

The effect of hill training on physical variables, physiological efficiency, and standard of performance for gymnastics beginners.

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Introduction:

The sport training is the main part of preparing the athlete as it is the physical process based upon the physical exercises, in order to develop the different characteristics of the athlete. So that we can achieve the highest level in certain kind of the sport activities.

Abo Alala Ahmed AbdElfatah (1997) points to the distinguished modern training as it tends to specification and concentration on the demands of the precaution performance in the sports kind, so that the quantity of the preparing exercises has increased for each training plan. He also adds that spreading the use of untraditional methods for increasing the effectively use of the functional abilities of the athlete such as the modern sets and the training on heights for increasing the standard of the muscular power.

The hill training is an effective method for building the aerobic energy and developing the power through steps, they are considered the best kind of resistance training by using the body weight. It is important to do warm – up before the training hill, and recovery after it. The training has done twice a week for (6-8) weeks, for increasing the physical fitness and improving the speed (3-5) minutes.

Many scientists see that hill training enable to reinforce the muscles and joints and tendons. Also allowing these tissues to work more with less effort and less fatigue, so we can expect much improvement in the muscular power and speed. Rob sleamaker and ray browing (2006) point out that hill exercises have many special benefits in developing the power and speed. Bill Rodgers and others (2002) say that hill exercises may improve many features in performance and the great benefit is increasing the speed. These

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exercises influence the body especially on the body efficiency. The body efficiency is the ability of the individual to warm – up and adjust the body systems quickly to meet the physical loads in training and also in games. Those warming – up and adaptation improve the curriculum system functions in breathing thus the outcome is saving effort and improving in the physical performance.

The high efficiency of the heart makes it able to provide muscles with more amount of blood that enables the individual to have his full needs of oxygen in order to reach high degree of efficiency. The sports activity makes the heart muscle reduce the oxygen consumption and reduce the rate of heart beat.

Ali Mohamed Galal Elden (2002) adds that the level of the physical efficiency is influenced by many factors such as (the athlete's motivation, the outer – environment, the readiness of the body, the health status). He also sees two other factors influence by their role on the dynamic physical efficiency level, they are: the high level athlete's fatigue and the uncured fatigue.

Gymnastics requires high degree of muscular steady strokes in one model of action that expresses a high standard of muscular nerve harmony.

Also that requires a huge amount of motor – sense balance, grace and flexibility.

Gymnastics influences positively on the players, body systems. It is a method for developing the physical characteristics such as power, endurance, flexibility and harmony. Besides it develops the sentimental characteristics such as courage and self – confidence, also it improves the functional status.

Hill exercises play an important role in developing the physical and proficiency characteristics and they increase the ability of speed performance.

From this point of view, and the researcher has trained the beginners in gymnastics. He noticed that they had a lack in their physical and proficiency level.

So the researcher sees that hill exercises play an important role in improving the physical proficiency of the gymnastics beginners. So he did that study to know the influence of hill exercises on the physical factors and the physiological proficiency, and the standard of action⁸ in gymnastics in this research.

This research aims at recognize the influence of hill exercises on the physical factors and the physiological proficiency factors for the gymnastics beginners, and the standard of actions

performance in gymnastics in this research for the beginners.

The Research Procedures

The Research Method:

The research uses the experimental method. He designs two groups, one is experimental, and the other is controlled, because of the nature of this research.

The research sample contains the students from the beginners in gymnastics in sharkia club, sharkia governorate. For the training session 2015/2016. they are (25) beginners. We take seven as questionnaire sample. Thus

the main research sample is (18) beginners in two groups of nine.

The research sample homogeneity:

There is a homogeneity between the research sample individuals in growth levels factors (age, height, weight) and some physical and physiological proficiency factors, and the standard of actions performance in gymnastics. The research has been registered in the period from 5/9/2015 to 10/9/2015 as shown in table (1).

Table (1)

The homogeneity of the research sample individuals in growth levels factors, the physical and physiological proficiency factors, and standard of actions performance in gymnastics under Research n =25

Factors			Arithmetic Mean	Standard Deviation	mean	Bend Coefficient	
Growth	Age	year	11.80	2.741	12.00	-.219	
	Height	cm	145.65	2.652	146.00	-.396	
	weight	kg	43.36	3.976	44.00	-.483	
Physical	Muscular Endurance	Decline Prostration	Number	9.42	1.157	9.20	.570
	Muscular Power	Vertical Jump	Cm	22.61	2.182	23.00	-.536
	Flexibility	Horizontal Bridge space	Cm	46.98	3.210	45.50	1.383
	Grace	Downhill zigzag Running	Second	17.15	1.541	17.25	-.195
	Correlation	Numbered Circles	Second	8.43	1.035	8.50	-.203

Attached Table (1)

The homogeneity of the research sample individuals in growth levels factors, the physical and physiological proficiency factors, and standard of actions performance in gymnastics under Research.

	Steady Balance	Standing on the fore-foot	Second	6.17	2.693	6.00	.189
	Motor Balance	Bass Balance	Degree	66.33	3.697	66.27	.049
physiological	Heart beat rata		Pulse/m	189.56	2.879	189.00	.584
	Vital capacity		Litre/s	3.28	.306	3.30	-.196
	Max. oxygen consumption		Litre/m	24.36	2.247	24.50	-.187
	Pulmonary air		Litre/m	60.35	3.774	60.00	.278
	Breathing rate		Litre/m	46.24	4.134	46.50	-.189
	Performance rate in gymnastics		Degree	6.25	1.674	.600	.0448

It was observed from table (1) that bend coefficient values of growth rates, physical factors, physiological proficiency and performance level in gymnastics under research are between (± 3) that refers to the homogeneity of the research sample.

Equality of the Research sample:

The researcher has done the equality between the two research groups; the experimental and the controlled, in the physical factors, the physiological proficiency, and the is done for ensuring the equality between the two groups in these factors. This measurement is the pre-measurement of the research groups as showed in table (2).

Table (2)

The denotation of differences between the two groups, the experimental and the controlled in the pre-measurement in the physical factors, the physiological efficiency and performance level in action gymnastics under research. $N_1 = N_2 = 9$

Factors		Measure Unit	Experimental		mean		"T" Value	
			S ₁	± M ¹	S ₂	± M ²		
Growth	Muscular Endurance	Decline prostration	Number	9.30	1.149	9.45	1.206	0.0919
	Muscular Power	vertical jump	Cm	22.50	2.0178	22.40	2.167	0.0180
	Flexibility	Horizontal Bridge space	Cm	46.13	3.301	45.63	3.322	0.440
	Grace	Downhill zigzag runing	Second	17.95	1.386	18.00	1.421	0.104
	Correlation	Numbered circles	Second	8.45	1.023	8.40	1.018	0.143
	Steady Balance	Standing on fore foot	Second	6.35	1.637	6.30	1.629	0.089
	Motor Balance	Bass Balance	Degree	66.25	3.582	66.27	3.631	0.016
Physiological	Heart Beat	Rate	Pulse/m	189.56	2.879	183.4	2.854	0.163
	Vital Capacity		Litre/S	3.28	0.306	3.27	0.295	0.095
	Max. Oxygen Consumption		Litre/m	24.36	2.247	24.44	2.253	0.104
	Pulmonary Air		Litre/m	60.45	3.782	60.55	3.794	0.077
	Breathing Rate		Litre/m	46.20	4.132	46.25	4.146	0.035
	Per formance Ratein Gymnastics		Degree	6.20	0.383	6.22	0.427	0.144

"T" value incorporeal level .05 = 2.093.

From table (2) we notice no ststi8tic differences between the two groups; the experimental and the controlled, in the pre-measurement of the physical factors, the physiological proficiency, and the

performance level of actions in gymnastics under research.

Methods and tools of collecting data:

1- Sets and tools:

- Medical scales weighs by. 1:10 kg.

- Rastamere for measuring height by cm.
- Measuring tape by cm.
- Stop watch for measuring the functional proficiency of the vital body systems.
- Sand bags, ropes, different weights, chalk, Sweden seat, gymnastics hall.

2- Physical tests in gymnastics:

The research has drawn some physical factors and tests that are used for measurement after he had revised the resources and specialized studies.

He has collected all physical factors and belonged tests and introduced them on experts then he has chosen the physical factors that have got 80% or more from the experts' views. They are:

- Decline prostration – bending the arms (for measuring the muscular endurance by number).

- Vertical jump test of sergeant (for measuring the muscular power of legs by centimeter).
- Horizontal bridge space (for measuring flexibility by centimeter).
- Zigzag running test; Baro method 3x4.5m (for measuring grace by second).
- Numbered circles test (for measuring the correlation by second).
- Standing on the fore – foot (for measuring the steady Balance by second).
- Bass test for the motor balance (for measuring the motor Balance by marks).

3- The functional status factors in gymnastics:

The researcher has revised many sources in the physiological field, and met many experts (10 experts) in order to determine the main physiological proficiency factors in gymnastics (see table 3).

**Table (3)
the percentage of the experts views about the main physiological factors in gymnastics.**

N	The functional status factors	Percentage of experts views
1	Breathing Rate	100%
2	Heart Beat Rate	90%
3	Pulmonary Air	90%
4	Max. oxygen consumption (Free)	100%
5	Max. oxygen consumption (Rated)	100%

Follow Table (3)
the percentage of the experts views about the main physiological factors in gymnastics.

N	The functional status factors	Percentage of experts views
6	Max. carbon dioxide consumption (Free)	30%
7	Max. carbon dioxide consumption (Rated)	20%
8	Oxygenic Pulse	20%
9	Vital Efficiency	50%
10	Vital Capacity	100%

The researcher has taken 80% or more for accepting the measurement according to the experts' views. The factors that will be measured are five (Heart Beat Rate, vital capacity).

4- Assessment of performance the total actions in gymnastics:

The researcher has done the assessment of the total actions in gymnastics under research through a committee of three experts in gymnastics field. They determined fifteen marks as a degree. The total actions in gymnastics under 12 years (2016) as follows:-

- **Part one:** Doing forward upside down on hands + forward round straight + forward circular round.
- **Part two:** round off for doing half – round, going an aerobic round; forward.

- **Part three:** Round off, back dive doing back aerobic straight round, with going round 108° (half round – vertical core around).

- **Part four:** 2 sleeper + 2 Tomas + V angle + press balance.

- **Part five:** Round off + Bella dive, doing back straight aerobic round plus a round of vertical core.

5- Suggested Hill exercises program:

The researcher has revised the Hill exercises resources and determined the main points that should be noticed when we put a training program using Hill exercises; they are:

- The period of training not exceed for 8 weeks.
- Preparing the player psychologically for training.

- For avoiding broadness', it is favourite to vary between the different Hill exercises (short, medium, long, mixed).

- The more intensive and longer training, the easier in become the next day.

- Warming – up is a must before training, and you should do recovery training after that.

- Don't practice hill exercises during the injury.

***When going up, we should notice:**

- When we going up, we should shorten the steps, than when we step on the flat ground.

- The body should be straight, not bending forward or back ward, the head and shoulders and bask should be on a straight line.

- If the speed of breathing increases, this means that running by high speed or jumping for away the ground during doing the skills.

***When landing, we should notice:**

- The earth gravity is which grabbed the weight of the body dawn.

- The feet should be near the ground in order to control the body.

- Avoid jumping up while landing.

- Avoid bending backward that it makes the motion slower.

- Bending forward and leaving the gravity enables the landing.

- Avoid landing on heels steps, and land on fore foot.

- Avoid using long steps, and use short steps, make you use more effort.

***steps of designing the training suggested units:-**

A- Aim of the training units:

The training units aim at putting a group of Hill exercises long for 8 weeks for improving the physical factors and the physiological efficiency, and improving the performance of total actions in gymnastics under research.

B- Objectives of training units:-

- To improve some physical factors in gymnastics.

- To improve some functional status factors such as (Heart Beat Rate, pulmonary Air, Breathing Rate, Max. Oxygen consumption, vital capacity).

- To improve the performance level in gymnastics under research.

C- The basis of putting the training units:

The research followed the following bases in putting the training units for the gymnastics beginners; the research sample, as standards of the suggested training units:-

- The training units are to be suitable for the age stage of the research sample.
- The potentialities and tools are to be available for the training units' execution.
- Determine the most important duties of training and their advance.
- Flexibility of the training units.
- Using the aid of the previous programs in the same field and in other fields.
- They share in achieving the wanted objective.
- Taking care of safety instructions.
- Taking care of the individual differences.
- They are to be easy and varied.
- They should be gradual led from easy to difficult.

D- Contents of the training units:-

- 1- warming – up
- 2- The main part that contain:
 - The special physical preparation.

- Hill exercises that connected to the performance
- 3 - The final part.

The first Experimental study:

The first experimental study has been done in the period from /2/9 to 17/9/2015; aims at:

- Recognize how the tests suitable for the beginners level.
- Train the helpers from colleagues to under stand the work and solve the difficulties.
- Find the scientific coefficients for the research tests.

Measuring Reliability:

The research used the distinguished reliability in physical factors and physiological proficiency, and the performance of all actions in gymnastics under research of the beginners under seventeen in sharkia club (distinguished group), and the research sample from the study society out of main sample (in distinguished group), each group are seven beginners, during two days 12, /3/9/2015 see table (4).

Measuring the stability:

The research has applied all the research tests than re-applied them in a period of time (three

days). He used Pearson correlation test to find the correlation coefficient between the first and the second applications in the period from 12/9 to 17/9/2015.

The second Experimental study:

It is applied on the same study sample, aim at:

- Determine the tools for the training application and make them ready
- Preparing the suitable place for applying the exercises the study results determine the suitable exercises and doing some simple adaptations in exercises that is suitable for the beginners, also the place in suitable for the application.

The pre-measurements:-

The researcher has done the pre-measurements for the two groups; the experimental and the controlled, in the physical factors, the physiological proficiency and the performance of all actions in gymnastics under research in the period of two days 2019, 21/9/2015.

The Application of the main study:-

The main experiment of the research has been executed in the period from 2019 to 12/11/2015 on the

experimental group which used the program of Hill exercises. The execution of the training units took 8 weeks; three times a week for 60 minutes in each time on days (Saturday, Monday, Wednesday) By exchange between the morning and after noon periods.

The researcher has come to the length of the training according to the experts' views; also how many times a week, and the period of each time. Thus the session time of training in one week (4.5) hours.

The training contains eight training units, each one has repeated three times in one week.

The controlled group:-

The controlled group has been trained according to the applied training program in the same period of time as the experimental group. The training unit contains preparation exercises for developing the body parts then training in the basic skills and improving the performance standard in all actions in gymnastics under research. Then some recovery exercises have been done. All the applications have been done by the scientific rules, during the execution of the experiment on

the two groups; the experimental and the controlled, we consider the following:

- The researcher has trained the two groups to unify the factors under research.
- Consider the time element for the two groups so that any group does not influence by the different time.
- Preparing the tools and the application place.
- Exchange the training days and periods weekly between the two groups.

The pre - measurements:-

After finishing the application of the basic experiment, the researcher has done the post-measurements on the two group; the experimental and

the controlled, in the physical factors, the physiological proficiency, and the performance of all actions in gymnastics under research in the period from 14/11 to 15/11/2015, by the same way and order of the pre-measurements.

The statistics treatments:-

The researcher has collected the results accurately and tabled them after finishing the application, he dealt statistics with them. He used (SPSS) program for the statistics: the arithmetic mean, standard deviation, the mean, Bend coefficient, T. Test, percentage of improvements.

Discussion and results:

Table (4)

The differences denotation and the percentages of improvement between the pre and post measurements for the experimental group in the physical factors, the physiological efficiency and the standard of performance in gymnastics under research N= 9

Factors			Measure Unit	Pre measurement		Post measurement		T Value	Percentage of Improvement
				S ₁	±M ¹	S ₂	±M ²		
Physical	Muscular Endurance	Decline Prostration	Number	9.30	1.149	12.50	0.734	6.638	34.41
	Muscular Power	Vertical Jump	Cm	22.50	2.178	26.32	1.325	4.238	16.98
	Flexibility	Horizontal bridge space	Cm	46.13	3.301	40.16	2.417	4.127	14.87

Follow Table (4)

The differences denotation and the percentages of improvement between the pre and post measurements for the experimental group in the physical factors, the physiological efficiency and the standard of performance in gymnastics under research N= 9

Factors		Measure Unit	Pre measurement		Post measurement		T Value	Percentage of Improvement
			S ₁	±M ¹	S ₂	±M ²		
Grace	Zigzag running	Second	17.95	1.386	14.22	0.636	6.918	26.23
Correlation	Numbered circles	Second	8.45	1.023	6.21	0.329	5.896	36.08
Steady Balance	Standing on forefoot	Second	6.35	1.637	8.69	0.964	3.484	36.85
Motor Balance	Bass Balance	Degree	66.25	3.582	71.75	1.568	3.978	20.95
Heart Beat Rate		Pulse/m	189.56	2.879	184.34	1.697	4.418	2.83
Vital Capacity		Litre/s	3.28	0.306	3.98	0.211	4.642	18.60
Max. Oxygen Consumption		Litre/m	24.36	2.247	32.75	2.691	6.769	34.44
Pulmonary Air		Litre/m	60.45	3.782	71.15	3.654	5.755	17.70
Breathing Rate		Litre/m	46.20	4.132	52.44	2.124	3.799	13.51
Per formance Ratein Gymnastics		Degree	6.20	0.383	9.75	1.263	7.608	57.26

"T" tabled value in corporeal level .05 =20.306

From table (4) we notice there are statistic differences in level .05 between the pre and post measurements for the experimental group in the physical factors, and the

physiological efficiency, and the performance of total actions in gymnastics under research that in for the side of the post-measurement.

Table (5)
Denotation of the differences and the percentages of improvement between the pre and post measurements for the controlled group in the physical factors, the physiological proficiency and the performance of total actions in gymnastics under research. N = 9

Factors		Measure Unit	Pre measurement		Post measurement		T Value	Percentage of Improvement	
			S ₁	±M ¹	S ₂	±M ²			
Physical	Muscular Endurance	Decline Prostration	Number	9.45	1.206	11.10	1.354	2.574	17.46
	Muscular Power	Vertical Jump	Cm	22.40	2.167	24.20	2.216	1.643	8.04
	Flexibility	Horizontal bridge space	Cm	45.36	3.322	43.45	3.211	1.335	5.02
	Grace	Zigzag running	Second	18.00	1.421	16.80	1.965	1.399	7.14
	Correlation	Numbered circles	Second	8.40	1.018	7.60	1.112	1.501	10.53
	Steady Balance	Standing on forefoot	Second	6.30	1.629	5.05	1.537	1.579	24.75
	Motor Balance	Bass Balance	Degree	66.27	3.631	68.35	2.936	1.260	3.14
Heart Beat Rate		Pulse/m	189.40	2.854	186.12	2.131	2.605	1.76	
Vital Capacity		Litre/s	3.27	0.295	3.32	0.286	0.344	1.53	
Max. Oxygen Consumption		Litre/m	24.44	2.253	24.75	2.324	0.271	1.27	
Pulmonary Air		Litre/m	60.55	3.794	61.18	3.817	0.322	1.04	
Breathing Rate		Litre/m	46.25	4.146	50.32	2.163	2.462	8.80	
Per formance Ratein Gymnastics		Degree	6.22	0.427	7.25	0.964	2.736	16.56	

"T" table value incorporeal level .05 =2.306

Form table (5) there not denoting difference statistically in the level .05 between the pre and post measurements for the controlled group in the factors (the legs muscular power,

group, flexibility, correlation, steady, balance, motor balance), and the physiological proficiency in factors (vital capacity,

Max. Oxygen consumption, pulmonary Air).

But there are statistically denoting differences in factors (the muscular endurance, Heart

beat rate, breathing rate.

Performance of total actions in gymnastics under research) for the side of the post measurement.

Table (6)

The denotation of differences between the two post measurements for the two groups; the experimental and the controlled, in the physical factors and the3 physiological proficiency and the performance of total actions in gymnastics under research:

$$N_1 = N_2 = g$$

Factors		Measure Limit	Pre measurement		Post measurement		T Value	Percentage of Improvement	
			S1	±M ¹	S ₂	±M ²			
Physical	Muscular Endurance	Decline Prostration	Number	12.50	0.734	11.15	10.354	3.748	12.61
	Muscular Power	Vertical Jump	Cm	26.32	0.325	24.20	2.216	3.386	8.76
	Flexibility	Horizontal bridge space	Cm	40.16	2.417	43.45	3.211	3.375	8.19
	Grace	Zigzag running	Second	14.22	.636	16.80	1.965	5.150	18.14
	Correlation	Numbered circles	Second	6.21	0.329	7.60	1.112	4.942	22.38
	Steady Balance	Standing on forefoot	Second	8.69	0.964	5.05	1.537	8.272	72.08
	Motor Balance	Bass Balance	Degree	71.75	1.568	8.35	2.936	4.212	4.97
	Heart Beat Rate		Pulse/m	184.34	1.697	187.12	2.131	4.208	1.51
	Vital Capacity		Litre/s	3.89	0.212	3.32	0.286	6.613	17.23
	Max. Oxygen Consumption		Litre/m	32.75	2.691	24.75	2.324	9.277	32.32
	Pulmonary Air		Litre/m	71.15	3.654	61.18	3.817	7.780	16.30
	Breathing Rate		Litre/m	52.44	2.124	50.32	2.163	3.939	4.21
	Per formance Ratein Gymnastics		Degree	9.75	1.263	7.25	0.964	6.488	34.48

From table (6) we notice there are statistically differences in the level .05 between the two post-measurements for the two groups; the experimental and the controlled, in the physical factors and the physiological efficiency, and the performance of total actions in gymnastics under research, for the side of the experimental group.

Discussion:

From table (4) we notice there are statistically denoting differences in the level .05, for the side of the post-measurement for physical factors under research; they are (the muscular endurance, the legs muscular power, flexibility, grace, correlation, steady balance, motor balance) also the percentages of improvement are between (14.87: 36.85%). This result agrees with Hebbel study (2000), Amr Mohamed Ali (2001) and Abo Alwafa Ahmed Mahmoud (2009) that Hill exercises have a positive influence of the suggested training units, that is positive. The study results agree with what Abo Alala Ahmed Abd Elfatah pointed (1997) that the modern training tends to

specification and concentration on the professional performance demands in the sport activity. So the size of the exercises has increased to prepare the training plans.

He also added that the more increase in using the in traditional methods, the more benefit from the functional potentialities, such as the modern sets, and training up heights for increasing the muscular power level.

Also Hill exercises are effective method for building the aerobic energy and developing power through downhill. They are considered one of the best ways of resistance exercises by using the body weight.

Many scientists see that Hill exercises help strengthen the muscles, tendons and joints and allow these tissues work more with less fatigue, so we expect much improvement in the muscular power and speed. From table (4) results there are in corporeal differences in the level .05 for the side of post measurement of the experimental group in physiological efficiency factors under research. The percentages of improvement are between (2.83% , 34.44%).

This result agrees with Dick and cavanagh study (1997), Amr Mohamed Ali (2001), Mohamed hassan Mohamed (2005) that Hill exercises have a positive influence on some physiological factors.

The research relates that denotation of the experimental group to the suggested Hill exercises as they have a positive influence. The extra press of these exercises requires more effort so we should have the productive energy systems work, that helps the best consumption of oxygen and improves the muscular – nerve adaptation. Also Hill exercises increase the aerobic capacity that helps using less oxygen. These exercises are good training of the blood vessels, they help improving the size of oxygen that body gets from max. Heart beat rate. It is the max. Oxygen consumption rate that help body make the best use of oxygen.

Hill exercises influence the body especially in the physical factors. The body efficiency is the individual ability to speedy preparation and adaptation of the body to meet the physical loads in training or in games, which

improves the curriculum – breathing system. The result is saving effort and improving the physical performance.

It was observed from table (4) that there are incorporeal differences in level .05 between pre and post measurements of the experimental group in the level of performance the total actions in gymnastics under research, for the side of the post- measurement also the percentages of improvement (57.26%).

This result agrees with Do McKenzie's study (2008), Allan Hahn (2008), Safaa Saleh Hussien (2008), Abo Alwafaa Ahmed Mohamed (2009) that Hill exercises have a positive influence on the skill factors. The researcher relates this denotation of the experimental group to the suggested training units that have a positive influence. The results of this study agree with Benj (2002) who points that hill exercises have an important role in developing the skill and physical features and reinforcing some basic skills and the speed performance.

So the improvement in the physical factors which lead

to develop the skill performance in the proficiency factors under research in an effective way. That agrees with the study results of Esam Elden Abd Elfattah (2009), there is a strong correlation between the physical potentialities and the proficiency performance level. The individual can not perform the basic skills perfectly in the activity in the case of lacking the motor potentialities of this activity.

From the pervious, notice the rightness of the first hypothesis that says: "there are statistically differences between the pre and post measurements of the experimental group in the physical factors, the physiological efficiency, and the performance of total actions in gymnastics under research, for the side of the post – measurements.

From table (5) we notice there are no statistically difference in the level .05 between the pre and post measurements of the controlled group in factors (legs muscular power, flexibility, grace, correlation, steady balance, motor balance). There are statistically differences in the

muscular endurance for the side of the post- measurement.

The percentages of improvement in the physical factors are between (3.14%, 24.75%). The researcher sees that improvement is not denoting statistically as practice of gymnastics needs these elements.

Practice gymnastics needs these elements in a very big degree. The muscular endurance is in standing for a long time in the case of medium muscular tension that requires muscular endurance in the shoulders and legs muscles. Also from table (5) we notice there are not statistically difference in the level .05 between the pre and post measurements in the physiological proficiency factors (the vital capacity, max. Oxygen consumption, pulmonary Air).

There are statistically differences in factors of heart beat rate, breathing rate, and performance of total actions in gymnastics under research.

The percentages of improvement are between (1.04%, 7.05%). The researcher relates that improvement in heart beat rate, breathing rate to the traditional

program as the pulse rate expresses the training case which appears in the relationship between the high pulse rate during the training, and the lower pulse rate during the recovery period.

Abo Alala Abd Elfattah and Mohamed Sobhy Hassaneen (1997) refer to the importance of pulse rate measure in the sports field as it connects to many physiological functions which the training can not measure them in the field. Beat of heart connects to max. Oxygen consumption level. The more heart beats, the more oxygen used.

Concerning the factors (vital capacity, max. oxygen consumption, pulmonary Air) there are not statistically differences in the level .05 because.

The researcher sees Hill exercises help with developing the physiological factors in short period of time, but it needs more time in the traditional program.

From table (5) we notice also there are incorporeal differences between the pre and post measurements in the performance level of total actions in gymnastics under

research, for the side of the post – measurement. The percentages of improvement are (16.56%). The researcher relates this little improvement of the controlled group to not practice the hill exercises for these elements are not developed. This agrees with Mohamed shehata and Mohamed Bereka (1995) that the physical characteristics are what enable the sports individual to do the kinematic skills (P. 16) of the sports activity, so the individual can reach the universal standard.

From table (6) results, there are denoting statistic differences in the level 05 between the two post – measurements of the two groups; the experimental and the controlled, in the physical factors, the physiological proficiency, and the performance of total actions in gymnastics under research, for the side of the experimental group as "T" value that measured is higher than "T" tabled value in the level 0.05 in all the physical factors, the physiological efficiency, and the performance of total actions in gymnastics under research. The researcher relates this improvement to the

suggested training units which contain Hill exercises as they help to develop the muscular power especially in the lower lips muscles and reinforce the muscles and speed, and the endurance power, improving the maximum power and reinforce the knee tendons, the leg, Ankle tendon and thigh joint. They enable the right usage of arms through the push stage and support the feet. This ensures the percentage of improvement in the physical aspect between the two groups; the experimental and controlled, they are between (8.19%, 72.08%), for the side of the experimental group.

From table (6) we also notice there are denoting statistical differences between the two post – measurements of the two groups; the experimental and the controlled, in all physiological proficiency factors, for the side of the experimental group. The researcher relates this improvement to the suggested training units which contain the Hill exercises as they improve the work of heart and blood vessels and protect the lower lips muscles and increase the aerobic enzymes which are

chemical substances that allow the muscles to work efficiently. Hill exercises improve the size of oxygen which the body gets by max. Heart rate that is the max. Oxygen consumption that helps the body using the oxygen efficiently. The researcher relates this improvement to the kind of the used exercises in the training units as they used Hill short exercises which improve the adenosine, tri-phosphate, and creatin – phosphate energy system. They improve the energy system of muscles and genes that improve the muscular – nerve adaptation and increase the vital capacity and use less oxygen in the longer distances. They improve the aerobic capacity and the blood vessels. There are differences in the improvement (P. 17) percentages (1.5% , 32.32%), for the side of the experimental group.

These results agree with the study results of Amr Mohamed Ali (2001) and Waleed Mohamed Hadya (2005) that there are denoting statistical differences between the post – measurements of the two research groups; the experimental and the controlled, in the functional

status factors, for the side of the experimental group.

From table (6) also we notice there are denoting statistic differences between the post – measurements for the two groups; the experimental and the controlled, in the performance level of actions in gymnastics under research, for the side of the experimental group. "T" value counted is more than "T" tabled value in the level 0.05 in all skill factors under research. The researcher relates this improvement to the physical improvement. This is ensured by the differences between the levels of improvement in the level of the proficiency performance between the two groups; the experimental and the controlled, they are (34.48%), for the side of the experimental group. This agrees with Abo Alala Ahmed Abd El Fattah (1999) that the sports training is the main part of preparing the athlete as it is the educational physical operation that uses the physical exercises in order to develop the characteristics of the athlete, to achieve the highest level in the sports activities.

Esam Elden Abd El Khaleq (2005) refers to preparing the

individual physically to meet the demands of the sports activity is the duty of the training operation thus makes it advances and have the individual reach the highest levels in the practiced activity. Hill exercises also play an important role in developing the physical and skill features and reinforce the basic skills and speed.

From the previous, we prove the correction of the third hypothesis, which says: "There are denoting statistics differences between the two post – measurements of the two groups, the experimental and the controlled, in the physical factors, physiological efficiency, and performance of total actions in gymnastics under research, for the side of the experimental group."

The Outcomes and Recommendations:

First: the Outcomes:

1- Hill suggested exercises have a positive influence on the physical factors which contain (endurance, legs muscular power, flexibility, grace, correlation, steady balance, motor balance).

2- Hill suggested exercises have a positive

influence on the physiological efficiency which contain (Heart beat rate, pulmonary air, max. Oxygen consumption, vital capacity, breathing rate).

3- Using Hill exercises lead to improve the performance of total actions in gymnastics under research.

4- The excel of the experimental group to the controlled group in all physical factors, physiological proficiency, and the performance of all action in gymnastics under research.

Second: The Recommendations:

1- Hill exercises should be used in training programs for the beginners in gymnastics for increasing the physical and physiological efficiency.

2- We should use some modern exercises such as Hill exercises when we do the physical preparation in gymnastics for the beginners.

3- The gymnastics trainers should use Hill exercises for developing the performance of all actions in gymnastics under research.

4- The workers in the sports field should use Hill exercises in developing some physical and functional status

in the different sports activities.

Arabic references:

1- **Abo Alala Ahmed Abd El Fatah (1999):** Biology of sport and Health of the athlete, Dar El Fekr Alaraby, Cairo.

2- **Abo Alala Ahmed Abd El Fatah (1997):** The sports Training, the physiological bases Dar El Fekr Alaraby, Cairo.

3- **Abo Alala Ahmed Abd El Fatah, Mohamed Sobhy Hassaneen (1997):** Physiology and Morphology of sport, Methods of measurement and Assessment, Dar El Fekr Alaraby, Cairo.

4- **Abo El Wafa Ahmed Mahmoud (2009):** The Influence of some training methods on developing some physical characteristics and the skill performance for taykondo players, master message, faculty of physical Education for males, Helwan University.

5- **Adel Saad Shinoda, Samya Farghal Mansour (1999):** The Artistic Gymanastic: Idioms – Applications, Moltaka El Fekr, Alexandria.

6- **Bahaa El Den Ibrahim Salama (2000):** Physiology of sport and the

physical performance (blood lactics), Dar El Fekr Alaraby, Cairo.

7- **Saad Kamal Taha (2005):** Sport and the basis of Biology, Almaady press, second edition, Cairo.

8- **(p. 19): Safaa Saleh Hussien (2008):** Hill exercises influences and speed stage on developing some factors connected to actual female fighting players in karate, faculty of physical education for females, Zagazig university.

9- **Esam El den Abd El Fatah Abd El Fatah (2009):** the influence of training program of some motor skills on developing somebasic legs skills for the defencers, faculty of physical education, Tanta university.

10- **Esam El den Abd El Khaleq (2005):** the sports training, theories and applications, nine Edition, dar El Maaref, Cairo.

11- **Ali Mohamed Gala Elden (2002):** the physiological basis for the motor activities, Book printing centre, Cairo.

12- **Amr Mohamed Ali Khalil (2001):** the Influence of using suggested training program for developing the

circulum – breathing endurance for the walking competitors, master message, faculty of physical education for males, Helwan university.

13- **Ewwes Elgebaly (2001):** the sports training, theory and application, second edition, GMC centre, Cairo.

14- **Mohamed Ibrahim shehata, Mohamed Gaber Bereka (1995):** the body measurements and the inematic performance Test, El Maref centre, Alexandria.

15- **Mohamed Hassan Mohamed Khatab (2005):** the Influence of training on heights for football players, faculty of physical education, El mansoura university.

16- **Mohamed sobhy Hassaneen (2001):** Measurement and Assessment in physical Education, part one, third edition, Dar El Fekr Al Araby, Cairo.

17- **Nahed Khairy Fayad, Nadia Abd El Kader Ahmed, Ibrahim Saad Zaghlol (2000):** Female gymnastics, G.M.S centre, Benha, kalyobia governorate.

18- **Waleed Mohamed Hadeea (2005):** the Influence of suggested training program for increasing the physical and functional efficiency, faculty of

physical Education, Alexandria university.

Foreign references:

19- **Allan Hahn, (2008):** The effect of training cardamom (Hill) on the components of the blood and the level of performance for runners, PhD, Australian Institute of Sport, Canberra, Australia.

20- **Bengt Saltin (2002):** Everything you need to know about hill training website copyright runner's world.

21- **Benj Ann Bloom, S., (2001):** Evaluation to improve learning me. Grow hill book company, New York.

22- **Bill Rodgers, Pete Pfitzinger, Scott Douglas (2002):** Road Racing For Serious Runners, Published Human Kinetics.

23- **Brian White (2006):** Why hill training, The Coach, Issue 16.

24- **Dick, Cavanagh (1998):** An explanation of the upward drift in oxygen uptake during prolonged sub-maximal downhill running, medicine and science in sports and exercise (Indianapolis) 19 (3), June.

25- **Don McKenzie, (2008):** The effect of training cardamom (Hill) on the level of performance as compared to training at sea level, PhD, The

University of British Columbia, Vancouver, Canada.

26- **Hebbel (2000):** Effects of hill running an endurance and muscle strength, microform publications, university of Oregon, Eugene, Ore.

27- **Holcamb, W.R. Lander, Erut R.M and Wilson, G.D., (2006):** The effectiveness of modified plyometric program An power and vertical jump low and of strength and conditioning.

28- **Johnson, W.R. (2004):** science and medicine of exercise and sports 2nd. Hyper, new York , London p 279.

29- **Rop Sleamaker, Ray Browning (2006):** Serious Training for Endurance Athletes, Published Human Kinetics.

Internet resorces:

30- [http://facuity.ksu.edu.s a/hazaa/doclib20/forms/alltem s.aspx](http://facuity.ksu.edu.sa/hazaa/doclib20/forms/alltem s.aspx)

31- [http://munfitnessblog.c om/why.should](http://munfitnessblog.com/why.should)

32- <http://www.aboregroun dpoolcoversshop.com>

33- <http://www.brianmac.c o.uk/hilltrain.htm>

34- <http://www.mamasheal th.com/ran/httain.asp>

35- <http://www.runnerswor ld.co.uk/news/artical.asp>