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EFFECT OF METHOD AEROBIC CIRCUIT TRAINING ON SPEED, POWER AND AEROBIC CAPACITY OF ATHLETES SOFTBALL

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Abstract
This study aimed to determine the impact of aerobic circuit training on increasing anaerobic capacity, specifically focusing on movement speed, strength, and aerobic capacity. The method used to obtain data and achieve the objectives was an experimental method, employing a one-group pretest-posttest design by providing treatment to students from the Softball Student Activity Unit at the Indonesian Education University. The results of the study showed that (1) carrying out the exercise did not have a significant impact on increasing anaerobic dynamic capacity, (1.a) carrying out the exercise had a significant impact on increasing movement speed ability, (1.b) carrying out aerobic circuit training did not have a significant impact on increasing power capacity, and (2) the implementation of aerobic circuit training had a significant impact on increasing dynamic aerobic capacity.
Keywords: *Aerobic Circuit Training, Anaerobic Capacity. Aerobic Capacity.*

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INTRODUCTION

Circuit training is a sports training program that consists of a series of posts, where each post has a different type of exercise to be carried out in a more systematic and targeted manner. For athletes who are used to circuit training, this is due to the frequent application of this training model when the training program is being implemented (Ramos-Campo et al., 2021). Circuit training designed to combine aerobic and anaerobic exercise in one structured training session. The main goal is to improve an athlete's strength, endurance and cardiovascular performance in a timely manner. By providing a variety of exercises in each post, circuit training allows for a more thorough workout for different muscle groups.

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Circuit training is a training method that focuses concentration on the athlete's physical condition, which is influenced by various components of physical condition including strength, endurance, muscle strength, speed, flexibility, agility, coordination, balance and accuracy. Research shows that circuit training effective in improving these aspects holistically in one structured training session (Reynolds, 2016). By providing a variety of exercises in each post, circuit training allows a more comprehensive workout for different muscle groups, optimizing the body's functional adaptation to training (Tashkin, 2009).

Examples of movements that can be done on circuit training among others zigzag, squat thrust, down the line drill, jingle, lateral spin jingle, dot wave drill, shuttle run, and others (Boraczyński et al., 2021). Then a study discussing the effect of power-based complex training (PCT) on body composition and muscle strength in male and female college athletes, showed that a 6-week PCT program could significantly improve body composition, especially for female athletes and increase strength. upper and lower body for both men and women, contributing to improved athletic performance (J. Miller et al., 2014).

For athlete softball, an approach in including aerobic exercise between deep training posts circuit training is still in the testing process to observe its potential benefits on their physical condition. The author is interested in integrating aerobic exercise between deep training posts circuit training, in the hope that this will result in an improvement in the athlete's physical condition softball comprehensively (Arisman & Agun Guntara, 2021).

Studies show that circuit training which includes a combination of anaerobic and aerobic training can effectively increase strength, endurance and aerobic ability in athlete softball (M. G. Miller et al., 2006). In addition, this method is also proven to be more effective than circuit common in increasing muscle endurance, with an increase of up to 6% and aerobic circuit training also offers a holistic approach by providing fast or running intervals jogging at sub-maximal intensity between

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training posts, which can increase aerobic capacity by up to 11% (Gormley et al., 2008).

With the various data and research that have been described, the background of this research highlights the importance of developing effective training methods to improve athletes' physical condition softball. Circuit training, with its potential to combine anaerobic and aerobic exercise, is a major focus in these efforts. Although no concrete evidence of experimental results can be presented at this time, the promise of increased strength, endurance and aerobic ability with this approach provides encouragement to explore it further (Taufik et al., 2021). Thus, it is hoped that this research can make a significant contribution in improving athletes' physical preparation softball to achieve their best performance.

METHOD

The research method applied in this study was an experimental design with a "one group pretest and posttest" approach. The research was conducted at the UPI Bandung stadium from March to April 2024. The exercise sessions were carried out three times a week, aligned with the training objectives and adhering to the principles and norms of training load to achieve physical training goals (Putra et al., 2020). The research subjects consisted of 15 students who were members of the sports activity student unit for softball.

The research tools used to conduct the process and collect data included exercise programs for fitness training and several test items to determine anaerobic and aerobic abilities. These were:

1. Anaerobic ability, which consisted of: Speed: 20-meter sprint test. Limb power: Three-hop test.
2. Aerobic ability, measured through the Bleep test.

Initial Measurement (Pretest)

Before starting the training program, initial measurements were carried out to determine the baseline of the subjects' anaerobic and aerobic abilities using speed tests (20-meter sprint, 3-hop test, 10-hop test) and the Bleep run endurance test.

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Implementation of Training Programs

The aerobic circuit training program was carried out at the UPI Bandung stadium for 6 weeks, with a frequency of 3 times a week. Each training session included a series of training stations designed to improve the subjects' endurance and aerobic ability.

Final Measurement (Posttest)

After completing the exercise program, repeat measurements were carried out to evaluate changes in the subjects' anaerobic and aerobic abilities using the same tests as in the initial measurements.

RESULT

The following are the test results and measurement data that have been processed for each component of anaerobic and aerobic ability in the initial and final tests, as explained in the Method.

Table 1. Hypothesis Test Results

Component	t-Calculated value	T table value (α=0.05)	Conclusion
Speed	2,712	2,056	There is a significant increase in movement speed.
Power	0,00062	2,056	There is no significant increase in power.
Anaerobic Ability	0,002	2,056	There was no significant increase in anaerobic dynamic ability.
Aerobic Ability	7,116	2,056	There is a significant increase in aerobic ability (endurance).

From the results of the data processing above, it can be concluded that aerobic circuit training has a significant impact in increasing movement speed and aerobic ability (endurance) in research subjects. However, there is no significant evidence that this method improves power, or dynamic anaerobic capability at a significant level.

DISCUSSION

Based on the analysis above, it appears that aerobic circuit training is not significant in increasing anaerobic ability. This can be seen from the increase that only occurred in the movement speed component, while there was no significant

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increase in the strength and endurance components. However, there was a slight increase in the average power. In contrast, aerobic circuit training has a significant impact on aerobic ability.

Therefore, the application of an aerobic circuit training pattern influences the increase in anaerobic ability, especially in movement speed, with a minor influence on power, as well as aerobic ability (Arisman & Noviarini, 2021). It is important for trainers to design a variety of aerobic circuit training programs to ensure safe training requirements and achievement of directed training targets (Rushall & Pyke, 1990). Effective application of training methods, patterns, principles and norms is essential to achieve optimal training effects (Schmolinsky, 1978). To encourage scientific developments in training effectiveness, future research could explore other sports that are dominant in improving speed, strength endurance, or endurance ability (Flaherty, 2022; Kidman & Hanrahan, 2020).

Thus, this training method has proven to be effective in improving certain aspects of the subject's physical condition, and can be a basis for further development in optimizing training programs for athletes softball and perhaps also athletes from other sports.

CONCLUSION

The results of this study concluded that the application of aerobic circuit training did not have a significant impact in increasing anaerobic dynamic capacity, whereas there was a significant increase in aerobic dynamic capacity.

SUGGESTION

The suggestion for trainers is to provide aerobic circuit training gradually and systematically according to periodization needs and the demands of training objectives related to speed training in the form of sprints, dynamic strength in the form of jumping movements, as well as strength endurance and endurance abilities.

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