JUMORA: JURNAL MODERASI OLAHRAGA
E-ISSN: 2797-8761
Volume 5, No. 1, June 2025
DOI: 10.53863/mor.v5i1.1524
Universitas Ma'arif Nahdlatul Ulama Kebumen

Original Article Research

Training Up and Down Stairs for 50 Meter Freestyle Swimming Speed at Win's Swimming Course Swimming Club

Muhamad Ihsan Hufadz[1]*, Burhaan Shodiq[1], Bagus Aryatama[1]

[1]*Sports Engineering, Faculty of Industrial Technology, Institut Teknologi Sumatera, Indonesia*

*email corresponding author: muhamad.hufadz@ro.itera.ac.id

Received: 13/02/2025 *Revised: 11/03/2025* *Accepted: 06/04/2025*

Abstract

This study examines the effect of stair climbing exercises on the 50-meter freestyle swimming speed of athletes from Win's Swimming Club. The research aims to determine whether incorporating stair climbing exercises as a dryland training method can significantly enhance swimming performance by improving leg strength and cardiovascular endurance. This study employs an experimental research design, involving a sample of 20 swimmers divided into an experimental group and a control group. The experimental group participated in a six-week stair climbing training program in addition to their regular swimming routines, while the control group continued with their standard training program. Swimming speed data was collected before and after the intervention and analyzed using statistical methods. The results indicate that stair climbing exercises contribute to an improvement in freestyle swimming speed in the experimental group compared to the control group. These findings suggest that stair climbing exercises can serve as an effective supplementary training method for competitive swimmers. Further research is recommended to explore the long-term effects and optimal parameters of stair climbing exercises on different swimming styles.

Keywords: Climbing Up and Down Stairs, Freestyle Swimming

How to cite:

Hufadz, M. I., Shodiq, B., & Aryatama, B. (2025). Training Up and Down Stairs for 50 Meter Freestyle Swimming Speed at Win's Swimming Course Swimming Club. Jurnal Moderasi Olahraga, 5(1), 85–93. https://doi.org/10.53863/mor.v5i1.1524

1. INTRODUCTION

Swimming is one of the most popular water sports and offers numerous benefits for health and physical fitness. According to (Tahapary & Syaranamual, 2020), swimming is generally defined as the effort to float or lift the body above the water surface. It is also a sport performed in water that requires coordination of arm and leg movements. Furthermore, swimming is enjoyed by various groups, including children and adults, regardless of gender (Selis & Dermawan, 2022) Swimming is not only a recreational activity but also a competitive sport contested at various levels, from local to international competitions. In the world of competitive sports, structured and

evidence-based training is essential to enhance swimmers' performance.

One of the frequently contested swimming styles is freestyle. According to (Rusmayani & Dewi, 2023), freestyle swimming involves swinging arm movements over the water surface. This style requires strength, endurance, and optimal technique to achieve maximum speed. Therefore, various physical training methods must be implemented to improve athletes' performance in freestyle swimming. Physical training that supports muscle strength and endurance plays a crucial role in optimizing swimming speed. Additionally, factors such as flexibility, coordination, and technical efficiency also play a significant role in enhancing freestyle swimming performance.

One of the effective physical training methods for increasing muscle strength and cardiovascular endurance is stair climbing training. This exercise predominantly engages leg muscles and enhances overall body coordination. Stair climbing training targets key muscles used in swimming, such as the thighs, calves, and glutes, which contribute to generating powerful propulsion in the water. Research by (Chan & Effendi, 2020) found that stair climbing and push-up exercises influence the speed of 50-meter breaststroke swimming in athletes. Furthermore, research conducted by (Al Rasyid, 2016) stated that leg and arm muscle strengthening exercises significantly impact 50-meter freestyle swimming. Moreover, findings from (Gusfa & Ridwan, 2018)showed a significant contribution between leg muscle explosive power and arm muscle strength to the speed of 50-meter freestyle swimming.

Stair climbing training not only focuses on increasing muscle strength but also improves aerobic and anaerobic capacity. Enhanced aerobic capacity helps athletes sustain swimming speed for extended periods, while anaerobic capacity is crucial for sprinting phases, such as in 50-meter freestyle swimming competitions. Additionally, this training can help improve body movement coordination and increase core stability, contributing to the efficiency of swimming techniques. Beyond its physical benefits, stair climbing training also positively impacts athletes' mental readiness. This training enhances psychological endurance, discipline, and focus, which are essential in competitive swimming. Athletes accustomed to high-intensity training will be better prepared to handle pressure during competitions, allowing them to maintain optimal performance in every race. In the context of swimming training, land-based training methods such as stair climbing complement in-water training by developing physical attributes that support overall swimming performance.

Win's Swimming Course, as a swimming club focused on developing young athletes, requires appropriate training strategies to improve its athletes' achievements. The implementation of stair climbing training is expected to become one of the training methods that can enhance the 50-meter freestyle swimming speed of the club's athletes. This training can be combined with other exercises to create a more comprehensive and effective training program. To further enhance the benefits of stair climbing training, it is essential to integrate it into a structured and periodized training plan. Coaches should determine the appropriate frequency, intensity, and duration to optimize results while minimizing the risk of injury. Additionally, combining stair climbing with resistance training and in-water drills can create a well-rounded training regimen that targets multiple aspects of swimming performance. According to (Farida et al., 2022), a combination of land and water-based training produces more significant improvements in athletes' overall physical condition compared to single-modality training.

Furthermore, individual differences in athletes' physical conditions should be considered

when implementing stair climbing training. Some athletes may require modifications or additional recovery time based on their fitness levels. Coaches should monitor progress regularly and adjust training programs accordingly. Consistent assessments and feedback can help optimize the effectiveness of stair climbing training and ensure athletes achieve their maximum potential.

Based on these considerations, this study aims to analyze the effect of stair climbing training on the 50-meter freestyle swimming speed of athletes at Win's Swimming Course. This study is expected to contribute to developing effective and evidence-based training strategies to enhance swimmers' performance. Additionally, the findings of this study are expected to serve as a reference for swimming coaches in designing more optimal training programs to maximize athletes' freestyle swimming speed.

This research also provides insights into the importance of land-based training in improving swimmers' abilities, which can ultimately be applied to various competitive swimming training programs. Furthermore, with the increasing body of scientific evidence regarding the effectiveness of physical training in enhancing swimming performance, it is hoped that swimming clubs will adopt more diverse and evidence-based training methods to support athletes' development to the fullest. Future research should explore long-term adaptations to stair climbing training and its effects on various swimming styles, providing a more comprehensive understanding of its benefits for competitive swimmers.

2. METHOD

This research design employs an experimental method. According to (isaac, Stephen, 1977) experimental research aims to investigate possible cause-and-effect relationships by applying one or more treatment conditions to one or more experimental groups and comparing the results with one or more control groups that do not receive the treatment. This study involves a sample of 20 swimming athletes, divided into an experimental group and a control group. The experimental group participates in a stair-climbing training program three times per week for six weeks in addition to their regular swimming routine, while the control group continues following the standard training program.

2.1 Participants

The participants in this study are athletes from Win's Swimming Course in Bandar Lampung, aged 7–11 years. This age range is considered a productive period for developing skills and abilities. Additionally, these athletes actively participate in swimming competitions in Lampung.

2.2 Research Design

This research design employs an experimental method, involving a sample of 20 swimmers divided into an experimental group and a control group. The experimental group follows a stair-climbing training program for six weeks in addition to their regular swimming routine, while the control group continues with the standard training program. Swimming speed data before and after the intervention are collected and analyzed using SPSS as the statistical data analysis method.

2.3 Instruments

In this study, we used a national-standard swimming pool in Bandar Lampung as the

research instrument. A stair-climbing training program was implemented over six weeks. Additionally, a stopwatch and written records were used to document the timing data for the pre-test and post-test measurements.

2.4 Procedures

The data collection technique in this study used the purposive sampling method, with criteria including athletes aged 7–12 years from the Win's Swimming Course Club in Bandar Lampung who actively participate in competitions, are physically and mentally healthy, and total 20 participants. These athletes were divided into two groups: an experimental group of 10 participants and a control group of 10 participants. The experimental group received additional stair-climbing training for 60 minutes, three times per week, over six weeks. This training aimed to assess its impact and effectiveness on 50-meter freestyle swimming speed. Throughout the treatment, all athletes were highly enthusiastic and actively followed the coach's instructions until the program was completed.

Data collection was conducted by measuring the 50-meter freestyle swimming speed before the stair-climbing program and reassessing it after the program in both the experimental and control groups.

Data Analysis

In this study, data analysis was conducted using the ANOVA test in SPSS. This analysis aimed to examine the effect of two independent variables (experimental/control group and pre-/post-intervention time) on swimming speed.

3. RESULTS

Table 1. Homogeneity Test

Tests of Homogeneity of Variances

		Levene Statistic	df1	df2	Sig.
PreTest	Based on Mean	0,150	1	18	0,703
	Based on Median	0,000	1	18	1,000
	Based on Median and with adjusted df	0,000	1	12,803	1,000
	Based on trimmed mean	0,117	1	18	0,736
PostTest	Based on Mean	0,324	1	18	0,576
	Based on Median	0,000	1	18	1,000
	Based on Median and with adjusted df	0,000	1	11,905	1,000
	Based on trimmed mean	0,252	1	18	0,622

Souece : Primary Data

JUMORA: JURNAL MODERASI OLAHRAGA
E-ISSN: 2797-8761
Volume 5, No. 1, June 2025
DOI: 10.53863/mor.v5i1.1524
Universitas Ma'arif Nahdlatul Ulama Kebumen

Table 2. Anova Test

Experimental Group and Control Group Research Results from the Learning Model

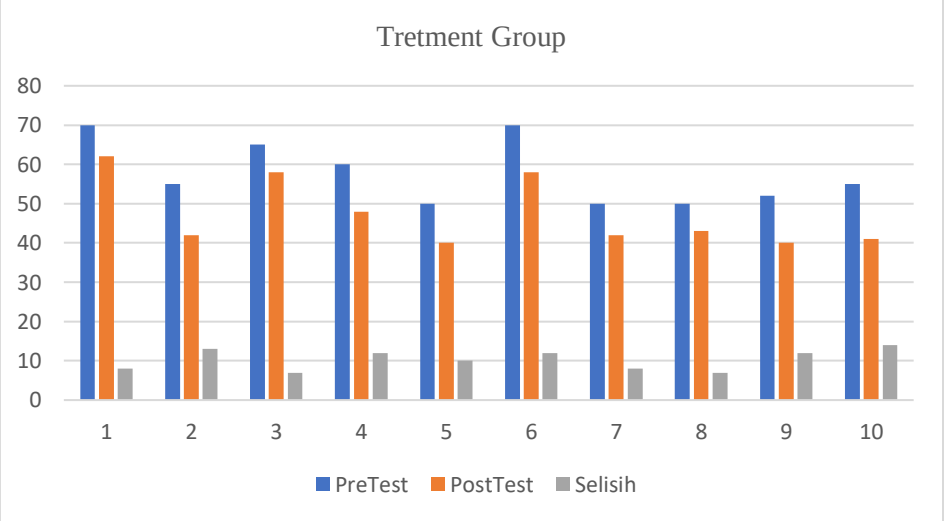
ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
PreTest	Between Groups	20,000	1	20,000	0,346	0,564
	Within Groups	1040,200	18	57,789		
	Total	1060,200	19			
PostTest	Between Groups	336,200	1	336,200	5,240	0,034
	Within Groups	1154,800	18	64,156		
	Total	1491,000	19			

Source: Primary Data

Figures.1.

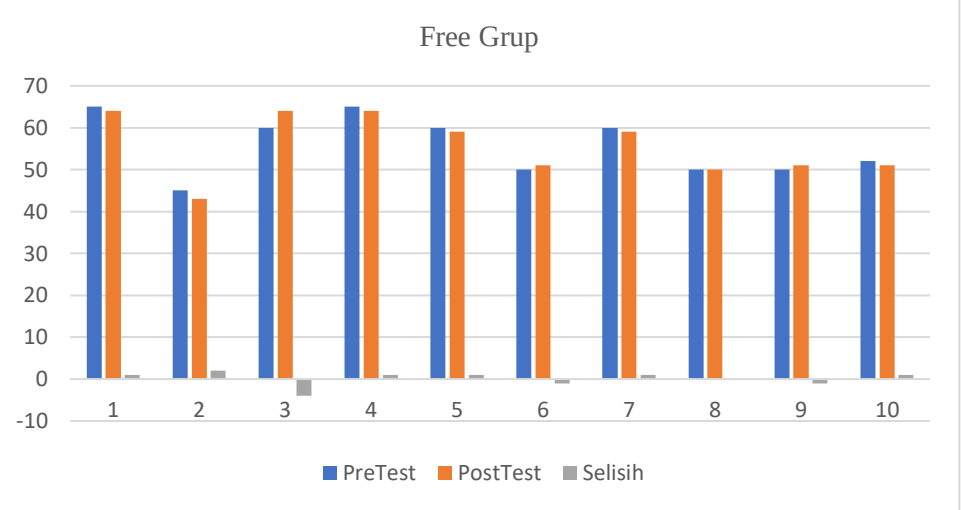
Statistics of PreTest and PostTest Data in the Treatment Group.



JUMORA: JURNAL MODERASI OLAHRAGA
E-ISSN: 2797-8761
Volume 5, No. 1, June 2025
DOI: 10.53863/mor.v5i1.1524
Universitas Ma'arif Nahdlatul Ulama Kebumen

Figure.2.

Pre-Test and Post-Test Data Statistics in the Free Group



Note: From the image above, we can conclude that the group that received the treatment showed significant results in the change of 50-meter freestyle swimming speed times in the PreTest, PostTest, and the difference. Meanwhile, the control group, which did not receive the treatment, showed no significant change in the 50-meter freestyle swimming speed times in the PreTest, PostTest, and the difference. Therefore, the conclusion is that the stair-climbing training intervention had a significant impact on the 50-meter freestyle swimming speed for children.

4. DISCUSSIONS

Stair climbing is a form of plyometric training that can enhance leg muscle strength, explosive power, and body coordination. These three aspects are closely related to swimming performance, especially in the 50-meter freestyle, which requires explosive power and good coordination. In a study conducted by (Kusmita et al., 2022). it was found that leg muscle strength has a significant correlation with swimming speed in the freestyle stroke. Additionally, research by (Prastiwi et al., 2022) also showed that plyometric exercises, such as stair climbing, can improve muscle explosive power, which contributes to swimming speed.

Leg muscle strength is crucial in swimming, as the kicking motion is the primary factor in generating forward propulsion. This movement involves major muscles such as the quadriceps, hamstrings, gastrocnemius, and soleus. Stair climbing helps strengthen these muscles by adding resistance due to gravity and the repetitive intensity of the movement. According to research by (Dewi & Ilmy, 2021) training that specifically targets leg muscles can enhance an athlete's performance in aquatic sports, including swimming.

Explosive muscle power refers to the ability of muscles to generate force in a short amount of time, which is highly essential in short-distance swimming like the 50-meter freestyle. Stair climbing involves explosive movements that increase the explosive power of the leg muscles. In a study by (Al Rasyid, 2016) it was found that high explosive power allows swimmers to perform faster starts and stronger kicks in the water. This demonstrates that stair climbing directly contributes to swimming speed by improving muscle explosive power.

Besides strength and explosive power, body coordination is also a critical factor in swimming. Swimming requires harmonious movements between the arms, legs, and breathing.

Stair climbing enhances coordination between the legs and upper body, as it requires balance and good control while ascending and descending. According to research by (Rahmawati, 2021). good coordination can reduce water resistance and improve swimming movement efficiency. Thus, stair climbing can help swimmers maintain a better swimming rhythm.

Several studies have proven the effectiveness of physical training in improving swimming speed. A study by (Rohman, 2019) found that the application of interval training methods contributed to increased swimming speed in the 50-meter freestyle. Although this study did not specifically examine stair climbing, the results indicate that training targeting strength and explosive power can positively contribute to swimming performance.

In the Homogeneity Test for the PreTest, the significance value obtained was 0.703, and for the PostTest, the significance value was 0.576 (both greater than 0.05). This indicates that the variance between groups in the PreTest data is homogeneous. Therefore, it is valid to proceed with the ANOVA test. In the ANOVA test, the results for the PreTest showed a significance value (Sig.) of 0.564, which is greater than 0.05. This means there is no significant difference in the average PreTest scores between the groups. However, for the PostTest, the significance value (Sig.) was 0.034, which is less than 0.05. This indicates a significant difference in the average PostTest scores between the groups.

The research findings indicate that stair-climbing training has a significant impact on improving 50-meter freestyle swimming speed in children. This training effectively enhances leg muscle strength, explosiveness, and body coordination, which play a crucial role in generating a stronger push in the water. In contrast, the group that did not receive the treatment showed no significant changes, emphasizing the need for structured interventions to improve swimming performance.

These findings are relevant for the development of young swimming athletes, where stair-climbing exercises can be integrated into training programs to improve physical strength and speed. However, this study has limitations, such as a limited sample size and a short training duration. Further research with a broader scope and longer duration is needed to confirm the long-term results and overall impact of this training.

5. CONCLUSIONS

Based on the research findings, it can be concluded that stair-climbing training has a significant impact on improving 50-meter freestyle swimming speed in children. The group that received the treatment showed significant changes in the PreTest, PostTest, and time differences, while the group without the treatment did not show significant changes.

Thus, stair-climbing exercises have proven to be an effective physical training method that can enhance leg muscle strength and swimming speed. This training is recommended to be integrated into children's swimming training programs to optimally support athletic performance improvement.

Acknowledgment

The author expresses gratitude for the cooperation and support in completing this research. In particular, appreciation is extended to the coaches, athletes, and all members of Wins

Swimming Club for their contributions to the implementation of this study. The support and participation provided were highly valuable in achieving optimal results.

REFERENCES

Al Rasyid, H. (2016). *Hubungan Kekuatan Otot Tungkai Dan Kekuatan Otot Lengan Dengan Hasil Renang Gaya Bebas 50 Meter Pada Atlet Millennium Aquatic Swimming Club*. UNIVERSITAS NEGERI JAKARTA.

Chan, Y. A., & Effendi, H. (2020). Pengaruh Latihan Naik Turun Tangga Dan Latihan Push Up Terhadap Kecepatan Renang 50 Meter Gaya Dada. *Jurnal Stamina*, *3*(6), 322–334.

Dewi, K. A. K., & Ilmy, S. K. (2021). The benefits of swimming training in dealing with stress in school-age children: A quasi-experimental study in Bali: Swimming reduces children's stress. *Promotion and Prevention in Mental Health Journal*, *1*(2), 64–68.

Farida, F., Sulistyaning, A. R., & Sari, H. P. (2022). Jus kombinasi semangka kuning (Citrullus lanatus (Thunb.) Matsum. & Nakai)-pisang raja (Musa acuminata x Musa balbisiana) meningkatkan endurance dalam aktifitas aerobik. *AcTion: Aceh Nutrition Journal*, *7*(1), 8–14.

Gusfa, G. S., & Ridwan, M. (2018). Kontribusi Daya Ledak Otot Tungkai Dan Kekuatan Otot Lengan Terhadap Kecepatan Renang Gaya Bebas 50 Meter Atlet Renang Tirta Kaluang Padang. *Jurnal Patriot*, 160–166.

isaac, Stephen, and W. B. M. (1977). *Handbook in Reaserch and Evaluation*.

Kusmita, F. S., Nurudin, A. A., & Saleh, M. (2022). Latihan Daya Tahan Kekuatan Otot Tungkai Untuk Meningkatkan Kecepatan Renang Gaya Bebas 50 Meter. *Jurnal Educatio FKIP UNMA*, *8*(3), 1052–1057.

Prastiwi, B. K., Ratimiasih, Y., Royana, I. F., & Zhannisa, U. H. (2022). Pengaruh latihan interval untuk meningkatkan kecepatan gaya bebas 50 meter atlet Pekan olahraga dan seni mahasiswa nasional (Porsenasma) Upgris. *Jurnal Sport Science*, *12*(2), 139.

Rahmawati, I. (2021). PENGARUH LATIHAN OTOT TUNGKAI TERHADAP KECEPATAN RENANG GAYA BEBAS 50 METER PADA ATHLET PUTRI DI PERKUMPULAN RENANG SWIMMER TIRTA KARTIKA METRO TAHUN PELAJARAN 2020/2021: PENGARUH LATIHAN OTOT TUNGKAI TERHADAP KECEPATAN RENANG GAYA BEBAS 50 METER PADA ATHLET PUTRI DI PERKUMPULAN RENANG SWIMMER TIRTA KARTIKA METRO TAHUN PELAJARAN 2020/2021. *JURNAL ILMIAH MAHASISWA ROSALIA*, *3*(1), 293–303.

Rohman, U. (2019). Application of Interval Training Method in Increasing 50-Meter Freestyle Swimming Speed. *Jurnal Ilmiah SPIRIT*, *19*(1), 59–67.

Rusmayani, N. G. A. L., & Dewi, K. A. K. (2023). Penerapan Pembelajaran Renang Gaya Bebas Terhadap Hasil Belajar Renang Gaya Bebas. *SPRINTER: Jurnal Ilmu Olahraga*, *4*(2), 260–265.

Selis, S., & Dermawan, D. F. (2022). Analis Kesesuaian Gerak Dasar Renang Gaya Bebas Pada Atlet Renang Club Amphibi Kabupaten Karawang. *Jurnal Pendidikan Dan Konseling (JPDK)*, *4*(6), 12551–12555.

Tahapary, J. M., & Syaranamual, J. (2020). Basic Engineering Training Can Improving Free Swimming Result. *Journal Science of Sport and Healthy*, *1*(1), 87.