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Swimming Resistance Band (Strech Cord) Training: An Experimental Study on Swimming Optimisation of Cenderawasih Swimming Club Jayapura Athletes

Zainal Widyanto*[1], Andi Syaiful[2], Ibrahim[3], Ipa Sari Kardi[4], Saharuddin Ita[5], Ince Abdul Muhaemin M[6], Marsuki[7], Ansar CS[8]

[1,2,3,4,5,6,7,8] Affiliation : Physical Education, Health and Recreation, Faculty of Teacher Training and Education, Universitas Cenderawasih, Papua, Indonesia.

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Abstract

Freestyle swimming is one of the numbers in swimming that is often contested. Therefore, training methods must be appropriate in an effort to increase the speed of athletes. This study aims to increase the swimming speed of 50 meters freestyle athletes Cenderawasih Swimming Club Jayapura, Papua through resistance band training using strech cord. Type of experimental research to determine the effect of training on 50m freestyle swimming speed. The population amounted to 144 athletes and the sample used amounted to 20 athletes selected using purposive sampling with the criteria of athletes who have participated in provincial level competitions. Data collection techniques using the 50 meter freestyle swimming test. Hypothesis testing using paired samples t test to determine pretest and posttest differences from resistant band (strech cord) interventions. The results obtained a P-value of 0.001 <0.05 which indicates a significant effect of the resistance band (strech cord) training method on the 50 meter swimming speed of Jayapura Swimming Club athletes. Based on the results of the study, it is concluded that the application of resistance band training needs to be added to the swimming training program in an effort to optimize freestyle swimming speed.

*Corresponding email : zainal.widyanto@gmail.com

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INTRODUCTION

Papua as the host of PON XX 2021, has produced 6 medals (1 gold, 4 silver and 1 bronze) from 6 swimming numbers in the swimming sport (Handoko, 2021). Whereas there are 38 swimming numbers that can still be an opportunity for Papua's victory. For stakeholders, this achievement is very unfortunate, but it also needs to be grateful and evaluated to improve future achievements.

Swimming is a competition to find the fastest swimmer in water (Harmoko & Sovensi, 2021). Various challenges in trying to dominate underwater movements, make swimming a sport that requires more effort than other sports. The dominance of achievement in the water requires various factors to win the competition.

The development of sports science in the field of sports performance is currently growing. All efforts to break through the limits of normal human ability are getting closer through training programmes, balanced nutrition, and some scientific engineering in various fields. Interest in studying the impact of pool temperature on swimming performance is increasing (Imran et al., 2021). Experimental studies in this area will involve manipulating pool temperature and measuring the resulting changes in swimming performance.

Researching the effect of resistance bands (strech cord) on 50 metre freestyle swimming speed performance serves to improve physical abilities during swimming training, of course, the development of physical strength and speed is an effective impact resulting from training using swimming-specific rubber, this is seen from the elastic nature of the rubber which can pull the body backwards while swimming so that the body expends energy to pull the rubber by swimming (Sari et al., 2023). Second, special swimming exercise rubber (strech cord) can also provide effective and efficient benefits when swimming, where the resistance bang strech cord can be used by tying the rubber end to the pool and the other end is tied to the body (Fish, 2020). Third, resistance bands (strech cords) also provide a good advantage by only using the side of the pool without having to swim to the end of the pool (Topreview, 2016).

In an effort to dominate the winning numbers in swimming sports at the PON XX Papua 2021 event, swimming sports stakeholders have made several efforts that are classified as radical in helping to improve the results of training programmes. Efforts that have been made by Papuan swimming coaches include strict athlete screening so that 26 competitive swimming athletes are obtained, placing athletes in integrated training facilities at the Gelora Bung Karno complex - Jakarta. In addition to these efforts, KONI Papua also brings swimming sports consultants from abroad (Kandipi, 2021).

Resistance Band (Strech Cord) or training aids made of rubber and used to exercise weight or strength in the water,

by tying it to the waist and then pulling it by swimming so that muscle strength can provide excellent physical condition (Rusli & Abadi, 2022). Resistance Band (Strech Cord) aims to increase strength, flexibility and speed. Muscle strength is very influential on the continuity of the same movement in a short time. So with increased strength comes increased speed. So muscle strength is very influential on the freestyle swimming speed that will be achieved (Epriyani et al., 2022).

The purpose of conducting a research study on the effect of training using a resistence band (strech cord) on 50 metre freestyle swimming speed performance. Basically, freestyle swimming is an easier swimming number than breaststroke, backstroke, and butterfly (Dharma Sanjaya & Rediani, 2022). What is the effect of resistence band (strech cord) on freestyle swimming speed? How does the resistence band (strech cord) affect the strength of arm muscles and leg muscles in freestyle swimming? How does the resistence band (strech cord) affect the endurance of freestyle swimming speed? Therefore, Cenderawasih SC Jayapura swimming athletes will be involved in this study as subjects to be analysed to improve the winning factor in the upcoming competition.

By conducting an experimental study, the researcher will be able to isolate the effect of training with a resistence band (strech cord) on freestyle swimming performance and provide accurate data-based recommendations for the optimal resistence band (strech cord) in the pool. This information could benefit a number of stakeholders, including swimming coaches, swimming facilities and swimwear manufacturers. Findings from this study can inform best practices for swimming training and competition and support the development of new technologies and products to improve swimmer performance and comfort.

METHODS

Researchers chose to use experimental research design (Valencia et al., 2022) with a one group pretest-posttest design and the entire population of Cenderawasih SC Jayapura athletes as a sample of 20 athletes. Although this design has several weaknesses, this design is ideal for Cenderawasih SC Jayapura athletes. The researcher's reason is to conduct a pre-test and post-test where in the test, Cenderawasih SC Jayapura athletes' performance will be pushed towards the maximum. Basically, Cenderawasih SC Jayapura athletes are designed to reach peak performance during targeted competition events. Moving on from this reason, the researcher only conducted two tests to reduce interference during the training programme.

The instrument that will be used to measure and assess swimming performance is to take part of Reichmuth's research used to measure 50 metre freestyle swimming speed performance.

Procedures

The research procedure, resistance bands (strech cord) on swimming performance, will outline a systematic and structured approach to conducting an experimental study focusing on swimming performance. The researcher designed the research questions to obtain valid and reliable results. The researcher will explain the stages of the study through several stages as follows: 1) The first step in this experimental research procedure is to formulate the research question and define the problem or issue that is the purpose of the research; 2) The second step is to compile a literature review. Literature review involves reviewing existing research and knowledge on the research topic, to identify gaps in knowledge and to inform the research design. During the literature review, relevant theories, models and previous studies are reviewed to build a comprehensive understanding of the topic; 3) The third step is designing the experiment. This process involves determining the sample size, experimental design, and variables; 4) The fourth step is recruiting the research sample. This step begins with identifying and recruiting the sample. The sample selected is based on the characteristics of the swimming number, namely 50 metres freestyle, age, gender, and pool characteristics; 5) The fifth step is to collect data on the performance of Cenderawasih SC Jyapura athletes at certain temperatures. Data was collected accurately and systematically, to ensure that the results were valid and reliable.

Design or Data Analysis

The stages of analysis for the pre-experimental pretest-posttest design are: 1) Data preparation: The first stage is to prepare the data by ensuring it is properly formatted, organised, and cleaned of any errors or outliers; 2) Descriptive statistics: The second stage involves calculating descriptive statistics for pretest and posttest scores to determine the mean, median, and standard deviation; 3) Pretest-posttest comparison: The third stage is to compare the pretest and posttest scores to determine if there is a significant difference between them; 4) Statistical analysis: The fourth stage is to conduct an appropriate statistical test, such as a paired t-test or Wilcoxon signed-rank test, to determine if the change in scores is statistically significant.

RESULT

Pretest and Posttest Data 50 Meter Freestyle Athletes Cenderawasih Swimming Club Jayapura as in table 1.

Table 1. Results of pretest and posttest

Respondent number	Pree-Test	Post-Test	Difference
1	33,34	30,02	3,32
2	32,77	29,98	2,79
3	34,88	31,33	3,55
4	31,98	29,11	2,87
5	33,56	30,45	3,11
6	34,77	31,22	3,55
7	32,23	29,77	2,46
8	33,91	30,11	3,8
9	34,18	31,03	3,15
10	32,78	29,79	2,99
11	33,94	30,22	3,72

12	35,67	32,67	3,00
13	32,19	29,23	2,96
14	31,87	28,94	2,93
15	33,68	29,98	3,7
16	34,45	31,78	2,67
17	32,79	29,77	3,02
18	32,83	29,99	2,84
19	33,97	30,87	3,10
20	31,73	28,97	2,76

Based on the results in table 1 the pretest and posttest data on the effect of resistance bands (stech cord) on 50 meter freestyle swimming shows an average of 33.37 preetest then increased in the posttest to 30.26 after being given a resistance band exercise program for 16 meetings.

The calculation of the T-test in this study aims to determine whether or not there is an effect of resistance band training (strech Cord) on swimming speed 50 metres freestyle performed. The test is intended to use paired sample t-tests in statistical calculations, namely paired sample difference tests. Significant if the value of t count> t table and sig value is smaller than 0.05 (Sig < 0.05).

Table 2. Uji Paired Samples t test

		Mean	Std. Deviation	t	Sig. (2 tailed)
Pair 1	Pretest - Posttest	3.11450	.37626	37.018	0.001

Based on the table, the T-test results can be concluded that T count 37.018 with a significance value of 0.001. So that the significance value of 0.001> 0.05 which means Ho is rejected. So the results can be concluded that there is a significant difference between the preetest and posttest after treatment. Based on the results obtained, it can be stated that swimming resistance band (strech cord) training is effective in optimising the swimming of Cenderawasih Swimming Club Jayapura athletes.

DISCUSSION

This study aims to optimise 50 metres freestyle swimming speed by providing a resistance band pulling training method in the water by swimming for Cenderawasih Swimming Club Jayapra swimming athletes. With the resistance band method can provide new knowledge in terms of freestyle swimming speed training for swimmers. This can be seen from the results of swimming speed, which shows an increase in an athlete's swimming because strength is one of the components that support the speed of an athlete. Because the strength of a swimmer's arms and legs is very influential in the speed of athletes at the time of the race.

Swimming performance can be improved through a combination of proper training, technique, nutrition and mental preparation (Zacca et al., 2019). Scientific research has shown that these factors play an important role in improving swimming performance and can be optimised through a systematic approach (Abbott et al., 2021). One of the main areas of focus for improving swimming performance is technique training. Correct swimming technique involves a combination of body position, arm and leg movements, and breathing patterns designed to maximise efficiency and speed in the water.

Swimmers can work with coaches to identify and correct deficiencies in their technique and practice specific exercises to build strength, flexibility, and endurance (Marinho et al., 2020).

Dryland training can help build strength, power and endurance, and can complement in-water training (Zacca et al., 2019). In addition to technical training, land training can also play an important role in improving swimming performance (Marinho et al., 2020). This may involve activities such as weightlifting, plyometrics and yoga. Endurance training is also important for improving swimming performance (Marinho et al., 2020). Building endurance involves adding distance to regular swimming workouts, as well as incorporating interval training to build speed and strength. To optimise endurance training, it is important to ensure that proper nutrition and hydration are available, as these factors can affect energy levels and endurance in the pool.

The results of previous studies show that training with resistance bands as can increase speed (Sarici & Gencer, 2024). Research on the effect of resistance band training is also used in other sports, such as the results of previous research showing that resistance band training using the set system method has a significant effect on the speed of adolescent pugilists' sickle kicks (Fitriyani et al., 2024).

Basically strength training with resistance bands in swimming improves swimming performance (Neagu et al., 2018). In addition, the results of similar studies suggest coaches and practitioners to integrate resistance band training as part of a training programme to improve swimming performance, not only for normal athletes but also athletes with disabilities (Hartono et al., 2024). Through resistance band training, muscle strength will be obtained which is very important in optimising swimming speed, because it allows the creation of optimal thrust and technical efficiency, which is able to increase the speed and endurance of athletes while swimming (Fisher et al., 2011).

CONCLUSION

Based on the results of research conducted on Cendrawasih Swimming Club Jayapura swimming athletes, it can be concluded that the average pre-test value is 33.3760 and the posttest value is 30.2615. Then the probability number obtained from sig is 0.001> 0.05. So, it can be concluded that resistance band training significantly affects speed in Cendrawasih Swimming Club Jayapura swimming athletes. Based on the results of the study, it is suggested to coaches and athletes to add resistance band training to their training program, thus helping to optimise speed improvements that have an impact on athlete performance..

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