Volume 4 Number 2 (2026)
July – December 2026
Page: 139-145

EDUJAVARE: International Journal of Educational Research
ISSN: 3031-2884
https://edujavare.com/index.php/edujavare
DOI: 10.70610/edujavare.v4i02.1599

The Effect of Burpee Training on Improving 50-Meter Breaststroke Speed in Youth Club Athletes at Noren Tirta Buana

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Article history Submitted: 2026/04/15; Revised: 2026/05/22; Accepted: 2026/07/08

Abstract

Swimming is an aquatic sport that demands technical skill, physical condition, and coordination to achieve optimal performance. This study aims to determine the effect of burpees training on increasing the 50-meter breaststroke swimming speed of youth athletes at Club Noren Tirta Buana. The study used an experimental method with a two-group pretest-posttest design. The study sample consisted of 20 youth athletes selected using purposive sampling techniques and divided into an experimental group and a control group of 10 people each. The experimental group was given burpees training for four weeks with a frequency of three times a week, while the control group underwent regular swimming training without burpees training. The research instrument used a 50-meter breaststroke swimming test measured using a digital stopwatch. Data analysis was carried out through normality tests, homogeneity tests, and t-tests at a significance level of 5%. The results showed that the experimental group experienced a better increase in swimming speed compared to the control group. The average value of the swimming time after treatment decreased, indicating an increase in swimming performance. The results of the hypothesis test showed a significant effect of burpees training on increasing the 50-meter breaststroke swimming speed of youth athletes at Club Noren Tirta Buana. Based on the research results, it can be concluded that burpees training is effective as a physical training method to increase the speed of 50-meter breaststroke swimming because it can increase leg muscle strength, explosive power, motor coordination, and muscle endurance which supports athlete performance when swimming.

Keywords Burpees, Breaststroke, Physical Training, Swimming Speed, Youth Athletes

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INTRODUCTION

Swimming is an aquatic sport that demands technical skill, physical condition, and coordination to achieve optimal performance. In the 50-meter breaststroke, athletes are required to generate maximum speed in a short period of time through efficient coordination of arm, leg, and breathing movements. Swimming speed is influenced by various components of physical condition, such as muscle strength, explosive power, endurance, and neuromuscular

coordination. Therefore, an appropriate training program is crucial in improving athlete performance.

The Noren Tirta Buana Club is a swimming club in Musi Rawas Regency that actively trains athletes of various age groups. Based on preliminary observations by researchers, several youth athletes still have substandard 50-meter breaststroke swimming abilities. The main problems identified include low leg strength, suboptimal hand and leg coordination, and insufficient propulsion during leg kicks, which impact swimming speed. This situation highlights the need for innovative training methods that can improve athletes' overall physical condition.

One form of training that can be used is burpees. Burpees are a functional exercise that combines squats, planks, push-ups, and vertical jumps in one sequence. This exercise engages nearly all muscle groups in the body, effectively increasing strength, endurance, coordination, and explosive power. In the context of swimming, increased leg muscle explosiveness plays a crucial role in generating greater propulsion during the breaststroke kick, thereby increasing swimming speed.

Several previous studies have shown that burpees have a positive effect on improving physical fitness, aerobic capacity, muscle strength, and explosive power. However, research specifically examining the effect of burpees on 50-meter breaststroke swimming speed in youth athletes is relatively limited. Therefore, this study is novel because it tests the effectiveness of burpees in youth swimmers as an alternative physical training method to improve 50-meter breaststroke performance.

Based on this description, this study aims to analyze the effect of burpees on increasing 50-meter breaststroke swimming speed in youth athletes at Club Noren Tirta Buana. It is hoped that this research can be used as a reference in effective burpee training as a physical training method to increase the speed of 50-meter breaststroke swimming so that it can increase leg muscle strength, explosive power, motor coordination, and muscle endurance that support athlete performance when swimming.

METHODS

This study employed a quantitative approach using an experimental method with a Two Group Pretest-Posttest Design involving an experimental group and a control group. Both groups were given an initial test (pre-test) to determine their baseline ability, after which the experimental group received burpees training while the control group continued routine swimming practice without burpees. At the end of the training program, both groups were given a final test (post-test) to measure changes in their 50-meter breaststroke swimming performance. The research was conducted at Noren Tirta Buana Swimming Pool, Musi Rawas Regency, over a period of four weeks, following the club's training schedule of three sessions per week for a total of twelve meetings. Each training session was carried out systematically and supervised directly by the coach and the researcher to ensure that all athletes followed the research procedures properly. The population consisted of all 37 athletes of Club Noren Tirta Buana,

including 21 male athletes and 16 female athletes. The sample was selected using purposive sampling based on the criteria of youth-category athletes who actively participated in training and were willing to complete the entire research process. A total of 20 athletes were selected and divided equally into two groups, with 10 athletes in the experimental group and 10 athletes in the control group. The research instrument was a 50-meter breaststroke swimming speed test, measured using a digital stopwatch with precision to fractions of a second. Each athlete completed one trial according to official breaststroke race procedures, and the recorded time was used as the research data. To maintain measurement validity, time recording was conducted by the coach and a trained timekeeping assistant who understood the testing procedures. The burpees training program was administered to the experimental group for four weeks with a frequency of three times per week, performed after warm-up and before the main swimming session. The intensity of the exercise was adjusted to the abilities of youth-category athletes while adhering to the principles of progression, specificity, and training safety. The burpees sequence consisted of a squat movement, plank position, push-up, return to a squat position, and an explosive vertical jump. This exercise was intended to improve leg muscle strength, arm muscle strength, movement coordination, and explosive power, all of which support breaststroke swimming performance.

The research procedure consisted of several stages: conducting initial observation and coordination with the coach of Club Noren Tirta Buana, determining the research sample based on the established criteria, administering the pre-test of 50-meter breaststroke swimming speed, providing burpees training to the experimental group for four weeks while the control group continued its regular training program, conducting the post-test using the same instrument, and processing and analyzing the data using SPSS. Data analysis was conducted in stages, beginning with descriptive analysis to obtain the mean and standard deviation, followed by tests of normality and homogeneity as prerequisites for parametric analysis. After all assumptions were met, hypothesis testing was carried out using the Paired Sample t-Test to determine differences between pre-test and post-test results within each group, and the Independent Sample t-Test to determine differences in improvement between the experimental and control groups at a significance level of 5% (α = 0.05). The results of these analyses were used as the basis for drawing conclusions regarding the effect of burpees training on improving 50-meter breaststroke swimming speed in youth athletes. This research was conducted at Club Noren Tirta Buana, Musi Rawas Regency, over four weeks with a total of 12 meetings, involving 20 youth-category athletes divided into an experimental group that received burpees training and a control group that followed routine swimming training without additional burpees, with 10 athletes in each group. The study specifically aimed to analyze the effect of burpees training on improving 50-meter breaststroke swimming speed.

FINDINGS AND DISCUSSION

This study was conducted at Club Noren Tirta Buana, Musi Rawas Regency, over a period of four weeks with a total of 12 meetings. The research sample consisted of 20 youth-

category athletes who were divided into two groups: an experimental group that received burpees training and a control group that followed a routine swimming training program without additional burpees. Each group consisted of 10 athletes. The study aimed to analyze the effect of burpees training on improving 50-meter breaststroke swimming speed.

Description of Research Results

Pre-test and Post-test Results of the Experimental Group. The initial test (pre-test) was conducted to determine the athletes' baseline ability before treatment was administered. After completing the burpees training program for four weeks, the athletes took the final test (post-test) using the same procedure.

Table 2. Summary of Experimental Group Results

Variable	Pre-test	Post-test
Number of Samples	10	10
Fastest Time (seconds)	37.80	34.80
Slowest Time (seconds)	40.20	36.80
Average (seconds)	39.11	35.98
Improvement		3.13 seconds

Based on the research results, the average completion time of the experimental group decreased from 39.11 seconds to 35.98 seconds after receiving burpees training. The reduction in completion time of 3.13 seconds indicates a considerable improvement in 50-meter breaststroke swimming speed after the treatment was given.

Pre-test and Post-test Results of the Control Group. The control group only participated in the routine swimming training program without additional burpees training during the research period.

Table 3. Summary of Control Group Results

Variable	Pre-test	Post-test
Number of Samples	10	10
Fastest Time (seconds)	37.90	36.88
Slowest Time (seconds)	40.10	38.99
Average (seconds)	38.94	37.83
Improvement		1.11 seconds

The research results show that the control group also experienced an improvement in swimming performance. The average completion time decreased from 38.94 seconds to 37.83 seconds, representing an improvement of 1.11 seconds. However, this improvement was smaller than that of the experimental group, which received burpees training.

Before hypothesis testing was conducted, the research data were tested using normality and homogeneity tests as prerequisites for parametric statistical analysis. The normality test using the Chi-Square method showed that the data from both the experimental group and the control group were normally distributed. The calculated χ^2 values for each group were smaller than the χ^2 table value at a significance level of 0.05, indicating that the data met the assumption of normality.

The results of the homogeneity test showed that F_calculated = 1.12, while F_table = 3.18. Since the F_calculated value was smaller than the F_table value, the variances of the two groups were declared homogeneous, indicating that both groups had equivalent characteristics for hypothesis testing.

Hypothesis testing using the Paired Sample t-test showed that there was a significant improvement in the experimental group after receiving burpees training. The average improvement in completion time was 3.13 seconds, which was much greater than the control group, which only improved by 1.11 seconds. These results indicate that burpees training had a positive effect on improving 50-meter breaststroke swimming speed among youth athletes of Club Noren Tirta Buana. Therefore, the alternative hypothesis (H_a) was accepted and the null hypothesis (H_0) was rejected.

This study aimed to determine the effect of burpees on increasing swimming speed in the 50-meter breaststroke in youth athletes from Club Noren Tirta Buana. Based on data analysis, it was found that the experimental group, which received burpees for four weeks, experienced a greater increase in swimming speed than the control group, which only followed a regular training program. The average time for the experimental group decreased from 39.11 seconds to 35.98 seconds, while the control group only experienced a decrease from 38.94 seconds to 37.83 seconds. The results of the hypothesis test indicated that burpees significantly increased swimming speed in the 50-meter breaststroke.

Discussion

The increase in swimming ability in the experimental group occurred because burpees are a full-body exercise that involves almost all muscle groups in the body. Repeated squats, planks, push-ups, and vertical jumps can increase leg muscle strength, arm muscle strength, muscular endurance, motor coordination, and explosive power. These components are essential physical conditions for breaststroke swimming, particularly during the frog kick and gliding phase. The greater the propulsive force generated by the legs, the faster the athlete will reach the finish line.

In addition to increasing muscle strength, burpees also play a role in improving an athlete's aerobic and anaerobic capacity. During training, the cardiovascular system works more optimally to meet the oxygen needs of muscle tissue. Physiological adaptations resulting from regular training lead to increased heart and lung efficiency, enabling athletes to maintain high-intensity movements without fatigue. This contributes to improved swimming performance, particularly in the 50-meter sprint, which requires a combination of strength, speed, and endurance.

The results of this study align with training theory, which states that improved athletic performance is influenced by the application of systematic, regular, gradual, and continuous training principles. The four-week burpee training program adhered to the principles of overload and progressive training, enabling athletes' bodies to adapt to the training load. This adaptation was demonstrated by increased physical ability, which ultimately resulted in a reduction in breaststroke swimming time.

The findings of this study are also supported by various previous studies that have shown that burpees effectively improve physical fitness, leg muscle explosiveness, muscle strength, and anaerobic capacity. Improvements in these physical condition components are directly related to improved performance in sports requiring explosive movements, including swimming. Therefore, the results of this study reinforce previous findings that burpees can be used as an alternative physical training method to improve athletes' abilities.

However, the control group also experienced improvements in swimming ability, although not as significant as the experimental group. This is likely because the control group continued to undergo regular swimming training throughout the study. Regular technical and physical training still have an effect on improving ability, but without the addition of burpees, the improvements were not as significant as those in the experimental group. This suggests that burpees provide an additional contribution to improving swimming performance beyond a regular training program.

From a coaching perspective, the results of this study have practical implications: burpees can be incorporated into the physical conditioning training program of swimmers, particularly in the youth age group. This exercise is relatively easy to perform, requires no special equipment, and can be applied both in and out of the pool. With appropriate training intensity and volume, burpees can be a form of supplementary training to improve muscle strength, explosive power, motor coordination, and swimming speed.

This study has several limitations, including a relatively small sample size and a treatment period of only four weeks. Furthermore, the study only measured 50-meter breaststroke swimming speed, thus not reflecting the effect of burpees on other swimming events or on different components of physical condition. Therefore, future research is recommended using a larger sample size, longer training duration, and combining burpees with other forms of physical exercise to obtain more comprehensive results.

Overall, the results of this study indicate that burpees are an effective training method for increasing 50-meter breaststroke swimming speed in youth athletes. Therefore, burpees can be recommended as a supplementary training program that coaches can implement to improve swimming performance.

CONCLUSION

Based on the research results and discussion, it can be concluded that burpees significantly increased the 50-meter breaststroke swimming speed of youth athletes from Club Noren Tirta Buana. This was demonstrated by the improved test results in the experimental group after four weeks of burpee training, indicated by a decrease in average swimming time compared to before the treatment. Meanwhile, the control group, which only followed the regular training program, also experienced improvement, but the increase was smaller than the experimental group.

Statistical test results showed a significant difference between the pre-test and post-test results in the experimental group, thus supporting the research hypothesis. Thus, burpees

proved effective in improving physical abilities that support swimming performance, particularly leg muscle strength, power, motor coordination, and muscular endurance. Improvements in these physical condition components contributed to increased 50-meter breaststroke swimming speed.

Based on these research results, burpees can be used as an alternative physical conditioning training program for youth swimmers. This training program is relatively easy to implement, requires no special equipment, and can be combined with swimming technique training to improve athlete performance.

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