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The effect of blocking blood flow on the muscular strength of the two legs and some biochemical variables for 50 m butterfly swimmers for young men

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Abstract

In this study, the researcher sought to develop the work of the two men in swimming 50 m butterfly for youth through the use of rubber girdles that impede the blood flow of the legs in low-intensity resistance exercises, by taking advantage of making the muscle environment acidic, which is reflected in the increased stimulation of growth hormone secretion, which plays a key role in increasing the thickness of the muscle fiber and increasing the muscle strength accompanying it when resting after performing the exercises, which works to bring about the same metabolic and nervous adaptations that high-intensity exercises cause without using this method. Swimming, which lies in the presence of a weakness in the strength of the work of the legs by pushing water during the daily exercises for swimmers, so the researcher decided to go into this study and develop appropriate solutions for it through the use of girdles that impede the flow of blood in the legs in order to benefit from the acidic environment inside the muscles when using this method, which is reflected in the stimulation of growth hormone and thus increasing the strength of the muscles of the legs, which leads to improving the digital level for this distance, as the research sample was chosen from the national team swimmers in swimming 50 m butterfly for young men, who numbered (10), they were divided into two groups, control and experimental, and after that a set of laboratory tests and analyzes were applied to find out the extent to which the benefit of the method of obstructing the blood flow of the two men in achieving better results on the digital level for swimming 50 m butterfly. After completing the experiment, the researcher collected the results and writing down all the numbers that showed the results and then they were processed statistically to find out the final outcome of this study and in the light of what the researcher obtained from the results of this study. Lactic acid as a result of using this training method to obstruct blood flow, which led to the development of the digital level in the 50 m butterfly swimming.

Keywords: Sports training physiology/swimming

Introduction

The applications of sports physiology have become applied in a way that expands and becomes more widespread from day to day, as those concerned with these applications, including coaches and players, must understand the energy production systems in the human body, which is difficult to deal with modern training methods based mainly on developing the body's physiology in producing the energy necessary for the swimmer's movement in the water. Physiological studies revealed to us that the energy.

Introduction to the research and its importance

Requirements in each race or distance of swimming distances differ from the others, so the coach must understand how the human body works in producing the energy necessary for swimming and the extent of the different physiological and biochemical processes required for each race and each distance of swimming distances in order to be able to achieve success. Focusing on developing the body's ability to provide the required amount of energy as quickly as possible for success and achieving records. This study focused on developing the work of the legs in the swimmer's body using an unconventional training method that works to develop the muscle strength of the working muscles of the legs, by using corsets that impede the flow of blood in the legs through the performance of a group of low-intensity resistance exercises that affect the aortic processes. Biochemistry inside the muscle cell, which helps in developing the muscular strength of the two men in this swim, and this is indicated by 129:1 (Abu El-Ela Ahmed Abdel-Fattah) as a result of obstructing the flow of preventing blood from the muscle and stray roots, and it works to prevent protein aggregation. Protein aggregation plays a role in muscle enlargement, so the muscle size increases as a result of

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increased protein buildup, and also as a result of disability causes an increase in growth hormone, through the fact that the environment in this disability is acidic, as the researcher seeks to speed up the training process and obtain later the improvement of the same goals achieved by the curricula. The traditional training represented in increasing the development of the level of muscular strength of the two men by obtaining physiological adaptations and the extent of benefiting from the relationship between increasing the acidic environment within the muscle by using rubber girdles to impede the flow of blood associated with performing low-intensity resistance exercises, which is reflected in the increased stimulation of growth hormone secretion, which plays a role Essential in increasing the thickness of the muscle fiber and increasing the muscle strength accompanying it at rest after performing exercises, which works to cause breathing Metabolic and nervous adaptations caused by high-intensity training without using this method, and this is what reinforces the importance of using a corset to obstruct the blood flow associated with low-intensity resistance exercises, which work to regulate the biochemical processes within the muscle fiber, which works to develop it with the least time and intensity followed in the resistance training programs that It is used by coaches, hence the importance of the study through the effect of obstructing blood flow on the muscular strength of the two men and some biochemical variables for 50 m butterfly swimmers for young men.

Research problem

Traditional swimming training is still used in many countries, as it is difficult for many to accept the scientific data that short work in physical training provides the largest volume of high intensity, which aims to develop physiological indicators, tactical endurance, and others, and through the researcher's field experience in the field of swimming and follow-up. For the results of swimming activities, especially the butterfly swimming, where he noticed that there is a weakness in these results for the 50-meter swimmers of the youth category, which the researcher worked hard to find out the weakness that occurs in this swimming, which lies in the presence of a weakness in the strength of the work of the two men by pushing water during the daily exercises of the swimmers, so the researcher decided to go into this study and develop appropriate solutions for it. Through the use of corsets that impede blood flow in the legs in order to benefit from the acidic environment inside the muscles when using this method, which is reflected in delaying the appearance of muscle fatigue and stimulating growth hormone, which has a key role in increasing the thickness of the muscle fiber and increasing muscle strength when resting after performing exercises, which works to induce the same biochemical adaptations that high-intensity training does without using this method.

Research objectives

1. Identifying the effect of obstructing blood flow on the muscular strength of the two legs of the 50 m butterfly swimmers for youth
2. Identifying the effect of obstructing blood flow on some biochemical variables for 50 m butterfly swimmers for young people.

Research Hypotheses

1. There are significant differences in the effect of obstruction of blood flow on the muscular strength of the two men for the 50 m butterfly swimmers for young men.
2. There are significant differences in the effect of obstructing blood flow on some biochemical variables for 50 m butterfly swimmers for young men.
3. There are significant differences in the results of the post-test between the experimental and control groups, in favor of the experimental group.

Research areas

The human field: the swimmers of the national Olympic swimming team in butterfly swimming for the youth category.

The spatial area: The Olympic People's Indoor Swimming Pool

Time range: from 4/7/2020 to 8/10/2020

Research methodology

The researcher used the experimental approach by designing the control and experimental groups with two tests (pre- and post-test) due to its suitability to the nature of the research problem.

The research community and its sample:

The available research community is defined as “the community that refers to the available number of the target research community that the researcher can refer directly to in withdrawing the sample items from it” 18:3.

The intentional method was determined for the selection of the research sample, which was represented by the national team swimmers in the Olympic swimming butterfly swimming for the youth category, whose number is (10) swimmers, who represent the community of origin 100%, and they were randomly divided into two control and experimental groups for each group (5) swimmers. The research sample examined some extraneous variables that may constitute an extreme in the results of the tests, as shown in Table (1).

Table 1: shows the homogeneity of all the sample members in the search variables

Variants	Arithmetic mean	Mediator	Standard deviation	Torsion coefficient
Length (cm)	174	169	3,322	0.695
Mass (kg)	71.22	64	4,161	0.594
Age (years)	17.58	18	0.681	0.290
Training age (month)	52.28	39	6,394	0.473

Research devices and tools and means of collecting information

Means of collecting information

Tests, measurements, modern technical devices and scientific sources were used as means of collecting information.

Research devices and tools

- Rubber girdles to obstruct the flow of venous blood.
- Laboratory devices for measuring research variables.
- Tubes to save blood samples drawn from swimmers
- A special box for transporting drawn blood samples

- Electronic balance to measure height and weight
- DELL computer.
- Legal closed swimming pool.
- Electronic stopwatch (10). Fox whistle (1)

Tests to measure the variables of the study

Standing broad jump test

The aim of the test: to measure the ability of the muscles of the legs.

Performance description

The laboratory begins with bending the knees with swinging the arms backwards and leaning forward in preparation for the process of broad jumping forward with the feet together for the longest possible distance, by raising the feet to the ground with swinging the arms forward and then landing forward, then the distance is measured from the starting line until the landing point.

Test measuring growth hormone (GH)

The purpose of the test: to measure the level of growth hormone (GH) concentration.

How to perform the test

The blood sample is taken through venous withdrawal from the arm of the swimmers at rest before starting the training unit and put it in special tubes and write the name of the subject on it and then put the tubes in a special box in order to transfer it to the laboratory to extract the results of the hormone tests for the research sample and then the numbers are written down to extract the values statistically

Lactic acid measurement test

The aim of the test: To measure the level of lactic acid in the blood.

How to perform the test

The blood sample is taken through an intravenous drawing from the arm of the swimmers, after (5-10) minutes of completing the 50 m butterfly swimming test and placed in special tubes and the name of the subject written on the tube

and prepared to be kept in a box and transferred to the laboratory to extract the test results in order for the values to be processed Statistically to see test results.

50 m butterfly swimming test

The aim of the test: to measure the time it takes to swim 50 m butterfly.

How to perform the test

And this is done by starting every two swimmers in a start, where after the swimmer stands on the starting platform (START) and takes the correct position, which is the feet being as wide as the seat while standing and fixing the toes of the feet around the edge of the starting base and then bending the upper part of the body forward and down and the bend is from the hip joint with Bend the knees until he holds the front edge with his hands, the base of the start, and as soon as he hears the signal of the absolute, the swimmer begins to push the arms quickly forward to enter the body into the water, arms and legs quickly, and when the swimmer reaches the end of the pool in swimming (50 m) butterfly, the time taken to cover the distance is calculated, and then the special times are recorded For swimmers in this test forms in order to extract the statistical values of the test results.

Exploratory experience

The exploratory experiment is one of the tasks that the researcher relies on, so the researcher conducted the exploratory experiment on a sample consisting of (4) swimmers from the research sample, so the first exploratory experiment was on 4/7/2020, as this experiment aimed to identify the nature of work by the assistants in using the method The compressor and identifying the main obstacles that the researcher may face while conducting the main experiment, as well as ensuring the safety of devices and tools, how to perform the tests, and the time taken for the tests. The second exploratory experiment was on 5/7/2020, which is how to deal with blood samples taken for the purpose of blood separation and ensure the safety of devices and tools used in it.

Table 2: shows the equivalence of the research sample for the two groups in the tests

T	The exams	Experimental group		The control group		Value (v)	Sig	Indication
		Q -	± p	Q -	± p			
1	Broad jump from standing / m	2. 61 5	0.170	2. 605	0.597	0.080	0.938	non-moral
2	Growth hormone (GH) ng/ml)	8.027 _	0.610	7.937	0.235	0.275	0.792	non-moral
3	Lactic acid/mg	1 66,645	0.497	1 66,085	0.695	1,310	0.283	non-moral
4	50 m butterfly swimming m/s	30,065	0.538	30,067	0.537	0.005	0.996	non-moral

The main experience

The researcher conducted physical and physiological pre-tests on 7/6/2020 on the research sample, with the help of the work team, and they included the following:

- Procedures for drawing blood from the research sample at rest time and keeping it in tubes with the name of the swimmer written on it for the purpose of extracting the level of growth hormone (GH) concentration in the blood afterwards.
- The physical test for measuring the ability of the muscles of the legs, the broad jump test from standing, and recording all the results obtained by the swimmers in a special form prepared for this purpose, and then

- A test (50 m) butterfly swimming was conducted for the research sample, with two swimmers launching in each start and at full speed, provided that the swimmers maintain their warm-up and readiness to start until their turn in the test arrives, and all the test results are recorded in a special form and immediately after the completion of the test.
- The swimmers were left and given a rest (5-10) minutes to conduct a second blood draw and store it in tubes on which the name of the swimmer is written, for the purpose of extracting the level of lactic acid in the blood after the effort of the test distance of 50 m butterfly swimming, and recording all test results in a special form

- After that, all the numbered tubes of the swimmers for the two tests were collected at rest and after effort, and placed in a special folder and sent to the laboratory for laboratory analysis.

Corsets obstructing blood flow used for the research sample

Mechanical pressure was used to achieve partial restriction of the venous blood of the two legs on 7/7/2020 by using rubber girdles with the use of the Perceived Pressure Standard (PPS) to find the amount of pressure that allows the obstruction of blood flow, which is (6 cm) wide, as this criterion is used to estimate pressure by Numeric between (0-10), as the standard number (0) indicates that there is no obstruction to the blood flow, while the criterion (10) indicates a total obstruction to the blood flow, as this criterion depends on the individual’s assessment of the level of pain and numbness, as he has a clear mental image of the type of pressure located on the specified side, and this is indicated by the study (Amal Al-Hamad, 2017) 21:2, that the best productive pressure is between the degree (7-10) according to the mechanism of the aforementioned standard, and also the reference of the study (2013, Wilson) 1: 558, as the researcher worked in This study divides the perceived pressure into three stresses, the first is low intensity (0-10), the second is medium intensity (7-10), and the third is high intensity (10-10). The researcher relied on the exercises used by the trainer, and corsets were used in the lung part It

is based on low-intensity resistance exercises, which range between (20-30%), with a time of no more than (10) minutes, which varies according to the gradient of the training curriculum, and with pressure to obstruct blood flow (7-10) of medium intensity. The time period for the curriculum was (3) months, by (6) training units per week.

Post exams

After the research sample completed all the exercises within the training program and by using rubber girdles to obstruct the blood flow of the two men, the post-tests were conducted, which were a day after the completion of the main experiment on 10/8/2020, and the researcher took into account that the tests were conducted in the same conditions in which the tests were conducted Tribal and the same working group assistant.

Statistical Methods

The researcher verified the results using the statistical bag system (spss) version (v26).

- Arithmetic mean
- Standard deviation
- The t-test for uncorrelated samples
- T-test for correlated samples

Presentation and discussion of the results

Presenting, analyzing and discussing the results of the tests for the variables of

Table 3: the arithmetic mean, standard deviations, and the calculated (T) value for the pre and post-tests in the tests (for the experimental group)

T	The exams	Pretest		Post-test		MGF	Magh 2 F	Value (v)	Sig	A to indicate
		Q -	± p	Q -	± p					
1	Broad jump from standing. M/	2. 61 5	0.170	3,550	0.129	-0.825	0.062	13,113	0.001	moral
2	Growth hormone (GH) ng/ml	8.027	0.610	10.137	0.661	1,890	0.518	3,645	0.036	moral
3	Lactic acid mg	1 66,645	0.497	1 58,235	1,826	-3,590	0.880	4,077	0.027	moral
4	50 m butterfly swimming / sec	30,065	0.538	29,418	0.104	0.647	0.242	2,673	0.044	moral

Through the above table of the statistical values of the research sample group in the pre and post-tests of the experimental group of the tests, it is clear that there are significant differences in the standing broad jump test, as the arithmetic mean in the pre-test for the standing wide jump test was (2.615) and with a standard deviation of (0.170), and in The post-test had an arithmetic mean of (3.550) and a standard deviation of (0.129), and the total deviations were (13.113), which is a significant level of (0.001), which indicates the presence of significant differences between the pre-test and the post-test, in favor of the post-test and in the hormone test. Growth (GH), where the arithmetic mean in the pre-test was (8.027) with a standard deviation of (0.610), and in the post-test the arithmetic mean was (10.137) with a standard deviation of (0.661). 0.036), which indicates the presence of significant

differences between the pre- and post-test and in favor of the post-test and in the lactic acid test, where the arithmetic mean in the pre-test was (166.645) with a standard deviation of (0.497), and in the post-test the sense average was Abi (158.235) and a standard deviation (1.826), while the calculated (T) value amounted to (4.077), which has a level of significance amounting to (0.027), which indicates the existence of significant differences between the pre and post-test and in favor of the post test. The pre-test was (30.065) with a standard deviation of (0.538), and in the post-test the arithmetic mean was (29.418) with a standard deviation of (0.104), while the calculated (T) value was (2.673), which has a significance level of (0.044), which indicates the existence of significant differences between the test Pre and post-test and in favor of the post test.

Table 4: The arithmetic mean, standard deviations, and (T) value calculated for the pre and post-tests in the tests (for the control group)

T	the exams	Pretest		Post-test		MGF	Magh 2 F	Value (v)	Sig	A to indicate
		Q -	± p	Q -	± p					
1	Broad jump from standing. M/	2. 605	0.597	3,125	0.298	-0.375	0.149	2,512	0.037	moral
2	Growth hormone (GH) ng/ml	7.937	0.235	8,920	0.302	1,017	0.111	9,129	0.003	moral
3	Lactic acid mg	1 66,085	0.695	163,972	0.472	-0.887	0.348	2,544	0.034	moral
4	50 m butterfly swimming / sec	30,067	0.537	29,833	0.364	0.333	0.211	1,581	0.175	moral

Through the above table of the statistical values of the research sample group in the pre and post-tests of the control group for the tests, it is clear that there are significant differences in the standing broad jump test, where the arithmetic mean in the pre-test for the standing wide jump test was (2.605) with a standard deviation of (0.597). The post-test had an arithmetic mean of (3.125) and a standard deviation of (0.298), and the total deviations were (2.512), which is a significant level of (0.037), which indicates the presence of significant differences between the pre-test and the post-test, in favor of the post-test and in the hormone test. Growth (GH), where the arithmetic mean in the pre-test was (7.937) with a standard deviation of (0.235), and in the post-test the arithmetic mean was (8.920) with a standard deviation of (0.302). 0.003, which indicates the existence of significant differences between the pre- and post-test and in favor of the post-test and in the lactic acid test, where the arithmetic mean in the pre-test was (166.085) with a standard deviation of (0.695), and in the post-test the sense average was (163.972) and a standard deviation (0.472), while the calculated (T) value amounted to (2.544), which has a level of significance amounting to (0.034), which indicates the existence of significant differences between the pre and post-test and in favor of the post test. The pre-test was (30.067) with a standard deviation of (0.537), and in the post-test the arithmetic mean was (29.833) with a standard deviation of (0.364), while the calculated (T) value was (1.581), which has a significance level of (0.175), which indicates the existence of significant differences between the test Pre and post-test and in favor of the post test

Discuss the results

Through tables (3) (4) of the results of statistical values in the pre and post-tests of the experimental and control groups in the research variables, it is clear that there are significant differences, and the researcher attributes the reason for this to the use of pressure to impede blood flow, which led to the development of muscle strength for the two men and was evident in the jump test Wide from standing and from the results of swimming 50 m butterfly swimming, where 372:4 The increase in the acidic environment associated with the use of the pressure method with the performance of low-

intensity resistance exercises works to stimulate the sympathetic nerves, which stimulate the endocrine glands, including the pituitary gland, to increase the secretion of growth hormone, which leads later after the end Exercise increases the production of muscle protein, which leads to an increase in the thickness of the muscle fiber as a result of the adaptation that occurs due to the partial obstruction of blood flow associated with the performance of low-intensity resistance exercises. Physical activity in the absence of oxygen when it requires the production of maximum muscle power to overcome external resistance as quickly as possible What is the reference to 4:380 (Sami'a Khalil 2008) that this hormone is of great importance during the exercise of sports activity because of its ability to consume fat as an energy source, as it helps in the metabolism of fatty acids and their conversion from adipose tissues to the blood and usually appears after a long period of exercise and when The intensity is high or below the maximum and during rest and the secretion of this hormone increases during sports activity for its benefit to the connective tissues and muscle growth, which increases the strength of the tendons, ligaments and muscles. The dimensional, where resistance exercises are a type of exercise that aims to develop the level of performance of the individual athlete in general, according to the specialized sport, which affects the strength and speed of the work of the two men and thus increases the speed of the swimmer 6:55, and this is consistent with what is indicated by (shalaby), as it was mentioned that the exercise It is one of the most powerful non-drug methods that target cells and functional body systems. These exercises work to develop muscle strength, speed, and muscle hypertrophy. The physiology of doing these exercises is the neuromuscular activity represented by recruiting the motor units available in the fast-twitch fibers that follow the principle of size in excitation. Small motor units begin after which the larger motor units are excitable in the same fiber mentioned. In conditions of lack of oxygen within the muscle fiber, so the continuation of the production of muscle strength in these conditions leads to an increase in the recruitment of motor units as a result of nervous stimulation, which is a reflection of the increase in the concentration of blood lactate in the muscle fiber, and this happens when using high-intensity resistance exercises.

Table 5: The arithmetic means, standard deviations, and (t) value calculated between the two groups (experimental and control) in the post-tests of the research variables

T	The exams	Experimental group		The control group		Value (v)	Sig	Indication
		S	P	S	P			
1	Broad jump from standing. M/	3,550	0.129	3,125	0.298	2,874	0.028	moral
2	growth hormone GH) ng/ml	10.137	0.661	8,920	0.302	2,152	0.030	moral
3	lactic acid /mg	158,235	1,826	163,972	0.472	3,459	0.013	moral
4	50 m butterfly swimming / sec	29,418	0.104	29,833	0.364	2,436	0.047	moral

Through the above table of the statistical values between the experimental and control groups in the standing broad jump test, where the arithmetic mean of the experimental group was (3,550) with a standard deviation of (0.129), and the arithmetic mean of the control group was (3,125) with a standard deviation of (0.298) and the calculated (t) value was (2,874.) which has a level of significance amounting to (0.028), which indicates the existence of significant differences in the post-test and in favor of the experimental group and in the growth hormone (GH) test, where the arithmetic mean of the experimental group was (10.137)

with a standard deviation of (0.661), and the arithmetic mean of the control group was (8.920). With a standard deviation of (0.302) and the calculated (t) value (2.152), which has a level of significance amounting to (0.030), which indicates the existence of significant differences in the post-test and in favor of the experimental group and in the lactic acid test, where the arithmetic mean of the experimental group was (158.235) with a standard deviation of (1.826.) and the arithmetic mean of the control group was (163.972) with a standard deviation of (0.472) and the calculated (T) value (3.459), which has a significance level

of (0.013), which indicates the existence of significant differences in the post-test and in favor of the group A Experimental and in the 50 m butterfly swimming test, where the arithmetic mean of the experimental group was (29.418) with a standard deviation of (0.104), and the arithmetic mean of the control group was (29.833) with a standard deviation of (0.364) and the calculated (t) value was (2.436), which has a significance level of (0.047), which This indicates that there are significant differences in the post-test in favor of the experimental group

Discuss the results

Through the statistical values in Tables No. (5) it is clear that there are significant differences between the post-tests of the two groups and the superiority of the experimental group in the research variables, and the researcher attributes the reason for this to the use of rubber girdles to impede blood flow, which affected the increase in the strength and speed of the work of the two men and thus affected the swimmer's speed as Reference 128:1 (Abu El-Ela Ahmed 2016) The muscle, when the muscle contraction, produces waste bi_products, and these waste accumulate in the muscle, but the body rids the muscle of these waste through blood flow, but in the way of obstructing blood flow, these waste remains in the muscle as a result of this venous obstruction These residues include lactic acid and increased secretion of growth hormone, as this method leads to many physiological changes in the human body, as the gathering of energy metabolism residues is what stands behind the benefits of this method, as blood lactate and muscle cells gather as a result of obstructing blood flow from the muscle, causing an increase in Growth hormone (GH) secretion, as this hormone increases secretion in the event that the muscle environment is acidic, and a decrease in (PH) leads to stimulation of the sympathetic nerve activity through the reflexes of the Chemical receptors, and this causes an increase in growth hormone, and one study has proven that this hormone increases its levels much more than the effect of traditional training, as myostatin works to regulate the increase in muscle hypertrophy and it decreases under the influence of obstructing blood flow from the muscle, and this method is more effective in the muscles of the legs because they are large muscles Where the researcher believes that the metabolic waste is a positive physiological benefit, especially because of its effect on increasing the growth hormone 132:1, as when the muscle contraction in normal conditions, not all muscle fibers contract in one moment, but they contract in succession, so they begin to contract first the slow muscle fibers, and then with the increase in the intensity of the load The fast-entry muscle fibers begin to contract, but under the influence of obstructing the blood flow from the muscle despite the use of low load intensity. Mobilization of fast, large muscle fibers to participate in muscle contraction, which usually do not participate in muscle contraction except under the influence of high-intensity loads. The results of the integrated electromyography study showed that the obstruction of blood flow from the muscle leads to the activation of a large number of fast muscle fibers, despite the decrease in the intensity of the training loads.

Conclusions

In light of the foregoing, the researcher concluded the following

- There is a significant effect of using rubber girdles to obstruct blood flow in developing the strength and speed of the work of the two men for the experimental research sample.
- Developing the digital level in the 50 m butterfly swimming for the research sample as a result of using rubber girdles to impede blood flow
- Increasing the secretion of growth hormone concentration in the blood and delaying the appearance of lactic acid as a result of using this training method to impede blood flow led to the development of the digital level in the 50 m butterfly swimming

Recommendations

In light of the foregoing, the researcher recommends the following:

- Conducting other studies on different activities and different ages in swimming
- Circulating this study to coaches and swimmers in order to know the development that occurred as a result of the use of rubber girdles to impede blood flow in the completion of this activity
- Using these rubber girdles to impede blood flow in the upper extremities in different swimming pools and different classes

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