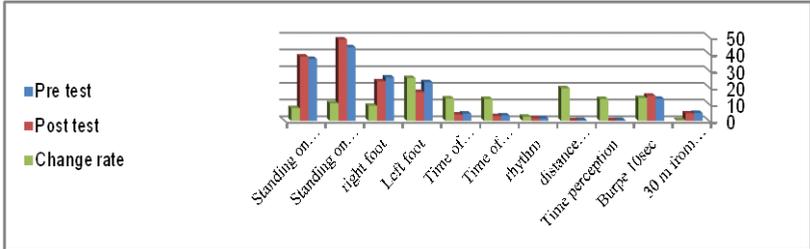


Chart (2) change rate for variables under study in the specific coordination variables values for the control group.

**Table (10)**  
**Significance of differences between the pre and post measurements in the specific coordination variables values of the sample of the study for the Experimental group n = 5**

specific coordination variables	measurement unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Change rate	
				Average ranks	ranks sum	Average ranks	Ranks sum				
The ability to accelerate	30 m from crouch start	sec	4.68	4.33	3	15	0	0	2.03*	0.04	1.46
The ability to changing direction	Burpee 10sec	num	14	17.2	0	0	3	15	2.12*	0.04	22.86
The rhythm ability	Time perception	sec	0.41	0.35	3	15	0	0	2.03*	0.04	14.98
	distance perception	cm	0.43	0.29	0	0	3	15	2.06*	0.04	32.41
	rhythm	sec	1.47	1.33	0	0	3	15	2.23*	0.04	9.78
The contribution ability	Time of hopping 10 m	sec	3.19	2.52	3	15	0	0	2.02*	0.04	21.08
	Time of hopping 15 m	sec	4.31	3.48	3	15	0	0	2.02*	0.04	19.21
Ability to exert effort	Left foot	cm	24.2	13.2	0	0	3	15	2.03*	0.04	45.45
	right foot	cm	27	16.2	0	0	3	15	2.06*	0.04	40
Ability to equilibrium	Standing on platform with left foot	sec	44.8	50.8	0	0	3	15	2.04*	0.04	13.39
	Standing on platform with right foot	sec	38.1	43	0	0	3	15	2.04*	0.04	12.87

\* Statistically significant at 0.05  
 Table (10) indicates that there are statistically significant differences between the pre and post measurements of the Experimental group in in the specific coordination variables values for the favor

Z value at 0.05= 1.96  
 of post measurement as the calculated value of error coefficient was less than 0.05. This is confirmed by the calculated Z value since it was higher than the table value at 0.05.

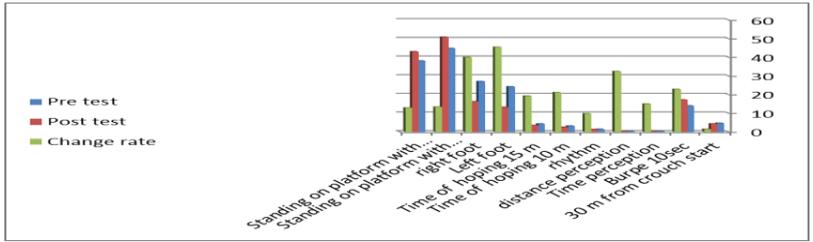


Chart (3) change rate for variables under study in the specific coordination variables values for the Experimental group.

**Table (11)**

**Denote the differences between pre and post measurements for experimental group and control group in specific coordination variables under study n = 5**

specific coordination variables		measurement unit	experimental group			control group			U value	Z value
			Average	Average ranks	Ranks sum	Average	Average ranks	ranks sum		
The ability to accelerate	30 m from crouch start	sec	4.33	3.6	18	4.4	7.4	37	3	2.01*
The ability to changing direction	Burpe 10sec Time perception	num	17.2	7.4	37	15	3.6	18	3	2.12*
The rhythm ability	Time perception	sec	0.35	3	15	0.38	8	40	0	2.64*
	distance perception	cm	0.29	3	15	0.35	8	40	0	2.62*
	rhythm	sec	1.33	3.6	18	1.46	7.4	37	3	2.01*
The contribution ability	Time of hopping 10 m	sec	2.52	3.4	17	2.8	7.6	38	2	2.20*
	Time of hopping 15 m	sec	3.48	3.5	17.5	3.75	7.5	37.5	2.5	2.10*
Ability to exert effort	Left foot	cm	13.2	3.1	15.5	17.2	7.9	39.5	0.5	2.53*
	right foot	cm	16.2	3	15	23.6	8	40	0	2.65*
Ability to equilibrium	Standing on platform with left foot	sec	50.8	7.6	38	48.6	3.4	17	2	2.27*
	Standing on platform with right foot	sec	43	8	40	39.8	3	15	1	2.46*

\* Statistically significant at 0.05

Z value at 0.05= 1.96

Seen from the table (11) there are of statistically significant differences between the post measurements to experimental group and post measurements of the control

group in favor of the post measurements to experimental group in the variables under study at the significant level of 0.05.

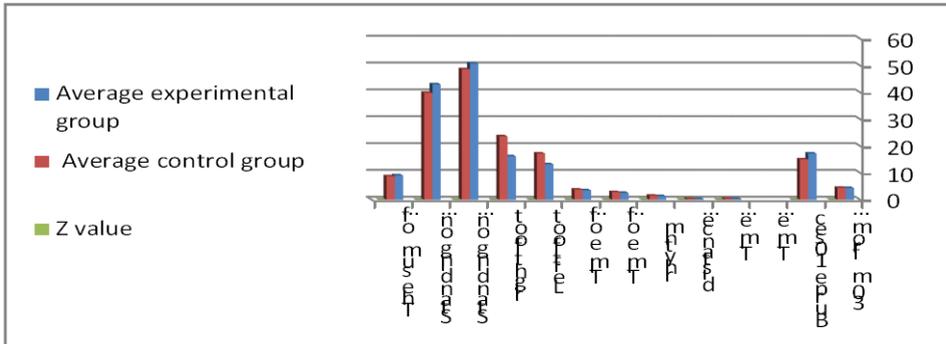


Chart (4) Denote the differences between pre and post measurements for experimental group and control group in specific coordination variables under study

**Table (12)**  
**Significance of differences between the pre and post measurements in kinematic variables for hurdle stride values for the control group n =5**

kinematic variables for hurdle stride	Measurement unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Change rate
				Average ranks	ranks sum	Average ranks	ranks sum			
Total displacement for hurdle entrance	cm	305.8	308.8	0	0	3	15	2.03*	0.04	0.98
Displacement for hurdle stride	cm	215.4	211.2	3	15	0	0	2.03*	0.04	1.95
Displacement after hurdle stride	cm	90.8	93.4	0	0	3	15	2.12*	0.04	2.86
Stride hurdle time of anterior pivot	sec	0.43	0.41	3	15	0	0	2.07*	0.04	4.21
time of anterior pivot	sec	0.13	0.12	3	15	0	0	2.12*	0.04	14.29

**Follow Table (12)**  
**Significance of differences between the pre and post**  
**measurements in kinematic variables for hurdle stride values for**  
**the control group n =5**

kinematic variables for hurdle stride	Measurement unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Change rate
				Average ranks	ranks sum	Average ranks	ranks sum			
time of posterior pivot	sec	0.18	0.16	3	15	0	0	2.03*	0.04	13.19
Angle of core on hurdle	degree	54	51.4	0	0	3	15	2.04*	0.04	4.81
Angle of pelvis on hurdle	degree	116.2	118	0	0	3	15	2.03*	0.04	1.55
Center of gravity height during entrance second	cm	101.8	99.4	3	15	0	0	2.03*	0.04	2.36
Center of gravity height on hurdle	cm	22.4	20.8	3	15	0	0	2.06*	0.04	9.57
Horizontal velocity of center of gravity	m/sec	7.43	8.23	0	0	3	15	2.03*	0.04	10.88
Vertical velocity of center of gravity	m/sec	1.01	1.08	0	0	3	15	2.03*	0.04	6.11
The sum of the velocity of the center of gravity	m/sec	8.36	8.72	0	0	3	15	2.02*	0.04	4.58

\* Statistically significant at 0.05  
 Table (12) indicates that there are statistically significant differences between the pre and post measurements of the control group in in the

value at 0.05= 1.96  
 kinematic variables for hurdle stride values for the favor of post measurement as the calculated value of error coefficient was less than 0.05.

This is confirmed by the calculated Z value since it was

higher than the table value at 0.05.

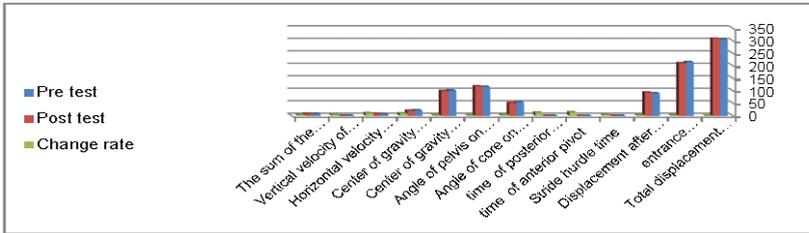


Chart (5) change rate for variables under study in the kinematic variables for hurdle stride values for the control group.

**Table (13)**  
**Significance of differences between the pre and post measurements in kinematic variables for hurdle stride values for the Experimental group n = 5**

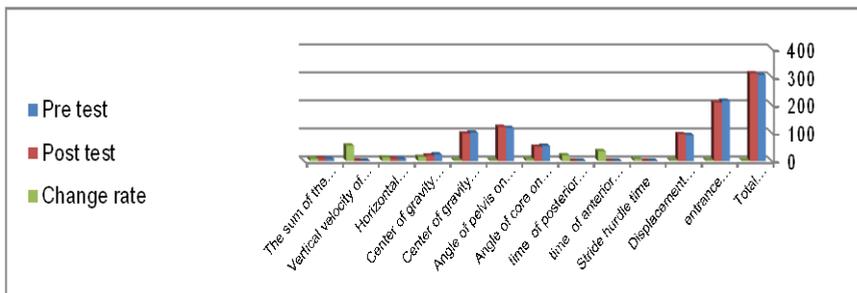
kinematic variables for hurdle	measurement unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Change rate
				Average ranks	ranks sum	Average ranks	ranks sum			
Total displacement for hurdle stride	cm	306.8	312.4	0	0	3	15	2.03*	0.04	1.83
Displacement for hurdle stride entrance	cm	214.6	208.2	3	15	0	0	2.03*	0.04	2.98
Displacement after hurdle stride	cm	92.2	95.4	0	0	3	15	2.12*	0.04	3.47
Stride hurdle time	sec	0.42	0.39	3	15	0	0	2.07*	0.04	7.08
time of anterior pivot	sec	0.14	0.08	3	15	0	0	2.06*	0.04	34.6
time of posterior	sec	0.17	0.14	3	15	0	0	2.03*	0.04	20
Angle of core on hurdle	degree	53.8	50.4	0	0	3	15	2.06*	0.04	6.32
Angle of pelvis on	degree	117.8	121.4	0	0	3	15	2.03*	0.04	3.06

**Follow Table (13)**  
**Significance of differences between the pre and post**  
**measurements in kinematic variables for hurdle stride values for**  
**the Experimental group n = 5**

kinematic variables for hurdle	measurement unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Change rate
				Average ranks	ranks sum	Average ranks	ranks sum			
Center of gravity height during entrance second	cm	101.2	97.6	3	15	0	0	2.03*	0.04	3.56
Center of gravity height on hurdle	cm	23	19.2	3	15	0	0	2.03*	0.04	14.29
Horizontal velocity of center of gravity	m/sec	7.5	8.38	0	0	3	15	2.03*	0.04	11.68
Vertical velocity of center of gravity	m/sec	1.03	1.59	0	0	3	15	2.03*	0.04	54.78
The sum of the velocity of the center of gravity	m/sec	8.33	9.05	0	0	3	15	2.02*	0.04	8.35

\* Statistically significant at 0.05  
 Table (13) indicates that there are statistically significant differences between the pre and post measurements of the Experimental group in in the specific coordination variables values for the favor of

Z value at 0.05= 1.96  
 coefficient was less than 0.05. This is confirmed by the calculated Z value since it was higher than the table value at 0.05.



post measurement as the calculated value of error

Chart (6) change rate for variables under study in kinematic variables for hurdle stride values for the experimental group.

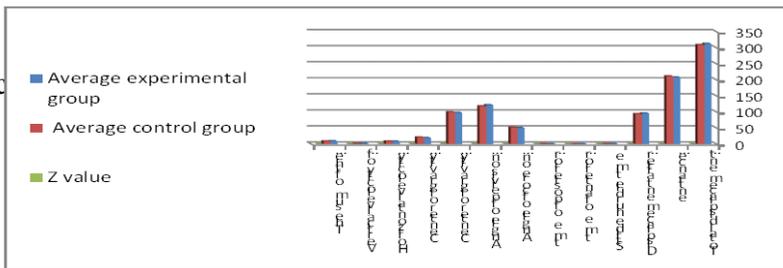
**Table (14)**  
**Indication of the differences between the post tests for experimental group and post tests for the control group in kinematic variables for hurdle stride n = 5**

kinematic variables for hurdle stride	measurement unit	experimental group			control group			U value	Z value
		Average	Average ranks	ranks sum	Average	Average ranks	ranks sum		
Total displacement for hurdle stride entrance	cm	312.4	7.6	38	308.8	3.4	17	2	2.14*
Displacement after hurdle stride	cm	208.2	3.4	17	211.2	7.6	38	2	2.14*
Stride hurdle time	sec	95.4	7.4	37	93.4	3.6	18	3	2.02*
time of anterior pivot	sec	0.39	3.3	16.5	0.41	7.7	38.5	1.5	2.40*
time of posterior pivot	sec	0.08	3.5	17.5	0.12	7.5	37.5	2.5	2.12*
Angle of core on hurdle	degree	0.14	3.5	17.5	0.16	7.5	37.5	2.5	2.13*
Angle of pelvis on hurdle	degree	50.4	3.6	18	51.4	7.4	37	3	2.15*
Center of gravity height during entrance second	degree	121.4	8	40	118	3	15	0	2.68*
Center of gravity height on hurdle	cm	97.6	3.6	18	99.4	7.4	37	3	2.03*
Horizontal velocity of center of gravity	cm	19.2	3.2	16	20.8	7.8	39	1	2.52*
Vertical velocity of center of gravity	m/sec	8.38	7.4	37	8.23	3.6	18	3	1.98*
The sum of the velocity of the center of gravity	m/sec	1.59	7.6	38	1.08	3.4	17	2	2.19*
	m/sec	9.05	7.9	39.5	8.72	3.1	15.5	0.5	2.52*

\* Statistically significant at 0.05  
 Table (14) indicates that there are statistically significant differences between the pre and post measurements of the Experimental group in in the specific coordination variables values for the favor

Z value at 0.05= 1.96  
 of post measurement as the calculated value of error coefficient was less than 0.05. This is confirmed by the calculated Z value since it was higher than the table value at 0.05.

l group in specific



Third present:

**Table (15)**  
**Significance of differences between the pre and post**  
**measurements in record level for 110m/hurdle values for the**  
**control group n = 5**

record level for 110m/hurdle	measurement unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Change rate
				Average ranks	ranks sum	Average ranks	Ranks sum			
record level for 110m/hurdle	sec	15.98	15.38	0	0	3	15	2.02*	0.04	3.74

\* Statistically significant at 0.05  
 Table (15) indicates that there are statistically significant differences between the pre and post measurements of the control group in the kinematic variables for hurdle stride values for the

Z value at 0.05= 1.96  
 favor of post measurement as the calculated value of error coefficient was less than 0.05. This is confirmed by the calculated Z value since it was higher than the table value at 0.05.

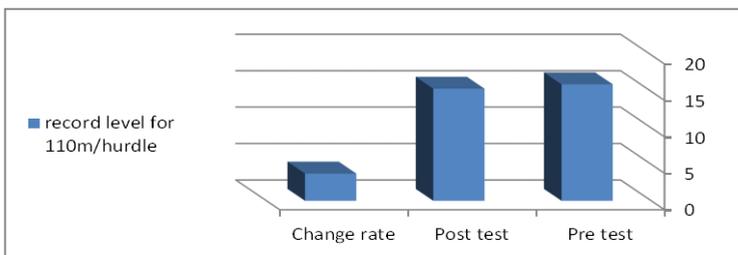


Chart (8) change rate for variables under study in the kinematic variables for hurdle stride values for the control group.

**Table (16)**  
**Significance of differences between the pre and post measurements in record level for 110m/hurdle values of the sample of the study for the experimental group n = 5**

record level for 110m/hurdle	meas ure ment unit	Pre test	Post test	Negative ranks		Positive ranks		Z value	Error coefficient	Chan ge rate
				Average ranks	ranks sum	Average ranks	Ranks sum			
record level for 110m/hurdle	sec	15.85	14.71	0	0	3	15	2.02*	0.04	7.18

\* Statistically significant at 0.05

Z value at 0.05= 1.96

Table (16) indicates that there are statistically significant differences between the pre and post measurements of the Experimental group in in the specific coordination variables values for the favor

of post measurement as the calculated value of error coefficient was less than 0.05. This is confirmed by the calculated Z value since it was higher than the table value at 0.05.

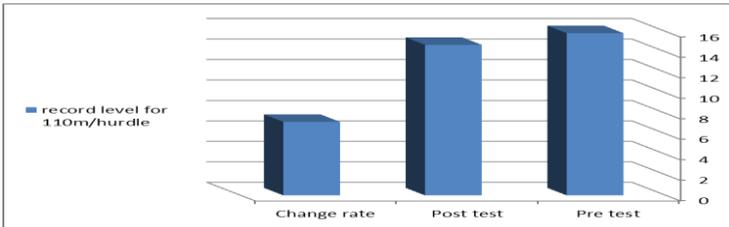


Chart (9) change rate for variables under study in the kinematic variables for hurdle stride values for the control group.

**Table (17)**  
**Indication of the differences between the post tests for experimental group and post tests for the control group in record level for 110m/hurdle n = 5**

record level for 110m/hurdle	measurement unit	experimental group			control group			U value	Z value
		Average	Average ranks	ranks sum	Average	Average ranks	ranks sum		
record level for 110m/hurdle	sec	14.71	4.6	23	15.38	6.4	32	8	1.99*

\* Statistically significant at 0.05

Z value at 0.05= 1.96

Table (17) indicates that there are statistically significant differences between the pre and post measurements of the Experimental group in the specific coordination variables values for the favor

of post measurement as the calculated value of error coefficient was less than 0.05. This is confirmed by the calculated Z value since it was higher than the table value at 0.05.

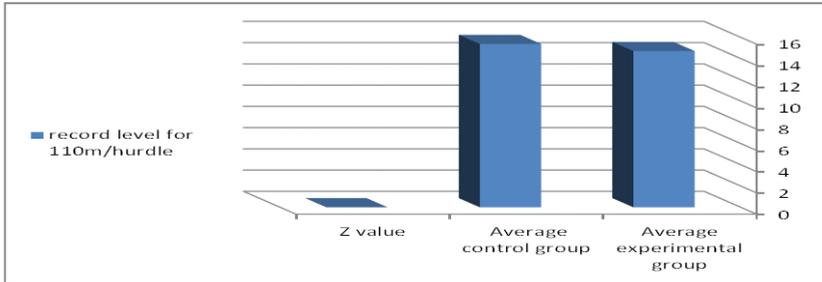


Chart (10) Indication of the differences between the post tests for experimental group and post tests for the control group in record level for 110m/hurdle .

**second discussion:**  
**discussion of the first hypothesis,** which states that "saq drills positively affect the specific co-ordination abilities of 110 meters / hurdles."

table (9) and chart (2) show statistically significant differences between the pre measurements and the post measurements of the control group in the tests of the specific co-ordination abilities under consideration (ability to speed, ability to change body position, (0.45%) and (25.54%). the highest value was in the ability to exert effort to the left foot 25.54%), while

the lowest change in speed measurement was time 30 meters from crouch (0.45%).

the researchers attributed the reason for this improvement to the application of the participants of the control group, the traditional training program, for a period of (ten weeks), and four training units per week, where the rate of change in the tests of some specific co-ordination abilities.

the researchers attributed the reason for this improvement is the application of the competitors of the control group for applying the

traditional program, which led to an improvement in the specific co-ordination abilities, which led to the arrival of the contestants to the stage of adaptation and upgrading the level of the loads of the training according to scientific method according to the capabilities of the contestants and also the result of continuing to exert physical effort throughout the period of performance and the occurrence of adaptation due to the regularity of the training, which led to the existence of statistically significant differences between the pre and post measurement of the tests of specific co-ordination abilities.

that improving the rhythmic ability leads to increased self-awareness of the motor's performance, its motor stages and its requirements in terms of strength and speed, thus improving the sense of speed and ability to control the speed of muscular contractions during motor performance this is consistent with mohammed lotfi (2006). (24: 133)

improving the rhythm is due to the fact that it makes the economic performance of

energy, delay the emergence of fatigue, improve the performance by controlling the rhythm of the movement of motion, and also helps the rhythm of movement to identify the parts of the movement that need a higher rate of power this is in line with kamal abdul hamid (2009). (19:39)

the development of the ability to exert the appropriate effort (excellence muscular sense) is the ability to achieve high accuracy and exert effort in the performance of the movement, and the degree of both constriction and muscle expansion in the light of the training program for the implementation of movement and thus develop and improve the sense of distances and time and muscle tension "and increases the spatial perception of movement, the ability to relax and tensile strength necessary for performance, as reflected on the ability of the athlete to perform movements in a coordinated competitions, this is in line with mohamed lotfi (2006), essam abdel khalek (2005). (24: 132) (12: 190)

the development of the ability to connect the motor is the most important co-ordination abilities of the performance of sports, which means the ability to represent the ability of the contestant to install parts of one movement to form the total movement, it is evident during the linking of movements of different parts of the body in a manner that achieves the ultimate goal of motor skill as well as the installation of more than one movement to form a composite motor performance, provided that this structure is consistent with the nature of motor performance during competition this is in line with mohamed lotfi (2006), issam abdel khalek (2005). (9: 131) (10: 190)

this is in line with the study of remko pullman et al. (2009) with the progress of the control group by a small percentage, but the application of the training programs according to scientific method lead to the effect of the result of the training program applied to them, the control group within the training program, which led to the adaptation process in the training.

so the contestant sense of rhythm plays an important role in achieving the highest levels of sport, which leads to the control of performance and the direction of power characteristic of speed, and each contestant his own rhythm in performance, which differs from the other in terms of distance and time which the difference in the time post of the rhythm and the amount of force exerted, which represents the dynamic post of the rhythm, at each stage of the tension and relaxation without interruption between them, which repeats itself constantly and thus shows the weighted dynamic rhythm of the rider, who can control the continuous performance until the goal achieved movement which can be observed by means of calendar properties of motion such as tracking, prediction, and agrees with that will freeman (2015) and bastoise ahmed (1997). (39: 141) (9: 239),

this is in line with the study of mohammed lutfi al-sayed (2006) that the process of adjustment in training and upgrading level is only through

continuous and continuous training .(24: 72)

table (10) and chart (3) show statistically significant differences between the pre measurements and the experimental measurements of the experimental group in the tests of some of the specific co-ordination abilities under consideration (ability to speed, ability to change body position, rhythmic ability, , the ability to exert effort, and the ability to balance) in favor of post measurements at a significant level (0.05). the percentages ranged between (1.46%) and (45.45%). %), while the least change was in the test of the ability to start speed (1. 46%).

this is attributed to the applying saq drills to develop the specific co-ordination abilities of the 110 meters / hurdles and for a period of (ten weeks), which led to the improvement of some specific co-ordination abilities, resulting in increased visual receptors and receptors for alerts to change the speed and status of the body and improves compatibility between the region and the other nervous system the center of the hand and between these

muscles on the other hand, which was observed during the performance of drills and movements in a tight time as well as the performance of interrelated movements and improvement of the variable (sense) distances and time has resulted from the frequent drills used in the program of change and as well as the implementation of movements to change the direction and the diversification of implementation conditions which emerged through the development of appropriate sense of time through drills (change the speed during the performance of the movement - the implementation of the duty motor at a specified time).

this is agree with a. s. nageswaran (2013) (6). however, the presence of neuromuscular compatibility results in smoothness and ease of performance. there is progress in the level of specific co-ordination abilities, and the researchers believe that the increase in compatibility abilities resulted from taking into account the drills used in the traditional training modules to develop the ability of the contestants to preserve the

body in a certain situation and restore this situation quickly in the case of deviation and thus improve the neural lines between the receptors of special alerts for the state of balance and between the competent areas of the central nervous system and muscles as members of the implementation.

this is agree with the study of amani and jihad nabih (2017) that the application of the training of the saq drills leads to an improvement in the level of specific co-ordination abilities of the contestants, which has increased the efficiency of the nervous system and increase the correlation between sensory nerves affected by the stimuli found within the program and its link with the motor nerves, to develop and improve the compatibility capabilities under consideration. (5:20)

this is agree with gamal al-nemaki (2002) that the nervous system plays a large role in the formation of the desired compatibility between the muscles and nerves as it is responsible for linking the functions of the devices and

achieve the integration unit of the contestant. (18: 185)

this agree with remko pullman et al. (2009) that saq drills is a modern, integrated training system designed to improve the speed of acceleration and acceleration, improve many specific co-ordination abilities, and respond quickly within a single training program. (33: 432)

table (11) and chart (4) show statistically significant differences between the post measurement to control and experimental parameters of for the experimental post where the value of the calculated mean is less than the tabular value. ) was calculated higher than the tabular value at the level of significance (0.05) (1.96). the values of (z) calculated between (2.01 \*, 2.65 \*) were the highest value in the right foot capacity test (2.65 \* the lowest value in the test of the ability to start speed, the test of the rhythmic capacity of (2.01).

the researchers attributed the difference between the two posts of the experimental group and the control group in the tests of the specific co-ordination abilities for the

experimental post to the application of the experimental group for the training of the saq for 10 weeks, and four training units per week, and led to statistically significant function between the specific co-ordination abilities of the experimental and control group.

this is agree with abdul khaliq salama (2014)(3)the training program has a positive effect on the development of technical performance by decreasing the total performance time and improving the speed and accuracy of technical performance through the followers of the training method depends on the level of technical performance of the exact competitors and kinetic control.

this is consistent with bastouisi ahmed (1997) on the importance of the specific co-ordination abilities of the 110 meters / hurdles, so that they can provide them with the necessary to cross the hurdle easily and quickly .(9: 65)

all of the above shows the superiority of the competitors of the experimental group on the

competitors of the control group in the measurements of the specific co-ordination abilities under the study, which indicates the effectiveness of the training of the saq to improve those specific co-ordination abilities.

**thus, the validity of the first hypothesis that** "saq drills positively affect the specific co-ordination abilities of 110 meters / hurdles" is achieved.

**discussion of the second hypothesis,** which states that "the training of the saq affect positively on some kinematic variables of the hurdle stride in the 110 meters / hurdles".

table (12) and chart (5) show statistically significant differences between the pre measurements and the post measurements of the control group in some kinetic variables for the stride of the hurdle (the total displacement of the stride of the hurdle, the displacement of the stride before the hurdle, the displacement of the stride after the hurdle, the time of the stride, the center of gravity at the moment of entry, the height of the center of gravity on the hurdle, the horizontal velocity of the center of gravity, the vertical velocity of the center

of gravity, the sum of the horizontal speed of the center of gravity) in favor of postal measurements at a significant level (0.05) ) sep percentage of the rate of change between (0.98%) (14.29%), where the highest value in the measurement of the time of the focal anterior (14.29%), while the lowest rate of change in the measurement of the total displacement stride hurdle (0.98%)

the researchers attributed the reason for this improvement to the application of the participants of the control group, the traditional training program, for a period of ten weeks, and the four training units per week, which was an indication of the effect of the training program and the contents of a set of drills that led to the arrival of contestants to the stage of adaptation to the training loads applied and thus led to these results.

this agree with mohammed ahmed ramzi (2001) (22), milan koh and janusz iskra (2012) (21) the regularity of training on a standardized scientific basis helps improve the technical performance of the hurdle.

table (13) and chart (6) show statistically significant differences between the pre measurements and the experimental measurements of the experimental group in some kinetic variables for the stride of the hurdle (the total displacement of the stride of the hurdle, the displacement of the stride before the hurdle, the displacement of the stride after the hurdle, the time of the stride, the height of the center of gravity at the moment of entry, the height of the center of gravity on the hurdle, the horizontal velocity of the center of gravity, the vertical velocity of the center of gravity, the sum of the horizontal speed of the center of gravity) in favor of postal measurements at a significant level (0.05), and ranged the percentage change was between (1.83%) and (54.78%). it was the highest value in the vertical speed measurement of the center of gravity (54.78%), while the least change was in the total deviation of the hurdle stride (1.46%).

the researchers attributed the reason for this improvement to the application of the

experimental group's competitors. saq drills , for a period of ten weeks, led to the improvement of some kinematic variables for the stride of the hurdle in the experimental group, thus improving the performance level of 110 meters / hurdles.

this is consistent with will freeman (2015) that the high speed of the hurdle racer requires him to move from a far distance from the hurdle so that he can lift the free leg over the hurdle so that he does not hit him. the distance between the hurdle and the lift point affects the time taken by the rider over the hurdle. the rider must adjust the timing of the movement of the two men while crossing the hurdle as well as the landing so that the free man touches the ground in front of the center of the body weight a little even obey the rider enemy between the hurdles successfully. (34: 141) this is in agreement with abdul khaliq salama (2014) that the 110 meter / hurdle of racing depends on speed and accuracy of technical performance, which requires high skill in the performance method of movement so that the hurdle

can be overcome with minimal physical effort without exaggerating the height above the hurdle, the hurdle and its fall, and reduce the time of the gallbladder above the hurdle (3: 112)

this is consistent with bastoise ahmed (1997) that many of the contestants may mistakenly believe that the technical performance to overcome the hurdles is unimportant. on the contrary, good performance allows to flow over the hurdle with a slight deviation from the shape of the natural enemy stride and that the flight distance before the hurdle is close to 2.13 m to 2 after the hurdle from 1.22 m to 1.27 m. (9: 79, 80)

this is in line with mohammed ahmed ramzi (2001) (22) the modification of the technical performance of the 110 meter / hurdles in light of the study, analysis and guidance of the factors affecting the technical performance is one of the most important stride to reach the higher levels. during the stages of the race according to the foundations and factors related to the nature of the

performance and form of movement of the human body.

table (14) and chart (7) show statistically significant differences between the two posts of the experimental group and the control group in some kinematic variables for the stride of the hurdle in favor of the experimental post of the experimental group where the value of man and the calculated mean is less than the tabular value. (z) were calculated higher than their tabular value at the level of significance (0.05) (1.96). the values of (z) calculated between (1.98 \*, 2.68 \*) were the highest value in the pelvic angle measurement (2.68 \*), measure the horizontal velocity of the center of gravity by (1.98\* ).

these results are shown that the fact that the training program has a positive effect on the development of technical performance through decreasing the overall performance time and improving the speed and accuracy of technical performance through saq training method depends on raising the level of technical performance of the exact contestants and motor control.

this is consistent with kamal abdul hamid (2009) that improving the correct rhythm of the movement raises the level of technical performance as it helps the contestant to move the parts of his body in the path of the right movement, and helps to identify the parts of the movement that improving the correct rhythm of the movement increases the level of technical performance as it helps the rider to move the parts of his body in the path of the right movement, and helps to identify the parts of the movement that require a higher rate of strength ,and the training program has a positive effect on the development of technical performance through the decrease of the total performance time and the improvement of both the speed and accuracy of technical performance through the followers of the training method depends on raising the level of technical performance of the exact competitors and motor control.(19:39)

all the above shows the superiority of the competitors of the experimental group on the competitors of the control group in the kinematic

variables of the stride of the hurdle under study, indicating the effectiveness of saq training in improving these kinematic variables of the stride of the hurdle.

thus, the validity of the second hypothesis is realized. "the saq drills positively affect some kinematic variables for the hurdle stride of 110 meters / hurdles."

**discussion of the third hypothesis**, which states that "the training of the saq affects positively on the record level in the 110 meters / hurdles".

it is clear from table (15) and chart (8) that there are statistically significant differences between the pre-measurement and the telemetry in favor of the remote measurement of the control group at the level of the digit at a significant level (0.05) where the percentage change (7.13%). the researchers attributed the development of the record level to the effect of the traditional program has a positive effect due to regularity and continuity of practice, which has had a significant effect in raising the level of specific co-ordination abilities on the development of some

specific co-ordination abilities and the kinetic variables for the stride of the hurdle and the record level under study.

as the result of the process of correct application of mechanical theories during the performance of the most important factors affecting the speed of performance itself, and this is clearly in the form and quality of performance for the contestants, where the shape of the angles of performance in the movements of the two legs and trunk and head in the time out in this performance ,this is consistent with the study of mohammed ahmed ramzi (2001). (22: 154-156)

this is in line with the fact that the speed of the reaction is an important factor for the 110 meter / hurdler, which led to an increase in the rate of speed, which contributed significantly to the development of speed in the study sample and thus its effect on the progress of the record level.

table (16) and chart (9) show statistically significant differences between the pre measurements and the post measurements of the

experimental group at the record level in favor of post measurements at a significant level (0.05) the change rate was (7.18%).

the researchers attributed the reason for this improvement to the application of the experimental group of researchers to the implementation of training sessions, and for a period of (ten weeks), and the existence of four modules per week.

the researchers attributed the development of the record level as a result of the improvement of the values of some specific co-ordination abilities and some kinematic variables of the hurdle stride for the contestants, which led to an improvement in their record levels.

this is in line with the study of both badi'a on abd al-samee (2012), (10), zaki muhammad hassan (2015) ( 5) and abdo mohammed (2007) (4) on the evolution of the record level due to the improvement of the values of some specific co-ordination abilities and some kinematic variables which led to an improvement in their record levels.

table (17) and chart (10) show statistically significant differences between the two posts of the experimental group and the control group in measuring the record level in favor of the experimental post of the experimental group where the value of man and the calculated mean is less than its tabular value. calculated at (0.05) (1.96). the values of (z) calculated between (1.99) were limited.

the researchers attributed the reason for this improvement to the application of the experimental group to saq drills , for a period of (ten weeks), and the existence of four training units per week.

this is in line with hazem reda elzeky (2014), that the ability to compete with the ability of the co-ordinations contributes to the speed, acquisition and mastery of motor skills, as reflected in the high level of technical performance (16: 301)

this is consistent with the study of ahmed issa al-yaqoub (2017) (1), ali husayn banyan (2017) (8), yousef jawad al-attar (2017) (35), and fadia ahmed et all (2015) (13 )the development of the record

level it is related to the competitors' specific abilities and high level of technical performance.

this is in line with the study badeaa on abd el-samee (2012) (10) of saq drills contributes to the development of the record level of the contestants.

all of the above shows the superiority of the experimental group's competitors on the control group's competitors in the measurements of the 110 meters / hurdles record level, indicating the effectiveness of saq training in the development of the 110 meters / hurdles.

thus, the validity of the third, which states that " saq drills will affect positively on the record level in the 110 meters / hurdles."

#### **conclusions:**

in light of the methodology and the sample of research and statistical treatments of the results, the following conclusions were reached:

- saq drills have positively influenced some of the specific co-ordination abilities under consideration (the ability to accelerate ,the ability to changing direction the rhythm

ability, the contribution ability, exert effort ability, ability to equilibrium) for 110 meters / hurdles contestants.

- saq drills were positively influenced by some of the research resultstotal displacement for hurdle stride ,entrance displacement for hurdle stride ,displacement after hurdle stride, stride hurdle time ,time of anterior pivot ,time of posterior pivot, angle of core on hurdle, angle of pelvis on hurdle ,center of gravity height during entrance second ,center of gravity height on hurdle ,horizontal velocity of center of gravity ,vertical velocity of center of gravity ,the sum of the velocity of the center of gravity for record level for 110 m/ hurdles contestants.

- saq training has positively affected the record level of 110 meters / hurdles contestants.

#### **recommendations:**

in the light of the results reached, the researchers makes the following recommendations:

- using saq drills during the implementation of the training programs for the 110 meters / hurdles and in improving the special specific co-ordination

abilities of the competitors 110 meters / hurdles.

- conduct more research on saq training for different samples in different races and sports, different age and training stages and both sexes.

- conduct more research to determine the effect of saq training on the nervous system and the nervous stimulation of the different stages of training and age and on both sexes.

- conduct more research on the saq training and its effect on the physical variables of the racists in the races 100-110-400 meters / hurdles.

- conduct further research on the saq training with different methods, methods and means of training during the various training programs on other physical, physiological and biochemical variables.

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