

# Training in Competition Speed Intensity and in the Light of the Motor Energy Law to Develop the Physical-physiological Abilities and the 400m Run for the Youth

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**Abstract---** (400mete) run is one of the competitions that is recognized by high speed at its final stages with the aim of breaking world records. This certainly emphasizes the development of the physical abilities related to power, speed, endurance and competition speed through special exercises. This necessitates the researchers to manipulate a new method to define new training intensity for the 400m runners according to the competition speed which is restricted to the speed covered by the competitor throughout the race. This is also restricted to a deliberate scientific planning to define the training intensity according to pace of ability law. This is intended to impact the development of some special physical & physiological abilities to achieve this competition. The researchers believe that this method has not been employed before and results of analyzing the times of the partial distances were not considered practically. This is directly conducive to improving performance and building special trustworthy training philosophy to develop the competitor's ability. This is done by entire reliance on the results of the competition speed rate of each competitor during race; this is called (Competition speed or competition Pace) along with the motor energy law as a strategy to gain good position. The research was applied on a specimen of track and field young competitors in Baghdad. The researchers applied the special speed tests, speed endurance tests and some other physiological parameters. Training sessions were applied for 10 weeks as 3 session per week. The researchers concluded that there was a vital development in speed endurance, and competition speed endurance, partial times development for each competition in addition to the development of the physiological parameters and performance

**Keywords---** Training, Speed Intensity and Physical-Physiological Abilities.

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## I. INTRODUCTION

The 400-meter running competition is one of the longest short competitions, according to the world record achieved and requires a measure of strength, speed and muscle tolerance, and this requires the use of a training method to meet the requirements of this competition related to the possibility of determining The intensity of new training for partial distances according to the speed of its competition, which is the speed of the rhythm of the race, according to a well-studied scientific planning and in a field and practical which may directly lead to the improvement of special physical abilities and indicators And achievement and therefore we can build a special

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training philosophy that depends on it in the development of the abilities of the racers of this competition based on the results of the real speed rate adopted by the rider during the race, which is called (speed) Competition or rhythm of the race) and by adopting the theory of kinetic energy, which the rider adopts as a strategy to get good position among the peers of the contestants.

The government's decision to re-establish a new government in 2008 was a sign of the need to increase the number of women in the country. The term speed of pace of the race was addressed by scientists in several definitions through some sources, which means "the highest speed for a player who can continue without exhausting the voltage and below the lactic threshold",<sup>1</sup> and also means "the highest oxygen and oxygen speed reached by the athlete during the race distance".<sup>2</sup> It is recognized that determining the training intensity when training for runners of different distances is for the purpose of developing speed and carrying special speed, requires us first to set the maximum time to travel this short distance that we want to train our players, and this time represents the maximum intensity of it (100%) To determine the intensity to be trained from this extreme intensity traditionally, and thus required the adoption of variables of mass, time and distance in accordance with the law of mechanical ability to determine the intensity of the time of the training of partial distances, originally based on the speed of competition in order to make an effective effect in the development of time Maximum intensity to be trained".<sup>3</sup>

Researcher Wen considered using the rhythm of the speed of the 400 m race and finding training times for partial distances and determining the intensity of these distances in accordance with the Law of Kinetic Energy, which gives the specificity of each individual's ability to perform, and the effect of this training on improving the speed of the special ideal With the race (rhythm) and special physical abilities and achievement, if researcher Wen believes that he did not use the determination of intensity according to this speed and the law of kinetic energy previously and Wen believes that this method in determining the intensity of training For the parts of these distances effectively affects and develops on the special physical abilities and some physiological indicators with this effectiveness and the resulting development of achievement. The importance of the research lies in clarifying the use of the speed of the race and determining the intensity of training according to this speed (speed of rhythm) and the law of motor energy and economy with the training of the special physical abilities of the player of the 400 meters and get a new training intensity to train An actor, this really requires knowing the basic information that goes into building most of the training curriculum and knowing the dynamic foundations of human performance, which is the basic basis on which the content of any training program is built.<sup>4</sup>

Therefore, the objectives of the research is :

1. To determine the speed of a joint competition for the 400-meter competition and to prepare training exercises for the law of kinetic energy according to this speed.
2. To Learn about the impact of these exercises on some special physical abilities, physiology and achievement.

The researcher imposed a statistically significant difference between the pre and dimensional tests in some physical and physiological abilities and the achievement of the research sample.

## II. RESEARCH METHODOLOGY

Using the experimental method, design (equal experimental group), researcher Wen chose a research sample from a hostile community of 400 meters for young people and their number(6)runner selected in the deliberate way of the players of the National Center for The Care of Talent in Athletics and project The Olympic champion in Baghdad represents 60% of the original community, the researcher made sure that the members of the sample found the coefficient of sprain (length, mass, training age) and as shown in table (1).

Table 1: Shows Homogeneity In (Length, Mass, Training Age)

Variables	Units	Mean	Median	SD	Skewness
Length	Meter	1.655	1.675	0.057	-0.489
Mass	Kg.	64.25	62.50	7.046	0.88
Training age	Year	4.38	3	1.996	1.036

It is noted from the table above that the values of spraining have receded between ( $\pm 2$ ) and this indicates the homogeneity of the sample members in these variables.

Researcher Wen used several devices and tools in his research including a laptop type(Lenovo), analysis software and various measurement tools. International information (Internet), observation, experimentation, analysis and exploratory experiments.

### *First Test*

Run Test (50m) of motion.<sup>5</sup>

The purpose of the test: measuring the maximum speed.

Tools used: The race area is determined by two lines, one for the beginning and the other for the end, so that the distance is 70 meters and the distance is set 50 meters after 20 meters from the launch of the laboratory.

Performance Specifications: The rider stands behind the starting line of 70 m in standby. The laboratory runs at its full speed to cut the finish line and the registrar records the time that the timer teaches him from the moment of the start signal when passing from the starting line of 50 m to the moment of crossing the finish line and records time in the second and its parts after calculating the average time of the three timers to the nearest 0.01 of the second.

### *Second Test*

400m Achievement Test.<sup>6</sup>

Test goal: measuring the time achieved for 400 meters.

Description of performance: The runner takes the position of sitting behind the line (low start). The runner's torso reaches the finish line and the runner's time is recorded in a registration form prepared for this purpose in seconds to nearest ten.

### *Third Test*

Measuring distance time (300 m) from standing within 400 m distance.<sup>7</sup>

The purpose of the test: measure the speed of the competition 400 m.

Performance specifications: One of the assistants stands in front of the end point of the 300 m distance within the official distance of the race and a signal with his arm to stop the stop watch for each rider passing the end of this distance. The rider continues to complete the official race distance, running at the speed of the race to travel the distance to the finish line. The registrar records the time that the timer teaches from the moment of the start signal until crossing the line (300 m) first and then the time of 400 m when he crosses the finish line and records the time in the second and its parts after calculating the average time of the three timers to the nearest 0.01 of the second.

### ***Physiological Measurements***

Anaerobic power is derived from the following equation

Running for 35 m for six short distance between 10th, the mass of each player is measured and the mechanical power is extracted for him and for each distance of 35 m and the anaerobic power is extracted through the following equation (-16)

$$\text{Anaerobic power} = \text{maximum power} - \text{less power} \div \text{total time for six distances}$$

If the output is less than 10 and below, it reflects excellent anaerobic capacity, and vice versa.

### ***Measuring the Concentration of Lactic Acid in the Blood***

The concentration of lactic acid in the blood was measured after the effort and as follows:

Blood was drawn from the research sample of each player by (3 \*X) from the muscular vein in the hummer us area after the passage of (5) minutes rest after the effort, and was inserted directly into the centrifuge (Centrifuge) in the test place for the purpose of separation of serum, and after the end of the process of separation of serum and blood was Pull it and empty it in other tubes bearing the same sequence the player wrote on it before the effort and kept in the cooling box. The symbiosis samples were transferred to the Central Health Laboratory in Baghdad and chemically treated by chemicals (chicks) for the extraction of the concentration of lactic acid in the blood by spectrometer.<sup>8</sup>The following equation was applied to the reading used for each model:

- Read the form
- Concentration of lactic acid in models (mg/ml) = x 9.7
- Read standard solution
- Concentration of lactic acid (mmol) = (concentration of acid in milligrams x 1110 and 0)= mmol

### ***Measuring V02max***

V02max values are measured according to max table (attachment notes) (ml/kg/min)

The researcher was adopted to extract the rate of rhythmic velocity calculated (6:65) according to the time of 300m and divided 300 m by its time =  $300 \text{ m} \div 37.25 = 8.058 \text{ m/s}$  and on the basis of this rate the intensity of the exercises of archetypal was extracted according to the theory of kinetic energy. Extract the temporal heat energy for each distance and then determine the training intensity according to the kinetic energy and extract the time corresponding to that intensity.<sup>9</sup>

Kinetic energy =  $1/2mv^2$  and after extracting the maximum kinetic energy we extract time according to the intensity of the training adopted and using the same law above

$$t = \sqrt{(m \cdot d^2 / \text{power training intensity} \times 2)}$$

- Researcher Wen conducted pretests on 2 July 2018 for two days as follows:
- 2/7/2018: Test ran 50 meters of standing, rest then 10 men., then finish 400 meters. (Limit the time of 300 m within the distance of the race in order to use this time to extract the rate of rhythm speed and extract the training stress on its light)
- Main experience and determine the intensity of exercises according to the speed of rhythm

The training supreme was started on 6/7/2018 until 5/10/2018, and the training intensity was determined when speed training for fast distance runners, requires us first to determine the maximum time to travel the speed of the rhythm and then determine the intensity to be trained from this intensity, we begin first By extracting the speed of the speed of the race in accordance with the law:<sup>10</sup>

$$\text{Speed} = m / \text{time}$$

Example: 300m time (rhythm speed within 400m) 37.25w

His speed =  $300 \leq 37.25 = 8.058$  m/s average speed of competition

This speed is adopted in the creation of time for special training partial distances and we divide each partial training distance (50, 100, 150, 200, 250, 300, 350, 400, 450)meters, at this speed.

$$8.058 = 200 / t$$

$t = 200 \leq 8.058 = 24.82$  seconds the maximum time of the race in accordance with the competition and then determine the intensity according to the law of capacity,  $t = \sqrt{(md^2/2 \times \text{power training intensity})}$ .

And so for the rest of the training distances. After determining the severity, the training units (main section) are worked according to the intensity of the competition speed and the energy law and applied in daily exercises and in the period of special preparation and the number of training units per week. The dimension of 8 and 10/10/2018 in the same manner and in the same manner and in the circumstances under which pretests were carried out.

### III. RESULTS

Table 2: Show Statistical Values in the Results of the Pre and Dimensional Tests in Physical Tests and Achievement

S	Variables	Groups	Mean	SD
1	50m (w)	Pretest	6.218	0.0600
		Posttest	5.625	0.0650
2	300 m (w)	Pretest	40.12	1.807
		Posttest	38.23	1.059
3	400 m (w)	Pretest	53.709	0.8410
		Posttest	51.195	0.285

Table 3: Show Comparison between Pre and Dimensional Tests

S	Variables	Tests	Mean diff.	SD diff.	(t) calculated	Sig.
1	50m	Pre-post	0.593	0.077	7.676	.0000
2	300 m	Pre-post	3.113	0.188	5.320	.0050
3	400 m	Pre-post	2.514	0.568	4.421	0.001

Level of significance  $\leq(0.05)$  and in front of the degree of freedom (5).

Table 4: Show Computational Circles and Standard Deviations of Step Speed Variables

S	Variables	Units	Tests	Mean	SD
1	Anaerobic power(Wat.)	W/Sec.	Pre	25.8	8.95
			Post	8.15	2.61
2	The focus of the lactic	Mg/10.litres	Pre	129	5
			Post	108	3.5
3	Vo <sub>2</sub> max	(ml/kg/. minute)	Pre	41.50	12.47
			Post	49.25	6.25

Table 5: Show Statistical Values between Pre and Dimensional Tests of Step Speed Variables

S	Variables	Mean diff.	SD diff.	(t) calculated	Sig.
1	Anaerobic power	17.65	5.19	3.396	0.001
2	The focus of the lactic	0.020	0.005	3.969	0.000
3	Vo <sub>2</sub> max	7.75	2.177	3.56	0.004

#### IV. DISCUSSION

It is clear from table (3 and 4) that there are moral differences between the pre and dimensional tests in the maximum speed variable 50 meters test for the research sample and in favor of the dimensional test due to the use of exercises according to the speed of the race and the law of kinetic energy, which required the members of the sample to exert a rapid muscle force For a limited period of time continuously during the run, which developed the ability of the muscles to exert strength effectively and quickly,<sup>11</sup> and this was clear, through the appearance of moral differences in the level of speed in the dimensional test gives an indication of the development and exertion of the rapid momentary force required to overcome the deficiencies Self-initiated stability and the development of the instantaneous and rapid strength of both men to the research sample members because of their exposure to the vocabulary of the lipogenic exercises according to the required intensity of the speed of the race and the motor energy associated with the exertive muscle work that was effective in determining The intensity of the run and the exertion of the force required to obtain the appropriate speed in which the development of the strength of the muscles working in the running and the emphasis on the use of appropriate anaerobic energy during the performance of these exercises by exploiting the high stress through the legal speed of the pace of the race used By the energylaw, this is consistent with the words.<sup>12</sup> that "the speed of the strength of the muscles of the legs and their exercises is related to the special exercises that develop the reactions of these muscles, which is reflected in the development of the speed of their production",<sup>13</sup> despite the difference in the speed of running The use of lapses, which was associated with the law of mechanical ability of the muscles working in jogging, makes the control of body parts and the appropriate amount of muscle contraction "affecting muscle strength and speed of strength, which will inevitably improve the speed of performance of the body as a whole, And achieve the real paths suitable for the body parts working during the performance of this event that gives good fluidity during the stages of artistic

performance",<sup>14</sup> and that the stage of speed increase is greatly influenced by muscle ability through the exertion of rapid force to travel a short distance, and "it must be performed Speed exercises according to the target speed level in the training curriculum so that the physiological adjustment of the body and muscles is carried out according to the required speed, target motor frequency and supporting strength".<sup>15</sup>

We also notice the impact of speed-bearing exercises for other parts of the 400-meter run distance according to the pace of speed was evident in the evolution of the time of the distance of the common distance that expresses the speed of competition which is the distance (300 meters) which expressed the development of the ability of the muscles to exert strength and develop the scalability and simplicity for a long time Relatively, the speed of the race was improved by the distance of 300 m and the improvement of the physiological indicators of anaerobic ability test and the most efficient oxygen consumption, indicating improved interactions between the tolerance of rapid muscle strength and the continuation of speed to get better Time to travel this distance that serves to produce the maximum speed matching the performance path of the 400 m run stages, which affected the continued exertion of strength when constriction and diastolic in the muscles of the legs and fits with the speed of movement required to travel the distance of the competition's own endurance limit, which means "the ability of the player to Resistance to fatigue resulting from the performance of the same activity for a long time in the field of specialization",<sup>16</sup> Your endurance at the speed of competition is very important and necessary for many sports events that require performance extreme or near maximum, so that the athlete resists fatigue and processes the accumulation of amounts of Lactic acid in the muscles and blood due to the lack of oxygen due to high performance "which is associated with resistance of the individual's organic organs to fatigue under extreme stress conditions",<sup>17</sup> and this means the development of the members of the sample which was reflected in their ability to maintain speed in conditions Continuous work and the development of their resistance to fatigue when carrying a high degree of intensity of (75%-100%)",<sup>18</sup> and thus the training according to the speed of the rhythm of the race by the energy law has increased the efficiency of the members of the sample in overcoming fatigue and resisting the continuous exertion of effort Muscular during the long fast run of the distance of 300 m with an attempt to adopt the increased speed i.e. "speed tolerance means struggle against fatigue and resistance during a continuous muscular effort which requires showing increased speed and energy production in anaerobic way".<sup>19</sup>

As Illustrated Us From Table (4) Same I'm not. Over their Differences Morale In Results 400 m)Achievement) And this. As a result It makes sense. For results Moral For capabilities. Physical Special As fast as you can And speed. Race The ego. That Already And it's done Discussed «If Focus Work In Implementation On As Foundations Scientific The right one. When Application Exercises On Spaces Partial Depend On Speed Rhythm Race It is Then Extract Time Target For that. Distance And determine Intensity By law Capacity «Had been Impressive In Development Speed And speed. Competition And achievement. «So, I'm not. Training User And sometimes Comfort Short For distances Especially. From Distance Race «And by adopting This Speed In Select Intensity Exercises And by law. Energy Eddie. To Improved Carry Run Special And in a rhythm. Faster From Rhythm Race «It was It's got to From I'm not. Be Over there Repeat To train Speed Special And bear Speed Special And hard. High With Technology Time Comfort Between Duplicate With a goal. Development This Capacity Special Which Is Selected Main For ability. Super To fight. Race400 Meter",<sup>20</sup>And he sees Researcher I'm not. Exercises That Used Has

Achieved Effect In Rhythm Race In form. That Within Continued Speed By rhythm. Required And what? Linked That By adapting. What's happening? With the device. Nervous Central From During Exchanges Fast And repeated For this. Operations Contraction And the diastolic. Muscular In Units Mobility Female workers It That Lead To Achieve Speed Required And its continuation.<sup>21</sup>

The results in tables 5 and 6 with regard to physiological indicators (anaerobic ability, lactic acid concentration and oxygen at capacity) were consistent with the development of the special speed of the research sample members, who used competition speed exercises under the energy law, and this indicates a clear indication of the development of tolerance. The speed and speed of these competitions, which were emphasized through the training used, have helped to develop these indicators as a result of the development of their own abilities rates, as the practice of exercises aimed at developing speed and speed tolerance makes the athlete to own The effective characteristics of jogging speed and technical performance help in the development of harmonic movements of the working body limbs, which can lead to improved speed, as the right choice for exercises most suitable for the type of effectiveness can occur in the transition effect of training to movement The President later.<sup>22</sup>

## V. CONCLUSIONS

1. The exercises according to the rhythm of the race and the energy law have been an effective role in the development of the achievement of the 400 m race.
2. Exercises according to race rhythm, distance segmentation and the determination of stress by the Motor Energy Act contributed to the development of special abilities (speed, speed of the race).
3. The speed of the competition is evolving 300 meter.
4. The development of physiological indicators (anaerobic ability, lactic acid concentration and maximum oxygenated capacity) the production of exercises according to the speed of competition and kinetic energy.

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