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The Effect of Exercise in the Morning and the Evening Times on Aerobic and Anaerobic Power of the Inactive Subjects

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Abstract: The aim of present research is compare the effect of exercise on aerobic power and anaerobic power of inactive subject in the morning and the evening times. For this purpose, 30 male students who they had not regular exercise in their daily program, voluntarily take a share in this research. Cases of this research divided into two groups of the morning exercise (N=15) and the evening exercise (N=15) with casual arrangement. This research performed in the form of semi-experimental that studies the changes of biological cycle by pre-test and post-test. Independent T test was used in order to comprehensive analyze of data and significant level ($p = 0.05$) was considered. Results indicated that aerobic and anaerobic exercises both in the morning and the evening along 8 weeks caused significant increase ($p < 0.05$) both in aerobic and anaerobic power. Also significant difference ($p < 0.05$) observed in the increase of aerobic power among two groups of exercise in the morning and in the evening and it was determined that exercise in the evening caused more increase in aerobic power toward exercise in the morning. But significant difference ($p > 0.05$) was not observed in anaerobic power.On the basis of research results, it was concluded that aerobic and anaerobic exercise in the morning and the evening caused increase of aerobic and anaerobic power but this increase was more in the evening group, however significant difference was not indicated in anaerobic power in the morning and the evening exercises.

Key words: Morning exercise · Evening exercise · Aerobic exercise · Anaerobic exercises

INTRODUCTION

Improvement of sport records in various fields indicates scientific impact whit educational and practical programs of the athletes, this development and progress owe to a great deal of researches and owe to true application of sport sciences, diet tulles, psycho skills, exercise situation and condition and new methods of physical preparation.

Sport trainers who undertake the control of the athletes learning from the beginning to get high levels of skill, in order to improve science and their information, have duty to learn new methods and take action with use them toward development and improvement of educational programs.New object which recently attract extensive attention is the matter of timerhythm and different times in day effect on height power of athletes.This attention is result from this, that aerobic power and anaerobic power is the basic parameter in the athletes success in sport fields and so measurement and study of time effect on maximum of aerobic power and anaerobic power is suitable to consider from two view points:On the one hand in formation about it for measurement the power of athletes and choice the best one of them at the appropriate time (from the view point of test) and on the other hand in designing practical programs, consider to time parameter and the effect of which on the athletes power Are aches important parameters which can result in Preferment and development of new practical methods. Because of this, in the national levels of numerous researches performed on the object of time effect on height of aerobic power and anaerobic power of athletes and most of this researches approved the effect of time factor on athletes

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capacity's. for example we can say that Hill and assistants (1992) by use of work meter bike performed a test in this field on a number of the athletes and they concluded that individuals capacity in performing aerobic and anaerobic work in the evening was more than those of in the evening (5). One day rhythm set the cells action and body hormones along the living during a 24 hours cycle. Cells action and hormones level gradually oscillate during one day. Study the performance of one day rhythm (rhythmic) effect on alive organism activity; consist of solitary cell, amphibians and mammalians and thus human constantly observed by researchers. one of the organs which affected by one day rhythm is pineal gland that it's effects mainly by means of melatonin secretion, observable in performance (activity, operation) and life of the alive (5). In a study, Filadelfi and *et al*. (1996) was engaged in study about the effects of melatonin – pineal gland system in coldblooded vertebrata and they concluded that secrete of one of the secretions from pineal gland known melatonin, was depend on the one day rhythm and it cause to establish connection between alive and he's (she's) environment (2). Thus numerous studies indicated that body capacity's also affected by onecircadian rhythm. Capacity's such as aerobic power and anaerobic power following from this rule. In a study in 1992 that performed on a number of the athletes, Hill concluded that aerobic work capacity in the evening is 5 percent more than that in the morning (13).

In one other study by Hill and assistants (1992) on a number of men and women, this results was obtained, so that the work was done at the evening about aerobic and anaerobic responses,ensemble, 9/6 percent was more than that in the morning (3). In another study, Tori and assistants (8) studied the effects of 4 weeks aerobic exercise program on 3 groups of males.These 3 groups in three times consist of morning; evening and night were engaged in exercise. They concluded that a group of the evening exercise indicated significant increase in their Vo2 max. Thus, a significant decrease observed in heart beat and blood lactic acid. Thus, the changes in the morning group were more than night group (9). On the other hand in research that performed by Rahmaninia and Mirzaei (2002) on a number of Gilan selective young wrestlers, this results obtained that wrestlers Vo2max in the morning and the evening is not significant deference (1).

Considering extensive disagreements in the performed researches and obtained results, this question was formed for researcher whether aerobic and anaerobic responses are different, after s weeks of sport exercises on inactive students in the morning and the night?

MATERIAL AND METHODS

This research performed in the form of semi-experimental that studies the changes of biological cycle by pre-test and post-test. Cases of this research divided into two groups of the morning exercise (N=15) and the evening exercise (N=15) with casual arrangement. Anthropometric characteristics of subjects were 19±1.5 age (year), 68±4.38 weight (kg) and 170.5±5.67 heights (cm). Exercises of the morning group have held at 9 o'clock and the exercises of the evening group have held at 17 o'clock. Cases of the morning and the evening groups participated in exercise along 8 weeks and 3 sessions in every week. Exercises of two groups was consist of 15 minutes heat practice and 1600 m running that running intensity controlled by means of heart beat meter belt which fasten around the chest and three repetition one minute crinkle jumping on 15 cm hurdle and three repetition exercise 4 × 9.

Researcher by means of protocol pre-test and post-test project performed the research and collected necessary information's.Before beginning of the work, research cases who voluntarily participated in this research were in formed from all stages of research performing and exist likely risks and consequences and the agreement caught of them.Two days before performing pre-test, timing of the cases sleep and diet in the day of performing pre-test explained for them.

For measurement of pre-test, all the cases who participated in research presented in university laboratory in two successive days at 10 AM.At first measurement of height and weight produced from the cases.

Before performing of pre-test, process of Wingate work for measurement of anaerobic power and process of rotating tape for measurement of aerobic power carefully analysis for the cases. Then the cases were placed on Wingate about 11:00 in the noon and performed 9 seconds test after the rest for 5 minutes. They went on rotating tape and performed.Brose test which simultaneously performed by 3 treadmills that any one of the cases was placed on one of them and the information about each cases was noted. After performing of the pre-test, under study persons became similar in order to they didn’t significant differences among groups. After making similar, the groups divided into two groups of the morning exercise and evening exercise with casual arrangement from the viewpoint of aerobic and anaerobic power. The morning group (n=15) performed own exercise at 9 a.m. and thus the evening group made own exercise at 5 p.m. 3 times a week exercise of two group was similar and it last 8 weeks.

Exercise of the morning and evening groups was consist of both general and special body heating that approximately take 15 minutes and basic exercises were consist of :

- 1600m running that its intensity increased evermore (running intensity have controlled by means of beat evaluator which was fasten around the chest). Exercise intensity was 60-70% maximum heart rate but it increased to 70 – 80% maximum heart rate in fourth week and it remained in this intensity until the end of the eighth week.
- Crinkle jumping on the 15 cm hurdle that performed three a minute times with maximum power of person and he got some rest between each 3 times.
- 4 × 9 Running which was performed in 3 times with 1 minute rest. After that, body cooling was performed by the cases. Whole time of practical program last about 50 minutes.

Along the work, asked from the cases that set own sleep and diet times at least 2 hours before the beginning of the practical program in order to it's not effect on their performance.After completion of 8 weeks exercise, the cases with pretest referred to Shiraz athletic sport base for after test in the same time. After test was performed 48 hours after the completion of practical project, In order to interfering factors related to fatigue result from is not effect on process of test performing. It asked from two groups that refuse from heavy actions in 48 hours before performing of the test and it asked them to set own sleep and diet program according to researcher opinion.

In this research, anaerobic power was measured by means of Wingate (a bike which is measurement the work). Work procedure was in this from that first the cases rest on the bike and at first they pedaled for heating for 45 seconds and then they waited in the state of stand by for 5 seconds and after that they pedaled with the whole power for 9 seconds and volume of the case power (in average 9 seconds work was done) on the basis of watt (kg) (watt on kilogram) indicated ones anaerobic power.

In this research, volume, of the anaerobic power on the rotating tape was evaluated by test. This test was designed for measurement of both aerobic and cardiovascular readiness. At first for performing test the person on treadmill, after heating and fasten the belt. The test begins after the select of brose test on the rotating tape and entering the primary information. after the end of the test, it's information that consist of: maximum heart beat of activity, maximum total and relative consumerist oxygen, Kilocalorie (Kcal) and met are appear for record on the face of treadmill.

RESULTS

There isn't significant difference between the effect of sport exercise on anaerobic power in two times of the morning and the evening.

The results of independent t test for comparison the changes of the anaerobic power in the exercise groups of the morning and the evening is indicated in Table 1.

On the basis of the results inserted in Table 1, there isn't significant difference in volume of the changes of the anaerobic power in two groups of the morning and the evening. (p=0.131), so the primary hypothesis in not verify.There is significant difference between the effect of sport exercises on the aerobic power in two times of the morning and the evening.

On the basis of entered results in Table 2, there is significant difference in volume of the anaerobic power changes in the exercise groups of the morning and the evening. (p = 0.001), so this hypothesis is verify Discussion and conclusion.

Table 1: Statistical results of comparison the anaerobic power in the exercise groups in morning and the evening.

Group	N	Anaerobic power Wat/Kg		Change of Anaerobic power Wat/Kg	Df	P Sig (p- tailed)
Morning	15	Pre	Post	24/1	18	0/131
		306	330/1			
Evening	15	308	340	32	17/93	0/131

Table 2: Statistical results of the comparison of the aerobic power in the exercise Groups of the morning and the evening

Group	N	Aerobic power Ml/Min/Kg		Change of Aerobic power Ml/Min/Kg	Df	P Sig (p- tailed)
Morning	15	Pre	Post	4	18	0/001
		41/2	45/2			
Evening	15	41/8	48	6/2	17/37	0/001

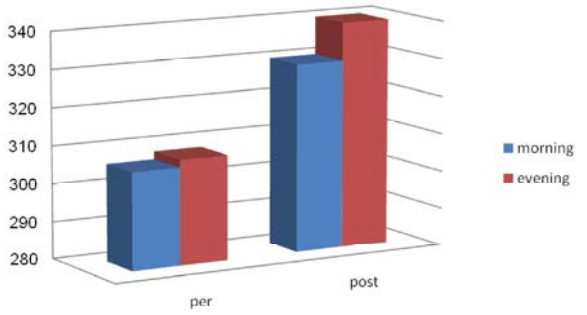

Fig. 1: Average of the anaerobic power changes in the exercise groups of the morning and evening.

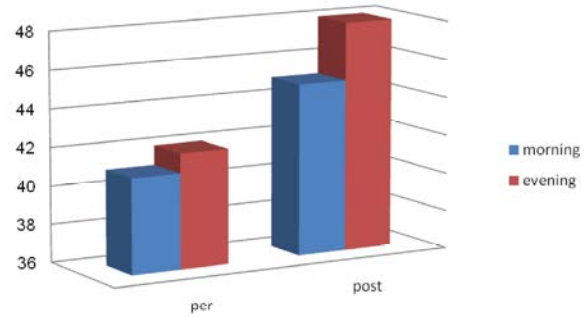

Fig. 2: The average of the aerobic changes in the exercise groups of the morning and the evening.

DISCUSSION AND CONCLUSION

The results of the primary hypothesis indicated that: performing sport exercise either in the morning or in the evening caused an increase in the anaerobic power and even though this increase was more in the evening group but the difference between two groups of the morning the evening in the anaerobic power changes was not significant. Consequences the research of Racinais and the assistances (24), Marth and the assistances (27) also stated that sport exercise either in the morning and in the evening caused increase in the anaerobic power and there isn't significant difference in volume of the anaerobic power changes in two exercise groups of the morning and the evening and in this case they were agreed with research results and thus the results of Hill and the assistances (3), Rheilly and assistances (29), Souiss and assistances (26), research indicated significant difference.

The effect related to body biological clock is two dimensional. At first, body biological clock make person able to do physical and mental activities and it expands cardiovascular changes so that it increased the level of physical and mental activity during the day and it help to recovery and return to first state during the night and in active period. Second character of body biological clock is making preparation for changes condition from active state to sleep state and vice versa. Secrete of melatonin have converse relation with body central temperature, so that in sunset duration when central temperature of body increased Secretion of this hormone decreased. Melatonin has more effects on the body such as capillary dilation for discharge body temperature. In this time of sunset, central temperature of body decrease result from direct effect of melatonin secretion which this caused body biological clock to held the set-point of body temperature in the lower threshold level (area).

To controlled discharge of temperature from body. In the morning, the increase of the set-point threshold level of body temperature (result in body biological clock) and the stop of melatonin secretion caused increase of the central temperature of body.

Mechanism of melatonin action is operation in opposite direction with proximity of the light. So melatonin tends to advanced in body biological clock in the evening and it tends to delay the body biological in the morning (29). As stated, the majority of before performed researches indicated that there is deference in the anaerobic power in the evening group relative to the morning group.The result of the second hypothesis of research indicated that: performing the sport exercises both in the morning and the evening in the aerobic power and this increase in the evening group has been with significant difference more than the morning group. The results of this research is conform with Tori and assistances (8), Atkinson and assistances (23), findings and the research result of Hill and assistances (15) and Rahmaninia(1) also stated that there is difference between the aerobic power in the evening group relative to the morning but this difference is not significant.

A set of habits and body rhythms is an important factor in sport operation. research results by majority of the biologists indicates that more than 300 different rhythmic motions is performed in a person body from sunrise to sunset (like: heart beat, respiration, secretion of various tumors, etc) that all the motions are in agreement and harmony is the cause of joy, wake, alertness feelings and finally body operation.This researcher state that rhythmic motions gradually subside from sunset to sunrise until gradually placed in reinforcement and rest state, the height of this rest is sleep. An athlete body in terms of special hours along one day has been in the high of preparation and powerful and the body has more efficiency. It is possible that the parameters like faster blood current, better metabolism of body, increase of the muscle reactions velocity, the liver and muscles full of glycogen and the ability of body in more observation of oxygen involved in improvement of operation in specific

hours of a day (1). In the wake time, secretion of adrenalin, muscular power and short time maximum power yield in the persons are set in largest quantity about at 6 PM (when the central temperature of body is set in its height point). In addition in this time 6 PM, more aspects of physical and mental operation are in a best state and majority of persons performing their best sport activity in this time (29).

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