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The Effect of Top and Bottom Start Sprint Training on the 50 Meters Freestyle Swimming Speed of Megalodon Swimming Athletes

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Abstract

The background of this research aims to analyze the effect of upper and lower start sprint training on 50 meters freestyle swimming speed in the megalodon swimming club. This type of research is a quasi-experiment. With a two groups pretest posttest research method. The subjects of this research were 14 male athletes from the KU-1 swimming club, divided into two groups, each group consisting of 7 people. The results of the study showed that the top and bottom sprint start training influenced the 50 meters freestyle swimming speed seen from the average and the paired t test hypothesis test on the pretest sprint start from the top getting an average value of 32.67 and the posttest sprint start from the top obtained a mean value of 30.29. The Paired Sample T-test on the sprint start from the bottom pretest obtained a mean value of 32.43 and the sprint start from the bottom posttest obtained a mean value of 31.86. The difference between the mean pretest and posttest sprint start from the bottom was 0.57, the independent sample t-test on the sprint start from the top group got a mean value of 30.29 and the sprint start from the bottom group got a mean value of 31.86. The average difference between sprint starts from the top and bottom is 1.57, which means there is a difference in swimming speed. An increase in the results of the 50 meters swimming speed occurred in the experimental group because the experimental group was given sprint start training from the top and bottom for 8 weeks repeatedly with training twice a week. Repeated 50 meters swimming training results in an increase in 50 meters freestyle swimming speed.

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INTRODUCTION

Swimming is a sport that is competed both individually and in groups. Swimming is a sport that involves moving body parts in water such as the arms, legs and head. Apart from that, swimming also has benefits for the body, such as training heart health, providing fun, relaxation, challenge, competition, and the ability to save yourself in an emergency in the water. Therefore, swimming is a very good sport for students. In swimming lessons, of course, many students have different backgrounds, so this becomes a challenge for teachers or lecturers in swimming courses. There are 4 swimming styles that are competed, namely breaststroke, backstroke, butterfly, and freestyle. (Destiawan, M. C., & Adi, S. 2021).

Freestyle swimming is one of the fastest styles in swimming, where it is a style that is often used by all groups, both adults and children. Basically, freestyle swimming is taken from the English translation, namely "free style". Freestyle swimming is considered an advanced swimming style, meaning that the swimmers themselves can swim freestyle if they can already swim other swimming styles, such as breaststroke. Indeed, there is no theory that requires this, but based on experience, freestyle is taught to swimmers after mastering swimming techniques with other styles. Therefore, freestyle swimming has movement techniques that you need to know so that you can easily master them. (Nursalam, H., & Aziz, I. 2020).

Freestyle swimming has several techniques that influence a person's ability to swim, including body position on the surface of the water, foot movements, hand movements, breathing, and coordination when swimming. The basic techniques that must be mastered for swimming are body position in the water or floating, leg movements or swinging the legs, paddling or hand movements, hand and foot coordination, and the respiratory system.The physical components that must be possessed and developed in order to achieve optimal performance are: endurance, muscle power, strength, flexibility, agility, coordination, balance, accuracy, reaction and speed. (Wardhani, R. 2022).

Improving sports performance is influenced by many influencing factors, which can generally be divided into two factors. Factors that influence sports success are internal factors and external factors. Internal factors are factors that come from within the athlete himself, physical skills, techniques, tactics, and mental abilities. External are factors that influence the athlete's performance from outside, on behalf of the coach, customers, climate and weather, nutrition, facilities, and infrastructure, etc. Many factors influence it as factors originating from the athlete himself, namely excellent physical performance, good technique and tactics as well as

strong mental abilities and external factors, coaches, managers, climate and weather, nutrition, infrastructure, and socio-economic factors. influence beyond the success of swimming, the coach because the coach must be able to offer training that can also improve the athlete's skills appropriate training methods. (Surahman, F. 2016).

Based on observations in the Lumban Tirta field or swimming pool among KU 1 male athletes at the Megalodon swimming club, several times during training there were still many swimmers who were not optimal in their 50-meter freestyle swimming speed. This is due to lack of strength; this can cause a lack of speed in the swimmer. One of the exercises to improve physical components, especially speed in 50-meter freestyle swimming, is sprint starts from the top and bottom. In a freestyle swimming competition, the start is made when you are about to start freestyle swimming. This means that to start freestyle swimming in a competition, a swimmer must first start as a sign of the start of freestyle swimming (Gabrilo, 2017). A good and precise start will be profitable for the swimmer because the distance is superior.

Sprint swimming is a training program to increase athletes' swimming speed. Sprint swimming training is a training method that has a variety of distances to be arranged in designing and developing an anaerobic energy system. The sprint swimming training program must be in accordance with the athlete's goals and needs, training guidelines and principles must be the benchmark for the coach to create a sprint swimming training program. (Farokie, L. K., Hariyanto, E., & Hariyoko, H. 2016). In sprinting, a good start results in optimal and long glide and coordination, requiring leg muscle power and flexibility of the stick to get a good initial body posture when you want to start freestyle swimming (Fischer & Kibele, 2016). Based on the description above, on this occasion the researcher wanted to conduct a study to obtain data and information that is close to the scientific truth regarding 'The Effect of Sprint Start Training from the Top and Bottom on the Speed of the 50 Meter Freestyle Swimming at the Megalodon Swimming Club'.

METHODS

This type of research is experimental research. It is called experimental research because this research provides treatment. This type of research experiment includes quasi experimental research (quasi experimental design). This research involves two classes of experiments. The research design used was "two groups pre-test-post-test design." namely a research design that has a pretest before being given treatment and a posttest after being given treatment, so it can be known more accurately, because it can be compared with those held before being given treatment (Mailili, 2016).

Participants

Determining the source of research data requires consideration in order to obtain data results that are relevant to the problem being studied. The element of the research object for obtaining data is called population. The population is the entire object studied in the form of people, objects, events, values, and things that happen. Based on this opinion, the target population in this research is all the athletes in the Megalodon club, totaling 72 persons

Sampling Procedures

The sampling technique used in this research is Cluster Random Sampling. Cluster Random Sampling is a technique of selecting samples from small groups of units. The research sample taken was one class taken at random.

Based on the quasi-experimental method, the main characteristics of which are without random assignment and using an existing group (intact group), the researcher uses existing groups as samples, so the researcher does not take samples from individual members of the population but in the form of classes. The reason is because if individual samples are taken, there is concern that the situation in the sample group will be unnatural. Of the seven existing classes, researchers have chosen one class, namely male athletes from KU 1 at the megalodon club as an experimental class with a total of 14 athletes.

Materials and Apparatus

In preparing your manuscript, you need to tell the reader about materials (e.g., questionnaires, stimulus words) and apparatus (e.g., devices to record data, surgical implements) that you used. In general, if researchers are likely to be familiar with your materials and apparatus, you need only mention them. But if you created your own materials, you should give a very detailed depiction of them. If you are using relatively unknown materials or apparatus created by others, you should provide a description of them and indicate to the reader where to obtain them. If you used personality inventories or questionnaires, it is a good idea to indicate levels of reliability reported by previous researchers.

Procedures

1. Initial Test (Pre-Test)

The initial test or pre-test is the first test carried out by researchers, namely by allowing athletes to swim 50 meters freestyle with the aim of finding out their time speed, so that the differences in results achieved after being given treatment can be seen. The treatment given must be achieved in less than 2-3 months.

Treatment was given in 13 meetings. After carrying out the initial test the sample was divided into two groups using ordinal pairing, namely with ABBA so it was divided into 2 groups.

2. giving treatment

The treatment in this experiment was carried out in 16 meetings, because it was deemed to have provided enough change, so the researcher tried to take the final test after the exercise which was carried out for 13 meetings. With a training frequency of between 2-6 times a week, in this study it was carried out 3 times a week.

3. Warming Up (Warming Up)

Warming up exercises are given to players for 15 minutes; this is very important because it increases body temperature and avoids the risk of injury to the athletes' toes and joints.

4. Core Training

Training is a process of systematically preparing an athlete's organism to achieve quality performance by being given physical and mental loads that are regular, directed, increasing, and repeated over time. The form of training carried out is training by swimming sprints from the top and bottom starts which are done repeatedly. In principle, this training is to increase the speed of the 50-meter freestyle swim, so the training is carried out in 16 meetings. Every week the number of sets and repetitions is increased so that there is improvement. In this exercise, the researchers took an intensity of 80-90%. To determine the number of repetitions, sets and intervals. If the training intensity is 80% then 100% is divided by 80% multiplied by the average pre-test results. So, for every maximum repetition, that is the result, for example 80% intensity, then 100 divided by 80 multiplied by the average of the pre-test results.

5. Colling Down

This relaxation is intended to restore the body to its pre-exercise condition so that muscle tension will gradually reduce to its original state so that you do not complain of pain after exercise.

Design or Data Analysis

1. Normality Test

The normality test calculation is intended to find out whether the variables in the research have a normal distribution or not. This normality test calculation uses the Shapiro Wilk method. Complete results are presented on the attachment page.

2. Homogeneity Test

The Homogeneity Test is useful for testing the similarity of samples, namely whether the variance of samples taken from the population is uniform. Test the homogeneity of pre-test and post-test data using the SPSS version 25 program. The homogeneity rule is if $p > 0.05$, then the test is declared homogeneous, if $p < 0.05$, then the test is said to be not homogeneous. The results of this research homogeneity test can be seen in the following table . Complete results are presented on the attachment page.

3. Hypothesis Testing

Hypothesis testing uses the t-test using the SPSS 25 program, namely by comparing the mean between the pretest and posttest. If the calculated t value is smaller than t table, then Ha is rejected, if

the calculated value is greater than t table then Ha is accepted. To test the hypothesis in this research, the researcher used the SPSS 25 program. To determine the percentage increase after being given treatment, the percentage increase calculation was used using the following formula:

Percentage increase = Mean Different x100% Mean Pretest Mean Different = mean posttest-mean pretest

RESULT AND DISCUSSION

> Sprint Normality Test Start from Top

Table 1. Sprint Start Normality Test From Above

Sprint Start from the Top	Signifikansi
Pretest	0,262
Posttest	0,591

Based on the table above, the normality test using Shapiro Wilk in the sprint start from above pretest got a significance value of 0.262 and the sprint start from above posttest got a significance value of 0.591. This means that both pretest and posttest data on the sprint start from the top get a significance value of > 0.05. It can be concluded that both data are normally distributed and meet the normality requirements to proceed to the paired sample t-test hypothesis test.

> Sprint Normality Test Start from the Bottom

Table 2. Sprint Start Normality Test From The Bottom

Sprint Start from the Bottom	Signifikansi
Pretest	0,262
Posttest	0,147

Based on the table above, the normality test using Shapiro Wilk in the pretest sprint start from the bottom got a significance value of 0.262 and the posttest sprint start from the bottom got a significance value of 0.147. This means that both pretest and posttest data on the sprint start from the bottom get a significance value of > 0.05. It can be concluded that both data are normally distributed and meet the normality requirements to proceed to the paired sample t-test hypothesis test.

> Normality Test for Differences in Sprint Starts from Top and Bottom

Table 3. Normality test for differences in sprint starts from the bottom.

Sprint Group	Signifikansi
Sprint Start from the Top	0,591
Sprint Start from the Bottom	0,147

Based on the table above, the normality test using Shapiro Wilk on swimming speed data for sprint starts from the top got a significance value of 0.591 and sprint starts from the bottom got a significance value of 0.147. This means that both sprint start groups from the top and bottom got a significance value > 0.05. It can be concluded that both data are normally distributed and meet the normality requirements to proceed to independent sample t-test hypothesis testing.

a. Sprint Start Homogeneity Test from Top

Table 4. sprint start homogeneity test from above

Test of Homogeneity of Variances					
		Levee Statisc	df1	df2	Sig.
Sprint Start from the Top	Based on Mean	.488	1	12	.498
	Based on Median	.353	1	12	.563
	Based on Median and with adjusted df	.353	1	12.000	.563
	Based on trimmed mean	.509	1	12	.489

Based on the table above, it can be seen that the homogeneity of variance test in the sprint start group from above obtained a significance value of 0.496 > 0.05, meaning that the sprint group data from above was homogeneous and had the same variance. This means that the data meets the homogeneous requirements to proceed to the paired sample t-test hypothesis test.

b. Sprint Homogeneity Test Start from the Bottom

Table 5. Sprint Start Homogeneity Test From The Bottom

Test of Homogeneity of Variances					
		Levene Statistic	df1	df2	Sig.
Sprint Start from the Bottom	Based on Mean	.090	1	12	.769
	Based on Median	.125	1	12	.730
	Based on Median and with adjusted df	.125	1	10.225	.731
	Based on	.074	1	12	.791

Based on the table above, the homogeneity of variance test in the sprint start group from the bottom obtained a significance value of 0.769

> 0.05 means that the sprint group data from below is homogeneous and has the same variance. This means that the data meets the homogeneous requirements to proceed to the paired sample t-test hypothesis test.

c. Homogeneity Test for Differences in Sprint Start from Top and Bottom

Table 6. tests differences in sprint start homogeneity from top to bottom.

		Levene's Test for Equality of Variances	
		F	Sig.
Swimming Speed	Equal variances assumed	.216	.651
	Equal variances not assumed		

Based on the table above, it can be seen that the homogeneity test using Levene's Test for Equality of Variances in the sprint start groups from the top and bottom got a significance value of 0.651 > 0.05, meaning that the sprint group data from the top and bottom were homogeneous and also had the same variance. This means that the data meets the homogeneous requirements to proceed to independent sample t-test hypothesis testing.

a. The Effect of Top Start Sprint Training on 50m Freestyle Swimming Speed at the Megalodon Swimming Club

Table 7. Hypothesis Test Of The Effect Of Sprint Start Training From Above.

Sprint Start from the Top	Mean	Difference	thitung	p-value
Pretest	32,57	2,28	12,394	0,000
Posttest	30,29			

Based on the table above, it can be seen that the paired sample t-test on the pretest sprint start from above got a mean value of 32.67 and the posttest sprint from above got a mean value of 30.29. The average difference between the pretest and posttest sprint start from the top is 2.28, which means there is a difference in swimming speed between the pretest and posttest. The table above also gets a tcount value of 12.394.

> ttable 2.44691 and a significance value of 0.000 < 0.05, meaning that there is an influence between the pretest and posttest in sprint start training from the top on the 50 meter freestyle swimming speed at the Megalodon Swimming Club.

b. Effect of Bottom Start Sprint Training on 50m Freestyle Swimming Speed at the Megalodon Swimming Club.

Table 8. Tests The Hypothesis Of The Effect Of Sprint Training Starting From The Bottom

Sprint Start from the Bottom	Mean	Difference	thitung	p-value
Pretest	32,43	0,57	1,922	0,103
Posttest	31,86			

Based on the table above, it can be seen that the paired sample t-test on the pretest sprint start from the bottom got a mean value of 32.43 and the posttest sprint from the bottom got a mean value of 31.86. The average difference between the pretest and posttest sprint start from the bottom is 0.57, which means there is no difference in swimming speed between pretest and posttest. The table above also gets a tcount value of 1.922 < ttable 2.44691 and a significance value of 0.103> 0.05 means there is no influence between the pretest and posttest on sprint start training from the bottom on the 50-meter freestyle swimming speed at the Megalodon Swimming Club.

c. The Effect of Top and Bottom Start Sprint Training on 50m Freestyle Swimming Speed at the Megalodon Swimming Club.

Table 9. Tests The Hypothesis Of The Effect Of Sprint Start Training From Above And Below.

Swimming Speed	Mean	Difference	t_{hitung}	p-value
Sprint Start from the Top	30,29	1,57	-2,157	0,052
Sprint Start from the Bottom	31,86			

Based on the table above, it can be seen that the independent sample t-test in the sprint start group from the top got a mean value of 30.29 and the sprint start group from the bottom got a mean value of 31.86. The average difference between sprint starts from the top and bottom is 1.57, which means there is a difference in swimming speed but not that much. The table above also gets a tcount value of 2.157 < ttable 3.05454 and a significance value of 0.052

> 0.05 means there is an influence between sprint start training from the top and bottom on the 50 meter freestyle swimming speed at the Megalodon Swimming Club. This study aims to determine the effect of upper and lower sprint start training on 50-meter freestyle swimming speed in the megalodon swimming club. Analysis was carried out using the T-test to determine the effect of upper and lower start sprint training on 50-meter freestyle swimming speed in the megalodon swimming club.

CONCLUSION

Effect of Top Start Sprint Training on 50m Freestyle Swimming Speed at the Megalodon Swimming Club. The results of the analysis show that there is an influence on the 50-meter freestyle swimming speed for Ku-1 athletes in the megalodon swimming club using the top and bottom sprint start training methods before and after training. This is shown by the T-count that the paired sample t-test on the pretest sprint start from above got a mean value of 32.67 and the posttest sprint from above got a mean value of 30.29. The average difference between the pretest and posttest sprint start from the top is 2.28, which means there is a difference in swimming speed between the pretest and posttest. This means that there is an influence between the pretest and posttest in the sprint start training from the top on the 50 meter freestyle swimming speed at the Megalodon Swimming Club, especially KU-1 athletes. Effect of Bottom Start Sprint Training on 50m Freestyle Swimming Speed at the Megalodon Swimming Club. The results of the analysis show that there is an influence on the 50-meter freestyle swimming speed for Ku-1 athletes in the megalodon swimming club using the top and bottom sprint start training methods before and after training. This was demonstrated by the paired sample t-test on the pretest sprint start from the bottom getting a mean value of 32.43 and the posttest sprint from the bottom getting a mean value of 31.86. The average difference between the pretest and posttest sprint start from the bottom is 0.57, which means there is no difference in swimming speed between pretest and posttest. This means that there is no influence between the pretest and posttest in the sprint start training from the top on the 50-meter freestyle swimming speed at the Megalodon Swimming Club, especially KU-1 athletes.

Effect of Top and Bottom Start Sprint Training on 50m Freestyle Swimming Speed at the Megalodon Swimming Club. The results of the analysis show that there is an influence on the 50-meter freestyle swimming speed for Ku-1 athletes in the megalodon swimming club using the top and bottom sprint start training methods before and after training. Based on the independent sample t-test, the sprint start group from the top got a mean value of 30.29 and the

sprint start group from the bottom got a mean value of 31.86. The average difference between sprint starts from the top and bottom is 1.57, which means there is a difference in swimming speed but not that much. This shows that the more significant influence is the sprint start from the top.

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