



## STUDY THE EFFECT OF USING TWO MEANS OF RECOVERY MEANS ON SOME GYMNASTICS JUNIORS' PHYSIOLOGICAL VARIABLES DURING THE COMPETITION PERIOD

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### Abstract

The research aims to explore the effect of using two means of recovery means on some of the physiological variables for gymnastics' juniors during the competition period. The researcher used the experimental method, the sample was chosen purposely from the gymnastics' juniors who belong to the military sports institution in Assuit governorate in the training season 2010/ 2011 whose number is ten (10) junior players. Those junior players were divided equally into two experimental groups in addition to (5) juniors for carrying out the research perspective experiment.

One of the most important conclusions was using the cold bath as recovery mean which is better and faster than Sauna to get the recovery because its positive effect on the physiological variables.(Lactic- Glucose- the pulse).

**Key words:** The recovery means- competition period- the physiological variables.

### Introduction

The fatigue phenomenon is considered as one of the physiological processes that relate to the recovery processes. If the fatigue, as the scientists defined, is temporary drop for the ability to complete the work, we find that the recovery is the reflective process to get back with the body systems to the state of the previous performance, and to get back to another state that sometimes exceeds the pre- performance state. Thus, the fatigue is considered as positive physiological phenomenon that occurs when the sports person performs the different training acts, it appears in the form of the temporary reduction in the ability to continue to perform the needed work. (C. Tie, Y. Horikiri, J. Park, C. Tanakan, 1995). Pre-competitions period in gymnastics is considered one of the hard periods that characterized by the performance difficulty for the players, the juniors in particular. During this period the motor skills are linked together in the form of motor action, thus the player faces the difficulty of performing the motor skills completely, in addition to repeating this action for many times during the training time to get the perfection stage and the stability of the skillful performance. (A.A.F. Amr Mahmoud, 2011) As the gymnastics sport is the one that depends on anaerobic system, it is expected that the fatigue occurs early. Thus, it is necessary to put the training programs which take care with the continuity of the player's performance without feeling with the early fatigue that resulted from the deficiency of body-physiological abilities, in which the recovery process is considered as one of the stages that completes the training unit (D. Steven, 1995). The recovery means are various such as Sauna and the cold water bath. As for Sauna, it is one of the healthy means of recovery process that occupies very important place among these means; it enhances the level of body biological functions. (A.A.F. Abu Al Elaa, 1999) Sauna bathrooms are considered as one of the important recovery means on which all sports teams depend.

They are considered as main part of the recovery plan. Sauna importance increase in particular during the concentrated and strong training periods and during the period that comes before the matches to get rid of the fatigue and removing the nervous tension. Sauna also helps to cure the sports injuries, improves the general body readiness and it also helps to speed the recovery after the heavy loads. Sauna is used during the training days and during the matches preparing period. "Abu Elaa Abdel- Fatah" (1999) mentioned that water baths are one of water treatment means that used for treatment, healthy and recovery purposes, others say that water baths strengthens the body and increases its immunity and its resistance to the diseases. Cold water activates blood circulation, which in its return activates the heart muscles and activates skin blood circulation. Through what the researcher have read from the previous studies (A.A.W. Hamdy, 2002; A.M. Alaa Abdel, 2004; I.M. Nagla, 2003; A.M. Hisham, 2001), which referred to the importance of using the means of recovery and the direct relation between them and between improving the level of the skillful performance The researcher also found out, through observing some training units, that most trainers overlooked the recovery and its different means, some of them also used the recovery means in way that isn't proper to the players' state, the matter which doesn't agree with the scientific principals of the modern sports training. This matter attracted the researcher's attention to the importance of doing study to explore the effect of using some of recovery means (the cold water bath- Sauna) on some of physiological variables (lactic- glucose- the pulse) for upgrading training and the performance level of juniors through getting back to their natural state and for defining the proper means to retain the recovery quickly.

### The research objectives:

The research aims to recognize the effect of two means of recovery on some of physiological variables during the competitions of gymnastics for juniors, she will know this through:

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- 1- Knowing the effect of using (the cold water bath-Sauna) on some of physiological variables (lactic-glucose- the pulse) of gymnastics' juniors (the research sample):
- 2- Knowing the differences between the aforementioned recovery means for the speedy of retaining the recovery at gymnastics' juniors (the research sample).

**The research hypotheses:**

- 1- There are statistical differences between the before and after measures of the first experimental group (Sauna) in the physiological variables of gymnastics' juniors (the research sample), these differences were on the side of the after measure.
- 2- There are statistical differences between the before and after measures of the second experimental group (the cold water bath) in the physiological variables of gymnastics' juniors (the research sample), these differences were on the side of the after measure.
- 3- There are statistical differences between the averages of the before and after measures of the first experimental group (Sauna) and the second

experimental group (the cold water bath) in the physiological variables of gymnastics' juniors (the research sample).

**The research's plan and procedure**

**The research methodology**

The research used the experimental methodology for the two experimental groups through using the before and after measurement because it is proper to the research's goals and hypotheses.

**The research community and sample**

The research community included some of junior gymnasts who belong to the military sports institution in Assuit governorate who are registered in the Egyptian federation for gymnastics (15) palyers, the younger juniors with twelve years old. This sample was chosen purposely (not randomly) from the training season 2010- 2011. The research sample included ten juniors; they were divided equally into two experimental groups, in addition to five juniors for doing the research experiment. Table No. (1) shows the equality of the research variables for the research sample.

**Table no.1**

**The arithmetic mean, the intermediate, standard deviation and torsion coefficient of age, training age, height, weight, diabetes, systolic blood pressure, diastolic blood pressure, pulse and the physiological variables included in the research**

The variables	The first experimental (sauna) (pulse =5)				The second experimental group (pulse= 5)				
	The arithmetic mean	The intermediate	Standard deviation	Coefficient Of torsion	The arithmetic mean	The intermediate	Standard deviation	Coefficient Of torsion	
Age	12.2	12.00	5.02	-0.83	12.80	12.0	5.40	-1.34	
Training age	7.6	7.00	3.78	-0.69	7.40	7.0	3.7	-0.48	
Height	172.6	175.0	5.13	-0.84	172.4	172.	5.5	0.09	
Weight	25.0	25.0	7.91	0.00	26.0	26.0	5.48	1.29	
Diabetes	106.0	110.0	18.51	0.08	107.6	107.	15.3	-0.05	
Systolic blood pressure	123.0	120.0	12.04	0.60	119.6	116.	9.07	1.71	
Diastolic blood pressure	81.6	80.0	2.70	0.58	81.80	80.0	3.49	0.39	
Pulse during rest	69.0	69.0	4.64	0.23	68.4	68.0	4.62	0.11	
Physiological variables after moving	pulse	156.0	157.0	7.55	-0.55	157.8	155.	14.6	0.14
	glucose	82.0	82.0	7.58	0.60	82.2	84.0	7.12	-0.44
	lactic	3.98	3.90	0.41	0.39	3.8	3.50	0.86	0.51

Table no.1 shows that the – coefficients of the training age, the height, the weight, sugar, blood pressure, the pulse and the physiological variables are confined between (-3, +3), this indicates that these coefficients are located inside the straight curve, thus the sample is distributed straightly.

**The tools and means of data collecting**

**First: the equipment and tools used in the research:**

- 1- Set for measuring blood pressure.
- 2- ACCU-CHEK set for measuring glucose rate.
- 3- ACCUTREND PLUS set for measuring lactic rate.
- 4- Sauna set.
- 5- Cold water bath.

**Second: The forms and the personal interviews:**

- 1- A form for surveying the experts' opinions regarding their defining to the physiological variables (the research topic). Attachment (3).
- 2- A form for registering the junior's data. Attachment (2).

**The research procedures**

**1- The exploratory study:**

The researcher gas made an exploratory study on a sample from the study community and outside the basic sample with five juniors who belong to the military sports institution in Assuit in the period from 1\2\2010 to 5\2\2010 under the same conditions of the basic experiment, the researcher wanted to know how is the exploratory study proper to the study sample. The exploratory study aimed to define the following:

- Knowing the appropriate and the validity of the tools and equipment used in the experiment.
- Knowing the difficulties that may face the researcher during doing the experiment.
- Choosing the assistants, defining their number and training them to use these tools and equipment.
- Training the assistants to register at the forms of the before and posteriori measurements.
- Knowing how is the topic order proper to making the research measurements.

**B- The basic experiment**

The researcher carried out the basic experiment of the research on 15/2\2010 after the training on the performance of training units that relate to the competition periods and performing some consequential movements. The research sample was ten juniors from the juniors of the military sports institution and the sample was divided into two experimental groups:

\* The first experimental group which used the Sauna as one of the recovery means and consists of five juniors, attachment (4).

\* The second experimental group which used the cold water bath as one of the recovery means which consists of five juniors. Attachment (5).

**1- The before measurement:**

The researcher made the before physiological measurements for every experimental group before using the means of recovery as the following:

- Measuring the pulse rate.
- Measuring the glucose rate in the blood.
- Measuring lactic in the blood.

**2- Using the recovery means included in the research:**

After the researcher had made the before measurements on the two groups of the research through entering the first experimental group, which used Sauna as recovery mean, into the Sauna room for ten minutes, then we entered the second group, which used the cold water bath as recovery mean, into the cold bath for five minutes.

**3- The posteriori measurement:**

After finishing the time limited to get out of the recovery means, the researcher carried out the posteriori measurements on the individuals of the research sample (the two experimental groups) whose number is ten juniors, as following:., Measuring the pulse rate., Measuring the glucose rate in the blood., Measuring lactic in the blood.

**The used statistical treatments:**

- The arithmetic mean, the mediator, Standard deviation., Coefficient of torsion, The correlation coefficient Man Wittny Labrometric test., Wilcoxon Labarametric test.

**First: The results:**

**Table 3**

**The differences between the two averages of the before and posteriori measurements of the first experimental group (Sauna) in the physiological variables included in the research (N= 5)**

The variables	The advantageous group		Disadvantageous Group		Z value	The function level
	Grades' total	Grades' average	Grades' total	Grades' average		
The pulse	3.00	15.00	0.00	0.00	2.02	0.043
glucose	0.00	0.00	3.00	15.00	2.02	0.043
lactic	3.00	15.00	0.00	0.00	2.02	0.043

The table value of (Z) at (0.05) = 1.96.

Table 3 shows that there are statistically differences between the before and posteriori measurements of the

first experimental group (Sauna) in the physiological variables included in the research, these differences take the side of the posteriori measurement.

**Table 4**

**The improvement percentage between the before and posteriori measurements of the first experimental group (Sauna) in the physiological variables included research (N= 5)**

the variables	The average of the before measurement	The average of the posteriori measurement	The improvement rate %
Pulse	156.00	105.00	32.69
Glucose	82.00	94.00	14.63
lactic	3.98	3.08	22.61

Table (4) shows that the improvement rate of the first experimental group (Sauna) in the physiological variables ranged from (14.63: 32.69%), this indicates to the positivism of using Sauna in improving the physiological variables of the sample included in the

research. It is also appears that the most improving physiological variables is the pulse (32.69 %) , whereas lactic came in the first place (22.61%) and glucose occupied the third place (14.63%).

**Table 5**

**The differences' significance between the averages of the before and posteriori measurements of the second experimental group (the coldwater bath) in the physiological variables included in the research**

The variables	The before measurement		The posteriori measurement		Z value	The function level
	Grades' total	Grades' average	Grades' total	Grades' average		
The pulse	3.00	15.00	0.00	0.00	2.03	0.043
glucose	0.00	0.00	3.00	15.00	2.03	0.043
Lactic	3.00	15.00	0.00	0.00	2.03	0.043

The table value of (Z) at (0.05) = 1.96.

Table 5 shows that there are statistically differences between the before and posteriori measurements of the second experimental group (the cold water bath) in the

physiological variables included in the research, these differences were in the side of the posteriori measurements.

**Table 6**

**The improvement percentage between the before and posteriori measurements of the second experimental group (the cold water bath) in the physiological variables included in the research (N= 5)**

the variables	The average of the before measurement	The average of the posteriori measurement	The improvement rate %
Pulse	157.80	89.40	43.035
Glucose	82.20	102.20	24.33
Lactic	3.88	2.02	47.94

Table (6) shows that the improvement rate of the second experimental group (the cold water bath) in the physiological variables ranged from (24.33: 47.94%), this indicates to the positivism of using the cold water bath in improving the physiological variables of the

sample included in the research. It is also appears that the most improving physiological variables is the lactic acid (47.94 %) , whereas the pulse came in the second place (43.35) and glucose occupied the third place (24.33%).

**Table 7**

**The differences between the two averages of the posteriori measurements of the first experimental group (Sauna) and the second experimental group in the physiological variables included in the research (N= 10)**

The variables	The first group sauna		The second group (the cold bath)		Z value	The function level
	Grades' total	Grades' average	Grades' total	Grades' average		
The pulse	8.00	40.00	3.00	15.00	2.61	0.009
glucose	4.20	21.00	6.80	34.00	1.36	0.175
lactic	7.90	39.50	3.10	15.50	2.51	0.012

The table value of (Z) at (0.05) = 1.96.

Table 7 shows that there are statistically differences between the two measurements of the first experimental group (sauna) and the second experimental group (the cold water bath) in the pulse and lactic, these differences take the side of the second group (cold water bath), whereas there are no statistically differences at the glucose variable.

**Table 8**

**The improvement percentage between the posteriori measurements of the first experimental group (sauna) and the second experimental group (cold bath) in the physiological variables included in the research (N= 10)**

the variables	The average of the first group (sauna)	The average of the second group (cold bath)	The improvement rate %
Pulse	105.00	89.40	14.86
glucose	94.00	102.20	8.72
lactic	3.08	2.02	34.42





Table (8) shows that the improvement rate of the first experimental group (sauna) and the second group (cold water bath) in the physiological variables ranged from (8.72: 34.42%), this indicates to the positivism of using the cold water bath which is better than sauna for getting the recovery and in its turn in improving the physiological variables of the sample included in the research. It is also appears that lactic acid is the most improving physiological variables (34.42%), whereas the pulse occupied the second place (14.86%) and glucose came in the last place (8.72%).

#### **The results discussion and interpreting:**

The first hypothesis stipulates that there are statistically differences between the before and posteriori measurements of the first experimental group (sauna) in the physiological variables at the gymnastics' juniors included in the research.

The results of table (3) indicate that there are statistically between the before and posteriori measurements of the first experimental group which used (sauna) in some of the physiological variables (the pulse- lactic- glucose) included in the research, these differences take the side of the posteriori measurement at level (0, 05), since the calculated value of (Z) is (2.02) and it is larger than the table value of (Z).

The results of table (5) showed the positive effect of using sauna on the sample of the first experimental group in the physiological variables, since the results reveal that the pulse average in the before measurement after performing the motor action and before entering into the sauna reached (156 نبض), whereas it decreased in the posteriori measurement after getting out the sauna to reach about (105 نبض), this refers to the improvement of pulse rate, since the percentage of improvement reached (32.69%).

On the other hand, we find that glucose rate in the before measurement after performing the motor action and before entering into the sauna reached (82.00), whereas it increased in the posteriori measurement after getting out of sauna to reach about (94.00%), this refers to the improvement of glucose rate in the blood, since the improvement rate reached about (14.63%).

The results referred that the average of lactic acid in the before measurement after performing the motor action and before entering into sauna reached (3.98 mille mole), whereas the average decreased in the posteriori measurement after getting out the sauna to reach (3.08 mille mole), this indicates to the improvement of lactic acid in the blood, since the percentage of the improvement reached (22.61%).

The researcher sees that the improvement of some physiological variables (the pulse rate- lactic acid- glucose) is resulted from using sauna, although the sauna increases body temperature, thus, increases the respiratory rate, in its turn it will increase the pulse rate, but the player in sauna will be completely relaxed, this will decrease and improve all physiological traits better than the junior's state after performing the motor

action. This agrees with what J. Vanakoskio (1996) indicated that using sauna increases the absorption process and the metabolism, sauna also helps to enlarge the vascular, decrease the pulse rates and pressure and improves the speedy of recovery of sports persons.

Abu Ella Abdel Fattah (1999) indicated that the hypoglycemia is the basic danger that must be avoided, in particular through performing the sports activities, through taking glucose or any other drinks that contain carbohydrates. The danger of glucose deficiency is resulted from its effect on the brain needs to sugar, the matter which leads to what we called as the center roll fatigue.

These results agree with what was referred by Hamdey Abdo's study (2002), Alaa Abdel Aziem's study (2004) and J. Vanakoskio's study that using sauna as recovery mean affects positively on improving the level of the physiological traits at the practitioners of the sports activities.

Accordingly, the first hypothesis achieved which stipulates that there are statistically differences between the before and posteriori measurements of the first experimental group (sauna) in the physiological variables at the gymnastics' juniors included in the research.

The second hypothesis stipulates that there are statistically differences between the before and posteriori measurements of the second experimental group (cold water bath) in the physiological variables at the gymnastics' juniors included in the research.

The results included in table (5) indicate that there are statistically differences between the before and posteriori measurements of the second experimental group that used (the cold water bath) in the physiological variables (the pulse- lactic- glucose) included in the research, these differences take the side of the posteriori measurement at the abstract level (0.05), since the calculated value of (Z) reached (2.02) which is higher than the table value of (Z). The results included in table no. (5) revealed the positive effect of using the cold water bath on the sample of the second experimental group, this effect represented in the pulse rate\ minute, since the results indicate that the average of pulse rate in the before measurement after performing the motor action and before using the cold water bath has reached about (157.80\ minute), whereas it decreased in the posteriori measurement after getting out of the cold water bath to reach about (89.40\minute), this indicates to the improvement of pulse rate, since the percentage of improvement reached about (43.35 %). Table (5) also shows that the glucose average in the before measurement after performing the motor action and before using the cold water bath reached about (82.20), whereas it increased in the posteriori measurement after getting out of the cold water bath and reached (102.20), this indicates to the improvement in glucose indicator, since the percentage of increasing glucose in blood reached about (24.33%). The results included in table 7



revealed the positive effect of using the cold water bath on the sample of the second experimental group on the lactic acid rate in blood, since the results indicate that lactic rate in the before measurement and before using the cold water bath reached about (3.88), whereas it decreased in the posteriori measurement after getting out of the bath to reach (2.02), this indicates to the improvement of lactic rate in the blood, since the percentage of improvement reached about (47.94%). The researcher sees that the improvement of the second group juniors who used the cold water bath in the level of the physiological variables is resulted from the cold water, because the cold water affects positively on the nervous system and the junior's position in the bath makes him feeling with relaxation that in its turn leads to reduction and improvement of the physiological traits at the whole body after carrying out the motor action and before using the cold bath.

In this regard we find Mr. Abu Ella Ahmed Abdel Fattah (1999) and H. Seatan (1994) indicate that the cold bath is one of the most important means recovery means because of its positive effect on the physiological variables (the pulse- lactic- glucose). The study results agree with what I. Nagla' study indicated in (2003) and what was revealed through the study made by Alaa Abdel azeem that revealed that using the cold water bath as recovery mean affects positively on improving the level of the physiological traits at the practitioners of the sports activities. The third hypothesis stipulates that there are statistically differences between the degrees' average of the two posteriori measurements of the first (sauna) and the second (cold bath) experimental groups, these differences take the side of the second group in the physiological variables of the gymnastics' juniors included in the research.

Table 7 shows that there are statistically differences between the degrees' average of the two posteriori measurements of the first (sauna) and the second (cold bath) experimental groups in the level of the physiological variables (the pulse rate- lactic acid- glucose) included in the research, these differences take the side of the second group at the abstract level (0.05), since the calculated value of (Z) reached (2.61) which is higher than the table value of (Z).

The results of table no 7 also indicates that the average of the posteriori measurement (after using sauna) of the first experimental group at the pulse rate reached (105.00), whereas the average of the posteriori measurement (after using the cold bath) of the second experimental group reached (89.40). the improvement rate reached (14.86%) for the side of the second experimental group. The results of table 9 also reveals that the average of the posteriori measurement of the first experimental group which used sauna in blood's glucose reached (94.00), whereas the average of the posteriori measurement of the second experimental group which used the cold bath reached (102.20), the improvement rate reached (8.72) for the side of the second group. Table 7 also shows that the average of

the posteriori measurement of the first experimental group which used sauna in lactic rate in blood reached (3.08), where as the average of the posteriori measurement of the second experimental group which used the cold bath reached (2.02), the improvement rate reached (34.42%) for the side of the second group. The researcher attributes the superiority of the second experimental group in the physiological variables (pulse rate- glucose- lactic acid) to te water bath, because the cold bath, , because the cold water affects positively on the nervous system and the junior's position in the bath makes him feeling with relaxation that in its turn leads to reduction and improvement of the physiological traits at the whole body after carrying out the motor action and before using the cold bath. In this regard we find Mr. Abu Ella Ahmed Abdel Fattah (1999) and H. Seatan (1994) indicate that the cold bath is one of the most important means recovery means because of its positive effect on the physiological variables (the pulse- lactic- glucose). The study results agree with what I. Nagla' study indicated in (2003) and what was revealed through the study made by Alaa Abdel azeem that revealed that using the cold water bath as recovery mean affects positively on improving the level of the physiological traits at the practitioners of the sports activities

### Conclusions:

In the light of the research results and the limitations of the research sample, its characteristics, the used methodology and the followed statistical analysis we could get the following conclusions:

1- Using sauna as recovery mean leads to positive physiological variables in the pulse rate, glucose rate and the rate of lactic acid, since we found that there are statistically differences between the before and posteriori measurements for the side of the posteriori measurement as the following:

- The pulse rate improved and decreased after using sauna as recovery mean with rate (32.69%).
- The rate of lactic in blood improved and decreased after using sauna as recovery mean with rate (22.61%).
- Glucose rate improved in the blood and increased after using sauna as recovery mean with rate (14.63%).

2- Using the cold bath as recovery mean leads to positive physiological variables in the pulse rate, glucose rate and the rate of lactic acid, since we found that there are statistically differences between the before and posteriori measurements for the side of the posteriori measurement as the following:

- The pulse rate improved and decreased after using the cold bath as recovery mean with rate (47.94%).
- The rate of lactic in blood improved and decreased after using the cold bath as recovery mean with rate (43.35%).
- Glucose rate improved in the blood and increased after using the cold bath as recovery mean with rate (24.33%).

3- Using the cold bath as recovery mean is better and faster than using sauna for retaining the recovery



because of its better positive effect on the physiological variables (lactic- glucose- the pulse).

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