

The effect of using the rubber ropes on some physical physiological variables and the digital level in 100m back- race

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The research introduction and problem:

The swimming sport is one of the sports that depend on the technical and skillful performance, the level of the fitness and the efficiency of some physical- physiological variables that help in achieving the digital levels which are ignored by a lot of the specialists in the swimming field, wither during the selection ,mite training or during the competitions.

Accordingly, we must focus on these aspects during training the juniors because they qualify them to reach the highest levels. This cant not be fulfilled without using proper training means for upgrading these aspects, which in its turn will help to upgrade the swimmer's level and to predict the progress of his digital level. Reaching the swimmers to the highest levels and achieving the success depend on scientific principals that are

represented in the methods of preparation, whether physically, physiologically or psychologically.

All studies conducted by Olson Kevin (1994) (15), Lidya Morees (1995) (5), Ahmed Mustafa and Emad Noufal (1995) (9), Mohammed Ameen (2000) (8), Hisaed and others (2000) (6), frank and others (2002) (7), Heba Saied (2004) (5), Fayza Mohammed (2006) (6) and Rabab Hafez (2006) (16) have agreed that using the resistance exercises have a positive effect on developing the physical abilities in comparison to the traditional exercises, which will improve the level of the skillful performance and will be reflected on improving the digital level.

Through the researcher's work in teaching and training the swimming sport and after studying the previous studies in

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the field of the sports activities in general, she (the researcher) noted the importance of using the resistance exercises, in particular using the rubber ropes, due to their positive effects in improving some physical and physiological variables which contribute in improving the skillful and the digital performance in the swimming. Moreover, the researcher has noted the rarity of researches in the swimming field and the rarity of using the rubber ropes in the swimming field, accordingly, and from this point the researcher has thought to conduct this study to recognize the effect of using the rubber ropes and to recognize their effect on some physical and physiological variables (the pulse at the rest, the pulse after exerting an effort and the vital capacity) and the digital level in 100m back race.

The research aims

This research aims to recognize the effect of using the rubber ropes on some physical and physiological variables (the pulse at the rest, the pulse after exerting an effort and the vital capacity)

and the digital level in 100m back race :

The research hypothesis

1- There are differences with a statistical significance between the pre- and after measurements for the experimental group regarding some physical and physiological variables (the pulse at the rest, the pulse after exerting an effort and the vital capacity) and the digital level in 100m back race in the direction of after measurement

2- There are differences with a statistical significance between the pre- and after measurements for control group regarding some physical and physiological variables (the pulse at the rest, the pulse after exerting an effort and the vital capacity) and the digital level in 100m back race in the direction of after measurement.

3- There are differences with a statistical significance between the experimental and the control groups of the after-measurement regarding some physical and physiological variables (the pulse at the rest, the pulse after exerting an effort and the vital capacity) and the digital level in 100m

back race in the direction of experimental group.

The research procedures:

The research methodology:

The researcher has used the experimental methodology through designing two groups, experimental and control groups, by the way of the pre-and after measurement for each group.

The sample of the research:

The sample of the research was chosen intentionally for ages from 14 to 15 years. The number of the sample reached (24) female swimmers at the Army Vanguard's Club who are registered in the Egyptian association for swimming.

Tools of gathering the data:

- 1- Al Restameter set for measuring the length by centimeter.
- 2- Medical scale for measuring the weight by kilogram.
- 3- Stop watch.
- 4- Ropes with 75cm long.
- 5- Sperometer set for measuring the vital capacity.
- 6- A digital pressure set for measuring the pulse.

Evaluating the digital level for 100m swimming on back:

The researcher has conducted 100 m race of swimming on back for both the experimental and control groups and recorded the digital level achieved by each group with the same way of the legal races for the nearest 1\100 of the second. A committee consists of (3) teaching staff specialized in swimming at the faculty through a list for registering the swimmers' data, the research sample.

The proposed training program by suing the rubber ropes:

The content of the training program by using the rubber ropes was set through reading and studying the specialized scientific references as well as the concerned studies (1) (2) (3) (4) (5) (6) (7) (8) (9) (11) (15), in addition to the experts' opinions according to the following:

Table (1)
distributing the power of the rubber ropes on the period of
the proposed training program

The statistical coefficients	Power of load	The size of the load				Time of performance	Time of the rest
		The groups		The repetitions			
		from	to	From	To		
The week							
The first	60%	6	8	15	-	12Minute	1Minute
The second	60%	6	8	15	-	12Minute	1Minute
The third	65%	5	7	16	-	12Minute	1Minute
The fourth	70%	5	7	16	20	12Minute	1Minute
The fifth	75%	3	-	14	-	12Minute	2Minute
The sixth	80%	3	-	12	-	12Minute	2Minute
The seventh	85%	3	-	10	12	12Minute	2Minute
The eighth	90%	3	-	8	10	12Minute	2Minute

The content of the training program:

The researcher has defined the content of the training program by using the rubber ropes exercises after studying a lot of scientific references and the previous studies in the field of the training with the resistors (the rubber ropes) (2) (5) (6) (11) (15), and it was presented to a group of experts in the research field for defining the most suitable exercises with the rubber ropes with considering its suitability for the level of the sample's individuals. The content of the program has

been amended and then it has been applied to the individuals of the experimental group.

The time division for the training program:

Through using the experts' opinions, the researcher has divided the program into (24) training units for (8) weeks, namely three training units a week. The time of the daily training unit is (45) minutes. Table (2) shows the time distribution for the daily training unit of the research's two groups.

**Table (2)
the time distribution for the daily training unit of the
research's two groups**

Time	The experimental group	the control group
5 minutes	The physical preparation (extension and flexibility exercises)	The physical preparation (extension and flexibility exercises)
15 minutes	The resistance exercises by using the rubber ropes for the two legs, arms and the torso.	Physical preparation that relates to the digital level 100m swimming on back.
20 minutes	The training on the digital level in 100m swimming on back	The training on the digital level in 100m swimming on back
5 minutes	Rest	Rest

Table (3)

A model of a weekly training unit for the experimental group

The unit parts	The time	The used exercises	The size of the load		The rest period between the groups
			The group	Repetition	
The physical adaptation	5 minutes	1- The various running, forward, backward, on the side of the pool.	4	8	1
		2- (Standing), bending the torso towards the right (1-4), then, towards the left (5-8), the pressure forwards (1-4) and backwards (5-8) with repetition.	4	8	1
		3- (Standing with opening the arms upwards), pressing the torso downward to the right (1-2), then pressing towards the left (3-4) and upwards (5-8), the exercise will be repeated.	4	8	1
		5- (Standing with fixing the waist), turn the torso backward to the right (1-4) then to the left (5-8) with repeating.	4	8	1
		6- (Sitting with your legs opposite to each other), pressing the knees downwards with the help of your hands (1-8) with repeating.	4	8	1

Follow Table (3)

A model of a weekly training unit for the experimental group

The unit	The	The used exercises	The size of the	The rest
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parts	time		load		period between the groups
			The group	Repetition	
The exercise of the rubber ropes for the two arms:					
The physical preparation	15 minutes	1- (Standing) with opening the arms with the chest width, then draw the rubber rope aside to extend the arms aside with repeating the exercise.	6	15	1
		2- (The same previous position), bind the arms with holding the rope's ends by one hand and pulling the two arms aside. The exercise must be repeated.	8	15	1
		The exercise of the rubber ropes for the two legs:			
		1- (Standing), the rubber rope is under the two foot, hold the rope's ends with your hands behind your body, then, make a front scale with lifting the two arms aside. The rope pulling must be repeated continuously.	6	15	1
		2- (Lying), the legs upwards with right angle, the rubber rope is a circle around the neck with bending the heels under the legs. The pulling must be with lowering the two legs with the exchange, the exercise must be repeated.	6	15	1
The main part	20 minutes	<ul style="list-style-type: none"> Swimming on the back by the trainer Swimming on the back by a distinguished swimmer. The female swimmers are divided into two groups and the trainers watches the training performed by the swimmers. Focusing on the right and correct performance. Focusing on the points of weakness in the unsuccessful performance if the swimming girl didn't perform the training correctly. 	20 minutes		
The final	5 minutes	1- Performing some exercises of the fixed extension. 2- (Standing), swing the arms slowly with inspiration and exhalation.	5 minutes		

Presenting and discussing the results:

First: presenting the results:

Table (4)

The significance of the differences between the pre and after measurements of the experimental group in some physical and physiological variables and the digital level in 100m swimming on back (N= 12)

The test	measuring unit	The pre measurement		The after-measurement		The difference between the two means	Calculated value of "T"
		X	Sx	X	Sx		
The board jump	Meter	2.10	0.69	2.75	2.75	0.65	2.95*
Pushing a medical ball	Meter	2.25	0.32	3.98	3.98	1.73	12.36*
Zigzag running	Second	5.92	0.67	3.25	3.25	2.67	9.46*
The pulse on the rest	Pulse / min	88.75	8.31	87.54	87.54	1.21	0.38
The pulse after an effort	Pulse / min	98.15	6.80	120.14	120.14	21.99	7.99*
The vital capacity	liter	2.61	0.60	3.21	3.21	0.60	3.00*
The digital level in 100m swimming on back	Degree	107.34	0.61	101.43	101.43	5.91	17.91*

The table value of (T) at the statistical significance $0.05 = 2.201$.

Table (4) shows that there are differences with a statistical significance between the pre and after measurements of the experimental group in some physical and physiological variables and the digital level

in 100m swimming on back, since the calculated value of (T) is higher than the table value of (T) at the significance level 0.05 for the interest of the after- measurement.

Table (5)
The significance of the differences between the pre and after measurements of the control group in some physical and physiological variables and the digital level in 100m swimming on back (N= 12)

The test	measuring unit	The pre measurement		The after-measurement		The difference between the two means	Calculated value of "T"
		X	Sx	X	Sx		
The board jump	Meter	2.95*	2.95*	2.30	0.11	0.21	2.63*
Pushing a medical ball	Meter	12.36*	12.36*	2.84	0.30	0.60	4.29*
Zigzag running	Second	9.46*	9.46*	4.64	0.55	1.30	4.33*
The pulse on the rest	Pulse / min	0.38	0.38	89.36	7.68	0.63	0.18
The pulse after an effort	Pulse / min	7.99*	7.99*	135.02	8.94	36.86	10.91*
The vital capacity	liter	3.00*	3.00*	2.70	0.54	0.07	0.29
The digital level in 100m swimming on back	Degree	17.91*	17.91*	105.40	1.10	1.96	3.77*

The table value of (T) at the statistical significance 0.05= 2.201
 Table (5) shows that there are differences with a statistical significance between the pre and after measurements of the control group in some physical and physiological variables and the digital level in 100m swimming on back, since the calculated value of (T) is higher than the table value of (T) at the significance level 0.05 for the interest of the after- measurement.

Table (6)
The rate of difference between the after- measurement and the pre measurement of the experimental and the control group in some physical and physiological variables and the digital level in 100 m swimming on back

The statistical coefficients The variables	The experimental group			The control group			Difference Groups between the two	The direction of each group
	pre	After	Rate of change%	Pre	After	Rate of change		
The board jump	2.10	2.75	30.95%	2.09	2.30	10.05%	20.90%	Experimental
Pushing a medical ball	2.25	3.98	76.89%	2.24	2.84	26.79%	50.10%	Experimental
Zigzag running	5.92	3.25	45.10%	5.94	4.64	12.89%	32.21%	Experimental
The pulse on the rest	88.75	87.54	1.36%	88.73	89.36	0.71%	0.65%	Experimental
The pulse after an effort	98.15	120.14	22.40%	98.16	135.02	37.55%	15.15%	Control
The vital capacity	2.61	3.21	22.99%	2.63	2.70	2.66%	20.33%	Experimental
The digital level in 100m swimming on back	107.34	101.43	80.52%	107.36	105.40	26.63%	53.89%	Experimental

The results in table (7) show the superiority of the individuals of the experiential over the control group in the rate of the after- measurement change as follows:

First: The physical variables:

The rate of the change ranged from (30.95%: 76.89%) for the experimental group, whereas the rate of change ranged from (10.05 to 26.79) for the control group with a

difference ranged from (20.90% to 50.10%).

Second: the physiological changes:

The rate of the change ranged from (10.36%: 22.99%) for the experimental group, whereas the rate of change ranged from (0.71 to 37.55) for the control group with a difference ranged from (0.65% to 20.33%).

Third: in the digital level in 100m swimming on back:

The rate of change reached (80.52%) for the experimental group. As for the control group, the rate of change reached (26.63%) with a difference reached (53.89%).

Second: discussing the results:

Discussing the results of the first hypothesis:

The results of table (4) show that there are differences with a statistical significance between the pre and after measurements of the experimental group in some physical and physiological variables and the digital level in 100m swimming on back for the interest of the after-measurement.

The researcher attributes these results to using the rubber ropes in the training for the swimmers of the experimental group, in which the rules of the strengthening the training ropes and gradualism from the easy to the difficult level were considered in order to be appropriate for the research sample regarding the physical and technical level. Moreover, the variety of trainings for the different working muscles (the legs- the

arms- the Trunk) in swimming on back has led to the development of some physical and physiological variables which contributes strongly in upgrading the digital level in 100 m swimming on the back, which in its turn led to the improvement of some physical and physiological variables and the digital level in 100 m swimming on the back.

This results agrees to the results of the studies conducted by (2), (11) (17) (16) (2004) (15) (6) (3) which indicated that using the resistance exercise affect positively on the rate of improving the physical variables of the players in different sports. The results of these studies also indicated that the development of the attention aspects and the speed of the motor response affect positively on developing the level of the technical and skillful performance in different sports activities.

This result also agrees to the results of the studies conducted by Olson Kevin (1994) (15), Lydia Morese (1995) (10), Heba Sayed (2004) (15) and Rabab Hafez (2006) (3) which indicated to the effect of the rubber ropes

exercise on developing the physical and skillful variables.

In this regard, both Mohammed Sobhey Hassanine and Ahmed Kessra (1998) indicated to the importance of developing the different abilities as a basic component for showing many of the other physical features in addition to showing the skillful performance in good way. This can not be achieved but through the exercises of the rubber ropes which develop the muscular ability (13: 83).

Thus, we reach the validity of the first hypothesis which indicates that there are differences with a statistical significance between the pre and after measurements of the experimental group in some physical and physiological variables and the digital level in 100m swimming on back for the interest of the after-measurement.

Discussing the results of the second hypothesis: The results in table (5) show that there are differences with a statistical significance between the pre and after measurements of the control group in some physical and physiological variables and the digital level in 100m swimming on back for

the interest of the after-measurement.

The researcher attributes these results that the traditional exercises as well as the concerning the trainers to learn the swimmers to upgrade the physical and physiological variables as well as the digital level. Moreover, providing the verbal reinforcement and correcting the technical errors immediately on its occurrence will lead to a simple improvement in the digital level in 100m swimming on back.

This agrees to the studies conducted by Mohammed Sobhy Hassnien and Ahmed Kessra (1998) which indicated that during the preparation period, all basic duties which guarantee the success will be achieved, since they develop the physical features and the motor experiences (8: 88).

Thus, we reach the validity of the second hypothesis which indicates that there are differences with a statistical significance between the pre and after measurements of the control group in some physical and physiological variables and the digital level in 100m swimming on back for

the interest of the after-measurement.

Table (7) also shows show the superiority of the individuals of the experiential over the control group in the rate of the after- measurement change as follows:

First: The physical variables:

The rate of the change ranged from (30.95%: 76.89%) for the experimental group, whereas the rate of change ranged from (10.05 to 26.79) for the control group with a difference ranged from (20.90% to 50.10%).

Second: the physiological changes:

The rate of the change ranged from (10.36%: 22.99%) for the experimental group, whereas the rate of change ranged from (0.71 to 37.55) for the control group with a difference ranged from (0.65% to 20.33%).

Third: in the digital level in 100m swimming on back:

The rate of change reached (80.52%) for the experimental group. As for the control group, the rate of change reached (26.63%) with a difference reached (53.89%). The researcher attributes these results to the efficiency of the training program by using the

exercises of the rubber ropes in the way that is proper to the nature of the technical performance in the swimming. On the other hand, the control group used the training program which depends on the verbal reinforcement correcting the mistakes immediately by the trainer. It also depends on repeating the performance and concerning with using various methods in the training and depending on the traditional physical exercise in the physical preparation.

These results agree to the results of the studies conducted by (1), (11) (3), (15), (6) (3) which indicated that using the resistance exercises have a positive effect on developing the physical abilities(the muscular ability of the two legs- arms- the flexibility- the nimbleness) in comparison to the traditional exercises, which will improve the level of the skillful performance and will be reflected on improving the digital level.

This result also agrees to results of the studies conducted by Olson Kevin (1994) (18), Lidya Morees (1995) (5), Ahmed Mustafa and Emad Noufal (1995) (3), Mohammed

Ameen (2000) (11), Hisaed and others (2000) (3), frank and others (2002) (3), Heba Saied (2004) (15), Fayza Mohammed (2006) (6) and Rabab Hafez (2006) (3) which indicated that using the resistance exercises have a positive effect on developing muscular ability of the two legs and arms and accordingly, improves the level of performance.

In this regard, both Mohammed Sobhey Hassanine and Ahmed Ibrahim (2015) indicated to the importance of developing the different abilities as a basic component for showing many of the other physical features in addition to showing the skillful performance in good way. This can not be achieved but through the exercises of the rubber ropes which develop the muscular ability (2: 83).

Thus, we reached the validity of the third hypothesis which indicates that there are differences with statistical differences between the experimental and the control groups in some physical and physiological and the digital level in 100 m swimming on the back for the interest of the experimental group.

The conclusions and recommendations:

First: the conclusions:

In the light of the aims, hypotheses and procedures of the research and discussing the results, the researcher reached the following conclusions:

1- Using the exercise of the rubber ropes improves some physical and physiological variables and the digital level in 100m swimming on the back.

2- The program applied by the control group improves some physical and physiological variables and the digital level in 100 swimming on the back.

3- The superiority of the experimental group over the control group in some physical and physiological variables and the digital level in 100 swimming on the back.

Second: the recommendations:

In the light of the research sample and its results, the researcher recommends with the following:

1- Paying attention to the usage of the rubber ropes exercises for developing the physical and physiological variables and the digital level in 100 swimming on the back.

2- Increasing the focus on developing some physical and physiological variables and the digital level in 100 swimming on the back.

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