



## **Push Up Exercise Against 50 Meter Swimming Speed Breaststroke**

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### **Abstract**

The aim of this study was to evaluate the influence of push-up training on improving the speed of breaststroke swimming in athletes who are members of the Palembang Tirta Sriwijaya Aquatic Club (TSAC). This study was conducted as an experiment using a one-group pretest and posttest research design. The research subjects included athletes who are part of the Palembang Tirta Sriwijaya Aquatic Club (TSAC). The research sample involved all members of age group III with an age range of 12-13 years consisting of 30 individual athletes. The tool used to measure variables is the breaststroke swimming test using a distance of 50 meters. The data analysis was conducted utilizing the T-test. Based on the analysis results, the t-value exceeded 4.762, while the t-table value was 2.045. These results indicate a significant difference between the pretest push-up and posttest push-up groups in relation to the improvement in 50-meter breaststroke swimming speed. The conclusion of this study revealed that push-up exercises had a positive impact on increasing breaststroke swimming speed as far as 50 meters.



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## INTRODUCTION

Sports activities are activities that teach individuals to compete with sportsmanship, learn to accept defeat in competition, bring up fair play ethics, develop a spirit of resilience, and from another point of view, sport also has the potential to improve one's physical fitness (Radif et al., 2019). The government is relentlessly pursuing sports development by monitoring potential and initiating early development. Intensive education and training in the field of physical activity aimed at achieving achievements, based on a deeper understanding and more efficient application of technology, and efforts to improve the quality of the organizational structure in the world of sports, both at the national and regional levels. Based on the provisions contained in Article 27 (1) of the Law of the Republic of Indonesia Number 3 of 2005 concerning the National Sports System, together with the Executive Rules of the Republic of Indonesia Number 16 of 2007 concerning the implementation of sports activities, it is explained that the implementation and development in the sports achievement sector are enforced and is focused on achieving brilliant sporting results at regional, national and international levels. Because of this, various coaching efforts have been carried out by government agencies, both at the national and regional levels, including in the form of sports such as football, martial arts, volleyball, basketball, badminton, taekwondo, swimming, and others. Therefore, in the realm of sports, there are organizational entities that are specifically responsible for developing the potential of athletes who achieve achievements.

In the realm of swimming, there is also an organizational entity, known as the International Swimming Association, or better known as FINA (International Swimming Federation), which is a forum

for regulating aquatic sports. Aquatics refers to various types of physical activity in the water, including swimming, playing water polo, diving, and artistic swimming, which are recognized globally, while in Indonesia, a similar organization overseeing swimming is PRSI (Association of Indonesian Swimming). (Arhesa, 2020) Swimming has been around since ancient times, with significant health benefits because it involves the activity of all body parts while moving in the water. According to (Arhesa, 2019) swimming is an attempt to make the body float or rise to the surface of the water. Swimming involves movement of the body's limbs and the ability to float in water, which results in free movement of all body parts. (Noora, 2017) revealed that competitive swimming is included in the most competitive sports category in the world. The main characteristic, swimming is a well-coordinated collaboration of limb and body movements, so that a person moves in the water as quickly and efficiently as possible.

Based on previous research from (Yeni et al., 2019) the findings from this study indicated that the mean score at the pretest was 0.57 while at the posttest stage it had increased to 0.62. Thus, it can be seen that there was an increase of 0.05. This shows that there is a significant effect of push-up training on breaststroke swimming performance as far as 50 meters in male athletes aged 15-17 years in Karimun Regency. Apart from that, there is also research from (Chan & Effendi, 2020) From the research results, it can be concluded that climbing and descending stairs and push-up training have been proven to have a significant effect in improving the ability to swim breaststroke as far as 50 meters for people. novice athlete from the Tirta Kaluang club in Padang City. This is proven by the *t* value (3.42 for male athletes and 3.06 for female

athletes) which is greater than the  $t$  value (2.13 for male athletes and 2.92 for female athletes). In the category of male athletes, the average speed of swimming the breaststroke is 50 meters in the initial stages. testing was 50.04, while in the final test the average was 48.79. Therefore, there is an increase in the average speed of 1.25.

Aquatic organizations request that the role of the coach is a very important role in developing every available age group. One of the steps taken is to improve the quality and caliber of trainers. Coaches must face the periodization of training programs for these athletes (Widi et al., 2022). The optimal method for improving performance in breaststroke swimming, both for achievement and speed-increasing exercises with movement precision and optimal results, requires the implementation of exercises that integrate certain components and strategies. This goal is to provide a basis for athletes in producing successful individuals in the world of sports.

Based on observations made by researchers on Wednesday, February 15 2023, at the Tirta Sriwijaya Aquatic Club Palembang, some of the male athletes aged 12-13 years old, their ability to swim breaststroke still had deficiencies in the speed aspect. Several factors that influence this are often making movements that hinder breaststroke swimming speed, including weakness in the arm pulls made by athletes and lack of strength in leg kicks when swimming. Based on the achievement information that I got at the Tirta Sriwijaya Aquatic Club Palembang in 2022, the Tirta Sriwijaya Aquatic Club Palembang won third place with 14 gold, 20 silver and 10 bronze medals for a total of 44 medals, of the 44 medals produced there were 4 medals. which was obtained in the breaststroke number at the Governor's Cup regional championship in Sumatra. For this reason, the researchers

felt interested in carrying out a study entitled "The influence of Push Up training on 50 meter breaststroke swimming speed in Tirta Sriwijaya Aquatic Club Palembang athletes".

Swimming has an important role as a means of social interaction and relaxation. Swimming sports activities involve action in the water with a variety of styles that have been introduced for a long time, providing various benefits for humans (Yudha et al, 2021). In its context, swimming is a form of sports activity carried out in water, involving body movements and floating on the surface of the water, with the body as a whole moving freely (Wahyudi, 2015). Swimming activities involve several variations of styles, including freestyle, back, chest, and butterfly which are variations of swimming techniques. Each type of style involves a combination of hand, foot and breathing techniques to move the body to the surface of the water with the aim of achieving top speed when approaching the finish line. Therefore, swimming is a form of sports activity that provides many positive benefits in supporting the health and growth of the body (Imansyah & Akhbar, 2021). Based on expert opinion, it can be concluded that swimming is a physical activity carried out in water carrying out a series of predetermined movements. This swimming sport includes four variations of swimming styles, including free techniques, chest techniques, back techniques, and butterfly techniques.

Breaststroke in swimming is often known as "frog swimming" because the movements imitate the movement of a frog when swimming. This swimming style is also known as "breaststroke" in English. Breaststroke is a type of swimming technique, where after the start and after the body rotates, the first movement that is carried out is the arm rowing, followed by the position of the body facing down and

the shoulders in a parallel position above the water surface (Shava, Kusuma and Rustiadi, 2017). Breast swimming technique is one part of swimming activities that is liked by adults, because this sport is often taught in schools that have swimming extracurricular activities. In breaststroke swimming there is not only one body position but consists of a sequence of several body positions (Imansyah, 2017). Breaststroke has experienced two different forms of development: traditional breaststroke which is suitable for recreational activities and modern breaststroke which is more geared towards achieving achievements. These two forms have significant differences in their movement techniques. In traditional breaststroke, the rowing movement of the arms extends further to the back, and the lifting movement of the legs occurs by opening wide to the side. Meanwhile, in modern breaststroke, the pulling movement of the arms is only parallel to shoulder width, and the width between the two knees when bent is only hip width (Badruzaman, 2013).

Based on expert opinion, it can be concluded that breaststroke swimming is a swimming technique with the body position facing down, the movement of the hands pulling the water to the side, then kicking both legs outwards and doing it repeatedly until the desired distance. Training is an iterative process of practicing that is carried out regularly, including increasing skills, physical capacity and energy, as well as paying attention to educational aspects (Sari, Hartati and Aryanti, 2019). To achieve an achievement in a sport requires programmed training (Hartati et al., 2021). Exercise is a part of physical activity carried out in a structured plan. This is exercise that involves repetition of body movements with the aim of improving or maintaining one or more components of physical fitness (Hartati,

Bayu and Aryanti, 2020). Training is a series of systematically structured practice activities, which need to be repeated with the aim of improving a person's skills, energy capacity and physical condition, while paying attention to related educational aspects (Pebrian, et al, 2021). Exercise can be interpreted as an effort to improve or maintain performance or achievement, both in the context of sports achievements and in sports activities in the school environment, exercise for physical health, and involves aspects of prevention and recovery (Anisa et al, 2023).

From the viewpoint of experts, we can conclude that Exercise is an action performed by an individual with full awareness and repeated periodically. According to (Syamsuramel et al, 2019) speed refers to skills in moving certain body parts or moving places in a very short period of time. Meanwhile, according to (Ridwan & Sumanto, 2018) Speed is the trained ability to produce body movements in a very short time or conditions that require a fast response. Another opinion expressed by (Henjilito, 2017) regarding reaction speed is the capacity of an organism or tool to respond to stimuli as quickly as possible to achieve optimal results. On the other hand, according to (Firmansyah & Victorian, 2017) an individual's running speed is usually limited to a distance of 60 meters. Therefore, if a sprinter runs 100 meters, his minimum speed includes 60 meters, and the rest falls under the acceleration category.

Based on the views of experts, it can be summarized that speed is an individual's ability to move from one place to another in a very short time. According to (wahyu, 2015) strength is an element of physical condition that is required in almost all types of sports, including swimming. Meanwhile, according to (Roziandy and Budiwanto,

2018) power refers to the ability of muscles to contract quickly or briefly, which involves a combination of peak strength, speed of muscle contraction, and muscle coordination. Meanwhile, according to (Kelly & Jameson, 2016) muscle strength is an important component for performance in explosive activities such as sprinting, throwing and jumping. Based on the views of experts, it can be concluded that power is a muscle ability that is very important for athletes in training.

Push ups are a form of physical activity that prioritizes increasing muscle strength in the arms. Every physical activity in an exercise program always produces changes in aspects such as body structure, physiology, biochemistry and psychology of the individual who carries it out (Mustaqim, 2018). Push-ups are a type of physical exercise intended to develop muscle strength in the arms and shoulders, which can be done by doing push-ups. This effect arises because the push-up movement consistently involves these muscles in the process, a number of muscles in the shoulder, chest and arm areas work with high intensity (Saparuddin, 2019).

Doing push ups has high effectiveness in increasing strength and stamina. From a different perspective, push-ups are a very useful exercise for developing muscle strength in the arms and shoulders (Ridwan and Sumanto, 2018). Based on the views of experts, it can be concluded that push-ups are an effective physical exercise program for increasing muscle strength in the arms and stomach area.

## METHODS

The research method applied is an experimental approach with a pre-test and post-test design carried out in one group in a research design called "one group pretest

and posttest design." Based on the theory that doing physical exercise over a period of 4-6 weeks can result in significant increases in skeletal muscle strength, weight loss, increased speed, and improvements in fat and glucose metabolism (Wijayanti, Mandan and Sari, 2019). duration of exercise applied over a 6-week period. In the context of this format, the pre-test steps are carried out before the treatment is given, while the post-test is carried out after the treatment is given. The aim of this study was to evaluate the impact of push-up training on increasing speed in breaststroke swimming. 50 meters long for athletes who are part of the Tirta Sriwijaya Aquatic Swimming Club Palembang.

## Participants

Population Refers to all individuals, events, or objects that are the focus of research, where the results of the research will apply in general. In the context of this research, the population consists of all members of the Tirta Sriwijaya Aquatic Club men's swimming team, totaling 45 individuals.

## Sampling Procedures

The sample in this research was selected using a purposive sampling approach in accordance with the method applied by (Ramadhani Khija, ludovick Uttoh, 2015). The number of samples taken was 30 individuals from male swimming athletes who were members of the Tirta Sriwijaya Aquatic Club Palembang.

## Materials and Apparatus

The tools used to collect data involved an initial test, which consisted of a 50-meter breaststroke swimming sprint measured using a stopwatch, as well as the same final test, namely a 50-meter breaststroke swimming sprint which was also measured using a stopwatch.

Meanwhile, the treatment instrument used involved a training method using push up exercises.

### Procedures

Within the framework of this study, the instruments used to collect information were the initial test in the form of a 50-meter sprint breaststroke, measured using a stopwatch, and the final test, in the form of a 50-meter breaststroke sprint, also measured using a stopwatch. Meanwhile, the treatment instrument used involved a training method using push up exercises.

The following are the stages undertaken in the initial examination stage (pretest) and final examination stage (posttest):

- 1) Record the participant's identity and provide instructions regarding the aim and purpose of this initial test.
- 2) Prepare the tools and facilities needed for the research, including 2 stopwatches used by 2 timers, a whistle as a start marker, and prepare a swimming pool with a distance of 50 meters for the test location.
- 3) Measure the time in the 50 meter breaststroke swimming sprint (pretest) using a stopwatch.

Using the following stages:

- 1) Provide instructions for getting started.
- 2) The athlete jumps from the starting block.
- 3) The athlete performs a breaststroke swimming sprint for 50 meters.
- 4) The athlete reaches the finish line and the time is recorded by the time taker.
- 5) Data from the initial test (pretest) are arranged in sequence and sorted by ranking, while data from the final test (posttest) is processed.

**Table1.** Breaststroke swimming assessment

No.	Son	Score	Criteria
1.	< 00.37.59	5	Very well
2.	00.37.60 – 00.40.90	4	Good
3.	00:40.91 – 00.44.22	3	Enough
4.	00.44.23 – 00.47.54	2	Not enough
5.	> 00.50.86	1	Very little

Source: PRSI (Indonesia Open Aquatic Champions 2022)

Below is a series of steps implemented:

- 1) Collect information regarding the identity of participants and provide instructions regarding the purpose of this research.
- 2) Prepare the tools and facilities needed for the research, including 2 stopwatches used by 2 time observers, a whistle to start, and prepare a 50 meter long swimming pool for the test location.
- 3) Measure the time in the 50 meter breaststroke swimming sprint in the initial test (pretest) and final test (posttest) using a stopwatch.

Using the following steps:

- 1) Give the signal to start.
- 2) The athlete jumps from the starting block.
- 3) The athlete does a 50 meter swimming sprint in a breaststroke.
- 4) The athlete reaches the finish line and the time is recorded by the time observer.
- 5) The results of the initial test (pretest) are collected and sorted by rank. The results of the final test (posttest) involve processing and analyzing data from the two tests.
- 6) Providing intervention in the form of a training program after the pretest stage with an equivalent amount of training during 18 meeting sessions to

members of the Tirta Sriwijaya Aquatic Club in Palembang.

**Design or Data Analysis**

The data analysis method applied in this research is through the use of the t-test. This analytical approach was applied to identify results regarding swimming speed in the 50 meter breaststroke. Complete calculations are assisted by the SPSS 29 computer program.

**RESULT**

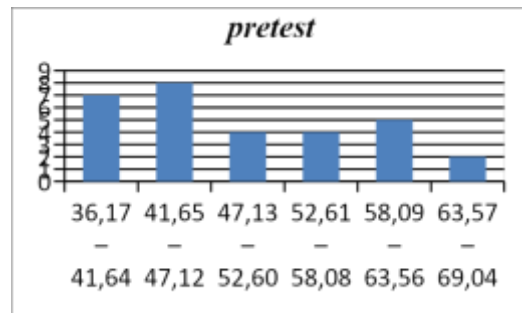
The tool used to collect information is a 50-meter breaststroke sprint test. To get more detailed results, the test results can be seen as follows:

**Table 2.** List of Distribution of 50 Meter Breaststroke Swimming Pretest Results

Class Intervals	Fi	Xi	Fi.Xi	Xi <sup>2</sup>	Fi.Xi <sup>2</sup>
36,17 – 41,64	7	38,90	272,30	1.513,21	10.592,47
41,65 – 47,12	8	44,38	355,04	1.969,58	15.756,64
47,13 – 52,60	4	49,86	199,44	2.486,01	9.944,04
52,61 – 58,08	4	55,34	221,36	3.062,51	12.250,04
58,09 – 63,56	5	60,81	304,05	3.697,85	18.489,25
63,57 – 69,04	2	66,30	132,60	4.395,69	8.791,38
Amoun t	30	314,78	1.484,79	17.124,85	75.823,82
		8	9	5	2

From table 2 which records the distribution of pretest results for 50 meter breaststroke swimming, we can conclude that there are 30 data entries. The total of the mean values (Xi) is 314.78, with the sum of the multiplication between the frequency (Fi) and the mean value (Xi) of 1,484.79. In addition, the sum of the squared values (Xi<sup>2</sup>) is 17,124.85, and the total of the product of frequency (Fi) and squared values (Xi<sup>2</sup>) is 75,823.82.

Information from this pretest distribution list can also be illustrated in the form of a histogram:



**Figure 1.** Pretest Distribution Histogram

Based on the pretest distribution histogram shown in Figure 1, it can be identified that the data generated from the pretest has several middle values distributed in certain intervals. There are several groups of data with a certain mean value and number of individuals in each class interval.

There were 7 people with a mean value of 38.90, which was in the class interval 36.17 to 41.64. Furthermore, there were 8 people with a mean value of 44.38, which fell into the class interval 41.65 to 47.12. A total of 4 people had a mean value of 49.86, which is in the class interval 47.13 to 52.60. Furthermore, there were 4 people with a mean value of 55.55, which fell into the class interval 52.79 to 58.32. The five individuals had a mean of 60.81, which falls within the class interval of 52.61 to 58.08. Finally, there were 2 people with a mean value of 66.30, which was in the class interval 63.57 to 69.04. A detailed display of the posttest results can be observed in the following description:

**Table 3.** List of Distribution of 50 Meter Breaststroke Swimming Posttest Results

Class Intervals	Fi	Xi	Fi.Xi	Xi <sup>2</sup>	Fi.Xi <sup>2</sup>
36,86 – 42,28	8	39,57	316,56	1.565,78	12.526,24
42,29 – 47,71	7	44,98	314,86	2.023,20	14.162,40

47,72 – 53,14	4	50,43	201,72	2.543,18	10,17	2,72
53,15 – 58,57	3	55,86	167,58	3.120,33	9,360,	99
58,58 – 64,00	6	61,29	367,74	3.756,46	22,53	8,76
64,01 – 69,43	2	66,72	133,44	4.451,55	8.903,	10
Amount	30	318,8	1.501,90	17.460,50	77,66	4,21

From table 3 which records the distribution of posttest results for 50 meter breaststroke swimming, we can conclude that there are 30 data entries. The total of the mean values ( $X_i$ ) is 318.85, with the sum of the multiplication between the frequencies ( $F_i$ ) and the mean values ( $X_i$ ) of 1,501.90. In addition, the sum of the squared values ( $X_i^2$ ) is 17,460.50, and the total of the product of frequency ( $F_i$ ) and squared values ( $X_i^2$ ) is 77,664.21.

The information contained in the posttest distribution list can then be realized in the form of a histogram, as can be observed in the following illustration:

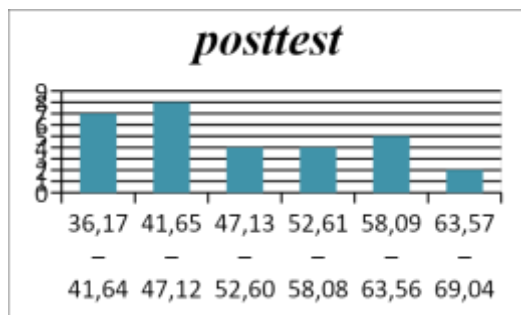


Figure 2. Posttest Distribution Histogram

Based on Figure 2, we can see the posttest distribution histogram which reflects the data obtained. The data is divided into several class intervals with the mean values and number of individuals as follows:

The mean value is 39.57 (class interval 36.86 - 42.28) with a total of 8 people, the mean value is 44.98 (class interval 42.29 - 47.71) with a total of 7

people, the mean value is 50.43 (class interval 47.72 - 53.14) with a total of 4 people, the mean value is 55.86 (class interval 53.15 - 58.57) with a total of 3 people, the median value is 61.29 (class interval 58.58 - 64.00) with a total of 6 people, and a median value of 66.72 (class interval 64.01 - 69.43) with a total of 2 people.

Testing for normal distribution of data was carried out using the Shapiro-Wilk test using SPSS software version 29, with test criteria ranging from (-1) to (+1), which indicates that the data distribution is normally distributed. Details of the normality test results can be observed in the following table:

**Table 4.** Normality test

	Tests of Normality					
	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Pretest	.149	30	.088	.916	30	.021
Posttest	.142	30	.126	.914	30	.019

Based on the results of the normality test, it is known that the pretest significance value is 0.021 and posttest 0.019. Thus, it can be stated that the residual value has a normal distribution. The hypothesis proposed in this study aims to assess the impact of push-up training on breaststroke swimming performance in a distance of 50 meters in Tirta Sriwijaya Aquatic Club Palembang athletes. Hypothesis testing is carried out by applying the One Sample t-test through the use of SPSS version 29 software. The test criterion is whether  $H_a$  (alternative hypothesis) can be declared very valid if the  $t_{count}$  exceeds the  $t_{table}$  value at a significance level  $\alpha = 0.05$  (with degrees of freedom  $D_k = N - 1$ ), then it can be concluded that the results of hypothesis testing have a sufficient level of



significance. Conversely, if the tcount value is lower than the ttable value at the same significance level, then the results of hypothesis testing are considered less significant or do not reach the specified significance level. You can see the details of the results of hypothesis testing in the table provided:

**Table 4.** Hypothesis test

	Paired Samples Test									
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig.	One-Sided p	Two-Sided p
				Lower	Upper					
F pretest - posttest	.66267	.76223	.13916	-.94729	.37804	4.762	29	<.001		<.001

Based on the table presented, it can be concluded that push-up training has a significant impact on increasing the speed of swimming the breaststroke as far as 50 meters in athletes from the Tirta Sriwijaya Aquatic Club (TSAC) Palembang. This is reinforced by the fact that the tcount (4.762) is greater than the ttable (2.045) at a significance level of  $\alpha = 0.05$ . Therefore, the alternative hypothesis ( $H_a$ ) can be accepted, while the null hypothesis ( $H_0$ ) is rejected. These results indicate that push-up training has a significant positive effect on increasing breaststroke swimming speed in these athletes.

## DISCUSSION

This study was conducted with the aim of identifying a significant effect on the results of swimming the 50 meter breaststroke. after being given Push Up training treatment to athletes from the

Tirta Sriwijaya Aquatic Club (TSAC) Palembang. To observe this improvement, a pre-test was carried out at the beginning of the meeting before engaging in the Push Up exercise and a post-test was carried out at the last meeting in the 50 meter breaststroke swim. Based on this research, it was carried out on 30 athletes with a focus on push-up training which aims to increase breaststroke swimming speed as far as 50 meters and the athletes are members of the Tirta Sriwijaya Aquatic Club (TSAC) Palembang. This research is included in the category of population research with a population of 45 athletes and from this population, researchers took a sample of 30 athletes.

The results showed that the increase in breaststroke swimming speed as far as 50 meters increased after undergoing the Push Up training program carried out three times a week for six weeks. Push Up training is a type of physical exercise that focuses on developing arm and shoulder muscle strength. When doing push-ups, the muscles in the front shoulders, chest and arms work with high intensity (Saparuddin, 2019). From the analysis of the data that has been presented, it can be concluded that after the experimental group underwent the Push Up training program for 6 weeks, with a training frequency of 3 times a week, there was a significant increase in the average posttest results for swimming the 50 meter breaststroke. The pretest data showed an initial average of 49.66, while the posttest data showed a final average of 50.33. This shows that the Push Up exercise has a significant positive impact on increasing the speed of swimming the breaststroke as far as 50 meters. The results of the normality test also show that both groups, pretest and posttest, have distributions that are close to normal, strengthening the validity of the data analysis. Furthermore, the results of the hypothesis test show that

there is a significant difference between the pretest and posttest, with the tcount value (4.762) exceeding the ttable value (2.045). Therefore, the null hypothesis ( $H_0$ ) can be rejected, and the alternative hypothesis ( $H_a$ ) is accepted.  $H_a$ 's statement stated that "There is an effect of Push Up training on increasing swimming speed of 50 meters breaststroke (breaststroke)." In other words, the results of statistical tests support that Push Up training has a significant impact on increasing breaststroke swimming speed as far as 50 meters." This shows that Push Up training significantly influences increasing breaststroke swimming speed as far as 50 meters in Tirta Sriwijaya Aquatic Club athletes (TSAC) Palembang. To achieve success, it is important to continue planned and continuous practice (Purba, 2016). Based on research conducted by (Siregar, 2013) The results showed that push-up training had a significant impact on increasing the swimming speed of breaststroke athletes from Ilham Rizal Club (IRC) in Padangsidempuan City in 2013. With a tcount that exceeds the ttable value ( $7.62 > 1.83$ ), this confirms that there is a significant difference between the pre-test and post-test results.

In addition (Arhesa, 2019) It can be concluded that push-up and squat jump exercises significantly contribute to an increase in freestyle swimming speed in athletes from the Arhesa Swimming Club. This was confirmed by statistical analysis which showed that the tcount reached 12.89, which was far greater than the ttable value of 2.045. Thus, the results of this study indicate that the combination of push-up and squat jump exercises has the potential to significantly increase freestyle swimming speed in these athletes. Another study conducted by (Aulia, 2019) The results of the study confirmed that the implementation of the Band Swim and Push Up training programs significantly

played a significant role in increasing arm muscle strength and breaststroke swimming speed in novice swimming athletes practicing at Tirta Kaluang Padang. Similar findings were also found in a previous study conducted by (Yeni et al., 2019).

The results showed that push-up training had a significant impact on increasing breaststroke swimming speed as far as 50 meters in male swimming athletes in the 15-17 age group. Karimun Regency in 2017. The tcount value of 5.26 proved to be higher than the ttable value of 2.77, indicating that there was a significant difference between the results before and after push-up training. This shows that push-up exercises make a positive contribution to increasing breaststroke swimming speed in this group of athletes. In research conducted by (Abarca, 2021) the findings of this study indicate that training up and down stairs and push-up training had a significant influence on increasing the speed of swimming 50 meters breaststroke in novice athletes who were members of Tirta Kaluang, Padang City. In the group of male athletes, the average swimming speed of the 50 meter breaststroke in the initial test was 50.04, and after undergoing the final test, the average speed reached 48.79, indicating an average increase of around 1.25. All of these studies consistently show that push-up training has a positive impact that is evenly distributed on increasing breaststroke swimming speed in various categories of athletes and in various situations.

## CONCLUSION

From the assessment results, it can be concluded that Push Up training has a positive impact on increasing the speed of 50 meter breaststroke swimming in athletes from the Tirta Sriwijaya Aquatic Club (TSAC) Palembang. Pretest data

revealed that the largest value was 69.04 and the smallest value was 36.17, with an initial average of approximately 49.66. After following the Push Up training program for 6 weeks by doing the exercises 3 times a week, there was an average increase of around 0.67 on the posttest. The results of the posttest show that the largest value is 69.38 and the smallest value is 36.86, with an average of 50.33. This shows that Push Up training positively influences the increase in breaststroke swimming speed in TSAC Palembang athletes. The conclusion of this study is that the Push Up exercise can be considered as an effective form of exercise in increasing speed in swimming the 50 meter breaststroke. The results of this study make a positive contribution in the context of swimming athlete training, which can be used by coaches and athletes to improve their performance in swimming competitions.

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