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Assessment and effect of explosive strength for the enhancement of the grab start in competitive swimming

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Abstract

Starting style used in swimming like grab starts, rear weighted track start. Explosive strength ability is very important in competitive swimmers in competitions swimming, the fundamental goal is to cover a set distance in the least amount of time. Plyometric training uses the acceleration and deceleration of the body. Method used for this study is experimental method. Data Analysis men, standard deviation, standard difference and T-test was taken. Finally, the following conclusion drawn in the present study. Performance in the start is strongly related to the overall swim performance. There are indications that, Regardless of the posture used, intensive practice of the start significance improvement shows. Swimmers very explosive and symmetrical in force production. It may be worthwhile. Changing to grab start where they can produce very high force in short period.

Keywords: swimming, starting style, grab start, explosive strength, plyometric training

Introduction

Historically swimming is as old as ancient mythology but for practical purposes, a review of progress over the last 50 years is all that is necessary. During this period methods of water progression have changed remarkably; each change in stroke has signalized by a corresponding increase in speed. Fifty year ago, the breaststroke was in general use for all purposes including racing. Then the over hand sidestroke was discovered, and it becomes the popular, with the result that all known speed standards were beaten. Later the trudged stroke was taken up and again new records were set up in the early age the cruel stroke took front place in popular favors and since then all speed, records have been reduced to figures which would have appeared fantastic to the old time performer Over the many starting styles have been used in free style butterfly and breast stroke events Initially swimmers took a starting position with arms extended backward. They soon found that they could start their body moving towards the water more quickly by swinging their arms backward (action reaction principal). Therefore, they assumed a preparatory position with arms in front. They would swing the arm straight backswing start was later replaced by a circular backswing on the theory that a longer arm swing would generate additional momentum and increase the distance travelled through the air. The circular arm swing (conventional start) has now been replaced by a faster Methods the grab start. The grab start was introduced by Hamauer in 1960 and has rapidly gained in popularity since that time. Several research studies have verified that grab is faster than other methods. The grab is superior because you can get your body moving toward the water faster by pulling against the starting platform. Unfortunately dry land exercises and weight-training programs in the sport of swimming frequently focus their attention on the development of upper body strength. In accordance with the concept of specificity, much time and effort has been spent on the development of specific exercises or weight training procedure that closely mimic swimming movement. Because of this, it has been suggested that swimmers, in general, lack the dynamic lower body strength needed to maximize performance in the block start and turns. This may also be because the benefits of developing explosive strength have not been properly investigated. In competitive swimming, the fundamental goal is to cover a set distance in the least amount of time. The swimming starts has been defined as including those events that takes place between the

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command, "take your marks" and the beginning of the first stroke. In competitive swimming, the fundamental goal is to cover a set distance in the least amount of time.

Swimming is an individual or team racing sport that requires the use of one's entire body to move through water. The sport takes place in pools or open water (e.g., in a sea or lake). Competitive swimming is one of the most popular Olympic sports, with varied distance events in butterfly, backstroke, breaststroke, freestyle, and individual medley. In addition to these individual events, four swimmers can take part in either a freestyle or medley relay. A medley relay consists of four swimmers who will each swim a different stroke, ordered as backstroke, breaststroke, butterfly and freestyle.

Swimming each stroke requires a set of specific techniques; in competition, there are distinct regulations concerning the acceptable form for each individual stroke. There are also regulations on what types of swimsuits, caps, jewellery and injury tape that are allowed at competitions. Although it is possible for competitive swimmers to incur several injuries from the sport, such as tendinitis in the shoulders or knees, there are also multiple health benefits associated with the sport.

Competitive swimming

Competitive swimming became popular in the 19th century. The goal of high level competitive swimming is to break personal or world records while beating competitors in any given event. Swimming in competition should create the least resistance in order to obtain maximum speed. However, some professional swimmers who do not hold a national or world ranking are considered the best in regard to their technical skills. Typically, an athlete goes through a cycle of training in which the body is overloaded with work in the beginning and middle segments of the cycle, and then the workload is decreased in the final stage as the swimmer approaches competition.

The practice of reducing exercise in the days just before an important competition is called tapering. Tapering is used to give the swimmer's body some rest without stopping exercise completely. A final stage is often referred to as "shave and taper": the swimmer shaves off all exposed hair for the sake of reducing drag and having a sleeker and more hydrodynamic feel in the water. Additionally, the "shave and taper" method refers to the removal of the top layer of "dead skin", which exposes the newer and richer skin underneath. This also helps to "shave" off mere milliseconds on your time.

Swimming is an event at the Summer Olympic Games, where male and female athletes compete in 16 of the recognized events each. Olympic events are held in a 50-meter pool, called a long course pool.

There are forty officially recognized individual swimming events in the pool; however the International Olympic Committee only recognizes 32 of them. The international governing body for competitive swimming is the Federation Internationale de Natation ("International Swimming Federation"), better known as FINA.

Open Water

In open water swimming, where the events are swum in a body of open water (lake or sea), there are also 5 km, 10 km and 25 km events for men and women. However, only the 10 km event is included in the Olympic schedule, again for

both men and women. Open-water competitions are typically separate to other swimming competitions with the exception of the World Championships and the Olympics.

Swim Styles

In competitive swimming, four major styles have been established. These have been relatively stable over the last 30–40 years with minor improvements. They are:

- Butterfly
- Backstroke
- Breaststroke
- Freestyle

In competition, only one of these styles may be used except in the case of the individual medley, or IM, which consists of all four. In this latter event, swimmers swim equal distances of butterfly, then backstroke, breaststroke, and finally, freestyle. In Olympic competition, this event is swum in two distances – 200 and 400 meters. Some short course competitions also include the 100-yard or 100-meter IM – particularly, for younger or newer swimmers (typically under 14 years) involved in club swimming, or masters swimming (over 18).

Dolphin Kick

Since the 1990s, the most drastic change in swimming has been the addition of the underwater dolphin kick. This is used to maximize the speed at the start and after the turns in all styles. The first successful use of it was by David Berkoff. At the 1988 Olympics, he swam most of the 100 m backstroke race underwater and broke the world record in the distance during the preliminaries. Another swimmer to use the technique was Denis Pankratov at the 1996 Olympics in Atlanta, where he completed almost half of the 100 m butterfly underwater to win the gold medal. In the past decade, American competitive swimmers have shown the most use of the underwater dolphin kick to gain advantage, most notably Olympic and World medal winners Michael Phelps and Ryan Lochte; however currently swimmers are not allowed to go any further than fifteen metres underwater due to rule changes by FINA. In addition, FINA announced in 2014 that a single dolphin kick can be added to the breaststroke pull-out prior to the first breaststroke kick.

While the dolphin kick is mostly seen in middle-distance freestyle events and in all distances of backstroke and butterfly, it is not usually used to the same effect in freestyle sprinting. That changed with the addition of the so-called "technical" suits around the European Short Course Championships in Rijeka, Croatia in December 2008. There, Amaury Leveaux set new world records of 44.94 seconds in the 100 m freestyle, 20.48 seconds in the 50 m freestyle and 22.18 in the 50 m butterfly. Unlike the rest of the competitors in these events, he spent at least half of each race submerged using the dolphin kick.

Competition pools

World Championship pools must be 50 metres (160 ft) (long course) long and 25 metres (82 ft) wide, with ten lanes labelled zero to nine (or one to ten in some pools; zero and nine (or one and ten) are usually left empty in semi-finals and finals); the lanes must be at least 2.5 metres (8.2 ft) wide. They will be equipped with starting blocks at both ends of the pool and most will have Automatic Officiating Equipment, including touch pads to record times and

sensors to ensure the legality of relay takeovers. The pool must have a minimum depth of two metres. Other pools which host events under FINA regulations are required to meet some but not all of these requirements. Many of these pools have eight, or even six, instead of ten lanes and some will be 25 metres (82 ft) long, making them Short course. World records that are set in short course pools are kept separate from those set in long course pools because it may be an advantage or disadvantage to swimmers to have more or less turns in a race.

Seasons

Competitive swimming, from the club through to international level, tends to have an autumn and winter season competing in short course (25 metres or yards) pools and a spring and summer season competing in long course (50-metre) pools and in open water.

In international competition and in club swimming in Europe, the short course (25m) season lasts from September to December, and the long course (50m) season from January to August with open water in the summer months. These regulations are slowly being brought to competition in North America.

As of right now, in club, school, and college swimming in the United States and Canada, the short course (25 yards) season is much longer, from September to March. The long-course season takes place in 50-meter pools and lasts from April to the end of August with open water in the summer months.

In club swimming in Australasia, the short course (25m) season lasts from April to September, and the long course (50m) season from October to March with open water in the summer months.

Outside the United States, meters is the standard in both short and long course swimming, with the same distances swum in all events. In the American short course season, the 500-yard, 1000 yard, and 1650yard freestyle events are swum as a yard is much shorter than a meter (100 yards equals 91.44 meters), while during the American long course season the 400 meter, 800 meter, and 1500-meter freestyle events are swum instead.

Beginning each swimming season racing in short course allows for shorter distance races for novice swimmers. For example, in the short course season if a swimmer wanted to compete in a stroke they had just learned, a 25-yard/meter race is available to them, opposed to the long course season when they would need to be able to swim at least 50 meters of that new stroke in order to compete.

The swimming starts has been defined as including those events that takes place between the command, “take your marks” and the beginning of the first stroke. Plyometrics were developed in the mid 1960’s as a training method to relate muscular strength and power. Although researchers articles “plyometrics” somewhat differently, Despains point put that most agree the term refers to exercises that are characterized by powerful muscular contractions in response to rapid, dynamic loading or stretching of the involved muscles. This loading or stretching of the involved muscles is an advantage of plyometric exercises in that they involve the dynamic stretch shorten cycle movement similar to those adapted in sporting action. Traditionally plyometric training uses the acceleration and deceleration of the body weight as the overload in dynamic activities such as depth jumps and bounds. These activities eliminate the deceleration phase seen in traditional weight training activities or training methods. This is due to the body not having to achieve zero velocity at the end of the concentric movement. Therefore plyometrics involve the production of high forces and acceleration throughout the entire range of motion, which is again specific to most athletic movements like the swimming block start. It is a combination of strength and speed abilities. It can be defined as the ability to overcome resistance with high speed.

Methods and procedures

The participant for this study were 20 swimmers in each group control as well as experimental, they are participating regularly in school national swimming competitions in under 19 age group. The experimental group has given fifteen days training. Initially researcher has taken starts timing of 15 mts. Mark in seconds in (i) conventional start (ii) grab start (iii) rear weighted track start (iv) forward weighted track start, each starting technique taught to the swimmers in detail and given 15 days for practice the skill and establish the skill. Then three were starts taken in each style and average start timing was taken for calculation. Measurement of explosive strength researcher took two test, (i) standing broad jump test, (ii) standing vertical jump test in three attempt considered highest score as test score.

Data analysis

For data analyses mean score, standard deviation, standard difference and T- test taken.

Results

Mean score, standard deviation, standard difference T- test

Table 1: Under-19, Pre-test result

S. No.	Name of the Starts	Mean Control Group	Experimental Group	Std-Dev. Control Group	Experimental group	Std-Diff.	T-Test
1.	Convene start	5.84	5.89	0.05	0.07	0.03	4.85
2.	Grab Start	5.57	5.58	0.06	0.06	0.02	0.29*
3.	Forward Weighted Track Start	5.40	5.91	0.11	0.16	0.09	18.81
4.	Rear Weighted Track Start	5.87	5.57	0.11	0.15	0.07	7.49

*Significant at 0.05 levels.

The table shows the name of starts, mean of control group and mean of experimental group, their standard deviation, standard difference, t-test values and number of objects. In Table 2 In conventional start, the mean of the control group is 5.84 and of the experimental group are 5.89. In grab start, the mean of the control group is 5.57 and of the

experimental group are 5.58. In forward weighted track start, the mean of the control group is 5.40 and of the experimental group are 5.91. In rear weighted track start, the mean of the control group is 5.87, and of the experimental group are 5.57. From these means, it is clear that the mean of the experimental group of each start is better than the

mean of the control group of each start respectively. (*stands for better start). Moreover, the t-test values 4.85 (conventional start), 0.29 (grab start), 7.49 (forward weighted track start), 18.81 (rear weighted track start) are >

0.05 as well as 0.01 level. Therefore, the t-test values are Significant at 1% level. In these t-test values, the value of grab start is most significant at 1% level. Mean score, standard deviation, standard difference T- test.

Table 2: Under-19, post-test result

S. No.	Name of the Starts	Mean control group	Experimental group	Std-Dev. Control Group	Experimental group	Std-Diff.	T-Test
1.	Conventional Start	5.78	5.40	0.11	0.23	0.14	8.50
2.	Grab Start	5.53	4.90	0.06	0.19	0.19	7.12*
3.	Forward Weighted Track Start	5.82	5.38	0.11	0.28	0.18	7.82
4.	Rear Weighted Track Start	5.38	5.23	0.14	0.14	0.01	53.39

* Significant at 0.01 levels.

Discussion

The table shows, name of the starts, mean of the control group and experimental group, standard deviation of the groups, their standard difference, t-test values and number of subjects. In Table 2 Unconventional start, the mean of the control group is 5.78 and of the experimental group are 5.40. In Grab Start, the mean of the control group is 5.53 and of the experimental group are 4.90. In forward weighted track start, the mean of the control group is 5.82 and of the experimental group are 5.38. In rear weighted track start, the mean of the control group is 5.38, and of the experimental group are 5.23. This shows that the mean of the experimental group of each start is better than the mean of the control group of each start respectively. (* stands for better start). And the t-test values 8.50 (conventional start), 7.12 (grab start), 7.82 (forward weighted track start), 53.39 (rear weighted track start) are > 0.01 level. Therefore, the t-test values are Significant at 1% level. In these t-test values, the value of grabs start is most significant at 1% level.

Conclusion

Finally, the following conclusions were drawn in the present study:

- (1) Performance in the start is strongly related to the overall swim performance.
- (2) There are indications that, regardless of the posture used, intensive practice of start results in significant improvement even among experienced competitive swimmers.
- (3) Increasing the amount of start practice significantly increases start performance.
- (4) For swimmer who is very explosive and symmetrical in their force production, it may be worthwhile changing to grab start where they can produce very high force levels in a short period.

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