14 (3) (2025) 1229 - 1234
Journal of Physical Education, Sport, Health and Recreations
https://journal.unnes.ac.id/journals/peshr

The Difference in the Effect of Using Fins and Zoomers on the Improvement of 50-Meter Backstroke Swimming Speed

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Article History

Received October 2025
Accepted October 2025
Published Vol.14 No.(3) 2025

Keywords:
Fins; Zoomer; Backstroke; Swimming Speed; Training Methods

Abstract

This study was conducted to examine the extent to which the use of fins and zoomers affects the improvement of 50-meter backstroke swimming speed among athletes of the Tri Cakti Semesta Semarang Club. A quantitative approach with a two-group pretest-posttest design was used. Twenty athletes were selected as participants and divided into two groups: the first group trained using fins, while the second group trained with zoomers. Data were collected through swimming speed tests conducted before and after 16 training sessions. The results were analyzed using Paired Samples T-Tests and Independent Samples T-Tests. The findings showed that both fins and zoomers significantly improved athletes' 50-meter backstroke swimming performance, with an average increase of 0.69 seconds and 0.72 seconds, respectively. However, a comparative analysis did not show a significant difference between the two training methods. In conclusion, both tools can be considered equally effective as training variations to support the improvement of backstroke swimming performance.

How to Cite

Pertiwi, A. L., & Supriyono. (2025). The Difference in the Effect of Using Fins and Zoomers on the Improvement of 50-Meter Backstroke Swimming Speed. Journal of Physical Education, Sport, Health and Recreation, 14 (3), 1229-1234.

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p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

Essentially, sport is a deliberate and structured physical activity aimed at maintaining health, improving physical fitness, and developing athletic performance. Beyond its physical benefits, sport in today's modern context also has strong social and psychological dimensions. It teaches discipline, teamwork, and self-confidence qualities that shape character and social interaction. Therefore, the development of consistent and sustainable sports programs, both recreational and competitive, plays a vital role in improving overall human well-being.

Swimming is one type of sport that is very popular in the world of sports and among the public. Swimming is one type of exercise that is refreshing, fun and also nourishes the body (Apriyadi et al., 2024) A prestigious sport competed at both the national and international levels from the National Sports Week (PON) to the SEA Games, the Asian Games, and even the Olympics. Swimmers usually enter more than one event at a competition, but the consistency or reliability of their performance between events differing in distance or stroke is an issue researchers have not previously addressed (Stewart & Hopkins, 2000).

An individual medley in swimming comprises of one competitor swimming all four strokes in the order: butterfly, backstroke, breaststroke and freestyle. A medley relay is in a different formant to the individual, instead going in the order: backstroke, breaststroke, butterfly and freestyle (GB, 2024). Of these four strokes, backstroke is unique because the swimmer performs it lying on their back on the surface of the water, requiring exceptional control of balance and body alignment. Thus, swimming does not only function as a character building tool and discipline but also as a medium to develop the potential of the young generation towards which is more positive and productive (Fendi Setyawan et al., 2024)

The 50-meter backstroke sprint is one of the most challenging events, focusing entirely on pure speed. In such a short-distance race, success depends on the athlete's ability to reach top speed in the shortest possible time while maintaining rhythm and efficiency. Swimming is done in the water, so in addition to the gravity factor of the earth it is also affected by the pressure of the water to the top (Ramadhan, 2023)

Therefore, training is a central element in building swimming excellence. A well-planned training program is not only about improving physical fitness; it also focuses on refining technique, conserving energy, and reinforcing correct motor habits. To achieve these goals, coaches often introduce a variety of exercises and use swimming aids as part of the program. This variety not only helps athletes stay motivated but also targets specific technical and physical aspects for improvement.

These instruments facilitate a diverse array of exercises that enhance endurance, balance, agility, and muscle mass, rendering them essential for swimmers with impair (Wahono & Nasution, 2022). Some research shows that exercises with aids, such as fins (swimming fins), can improve the technique and increase the thrust of the foot (Elvina et al., 2025). Zoomers, on the other hand, are shorter and designed for fast, high-frequency kicks that closely mimic natural swimming without aids. These design differences lead to differences in how each tool contributes to speed and endurance. Previous research has confirmed the benefits of using swimming aids in performance training. Fins have been shown to increase leg strength and propulsion, while zoomers are effective in improving kick rhythm and technical precision. However, studies directly comparing the effectiveness of fins and zoomers, particularly in the 50-meter backstroke, are limited.

The sport of swimming has been competed a lot from the regional to the international level, so it is necessary to conduct a talent search process so that it can be trained and can make the country proud in the future. make the country proud in the future. In the process of preparing the athlete's ability to face every competition, the coach provides various forms of training to the athlete (Haryanto & Denay, 2020)

This research gap highlights the need to explore how each aid uniquely impacts swimming performance. Such research provides valuable insights for coaches in selecting the most effective training variations based on the athlete's needs. By understanding these differences, coaches can design more targeted programs, and athletes can benefit from varied and engaging training sessions that prevent monotony and increase motivation.

In high performance sports such as swimming, organizing and monitoring training loads for athletes effectively requires a balance between external and internal load training (Widiawati et al., 2025). These findings are expected to expand the current literature and serve as a reference for future studies in the field of sports science. Innovation in training methods is crucial for developing athlete performance, especially in an era where scientific approaches are increasingly

shaping coaching practices. In conclusion, swimming particularly the 50meter backstroke requires continued innovation in training to achieve optimal speed performance. The integration of fins and zoomers into training routines offers a promising approach worthy of empirical exploration. This study aims not only to provide practical guidance for coaches and athletes but also to enrich the academic discourse on effective training methodologies in swimming development programs across Indonesia.

METHODS

This study used a quasi-experimental, Quasi-experiments are similar to randomized controlled trials in many respects, but there are many challenges in designing and conducting a quasi-experiment when internal validity threats are introduced from the absence of randomization (Capili & Anastasi, 2018). Approach with a pre-test-post-test control group design to evaluate the effectiveness of swimming aids in improving 50-meter backstroke speed. This design allows for direct measurement of performance changes before and after the training intervention. Two groups of swimmers were observed each receiving a different treatment to identify how different training aids affected their performance improvement over time. The method used is the drill method of the basic backstroke swimming technique which is carried out periodically until there is an improvement in the backstroke swimming technique that is better than before the action is carried out (Waleuru, 2020).

Participants consisted of 20 athletes from the Tri Cakti Semesta Semarang Club, aged between 15 and 18. A purposive sampling technique was used to ensure each participant met the specific research criteria. These criteria included:

1. Active membership in the club for at least one year,
2. Mastery of basic backstroke techniques, and
3. Willingness to participate consistently throughout the study period.

The athletes were divided equally into two groups. Group A trained using fins, while Group B trained using zoomers. This grouping aimed to provide a fair comparison between the two aids while maintaining similar training conditions for both.

The experiment was conducted at the Jatidiri Swimming Pool in Semarang, which meets official competition duration standards. The entire study lasted five weeks, from September 17 to October 22, 2024, with a total of 16 training sessions. The training schedule was adjusted to fit the athletes' club routines so they could participate without disrupting their regular training commitments.

The study procedure consisted of three sequential stages:

1. Pre-test (Initial Test):

All participants performed a 50-meter backstroke sprint, and their times were recorded using a high-precision digital stopwatch. This established the athletes' baseline performance before the intervention.

2. Treatment (Training Session):

The fin group performed a training session using long fins designed to increase surface resistance and strengthen leg propulsion.

The zoomer group used shorter fins that required faster kicks and a higher frequency, emphasizing speed and rhythm.

Both groups followed the same training volume and intensity, training three times a week for 16 sessions. The only variable that differentiated them was the type of swimming aid used.

3. Post-test (Final Test):

After the training program was completed, both groups underwent another 50-meter backstroke test. Their post-test results were then compared with the pre-test data to determine the degree of improvement.

The main instrument used in this study was a 50-meter backstroke swimming speed test. Performance time was recorded with a digital stopwatch accurate to 0.01 seconds. This instrument was chosen for its high reliability and validity in assessing short-distance swimming speed.

Data were analyzed through statistical tests using both Paired Sample T-Test and Independent Sample T-Test.

The Paired Sample T-Test was applied to evaluate differences between pretest and posttest scores within each group, determining whether fins and zoomers individually contributed to significant performance improvement.

The Independent Sample T-Test was used to compare posttest results between the two groups, examining whether one aid was more effective than the other.

Before conducting the tests, data were first checked for normality and homogeneity to ensure they met the assumptions required for parametric analysis.

RESULTS AND DISCUSSION

This study was conducted at the Tri Cakti Semesta Semarang Club with 20 athletes aged between 15 and 18. Training sessions took place at the Jatidiri Swimming Pool in Semarang over five weeks, with a total of sixteen sessions. Participants were divided into two equal groups: Group A, which trained using fins, and Group B, which trained using zoomers. Both groups followed identical training loads, volumes, and frequencies; the only difference was the type of equipment used.

The 50-meter backstroke sprint was used as the primary test for the pre-test and post-test phases. Performance results showed a clear improvement in both groups:

In the fin group, the average pre-test time was 34.45 seconds, while the average post-test time increased to 33.76 seconds, resulting in an average improvement of 0.69 seconds. In the zoomer group, the average pre-test time was 34.61 seconds, and the average post-test time increased to 33.89 seconds, representing an average increase of 0.72 seconds.

These findings indicate that both groups demonstrated improved speed performance after completing the training program. The observed improvements in both groups suggest that the use of swimming aids either fins or zoomers can positively impact athletes' sprint speed in the 50-meter backstroke.

The Kolmogorov–Smirnov test (hereafter the KS test) is a much used goodness-of-fit test (Steinskog et al., 2007). To ensure data validity, a Kolmogorov–Smirnov normality test was performed. It's used in statistics (like for ANOVA) and software (SPSS) where normality is an assumption, but it's better for large samples and has limitations, often being replaced or improved by the Lilliefors test (a corrected K-S for normality) in modern packages, where a p-value (Asymp. Sig.) > 0.05 typically indicates normality.

Statistical hypothesis testing was conducted using Paired Samples T-Tests and Independent Samples T-Tests:

For Group A (fins), the Paired Samples T-Test yielded a t-value of 4.435, greater than the t-table value of 1.833, with a significance level of $p = 0.002$ (<0.05). This indicates that fin training has a significant positive effect on increasing backstroke swimming speed.

For Group B (zoomers), this test yielded a t-value of 2.876, exceeding the t-table value of 1.833, with a significance level of $p = 0.018$ (<0.05). This also indicates a statistically significant increase in speed after training with the zoomer.

To examine whether there was a difference in effectiveness between the two aids, an Independent Samples T-Test was conducted on the post-test results of both groups. The analysis produced a t-value of -0.094, smaller than the t-table value of 1.734, with a significance level of $p = 0.926$ (> 0.05).

If the significant value is > 0.05, then the null hypothesis (H0) is accepted and the alternative hypothesis (H1) is rejected, if the significant value is < 0.05 then the null hypothesis (H0) is rejected and the alternative hypothesis (H1) is accepted (Magdalena & Angela Krisanti, 2019).

These results demonstrate that while both fins and zoomers significantly improved swimming speed, no statistically significant difference was found between the two. In other words, both training aids were equally effective for developing 50-meter backstroke performance.

The relatively similar improvement patterns suggest that each device contributes to performance through different but complementary mechanisms fins enhance propulsion power and leg strength, while zoomers emphasize high-frequency movement and rhythm control.

The purpose of this study was to analyze the differences in the effects of fin and zoomer use on 50-meter backstroke swimming speed in athletes from the Tri Cakti Semesta Swimming Club in Semarang. The findings indicate that both fins and zoomers have a positive and significant impact on increasing swimming speed.

Data analysis using a Paired Samples T-Test showed that the fin training group achieved significant improvements with an average increase of 0.69 seconds ($t = 4.435$; $p < 0.05$). Similarly, the zoomer training group also demonstrated significant improvements with an average increase of 0.72 seconds ($t = 2.876$; $p < 0.05$). These findings indicate that both training aids fins and zoomers contribute effectively to developing leg power and propulsive efficiency during backstroke. The consistent and systematic training program implemented over sixteen treatment sessions , The success of an accompanying strength training program is likely to depend primarily on the optimal combination of the different strength training and endurance training strategies integrated into the swimmers training program, whereby it is not possible to avoid interactions due to the large number of performance factors to be triggered (Capili & Anastasi, 2022).

However, an Independent Samples T-Test

did not reveal a statistically significant difference between the fin and zoomer groups ($t = –0.094$; $p > 0.05$). This result suggests that while both training aids resulted in improved performance, neither fins nor zoomers proved more effective than the other in increasing backstroke speed. This lack of a significant difference may be due to factors such as varying levels of technique mastery, body balance, fatigue, or motivation among athletes during training. Furthermore, the relatively small sample size ($n = 20$) and short training period (sixteen sessions) may have limited the detection of stronger differences between the two methods.

This study was conducted to test the effectiveness of using fins and zoomers as training aids in improving the 50-meter backstroke swimming speed of athletes from the Tri Cakti Semesta Semarang Club. During sixteen training sessions over five weeks, both groups followed identical training programs, differing only in the type of training aid used.

The results showed that fins and zoomers significantly improved swimming speed performance. Athletes who trained with fins improved their average time by 0.69 seconds, while those who used zoomers achieved a slightly higher improvement of 0.72 seconds. However, statistical analysis using an Independent Samples T-Test revealed no significant difference between the two groups.

From a biomechanical perspective, both fins and zoomers provide additional propulsion and resistance, engaging the lower body muscles more intensively. Fins, with their longer blades, generate greater propulsion but require stronger leg control, while zoomers with their shorter, stiffer blades encourage a faster kick rate and increase cardiovascular endurance. This combination of factors contributes to improved efficiency, power, gand overall backstroke performance. Follow a well-designed training plan that strategically incorporates drills to target specific weaknesses and refine your technique over time.

On the other hand, the use of media fins has a dual function. Fins don't just work as a thrust aid, but also as a means to increase propulsion, Improve the streamlined body, and accelerate the learning of the rhythm of foot movements and overall body coordination. By using fins, swimmers can feel the sensation of speed and ideal body position, which is difficult to achieve without aids (Ridwan et al., 2025).

The fins referred to in this research are the objects used in swimming training so that athletes can increase foot thrust and strength limbs (Fahrizal Imansyah, 2016). Despite the positive results, this study faces several limitations. The athletes were not placed in controlled conditions, so their external activity and rest schedules could not be monitored, which may have influenced performance variability.

Furthermore, differences in age and body composition among participants may have influenced training responses. The limited diversity of training programs may have also reduced athletes' motivation and enthusiasm during treatment sessions. In summary, this discussion highlights that both fins and zoomers are effective and reliable tools for increasing backstroke speed.

When practicing done with motivation that height will encourage the achievement desired goal and on the contrary (Surahman, 2016). For optimal results, future studies should involve larger samples, longer training durations, and more varied training protocols to determine the long-term effects and the most efficient combination of training aids for specific swimming techniques.

CONCLUSION

This study demonstrates that athlete performance improvement is influenced not only by the equipment used, but more importantly, by the structure, consistency, and quality of the training program. Both aids contribute to performance improvement through different mechanisms fins by increasing lower limb propulsion and strength, while zoomers by increasing kick frequency and rhythm control. When applied within a systematic and progressive training framework, these devices can effectively support the development of sprint swimming speed.

These findings indicate that both training aids are equally effective in developing short-distance backstroke swimming speed. In conclusion, both fins and zoomers are effective and reliable tools for improving 50-meter backstroke speed. While neither has been proven superior, their combined use offers a comprehensive approach to performance improvement. This study underscores that true progress in swimming performance depends not only on equipment but also on consistent, structured, and scientifically based training practices.

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