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REVIEW

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Indonesian Federation of Sport Climbing Athletes: The Impact of Circuit Training Methods on Speed World Record Track Wall-Climbing

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A B S T R A C T

The purpose of the study. The goal of the study is to see how the circuit training approach affects the speed of wall-climbing by athletes from the Indonesian Rock Climbing Federation (FPTI) on the Pekanbaru City Speed World Record Line.
Materials and methods. A research technique using an experimental methodology of one group pretest-post test design, in which a pretest is administered before therapy is administered. The study's population included the whole Indonesian Rock Climbing Federation (FPTI) Pekanbaru City, which included six male athletes.
Results. We apply the t-test procedure to test the hypothesis, and we receive tcount = 7.01 from the t-value calculation, which we then compare to the ttable value. The value of ttable = 2.132 is known from table t, indicating that tcount is larger than ttable. As a result, the accepted hypothesis and the effect of circuit training on the ability to climb wall-climbing speed with a 19.31% increase in ability.
Conclusions. Circuit training provides a 19.31% increase in speed for wall climbing athletes, according to data analysis

Keywords: *circuit training method; speed world record track; wall-climbing.*

A R T I C L E I N F O

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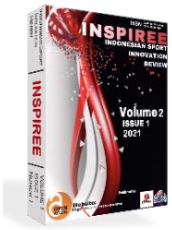

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INTRODUCTION

Rock climbing is a high-risk outdoor activity or sport that necessitates a wide range of physical talents, methods, and equipment. Balance, grip, and footing are the fundamentals of rock climbing. Climbing or climbing a cliff with gaps or bumps that may be utilized as a handle and foothold in order to gain height is known as rock climbing (Sumatra Hanger Rock Climbing School, 2007). Natural rock climbing (climbing) and wall climbing emerged as two distinct kinds of rock climbing (artificial rock climbing). Only the climbing medium utilized separates these two sorts of activities. Rock cliffs or original rock cliffs that exist in the natural and are not the consequence of human engineering are used as climbing material in rock climbing.

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Authors'Contribution: a-Study design; b-Data collection; c-Statistical analysis; d-Manuscript preparation; e-Funds collection.

Meanwhile, wall climbing makes use of human-engineered climbing medium in the form of a climbing board, which is typically made up of plywood boards, fiberglass, or an approximation of a cement and plaster combination, or other specific materials. Despite the differences in activity categories, the essential core of the procedures and tools utilized in these two activities is the same; the only variation is in the unique abilities and approaches.

Wallclimbing is a type of artificial rock climbing that is built or man-made, and the climber is obliged to use a climbing path that he has chosen according to his own preferences. The sport of wallclimbing is classified into numerous categories, including: 1) Long trails to climb (leads). In this climbing route, the climber gets 6 minutes to reach the judges' objective, and he or she only has one chance to climb. 2) Climbing on a short trail (Boulder). A climber is allowed 4 minutes to reach the summit or the stated objective in this climbing. Climbers are allowed to climb as many times as they like until the time limit (4 minutes) expires. 3) Climbing in the fast lane (Speed). The speed lane is a climbing path that emphasizes speed, requiring athletes to focus intensely and penetrate the course in the lowest amount of time.

Circuit training is one of the influencing aspects in training since the program is meant to enhance muscular strength and power endurance. As a result, it is important to stress the physiological impacts generated as well as the training objectives to be met while preparing the program. That training, according to Fox (1993), is a physical training regimen designed to prepare an athlete for crucial contests. It is equally important to increase one's abilities and one's energy capacity. Exercise, according to Zulya et al. (2005), is an iterative and growing process for developing potential and achieving maximum performance.

Since its inception by Morgan and Adamson in 1953 at the University of Leeds in England (Wilmore, 1977), this training technique has grown in popularity and recognition among many trainers. As an exercise regimen that can concurrently enhance the complete body, including the components of power, endurance, speed, flexibility, mobility, and other physical components, it has been hailed by physical education professionals and athletes. Circuit training, according to Syafruddin (1994), can enhance overall conditions and, more importantly, performance. This implies that

a strength and endurance circuit may be built. The differences' features are carried out in the same way that they are in the relevant parts. According to Irawadi (2011), the circuit training technique is a type of exercise that involves using posts and doing a new type of training activity at each post. This is the first of a series of exercises. It moves on to the next post after finishing one. The transition from one post to the next is done in a systematic manner, with rest periods in between. Exercise is generally done in sets of many repetitions, with rest time between sets. Rest time between sets is usually longer than rest time between posts. With 6-15 training stations, a circuit training program is carried out. Each station has one workout that takes 30 seconds to perform. A circuit takes 5 to 20 minutes to complete Haris (2018), with 15-20 seconds of rest time at each station. Circuit training is a type of exercise that mixes numerous different types of training to make an activity less boring and more effective. Exercises for circuit training will include, Nugroho (1987): 1) Muscle strength, 2) Muscle endurance, 3) Flexibility, 4) Agility, 5) Balance, and 6) Cardiopulmonary endurance. The circuit training implementation is as follows: Several posts or stations, for example, 6 posts, are established in a specific region or area, and the athlete is expected to perform at each post. A specific type of workout. The workouts are typically in the form of strength, speed, agility, endurance, and other physical condition activities. Push ups, jump jacks, full ups, shitups, dragging rubber tires, and squad thrust, for example, are all types of exercise in each consecutive post. If done correctly, one circuit might result in a pulse rate of 160-180 beats per minute, indicating that the athlete has been exercising hard and has entered his training zone.

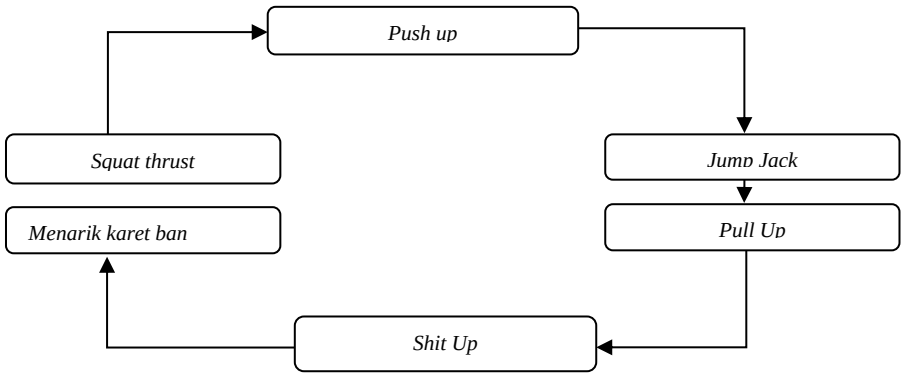

Figure 1. *Example of a Rock Climbing Training Circuit Method Exercise.*

According to observations made by Wallclimbing researchers, athletes from the Indonesian Rock Climbing Federation (FPTI) Pekanbaru city still have deficiencies during training, including a lack of arm muscle training. This may be noticed during an activity where the arm mobility is poor, resulting in a less-than-ideal climbing pace. Arm motions should be linked and effectively integrated so that the climber's time is reduced. Climbing the speed line requires a level of mastery that is difficult to achieve. Climbers' hand, foot, and view motions, which should be carried out, are frequently not carried out, resulting in less-than-optimal results. There was a lack of structured training for athletes from the Indonesian Rock Climbing Federation (FPTI) Pekanbaru city throughout training, since they primarily exercised independently without a defined training schedule, resulting in less than optimum outcomes.

MATERIALS AND METHODS

Study participants

Population is a generalization area made up of objects/subjects with specific features and characteristics that researchers choose to study and derive conclusions from Sugiyono (2008). As a result, the whole Indonesian Rock Climbing Federation (FPTI) Pekanbaru City population is included in this study.

Study Organization

An experimental research is one that aims to determine the impact of some factors on other variables under carefully controlled settings. A one-group pretest-posttest design was used in this investigation. There is a pretest in this design before therapy is provided. As a result, the treatment results can be known to be more accurate since they can be compared to the pre-treatment circumstances. The following is a description of this design:

$$0_1 X\ 0_2$$

Keterangan:
0_1 = Nilai Pretest
0_2 = Nilai Posttest

Figure 2. *Desain Pree test and Post Test*

Testing Procedur

Based on the major data required for this study, data is collected by conducting a test, specifically the Speed Word Record track test described in the 2010 Indonesian Rock Climbing Federation book. To identify the speed level of Wall climbing in the Speed track, which can then be used to measure or categorize the speed level, so that the value of Wall climbing sports education in the Speed World Record track can be determined.

Table 1. *Rock climbing speed norm for Speed category*

No	Athlete value	Description
1	<7″	BAIK SEKALI
2	8″- 10″	BAIK
3	11″- 13″	SEDANG/CUKUP
4	14″- 16″	KURANG
5	>17″	KURANG SEKALI

Source from: Djoko Pekik Irianto

Statistical Analysis

Data analysis is a method of searching and organizing records of study findings in a methodical manner. After that, the information gathered through observation sheets and sickle kick tests was evaluated. The "t" test is used to analyze the data that has been collected. The "t" significance test is used to assess if the X and Y variables, namely the circuit training technique and the athlete's climbing speed, are significantly different. The "t" test suggested by Arikunto (2006) was used to analyze the data in this study, utilizing the following formula:

$$t = \frac{Md}{\sqrt{\frac{\sum x^2 d}{n\,(n-1)}}}$$

Information :
Md = The mean (mean) of the difference between the pre-test and the post-test
Σ = Sum squared deviation
N = Sample quantity

Equation 1. *Formula Analysis of the data performed t test*

RESULTS

Pre-Test Data for Wall Climbing Speed

The findings of Wallclimbing Climbing Speed data were produced based on the results of data collection for five samples. The data is then divided into five classes, each having a size of four. There is a frequency of 4 people with a relative frequency of 66.67 percent in the first class with a value range of 12.63-17.79, none in the second class with a value range of 17.80-22.97, 1 person with a relative frequency of 16.67 percent in the third class with a value range of 22.98-28.14, and 1 person with a relative

frequency of 16.67 percent in the fourth class with a value range of 28.15-33.32. See the table below for further information:

Table 2. *Pree Test Frequency Distribution in Indonesian Rock Climbing Federation (FPTI) Athletes Competing in the Speed World Record Line.*

No	Value	Frequency	Relative frequency
1	12.63-17.79	4	66.67%
2	17.80-22.97	0	0.00%
3	22.98-28.14	1	16.67%
4	28.15-33.32	1	16.67%
Total		**6**	**100%**

Source from: 2021 processed data

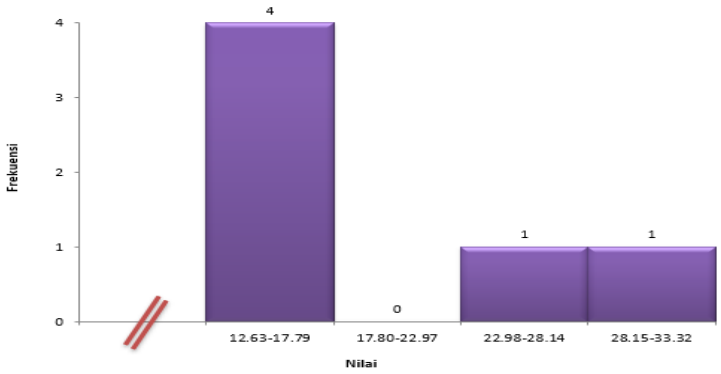

Figure 3. *Histogram of Indonesian Rock Climbing Pree Test (FPTI) in the Speed Word Record Track.*

Wallclimbing Speed Post Test Results Data

From the results of the posttest measurement test, namely the wall-climbing climbing speed test from 5 samples. The data is also divided into four classes, each with a class value of 4.82. There is a frequency of 4 people with a relative frequency of 66.67 percent in the first class with an interval of 10.27-15.08, 1 person with a relative frequency of 16.67 percent in the second class with an interval of 15.09-1990, none in the third class with an interval of 19.91-24.72, and 1 person with a relative frequency of 16.67 percent in the fourth class with an interval of 24.73-29.53. More information may be found in the table below:

Table 3. *Distribution of Post Test Frequency of Test Results In Track Speed World Record*

No	Value	Frequency	Relative frequency
1	10.27-15.08	4	66.67%
2	15.09-19.90	1	16.67%
3	19.91-24.72	0	0.00%
4	24.73-29.53	1	16.67%
Total		**6**	100%

Source from: 2021 processed data

Then the data from the table above can also be illustrated by the following diagram:

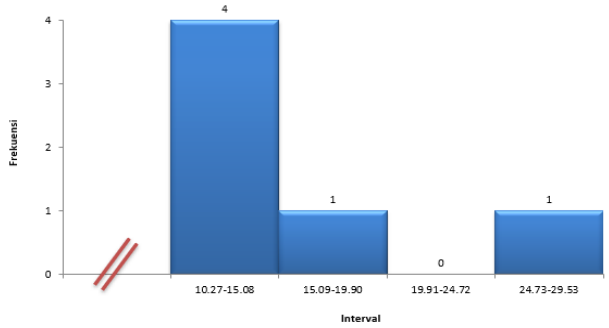

Figure 4. *Post Test Diagram In Speed World Record Tracks*

Data Analysis

After then, the information gathered is evaluated. The circuit training activity is variable X, while the Wallclimbing Climbing Speed is variable Y. The following information was derived from a data study of Wallclimbing Climbing Speed in the Speed Word Record Track:

Table 4*. Increased Climbing Speed of Wall Climbing Athletes on a World Record Speed Track*

Test	Mean	$t_{calculate}$	t_{table}	Information
Pretest	18.45	7.01	2.132	Influential
Postest	14.89			

According to the table above, students' average wall climbing speed improves after the circuit training program is implemented compared to before the circuit training program was implemented. The improved training results demonstrate that the circuit training approach is also beneficial in improving wall climbing speed on the world speed record track. We apply the t test formula to test the hypothesis, which yields tcount = 7.01 when the t value is calculated. The t value in the t value distribution table was then compared. The value of ttable=2.132 is known from table t, indicating that tcount is higher than ttable. As a result, the hypothesis is accepted, and circuit training has an influence on the capacity to climb wall-climbing speed, with a 19.31 percent increase in ability.

DISCUSSION

Circuit training exercises might impact the outcomes of the speed of wall-climbing performed on Indonesian Rock Climbing Federation Athletes (FPTI) at the speed world record track in Pekanbaru City, according to research. According to various experts, Ambarukmi's (2007) concept of sports training is as follows: 1) The practice of developing sports via a scientific approach, particularly educational concepts, on a regular and scheduled basis in order to improve athletes' abilities and preparedness. 2) Athlete development

program aimed at improving skill and capacity in order to compete. 3) A systematic approach to improving an athlete's fitness in the sport of choice. As a result, the goal of this research is to see how the Circuit Training Method affects the speed of climbing wallclimbing in the Speed Word Record Track.

The circuit training method is a type of exercise that involves using posts and performing a different type of training activity at each one (Irawadi, 2011). This is a series of exercises in which you complete one post before moving on to the next. Transfers from one post to the next are done in a certain order, with rest times in between, such that the exercise is generally done in multiple repetitions (sets), with rest time in between each set. The rest time between sets is longer than the rest time between posts.

Meanwhile, Rock climbing is a technique for climbing that involves using rock flaws such as protrusions, cracks, or hollows without the need of any equipment (Darsono, 2008). Rock climbing can be understood as a natural activity that solely employs tools or media from the rock wall to climb, based on the aforementioned viewpoint. The increase in the outcomes of the exercise may be determined by subtracting the average (mean) post test from the average (mean) pree test divided by the average pree test multiplied by one hundred percent, yielding 19.30 percent. As may be seen in the example below::

$$\text{Improvement} = \frac{\text{Pretest} - \text{Postest}}{\text{Pretest}} \times 100\%$$

$$= \frac{18.45 - 14.89}{18.45} \times 100\%$$

$$= \frac{3.56}{18.45} \times 100\%$$

$$= 0.1930 \times 100\%$$

$$= 19.30\ \%$$

Equation 2. *Calculation Results of Pree test and Post Test*

Based on the findings of the study, it can be concluded that, in addition to circuit training, flexibility and strong coordination impact wall-climbing speed skills.

CONCLUSION

Based on the data analysis, it can be determined that circuit training has an influence on athletes' speed of wall-climbing in the Speed World Record Track, with a 19.31 percent increase.

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APPENDIX

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