

Effect of Using Fartlek Techniques to Control the Rhythm of Running for 1500 m Runners

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Introduction :

Athletics has recently witnessed noticeably great development in breaking records even reached the extent of the human miracle due to the clear scientific progress in different sports sciences such as the training science, biology, biological chemistry and sports medicine and what such sciences provide to develop training systems and to improve methods of performance.

Fartlek has different methods in respect of time, place, targets, or even the method by which it is used as it is performed collectively or individually. Also it is varied according to players' performance whether they are boys or girls. The common methods of using Fartlek are as follows:-

1- Holmer's method (discovered the method):-

It is the old method known by all depending on manipulating the speed where the player can change the rhythm of his steps

while running from slow to fast or vice versa.

2- Lydiard's method (the famous New Zealand coach):-

This coach could define a specific technique to operate the Fartlek and he innovated some model examples such as the Fartlek short way, the Fartlek long way, the downward Fartlek, the upward Fartlek and the hierarchical Fartlek).

3- The Polish Fartlek:-

The Polish type inserts the strength element to speed and endurance elements where exercises for arms, shoulder girdle, abdomen and back should be added to the program where such exercises should be performed between sets or repetitions. **(9: 45)**

Aida Mohammad Redha and Enayat Labib (2002) stated that skillful athletes were characterized by following a distinct motor rhythm which was not spontaneous but it was originated and took its shape during several phases of

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continuous training supported by the athletic trainer and it could be modified, improved and fixed through individual rhythm for athletes while performing a specific task in sports exercises. (4:33)

Ugarkovic D1, Matavulj D, Kukolj M, Jaric S (2002), Muller , Ritzdorf,(2000) , illustrated that when training 1500 m runners the balance between aerobic and anaerobic energies should be considered as it has been previously thought that the rate of contribution of the aerobic and anaerobic systems was 55% and 45% but the recent studies have verified that the two systems should be equalized and coaches specialized in training such race should consider the development of the three types of energy systems. (16:138) (14)

The research problem is that the majority of 1500 m runners of Egyptian athletes have no regular running rhythm during the race in respect of time of each round or the number of its steps *, with the result that it effects negatively on the best distribution of the runner's effort however, the Egyptian runners have good physical possibilities but there is some

deficit in the way of running the race. Through the results of the pilot study that has been conducted, reviewing references and previous scientific researches and meetings made with experts in the field of training 1500 m – run, they confirmed the maximal importance of the run rhythm in 1500 m-run race and all these facts stimulated the researcher to carry out the current study to identify the effect of the rated Fartlek techniques on controlling the running rhythm of 1500 m runners.

Research objective:-

Identifying the effect of using the rated Fartlek techniques on some physical and physiological variables and time of sections of 1500 m – run race in the research sample.

Research hypotheses:-

- 1- Using the rated Fartlek techniques effects positively on some physical variables in the research sample.
- 2- Using the rated Fartlek techniques effects positively on some physiological variables in the research sample.
- 3- Using the rate Fartlek techniques effects positively on time of sections of 1500 m-run race in the research sample.

Research procedures:-**Method:**

The researcher used the experimental method to suit the nature of this study by using the experimental layout of pre and post-measurements of one experimental group.

Sample:**Research sample homogeneity:**

It was selected from athletes of Zagazig University team of athletics in 2014/2015 academic year including (5) 1500 m runners for the main research sample individuals and (4) athletes for the pilot experiments from the same research population.

Table (1)

Homogeneity of the total research sample in growth, physical, physiological and race sections variables N = 9

variables	Units	Mean	SD	M	Skewness coefficient	
Growth	Age	Yr.	20.73	0.32	20.04	0.87
	Height	cm	177.78	4.9	177.00	-0.16
	Weight	kg	71.11	3.07	70.00	1.09
Physical	Transitive speed	sec.	3.74	0.07	3.73	0.40
	Flexibility	cm.	17.44	2.70	18.00	-1.79
	Muscular power of legs	m	2.29	0.07	2.31	-1.09
	Speed endurance	min.	1.33	0.03	1.34	-0.81
Physiological	Pulse rate at rest	Beats/min.	77.73	0.70	77.70	-0.29
	Vital capacity	ml/L	3828.77	30.90	3827.00	0.16
Race sections	Time of the 1 st round (the 1 st 300 m)	sec.	00.07	1.29	00.00	0.10

Follow Table (1)

Homogeneity of the total research sample in growth, physical, physiological and race sections variables N = 9

variables	Units	Mean	SD	M	Skewness coefficient
Time of the 2 nd round (2 nd 400 m)	sec.	77.40	1.40	77.00	0.93
Time of the 3 rd round (the 3 rd 400m)	sec.	80.89	0.93	81.00	-0.36
Time of the 4 th round (the 4 th 400m)	sec.	80.32	0.90	80.32	0.01
Time of running 1500 m	min.	4.49	0.06	4.48	0.49

Data in Table (1) show that values of skewness coefficients range from (-1.79 to 1.09) and they are all within ± 3 indicating that all sample individuals are under the normal curve in growth, physical, physiological and 1500 m race sections variables under investigation.

Tools of collecting data:

I. Equipment:

- 1- Medical balance (kg).
- 2- Restameter (cm).
- 3- Dry Spirometer.

II. Tools:

- 4- Stopwatches to the nearest 1/100 sec.
- 5- The proposed training program.

III. Measurements used in the research:

Having reviewed the previous studies related to the research topic and a set of scientific references specialized in tests and measurements and in line with the research objectives and hypotheses, the researcher reached a set of measurements concerned with measuring the current research variables as well as dividing the race sections of 1500 m-run as follows:

- 1- Measuring total height in (cm). (13:52)
- 2- Measuring body weight. (13:59)
- 3- Measuring time of running from motor start (transitive speed). (13:292)
- 4- Test of stand broad jump (muscular power of legs). (13:307)

5- Test of Bent trunk forward from long sitting position (flexibility).(13:265)

6- Test of running 600 m. (speed endurance).

7- Measuring pulse rate.(12 : 95)

7- Vital capacity. (13 : 63)

8- Measuring time of the 1st round (the 1st 300 m.).

9- Measuring time of the 2nd round (the 2nd 400 m.).

10- Measuring time of the 3rd round (the 3rd 400 m.).

11- Measuring time of the 4th round (the 4th 400 m.).

12- Measuring the numerical level of 1500 m-run race.

Physiological variables under investigation were measured at rest and 5 min. after running 1500 m.

The proposed training program:

The researcher considered that the proposed training program be in line with the scientific manner. The program was applied for (8) weeks by (4) training units a week and the training unit lasted (90 to 120) min. as per the level of endurance characterizing the specific training week.

Time of units	Components of training load					Training content	weeks
	Density		Sets	Repetitions	Intensity		
	Within sets	Within repetitions					
90 – 115 min.	-	1 – 2 min jogging	1	7 – 8 times	80 – 85%	(Preliminary exercises- special preparation) short way Fartlek (30 sec.) (1 min.) (2 min.)	1
90 - 120 min.	-	2 min. jogging	1	4 – 6 times	80 – 85%	(Preliminary exercises- special preparation) short way Fartlek (30 sec.) (1 min.) (2 min.) upward and hierarchal Fartlek	2
100 – 120 min.	-	2 min. jogging	1	5 – 6 times	80 – 90%	(Preliminary exercises – special preparation) shot way Fartlek (2 min.) downward, upward and hierarchal Fartlek.	3

Time of units	Components of training load					Training content	weeks
	Density		Sets	Repetitions	Intensity		
	Within sets	Within repetitions					

90 – 115 min.	2 min. jogging	2 min. jogging	2	3+2+1 successively	80 - 90%	(Preliminary exercises – special preparation) downward Fartlek (1 min.), hierarchal Fartlek.	4
90 – 120 min.	4 min. jogging	2 min. jogging	2	1+2+3 successively	80 - 95%	(Preliminary exercises – special preparation) long way Fartlek (4 min.), downward Fartlek, upward Fartlek (12+30+45+60 sec.) and hierarchal Fartlek.	5
100 – 115 min.	-	1 min. jogging	1	1+2+3 successively	80 - 85%	(Preliminary exercises – special preparation) Upward Fartlek (12+30+45+60 sec.) and hierarchal Fartlek (1+2+3+2+1) min.	6
90 - 120 min.	3 min. jogging	2 min. jogging	2	2 – 3 times	80 - 95%	(preliminary exercises- special preparation) long, downward and upward Fartlek.	7
90 – 110 min.	-	3 min. jogging	1	3-5 times	80 - 85%	(Preliminary exercises – special preparation) short, long and downward Fartlek	8

Pilot study:

The researcher conducted the pilot study on Tuesday, 20/1/2015 till Monday, 26/1/2015.

Conducting the research experiment:-

Pre-measurement:

The researcher carried out the pre-measurements within Wednesday and Thursday, 28 & 29/1/2015 on the track of Zagazig University Stadium.

Main experiment:

The main experiment was applied in the period from Saturday, 31/1/2015 to

Wednesday, 25/3/2015 on the track of Zagazig University Stadium.

Post-measurement:

The researcher carried out the post-measurements on Saturday and Sunday, 28 & 29/3/2015 according to conditions and specifications of the pre-measurements.

Statistical treatments used in the research:

- Mean - Median- Standard deviation.

- Skew ness- correlation- Mann-Whitney test.

- Wilcoxon test. - Improvement percentage.

Presentation and discussion of the results:

Presentation of the results:

Presentation of the results of the 1st hypothesis:

(Table 2)
differences significant between per and post measurement in physical variables for research N = 5

Variables	Units	Mean For measurement	Per measurement	Mean For measurement	Post measurement	Media ranks		Statistical test z from Wilcoxon	(P-value)
						(-)	(+)		
Transitive speed	sec.	3.70		3.49		3.00	0.00	2.06	0.039
Flexibility	cm.	10.20		20.60		0.00	3.00	2.02	0.042
Muscular power of legs	m	2.27		2.42		0.00	3.00	2.06	0.039
Speed endurance	min.	1.33		1.31		3.00	0.00	2.06	0.039

* Statistically significant at 0.05>Sig.(p.value)

Data in Table (2) illustrate that all (P- value) computed are less than the level of significance (0.05) for all physical tests under investigation i.e. the difference between the pre and post-measurements is significant in favor of the post-measurement and there are percentages of

improvement between the pre and post-measurements in the main group where the highest difference in percentages of improvement is 35.53% for flexibility whereas the lowest difference in percentages of improvement is 1.50% for speed endurance.

Presentation of results of the 2nd hypothesis:

(Table 3)

differences significant between per and post measurement in

Physiological variables for research N = 5

Variables	Units	Mean For Per measurement	Mean For Post measurement	Media ranks		Statistical test z from Wilcoxon	(P-value)
				(-)	(+)		
Pulse rate at rest	Beats/min	۷۷.۶.	۷۳.۶.	۳.۰۰	۰.۰۰	۲.۰۴	۰.۰۴۱
Vital capacity	ml/L	۳۸۳۳.۸.	۳۹۴۱.۴.	۰.۰۰	۳.۰۰	۲.۰۳	۰.۰۴۲

* Statistically significant at $0.05 > \text{Sig. (p.value)}$

Data in Table (3) show that all (P- value) computed are less than the level of significance (0.05) i.e. the difference between the pre and post-measurements is significant in favor of the post-measurement in physiological tests under investigation and there are percentages of improvement

between the pre and post-measurements in the main group in physiological variables under investigation where the percentages of improvement in pulse rate at rest is 5.15% which is higher than the percentages of improvement in vital capacity mounted to 2.81%.

Presentation of results of the 3rd hypothesis:

(Table4)

differences significant between per and post measurement in Race

sections for 1500 m Runners N = 5

Variables	Units	Mean For Per measurement	Mean For Post measurement	Media ranks		Statistical test z from Wilcoxon	(P-value)
				(-)	(+)		
Time of the 1 st round (the 1 st 300 m)	sec.	۴۹.۰۳	۴۷.۷۷	۳.۰۰	۰.۰۰	۲.۰۳	۰.۰۴۲

Follow Table (4)

differences significant between per and post measurement in Race

sections for 1500 m Runners N = 5

Variables	Units	Mean For Per measurement	Mean For Post measurement	Media ranks		Statistical test z from Wilcoxon	(P-value)
				(-)	(+)		
Time of the 2 nd round (2 nd 400 m)	Sec.	٧٦.٥٣	٧٤.٨٨	٣.٠٠	٠.٠٠	٢.٠٣	٠.٠٤٢
Time of the 3 rd round (the 3 rd 400m)	sec.	٨٠.٤٠	٧٩.٧٩	٣.٠٠	٠.٠٠	٢.٠٢	٠.٠٤٣
Time of the 4 th round (the 4 th 400m)	sec.	٧٩.٨١	٧٥.٣٤	٣.٠٠	٠.٠٠	٢.٠٣	٠.٠٤٢
Time of running 1500 m	min.	٤.٤٦	٤.٣٧	٣.٠٠	٠.٠٠	٢.٠٢	٠.٠٤٣

* Statistically significant at $0.05 > \text{Sig. (p.value)}$

Data in Table (4) clarify that all (P- value) computed are less than the level of significance (0.05) for all sections of 1500 m-run i.e. the difference between the pre and post-measurements is significant and contains significant differences in favor of the post-measurement in sections of 1500 m-run and there are percentages of improvement between the pre and post-measurements in the main group in sections of 1500 m-run where the highest percentage of improvement is located in the time of the 4th round (the 4th 400 m) mounted 5.43% and the lowest difference in percentages of improvement is in the time of

the 3rd round (3rd 400 m) mounted 1.50%.

II. Discussion of results:

Discussion of results verifying the 1st hypothesis:

Data in Table (2) indicate that there are significant differences in all physical variables viz. transitive speed, flexibility, muscular power of legs and speed endurance between the pre and post-measurements in favor of the post-measurement in the research sample where the (P- value) is $< (0.05)$ in these variables in the research sample individuals.

Also the results in Table (2) the mean categories between the pre and post-measurements are improved in all physical variables in 1500 m runners

where the mean categories in variables of transitive speed and speed endurance is getting lower and tending to negative signals and this is an indication of improvement, whereas the mean categories in variables of flexibility and muscular power of legs are all getting increased and tending to positive signals when comparing the mean categories between the pre and post-measurements in the research sample individuals and this is also an indication of improvement.

The researcher related this statistical significance in differences and improvement to the effect of the proposed training program by using the rated Fartlek techniques applied to the research sample individuals to control the running rhythm for 1500 m runners and this agreed with the results of Rania Gharib (2011) and Abul Hassan Mabrouk (2014) who concluded that training by using the Fartlek techniques led to a positive effect on physical variables in individuals in their research samples.

Eweys Al-Gebali (2000) indicated that middle distance races particularly the race of

1500 m-run occupied a prominent position in athletics where athletes were requested to be characterized by physical traits combining speed, strength and endurance which may not be available in many athletes and also athletics requested from athletes to be aware of technical aspects of these events. (7 : 191)

Discussion of results verifying the 2nd hypothesis of the research:

Data in Table (3) indicate that there are significant differences in all physiological variables viz. pulse rate at rest and vital capacity between the pre and post-measurements in favor of the post-measurement in the research sample individuals as the value of (P- value) is < (0.05) in these variables in the research sample individuals.

Also data in Table (3) illustrate that mean categories between the pre and post-measurements are improved in all physiological variables in 1500 m runners where the mean categories in pulse rate at rest variable are getting decreased and tending to negative signals and this is an indication of improvement whereas the mean categories in vital

capacity variable are getting increased and tending to positive signals when comparing the mean categories between the pre and post-measurements in the research sample individuals and this also an indication of improvement.

The researcher attributed this statistical significance in differences and improvement to the effect of the proposed training program by using the rated Fartlek techniques applied to the research sample individuals during the main experiment to control the running rhythm of 1500 m runners and this agreed with what achieved by Rania Gharib (2011), Abul Hassan Mabrouk (2014) and Hanon (2008) who reached that training with the Fartlek technique led to a positive effect on physiological variables in their research samples.

Abul Ella Abdel Fattah and Ahmed Nasr (2003) thought that vital capacity was the true biological indicator of the body state in general and cardio-respiratory system in particular and they emphasized that there were some differences between athletes and non-athletes concerning this point. (1: 458)

Jannat Mohammad Darwish (2007) indicated that heart rate was an important physiological measurement showing the response of heart and circulatory system to training and this measurement showed a clear superiority to the other methods used as an indicator to the intensity of effort. (11: 126)

Discussion of results verifying the 3rd hypothesis:

Data in Table (4) indicate that there are significant differences in the race sections and the numerical level of 1500 m runners between the pre and post-measurements in favor of the post-measurement in the research sample as the value of (P- value) is $< (0.05)$ in these variables in the research sample individuals.

Also Data in Table (4) show that mean categories between the pre and post-measurements are improved as all mean categories in the race sections and the numerical level of 1500 m runners are getting decreased and tending to negative signals and this is an indication of improvement when comparing the mean categories between the pre and

post-measurement in the research sample individuals.

The researcher attributed this statistical significance in differences and improvement to the effect of the proposed training program by using the rated Fartlek techniques applied to the research individuals while conducting the main experiment to control the running rhythm of 1500 m runners. This agreed with what concluded by Ahmed Samir (2012), Al-Sayed Gomaa (2014), Brown and Emily (2005) and Hanon (2008) that the Fartlek technique led to improve the strategy and times of sections of 1500 m-run race

Using the running rhythm and the rate of step means that the speed of repetitions is modified everyday according to physical fitness and the level of energy in the runner. When training a group of athletes time targeted may be suitable for one or two athletes but not suitable for the majority of players in the group. Using the rate of step means that each player is trained on the individual rhythm suitable for his performance and developing the level of fitness he needs.
(10 : 96)

Conclusions:

1- Using the rated Fartlek techniques had a positively significant effect on some physical, physiological and time of sections of 1500 m-run variables in the research sample individuals.

2- The highest percentage of improvement in the race sections was in time of the 4th round whereas the lowest percentage of improvement in the race sections was in time of the 3rd round.

3- Training on the running rhythm may need relatively longer times to achieve the expected results.

Recommendations:

1- Using the rated Fartlek techniques to prepare 1500 m runners.

2- More applied researches of the middle distances aiming to develop the level of the race should be carried out.

3- Drawing a clear plan by Egyptian Federation of Athletics to discover young athletes of middle distances and working out to develop their levels.

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