

The effectiveness of the Hydro Hip tool on the improvement of the arms movement and Numerical level of breaststroke

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Introduction and Research Problem:

In recent years, swimming in general and breast stroke in particular has seen remarkable progress in the performance form to reach the optimum level to achieve the highest digital level. Breaststroke is the only swim in which the arms have an effective role that may be equivalent to the legs effect on moving the body forward. (1: 45) (7: 24) (9)

Breaststroke begins with placing the body flowing and horizontally on the surface of the water, the arms and legs are extended and the head is slightly raised and looking forward without contraction in the neck's muscles. The legs are fully kept under the surface of the water and shoulders at the water level. The movement starts with similar legs kick and that's done by bending the joints of the knees and thighs at 45 degrees angle with the spine, pulling the heels up near the backside and the instep direction outwards, then the feet are pushed firmly and quickly outwards while joining the legs together at the end of the push until the legs are fully horizontal and extended. (7: 24) (9)

Arm movements are divided into three stages (outsweep stage, insweep stage, recovery stage) the arms movement starts with opening the arms and directing the palm of the hands slightly outwards and the fingers straightened to the forearm level and catching the water at a depth between 15-20 cm, this situation doesn't generate any pushing forward of the body but prepares the body for less resistance during swimming and increases the ability to move forward easily. (1: 45) (19)(17) (21)

Mohamed Aly El Qot (2002) mentions that the swimmer's speed is produced from the exchange between pushing strength and resistance strength as lifting forces during the various stages of the full arms cycle, the swimmer has to reach the point where he can catch the water in an effective way, so that he can apply the strength resulting from the shoulders muscles to move the body forward effectively. (7:24)

The arms continue to open aside and when they surpass the width of the shoulders, the insweep begins; where arms pulling occur, this is where the forward push generation begins by moving the arms back through bending the elbows upward to allow for a change in the arms direction movement backwards and with the help of the palm and the forearm pulling backwards can

be used to generate a forward force, bearing in mind that the pull movement is quick and short, and the gliding occurring to the body depends on the distance and speed of the arms movement. (19)(17) (21)

The pulling efficiency represented in (the efficiency of catch in attempt to reduce resistance and pulling to increase pushing force methods) is considered among the important factors that increase the swimmer's speed. Eenest W.Maglisco (2003) pointed out that the start point to enhance the swimmer speed depends on the pull efficiency while maintaining the pulls average rate. This agrees with "Khaled Salah El Din Mohamed" (2002), who stated that the pull efficiency is among the factors affecting the swimmer's speed. (11: 705) (5) Abo El Ella Abd El Fattah and Hazem Hussein Salem (2011) mentions that the skill performance mechanism of the swimming method is one of the most important factors affecting the swimmer's speed and digital level and the increase of this speed comes about 70% through the good performance and compatibility during the movements of the arms and the ability of the swimmer to reduce the resistances that the body gets exposed to during performing in the water, and 30% to the ability and the swimmer's training condition (1: 49)

This is followed by the recovery phase, when the hands are lining with the shoulders, the arms are joined together by bringing them closer to one another in the body's direction and upwards near the surface of the water, then extend the arms by cutting through the water with both hands together forward above the water surface at full speed and as far as possible. (1: 45) (19) (17) (21)

Mohamed Ali Al Qot (2002) stated that the overall shape of the arms in the breaststroke implies that the hands are moving backwards at the end of the arm cycle, but in fact it doesn't actually move backwards, but only forward, inward and outward, where the swimmer's body moves under the influence of lifting force that can produced by the hands in the water. This force is the outcome of resistance strength and lifting force; where the resistance strength works inwards, while lifting force in the direction of the swimmer's movement hence moving the body forward. (7:25)

In breaststroke the swimmer takes one breath after each arms and legs cycle; where the chin is pushed forward, which works on lifting the shoulders upwards while maintaining the smooth position of the body, helping the mouth exiting the water inhaling strongly and deeply during the pull performance. This is followed by pulling the chin inwards to return the face in the water through extending the hands forward, then exhaling from the nose and mouth together. The swimmer must take in consideration the proper timing between the basic stages of both the arms and legs due to the difference in motor performance for them both; so that they are preformed consecutively, non-stop or cut until constant flow of movement occur. During pulling with arms stage, the legs start to bend ready to push, and during the arms gliding forward related period, the legs are extended backwards so that the body remains straightened and extended

directly under the water surface, taking in consideration the harmony of breathing with arms movement. (20)

The assistance tools represent an important part in improving the educational process in the motor skills education field in swimming and an important factor in the development of the swimmer's skill performance, especially for the youth stage, which is considered the first basis for enhancing the digital level to reach the higher levels and the basic pillars to attain future championships. These tools help to fully acquire the right movement, develop motor skills and achieve of a faster rate in the learning process and helps to build and develop swimmer's motor perception and enhance the performance specifications, and influence the learning speed. The assistance tools are one of the important factors in attracting learner's attention and agitate their interest and suspense, and works to create positive trends in work and enhance performance. It also works on saving teacher's time and effort, in addition to its role in helping the teacher diversify their teaching methods. The assistance tools is all that can be used from the available resources contributing significantly to the learner's acquisition of motor skills and mastering it. Emmet Hines (2008) points out that there are many new assistance tools in swimming training that the trainer can enhance performance through. (2) (6: 98) (9: 56) (10: 86).

The Hydro Hip is considered an important training tool used to give the swimmer prompt and early feedback on the correct arms movement effectively, it consist of two blades fixed to a belt on the chest that helps control the timing of the arms and body movement. The Hydro Hip tool is used in breaststroke by fixing the belt near the chest; the two blades should be on the body's sides under the arm, and while performing the arms movement. If the swimmer's performance is incorrect his arms will hit the tool's side blades, this means the elbows will fall down and pull away in a wrong manner, causing resistance increase and gliding forward hinder. When the swimmer masters the arms movement without touching the blades; it results in reducing the resistance and increased speed. The Hydro Hip can also be fixed by joining the two blades together in the middle of the chest, to urge the swimmer to touch the blades with the forearms together during the recovery movement. Therefore, Hydro Hip tool works on helping the swimmer on maintaining the correct timing of the arms movement, stabilizing and mastering the proper performance, and continues swimming with the same efficiency even after the removal of the tool. (12) (16) (14) (18)

Through the self-observation of the researchers in 15 of May club as supervisors of the field training course and observing the youth teams under 11 years they discovered that breaststroke is among the kind of swims that are difficult for young swimmers' to absorb its performance technique and easily apply it and most trainers overlook the exercises that require using the tools that helps young swimmers to correctly understand the movement and master it. This can result

in the existence of special errors in arms movement that are mostly presented in the exaggeration in opening the arms to the side during the pulling or not joining both arms together before the recovery move, which results in the movement hindering and increasing water resistance on the body therefore reducing the swimmer's speed. By scanning through previous studies, the researchers reached a study about "the effectiveness of educational program to enhance the torso angle in the breaststroke undulation using pool noodle tool". They also found studies that used the Hydro Hip tool that dealt with "Effectiveness of the Hip's rotational motion exercises using Hydro Hip tool on enhancing the level of front crawl stroke" and the other study was under the title of "Hip's rotational motion exercises using Hydro Hip tool on enhancing the performance level and timing of backstroke" (9) (3) (8)

Within the knowledge limits of the researchers, they didn't find studies that used the Hydro Hip tool to correct the arms movements' errors of the breaststroke. This prompted the researchers' to use the Hydro Hip tool in the breaststroke for youth U-11 and identifying the impact of these exercises on improving the arms movement and digital level. The importance of the Hydro Hip tool is presented in giving the swimmer a prompt and early feedback on the correct arms movement effectively as well as mastering and fixing this performance even after the removal of the tool and swimming without it.

Research aims:

The aim of the research is to identify the effect of the Hydro Hip on improving:

- Arms movements (50 m arms pulls number- 50 m arms movement timing- 50 m full cycles timing- Evaluate the arms movements' performance)
- Digital level of 50 m breaststroke.

Research Hypothesis:

1. The Hydro Hip tool has a positive effect on improving the arms movements of (50 m arms pulls number- 50 m arms movement timing- 50 m full cycles timing- Evaluate the arms movements' performance)
2. The Hydro Hip tool has a positive effect on the digital level of 50m breaststroke.

Research Terminologies:

Hydro Hip:

It is an important tool for training arms movement in breaststroke. It's a fin-shaped tool fixed on both sides of the chest, forcing the swimmer's arms not to return backwards, and helps joining the arms under the chest during the recovery period. Hence, it works on giving the swimmer the right performance feedback and therefore, improves the swim's efficiency and effectiveness and its best use is during the swimmer's short distance training



(procedural definition).

Research Procedures:

Research Methods:

The researchers used the experimental method, by using the experimental design of two groups; control and experimental by applying the pre and post measurements of both groups.

Research Community:

The research sample was selected in purposive way from 15 May club juniors.

Research Sample:

The total sample number of the study consisted of (36) juniors from those who have learned breaststroke and can perform arms and legs movements. A breaststroke performance test was done and (20) swimmers who performed the arms movement efficiently were excluded, so the sample became (36) swimmers with arms movements flaws and perform the legs movements efficiently. The sample was divided as follows; (12) swimmers for the pilot study, and (24) swimmers divided into (12) experimental group and (12) control group. The two groups underwent training to improve arms movement in breaststroke. The experimental group was trained with the Hydro Hip tool, and the control group underwent the same training without the tool.

Means of Sample Selection:

- Conduct a 50 m breaststroke test for all the junior swimmers in the club to evaluate their arms movements through evaluation form attachment () by a committee of three teaching staff members of the water sports training department to give a score on a scale up to (5) points. Attachment ()
- They selected swimmers with obvious flaws in arms movements in breaststroke.
- Swimmers who got less than 3 out of 5 points.
- Approval to participate in the experiment.

Research Sample Homogeneity:

The researchers conducted homogeneity between the research sample members in the following variables:

- Height, weight, age, fitness elements.
- Evaluate the arms movements' performance in breaststroke.
- Number of arms pulls, 50 m arms movements timing in breaststroke (the swimmers begin in the swimming pool, he starts swimming by pushing the wall with his feet, the swimmer then starts performing the arms movement with stabilizing the feet during floating, the trainer starts counting the arms pulls with the first pull until the swimmer finishes by touching the wall on the other side of the swimming pool.)
- 50 m full cycles timing.

Table (1) Arithmetic mean, standard deviation, and torsion coefficient

value for the variables of research sample (n=36)

No.	Variables	Measurement Units	Mean	SD	Mediator	Torsion coefficient	
1	Age	Year	10,023	0,000	10,00	-0,099	
2	Height	cm	138,00	1,800	139,00	-0,094	
3	Weight	Km	39,090	0,989	41,00	0,119	
4	Physical tests	Arms muscles strength	No.	0,863	0,863	10,00	-0,137
5		Abdominal muscles strength	No.	0,000	0,783	18,00	-0,043
6		Legs ability	Cm	140,07	2,220	140,00	0,334
7		Body flexibility	Cm	39,794	0,969	40,00	-0,393
8		Shoulder flexibility	Cm	39.19	1,094	39,00	-0,264
9		Legs flexibility	Cm	7.886	0,606	8,00	0,149
10	Skill tests	Evaluation of arm movement performance	Degree	1.677	0,470	2,000	-0,090
11		50 m arms pulls number	No.	73.735	3,470	74,00	-0,008
12		50 m arms movement timing	Min	1.376	0,681	1,390	0,102
13		50 m full cycle timing	Min	1.130	0,039	1,10	0,831-

Table (1) shows that the torsion coefficient of the variables is limited between (0.831 - 0.910) so the value is limited between (± 3) indicating the homogeneity of the study sample.

Research Sample Equivalence:

The researchers divided the research basic sample into two random groups each group contains (12) players aiming to find the equivalence between the experimental and control groups in the variables of the research sample, as shown in table (2).

Table (2) the significance difference between the experimental and control groups in the post measurement of the research variables

No.	Variables	Measurement Units	Experimental group N=12		Control group N=12		T	
			Mean	SD	Mean	SD		
1	Age	Year	10,023	0,016	10,467	0,016	0,304	
2	Height	cm	138,023	1,846	138,60	1,882	0,98	
3	Weight	Km	39,40	0,986	39,80	1,082	1,008	
4	Physical tests	Year	10,200	0,770	10,467	0,990	0,821	
5		Abdominal muscles strength	No.	17,93	0,799	18,13	0,743	0,710
6		Legs ability	Cm	140,067	2,120	141,133	1,306	1,303
7		Body flexibility	Cm	39,80	1,006	40,00	0,863	0,078

8		Shoulder flexibility	Cm	39,066	1,033	39,20	1,146	0,330
9		Legs flexibility	Cm	7,867	0,639	7,793	0,704	0,043
10	Skill tests	Evaluation of arm movement performance	Degree	1,667	0,490	1,700	0,402	0,432
11		50 m arms pulls number	No.	73,917	3,003	74,916	2,843	1,008
12		50 m arms movement timing	Min	1,378	0,078	1,389	0,770	1,062
13		50 m full cycle timing	Min	1,120	0,078	1,127	0,460	0,497

T value at a significant level (0.05) = 1.769

Table (2) shows that there are no statistically significant differences between the two groups, indicating the equivalence of the two groups in the research variables.

Tools and means of data collecting:

First: the applications:

- The researchers surveyed the experts' opinions and their names are shown in attachment (1) through a questionnaire on:
 - The most suitable physical tests for the research.
 - The most suitable skill tests that will be consistent with the research objectives.
 - Contents of proposed exercises using Hydro Hip tool. Attachment (3)
- Research samples tests registration form.

The experts' opinions reached the following:

- The physical tests agreed upon by the experts were selected by 80%. Attachment ()
- Arms movement performance test for breaststroke and accepting the swimmer that gets less than three points in performance assessment of the research sample. Attachment ()
- Agreement on training using the Hydro Hip tool to improve the arms movements.

Second: Equipment

- Restameter to measure length (for nearest cm).
- Weight scale; to measure weight (for nearest kg).
- Stop watch to measure the timing with seconds.
- Measure tape (cm).
- A ruler to measure flexibility.

Third: Tools used

- Hydro Hip tool: It's a fin-shaped tool fixed on both sides of the chest, forcing the swimmer's arms not to return backwards, hence, it works on

giving the swimmer the right performance feedback and therefore, improves the efficiency and effectiveness of breaststroke. Attachment ()

- Fins, lane ropes, legs fixer.

Fourth: Used tests

A. Physical tests:

- Push-Up tests to measure the arms muscles strength.
- Sit-up tests to measure the abdominal muscles strength.
- Long jump test to measure the legs strength.
- Shoulder joint flexibility test.
- Foot joint flexibility test.

B. Skills Tests:

- Evaluate the arms movement performance.
- 50 m Arms pulls number.
- Timing of the 50 m arms movement of breaststroke using a stopwatch for the nearest 1/100 sec.
- The timing of 50 m test for breaststroke full cycle by using a stopwatch for the nearest 1/100 sec.

The physical and skills tests were presented to the experts and their opinions reached the following:

- Selection of the physical tests that were agreed upon by 80% of the experts (attachment).
- Arms movement performance test for breaststroke and accepting the swimmer that gets less than three points out of 5 points in performance assessment of the research sample. Attachment (4)
- Agreement on training using the Hydro Hip tool to improve the arms movements. Attachment (5)

Scientific procedures of Physical Tests

The researchers applied the scientific procedures on the sample of the exploratory study as follows:

i. Validity:

The researchers used the validity of peripheral comparison method by applying physical tests on (12) players sample from (the research community) and outside the basic sample. The research sample results in the physical variables were arranged in ascending order and were divided into quartiles; the highest and lowest quadrants were compared to ensure that the tests were valid in what it was meant to measure as in Table (3).

Table (3) Validity coefficients for physical tests

No.	Variables	Measurement Units	High Quadrants		Low Quadrants		T
			Mean	SD	Mean	SD	
1	Arms muscles strength	No.	10,00	1,002	8,667	0,077	4,00
2	Abdominal muscles strength	No.	18,667	0,077	16,00	1,00	8,00

3	Legs ability	cm	144,33	1,028	137,00	1,00	6,102
4	Body flexibility	cm	40,001	1,002	37,303	1,028	8,00
5	Shoulder flexibility	cm	39,677	0,077	37,677	1,027	3,463
6	Legs flexibility	Cm	8,343	0,077	6,677	0,077	0,001

T value at a level (05) = 1.860

Table (3) shows that there is a significant difference between the high and low quadrants in favor of the high quadrant group in the entire physical tests understudy indicating the validity of the used tests.

ii. **Stability:** The researchers applied the physical tests and then re-applied them after a period of one week from the first application. Table (4) shows the stability coefficient.

Table (4) Stability coefficients for physical tests

No.	Variables	Measurement Units	First application		Second application		R
			Mean	SD	Mean	SD	
1	Arms muscles strength	No.	10,167	0,830	10,200	0,866	*,943
2	Abdominal muscles strength	No.	18,083	0,793	19,117	0,792	*,880
3	Legs ability	cm	140,41	2,101	140,67	2,103	*,978
4	Body flexibility	cm	39,702	1,000	39,700	0,866	*,821
5	Shoulder flexibility	cm	39,08	1,084	39,303	0,980	*,824
6	Legs flexibility	Cm	7,917	0,669	7,700	0,703	*,807

R value at a level (0.05) = 0.798

Table (4) shows that there is a significant correlation between the application of the test and its reapplication at a significant level (0.05). The correlation coefficients ranged between (0.824 *: 0.978 *) indicating that the physical tests used are highly stable.

The proposed training:

After viewing the specialized scientific books, previous researches, relevant Internet sites and personal interviews with the field workers, the researchers identified the following:

First: Training aim:

Upgrade the skill level by improving the arms movement of breaststroke for the juniors by using Hydro Hip tool.

Second: The foundation of Setting Exercises:

- The suitability of improving arms movement exercises of breaststroke by using Hydro Hip tool for the age group and the digital level of the research sample.
- Take in account the individual differences.
- Graduation of exercises from easy to harder and from simple to complex.
- Take into account the diversity of in-dose training.

Preparing the exercises in their initial form:

The researchers prepared the exercises in its initial form, and presented it to (8) teaching staff members specialized in swimming training field and have at least 20 years of experience, to know their opinions about the exercises in terms of:

- Exercises achieving its purpose.
- The application total duration.
- The number of training doses and its time division.
- Select and add the most appropriate exercises that achieve the goal.

The experts' opinions reached the following:

- The experiment duration is (8) weeks.
- The number of training doses is (24); (3) doses per week.
- The dose duration is (30) minutes, that is taken from the approved time schedule done by the club management.

Research executive steps:

Pilot Study:

The researchers conducted the pilot study on Friday 1/6/2018 and they repeated it on Friday 8/6/2018 on a 12 swimmers sample from the research community and outside the study's sample and that's on the study variables to achieve the following objectives:

1. Ensure the tests validity and their suitability for the sample understudy.
2. Check on the devices used and their validity.
3. Ensure the validity and stability of the tests (scientific transactions).
4. Identify the executing timing of the exercises.
5. Ensure the suitability of exercises using the Hydro Hip tool for the selected sample.

Pre Measurements:

The pre measurement was carried out on the experimental and control groups on Monday and Tuesday 18th and 19th June 2018, and it included the measurements and tests understudy (age- height-weight- physical tests- arms movement performance evaluation- 50 m arms pulls number- 50 m arms movement timing- 50 m full cycles timing)

Research experience execution:

The research experience was applied at 15 May Club during the period from 22/6/2018 to 17/8/2018 for the two groups of the research sample as follows:

- The experimental group is implementing training to improve arm movements for breaststroke by using the Hydro Hip tool.
- The control group is implementing training to improve arm movements for breaststroke without using the Hydro Hip tool.

The researchers trained the two groups for two months (8) weeks and (24) training dose; (3) days a week (Sunday - Tuesday - Thursday) for the experimental and control groups, under the same circumstances to adjust the variables that may affect the research results.

The training dose of the two research groups is (30) minutes, taken from the

main part of the total dose of (120 minutes) for players in the club; the experimental group trained using the Hydro Hip tool and the control group without the tool and that was in the first trimester of the players training dose under the trainers supervision.

The researchers considered that the two groups training should be under the same conditions to adjust the variables that may affect the research results in terms of time and place in the following way:

***Post measurement:**

After completing the research experience, the post measurements were done to (evaluate the arms movement performance, the 50 m arms pulls number, 50 m arms movement timing and 50 m full cycles timing) on Saturday and Sunday 18/19 of August 2018.

Statistical treatments used:

Arithmetic mean, Median, Standard Deviation, Torsion coefficient, T-test, Correlation coefficient, change rate percentage.

Results presentation and discussion:

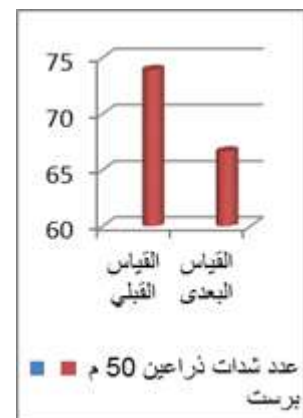
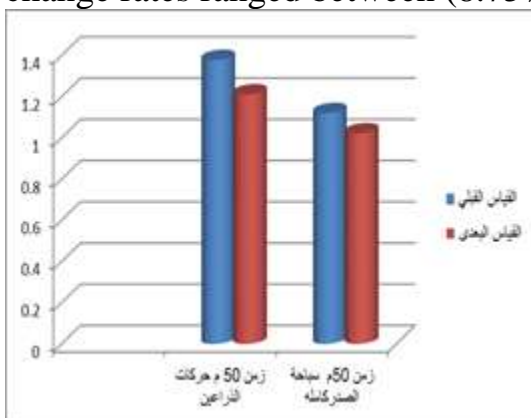
First: Results presentation

Table (5) significant differences between the pre and post measurements of the experimental group in the skill variables (n=12)

Variables	Pre measurements		Post measurements		Calculated T value	Change Rate
	Mean	SD	Mean	SD		
Arms movement performance evaluation	١,٦٦٧	٠,٤٩٠	٤,٦٦٧	٠,٤٩٢	١٤,٠٧١	١٧٩,٩٦%
50 m arms pulls number	٧٣,٩١٧	٣,٠٥٥٣	٦٦,٦٦٧	٢,٩٠٢	١٢,٣٣٣	٩,٨١%
50 m arms movement timing	١,٣٧٨	٠,٠٧٨	١,٢١١	٠,٧١٣	٧,٦٢٩	١٢,١٢%
50 m full cycles timing	١,١٢٠	٠,٥٧٨	١,٠٢٢	٠,١٨٠	٥,٧٨٣	٨,٧٥%

T value at a level (0.05) = 1.796

Table (5) shows statistically significant differences between the pre and post measurements of the experimental group in the skill variables in favor of the post variable, where calculated “T” value is higher than the tabular value. The change rates ranged between (8.75%: 179.96%).



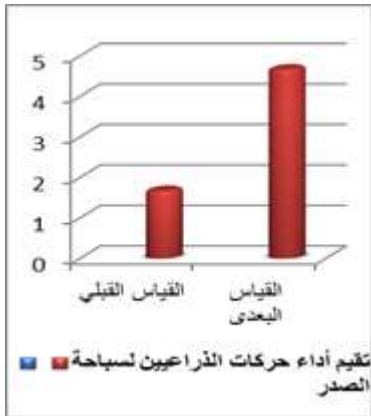


Figure (1) shows significance differences between the pre and post measurements of the experimental group in the skill variables.

Table (6) significant differences between the pre and post measurements of the control group in the skill variables (n=12)

Variables	Pre measurements		Post measurements		Calculated T value	Change Rate
	Mean	SD	Mean	SD		
Arms movement performance evaluation	1,750	0,452	3,333	0,492	10,652	90,46%
50 m arms pulls number	74,916	2,843	70,250	2,490	5,826	6,23%
50 m arms movement timing	1,389	0,775	1,292	0,674	3,617	6,98%
50 m full cycles timing	1,127	0,465	1,09	0,181	2,713	3,28%

T value at a level (0.05) = 1.796

Table (6) shows statistically significant differences between the pre and post measurements of the control group in the skill variables in favor of the post variable, where calculated “T” value is higher than the tabular value. The change rates ranged between (3.28%: 90.46%).

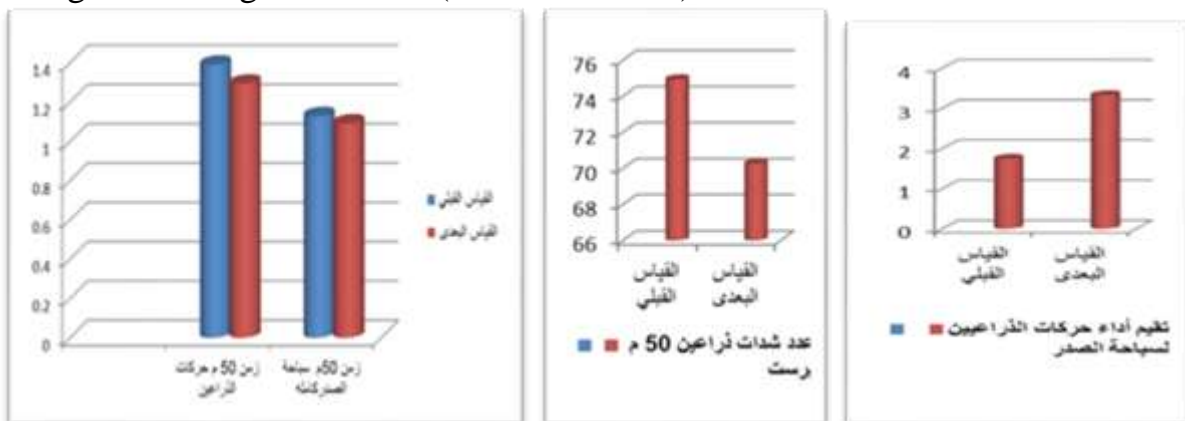


Figure (2) shows significance differences between the pre and post measurements of the control group in the skill variables.

Table (7) Significant differences between the post measurements of the experimental and control groups in the skill variables (n=12)

Variables	Pre measurements		Post measurements		Calculated T value
	Mean	SD	Mean	SD	
Arms movement performance evaluation	1,750	0,452	3,333	0,492	10,652
50 m arms pulls number	74,916	2,843	70,250	2,490	5,826
50 m arms movement timing	1,389	0,775	1,292	0,674	3,617
50 m full cycles timing	1,127	0,465	1,09	0,181	2,713

T value at a level (0.05) = 1.796

Table (7) shows statistically significant differences between the experimental and control groups in favor of the experimental group in the skill variables, where calculated “T” value is higher than the tabular value.

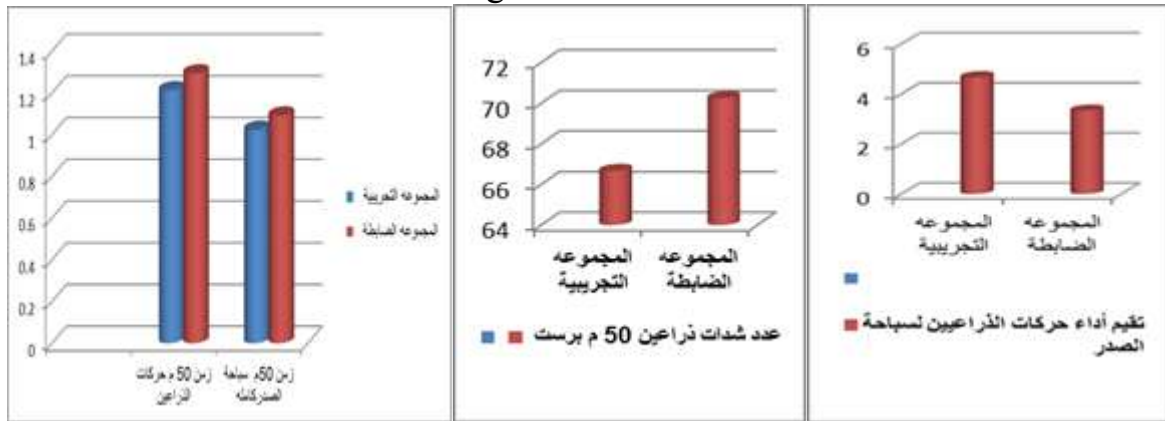
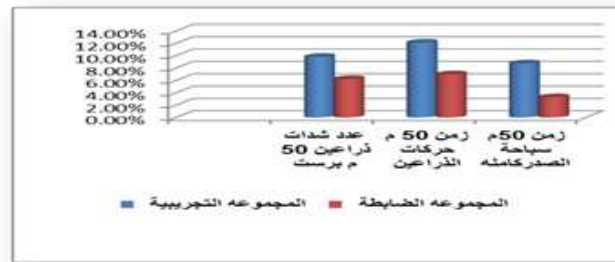


Figure (3) shows significance differences between the post measurements of the experimental and control group in the skill variables.

Table (8) differences in the improvement rate of the post measurements of the experimental and control groups in the skill variables

Variables	Experimental group			Control group			Change Rate
	Mean	SD	%	Mean	SD	%	
Arms movement performance evaluation	4,667	0,492	179,96%	3,333	0,492	90,46%	89,5%
50 m arms pulls number	66,667	2,902	9,81%	70,250	2,490	6,23%	3,58%
50 m arms movement timing	1,211	0,713	12,12%	1,292	0,674	6,98%	5,14%
50 m full cycles timing	1,022	0,180	8,75%	1,09	0,181	3,28%	5,47%

Table (8) shows differences in the change rate percentage between the post measurements of the experimental and control group in the skill variables, ranging between (8.75%: 179.96%) in favor of the post measurements of the experimental group, and ranged from (3.28%: 90.46%) in favor of the post measurements control group, with difference between the two groups ranged between (3.58%: 89.5%) in favor of the experimental



group.

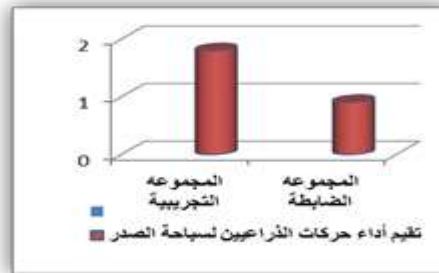


Figure (4) shows the change percentages between the post measurements of the experimental and control groups in the skill variables.

Results discussion:

Table (5) showed statistically significant differences between the pre and post measurements of the experimental group in the skill variables in favor of the post variable, where calculated “T” value is higher than the tabular value. The change rates ranged between (8.75%: 179.96%). The researchers noticed that the Hydro Hip tool used for the experimental group as an aid tool in the breaststroke through fixing the belt near the chest, for the swimmer to avoid touching the blades with his hands and not to cause elbow fall and pull away in the wrong way, which increases the resistance and hinders the gliding forward. When the swimmer masters the arms movement without touching the blades, this result in reducing resistance and increasing speed, which helps the swimmer to maintain correct timing of the arms movement and master the proper performance, while continuing to swim efficiently after removing the device. This resulted in an improvement in the arms movement of the breaststroke by 179.96% and reducing the arms pulls number during the 50 m breaststroke by 9.81%, where the pull efficiency represented in (the efficiency of the catch and pull process) is from the important factors that increase the swimmer’s speed. This agrees with what Eenest W.Maglischo (2003) mentions that the intro to develop the swimmer’s speed depends on the pulls efficiency while maintaining the pulls rate. Khaled Salah El Din Mohamed (2002) also mentions that the pulls efficiency is among the factors affecting the swimmer’s speed. (10: 705) (5)

Table (5) also shows the improvement of the 50 m arms movement timing by 12.12% which had a positive effect on improving the 50 m breaststroke full cycle timing by 8.75%. This is in line with the findings of Bahgat Abo Tama’a

(2007) and Wessal El Rabdi (2010) that the assistance tools are an important part of enhancing the educational process in teaching of complex swimming skills field; it helps gain movement accuracy and achieve faster movement rate. The researchers also views that using the assistance tools in swimming training performance ease the possibility of learning difficult movements; for that the tools make the learner more focused on skills intended to be learned. (9) (4) (12) (14)

The researchers therefore, concluded that the Hydro Hip tool contributed in giving a prompt feedback on the arms and chest positions, which contributed in correcting the arms movement flaws and helped improving the performance level of the swimmers; this reflected on enhancing the post measurements in the skill variables.

Table (6) shows statistically significant differences between the pre and post measurements of the control group in the skill variables in favor of the post variable, where calculated “T” value is higher than the tabular value. The change rates ranged between (3.28%: 90.46%).

The researchers attributed the results to the fact that the control group was committed to implement the same training units and exercises of the experimental group but without using the Hydro Hip tool, therefore, the improvement was due to the use of skill exercises. This resulted in the improving of the breaststroke arms movement by 90%, reducing the arms pulls number during the 50 m breaststroke by 6.23% and improving of the 50 m arms movement timing by 6.98% which had a positive effect on improving the 50 m breaststroke full cycle timing by 3.28%. This is in line with what Caroline Krattli (2004) pointed out that swimming drills are a great mean to maintain the improvement technique and the efficiency of breaststroke.

Table (7) shows statistically significant differences between the experimental and control groups in favor of the experimental group in the skill variables, where calculated “T” value is higher than the tabular value. The change rates between them affirmed their differences; where table (8) shows differences in change rates between the post measurements of the experimental and control groups, where the differences between them in the arms movement improvement of breaststroke was 89.96% in favor of the experimental group, the arms pulls number during the 50 m breaststroke by 3.58% in favor of the experimental group, the 50 m arms movement timing by 5.14% in favor of the experimental group, and the 50 m breaststroke full cycle timing by 5.47% in favor of the experimental group. Hence the difference between the two groups ranged between (3.58%: 89.5%) in favor of the experimental group. The researchers attributed this finding to the fact that the usage of the pilot group to the Hydro Hip tool worked on reducing the arms pulls number in the post measurements. The researchers also noticed that the assistance provided by the Hydro Hip tool during the arms movement performance helped swimmers

obtain the correct movement that prevented the arms from opening too much, it also helped to reduce the effort during pulling with reducing body's resistance during the recovery and increase the distance and speed of the gliding forward, hence increase the timing and speed of the 50 m breaststroke swim.

The researchers believe that the excel of the experimental group in the post measurements over the control group is due to what Abo El Ella Abd El Fattah and Hazem Hussein Salem" (2011) called increasing the performance effectiveness, where the experimental group was able to produce larger group of driving forces with less energy loss that the control group and this is the reason for its superiority and distinction. This also agrees with the findings of "Amal Khalil Hassan" (2016), and "Heba Ashkar" (2017) researches that using the Hydro Hip tool improved the digital level and performance of the crawls and back stroke swims.

This achieves the validity of the two hypotheses that stated; The Hydro Hip tool has a positive effect on improving the arms movements of (50 m arms pulls number - 50 m arms movement timing- 50 m full cycles timing- Evaluate the arms movements' performance)and on the digital level of 50m breaststroke.

Conclusion:

From the results that the researchers reached and within the limits of the research sample they concluded the following:

1. Training using the Hydro Hip tool led to improvement of the skill variables.
2. There are differences in the change rate between the post measurements of the experimental and control groups in the skill variables in favor of the experimental group.

Recommendations:

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

1. Training using the Hydro Hip tool improved the arms movement.
2. The trainers interest in adding part of the training units to train on fixing the arms movement of the breaststroke by using Hydro Hip tool.
3. The trainers interest in teaching the correct performance to the junior stage.
4. Conducting other researches using the tool on other age groups.

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