

## The Effect of Zig zag Running Training on Increasing VO<sub>2</sub>max for Mega Futsal Athletes



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**ABSTRACT:** This study aims to determine the effect of zig-zag running training on increasing VO<sub>2</sub>max for mega futsal club athletes. The method in this research is to use an experimental method with a one group pretest-posttest design. The population in this study were 30 athletes of futsal mega club. The research sample is 30 mega club futsal athletes using total sampling technique. technique of measuring VO<sub>2</sub>max uses a Yo-yo intermittent recovery test. The data analysis technique used is quantitative description and analyzed using SPSS 26 software to test data normality, data homogeneity, and influence test. The results in the study show that 1). There is an effect of zig-zag running training on increasing VO<sub>2</sub>max of mega club futsal athletes, 2) zig-zag running training is proven to improve the physical condition of mega club futsal athletes.

**KEYWORDS:** zig-zag running exercise, vo<sub>2</sub>max, athlete futsal mega klub

### INTRODUCTION

Sport is a physical activity that is loved by everyone for their daily needs (Marpaung & Manihuruk, 2017). Sport grows and develops in various forms and ways of implementation, organization and goals according to its own focus, there are four goals to be achieved in carrying out sports activities, namely: (1) Recreational sports that place more emphasis on physical and mental health (2) Player achievement (competitive) more emphasis on competitive activities and achievements (3) Sports education emphasizes the educational aspect where sports are included as subjects (Marshella Aguss, Fahrizqi, Ameraldo, Nugroho, & Mahfud, 2022). In Indonesia itself, futsal is very popular with all people, from children, teenagers, to adults and Indonesian futsal is still having good achievements (Aswadi, Amir, & Karimuddin, 2016).

Futsal is a sport that is favored by the community and the popularity of futsal is not only known as an achievement sport, but also often as a health or recreational sport (Romadhoni, Herawati, & Pristiano, 2018). Futsal is a sport played by 2 teams, each team contains 5 players with the aim of putting the ball into the opponent's goal, the game of futsal requires speed of thought and physical ability, tactics, technique, agility and VO<sub>2</sub>max in high intensity, when playing futsal players are required to move and change direction quickly, because in one team there are only 5 players with a field measuring 38m-42m x 20m-25m and played within 2x20 minutes, so futsal players are required to continue to focus and move, therefore Futsal players must have strong endurance, strong endurance is obtained from hard and correct training, high-intensity exercise requires strong stamina and physical fitness (Fuadi & Jatmiko, 2020).

The characteristics of the futsal sports components are that it requires aerobic endurance (VO<sub>2</sub>max), strength and agility in a relatively long time and the main factor needed by futsal athletes is the level of physical condition so that they are able to carry out futsal game activities without experiencing excessive fatigue because they have good physical conditions (Kharisma & Mubarak, 2020). Special physical conditions that must be possessed by futsal athletes are strength, agility, endurance, speed and flexibility (Setiawan, Soetardji, & Nugroho, 2014) (Maryami Dati, 2016).

Oxygen intake during exercise greatly affects the stamina, flexibility, endurance and fitness of the athlete's body which is often called VO<sub>2</sub>max (Habibah, Junaidi, & Hermawan, 2017). Athletes who do not have good VO<sub>2</sub>max will be very visible in matches on the field, these players will experience a decrease in stamina, strength and concentration, and make many basic mistakes that can harm the athlete himself and of course for the team (Debbian & Rismayanthi, 2016).

Aerobic ability (VO<sub>2</sub>max) is the greatest aerobic exercise ability that a person has which is determined by the amount of oxygen that can enter the heart, respiration, and hemohydro-lymphatic or transport O<sub>2</sub> and, CO<sub>2</sub> nutrients every minute What is meant by Vo<sub>2</sub>Max is the maximum degree of aerobic metabolism in dynamic physical activity that a person can achieve (Gumantan

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& Fahrizqi, 2020). Higher pressure can release maximum secretions and increase oxygen saturation, but on the one hand, high pressure allows decreased oxygen saturation, trauma, hypoxemia, bronchospasm and anxiety (Suparti, 2019). Having a good level of endurance (VO<sub>2</sub>max) is the most important thing and needs to be considered in determining futsal players (Sambora & Ismalasari, 2021).

In the game of futsal, it is very important to train physical conditions with training methods. In a coaching effort to improve skills and physical condition (VO<sub>2</sub>max) various kinds of training can be carried out, especially zig-zag running (Novsir, Defliyanto, & Yarmani, 2020). Physical condition training in its implementation is more focused on the process of fostering the physical condition of athletes as a whole, and is one of the main and most important factors that must be considered as a necessary element in the training process in order to achieve the highest achievement (Ridwan, 2020). Efforts to improve competitive performance by reducing the potential for physiological losses during and after competition, are proposed through a physical condition training program strategy on the dominant physical aspects of futsal and the dominant physical aspects that influence the results of the study of scientific articles on futsal are VO<sub>2</sub>max, endurance, speed, explosive power, and agility in an effort to improve or improve physical condition through training models on the dominant physical aspect of futsal with zig-zag running exercises (Widodo, 2020).

The zig-zag running exercise is an exercise in the skill of changing the direction of body movement by turning in the shortest time, the way to do the exercise is based on the technique of running as fast as possible with a twisting trajectory (Razbie, Nurudin, & Soleh, 2018). In zig-zag running, many factors influence, namely VO<sub>2</sub>max, speed, coordination, stabilization, strength, flexibility and balance. The purpose of the Zig-zag running exercise is to master the skills of running and avoiding opponents during training and competition (Udam, 2017). One of the training methods to increase VO<sub>2</sub>max is zig zag running, this method is a method that researchers can improve physical condition in athlete's game as expected and zig zag running is a winding running technique (Ruslan, Sarjan Mile, & Faturrahman Sangadji, 2021). The form of this exercise is in accordance with the dribbling movements in the futsal game.

Currently what happens is that most coaches do not pay attention to the physical condition of athletes so that athletes easily get tired when doing exercises or competitions. If the athlete's physical condition is good, it will be faster to the movement techniques he trains, because technical, tactical and physical training will be able to be carried out optimally (Firdaus Soffan Hadi, 2016). Poor physical ability certainly has an impact on technical and tactical aspects (Ridwan, 2020) (Indriansah, 2020). In the final match, which was participated by the club's mega futsal team, the athletes were easily fatigued or endurance which resulted in the athlete's VO<sub>2</sub>max being not good or lacking, so that the athlete lacked concentration, passed incorrectly and was dehydrated. Other aspects outside the match physiology profile are anthropometry, somatotype, physical condition, and player concentration levels (Widodo, 2020).

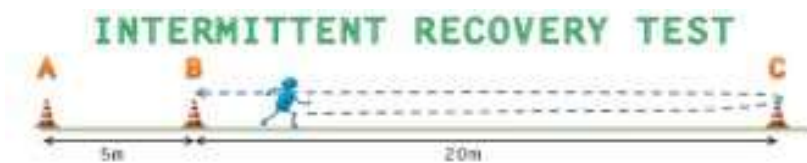
The purpose of this study was to determine the effect of zig-zag running training on increasing VO<sub>2</sub>max mega futsal athletes club. The benefits of this research; 1) theoretically this research opens a paradigm for trainers to pay attention to the physical condition of athletes, 2) as input for mega futsal clubs to find out how to use zig-zag running to increase VO<sub>2</sub>max), 3) as a reference for further research.

### METHOD

The research method used is the experimental method, in the sense that experimental research has treatment (Tanner, 2018). The design in this study used a pretest-posttest (The One Group pretest-posttest). This research was carried out in the futsal field mega club at Gambir Baru, Asahan Regency, North Sumatra. This research was carried out for 8 weeks or 2 months, this study began January 18, 2022 - March 18, 2022. The population in this study was 30 athletes of mega futsal club. The sampling technique is total sampling, meaning that the entire population is taken as a sample. The data collection technique in this study used a Yo-Yo intermittent recovery test to measure VO<sub>2</sub>max. The data analysis technique in this study is SPSS 26 software. The purpose of data analysis is to describe data so that it can be understood, and also to draw conclusions or draw conclusions about population characteristics based on data obtained from samples, which are usually made on the basis of estimation and hypothesis testing.

**Table 1. Design One Group pretest-posttest**

Pretest	Treatment	Posttest
Q1	X	Q2



Picture 1. Yo-yo intermittent recovery test

**RESULTS**

Based on the results of the study that the data were normally distributed, homogeneous and there was a significant effect of zigzag running exercise. The results of data analysis can be seen in the table below.

**Table 2. Normality Test**

Tests of Normality Kolmogorov-Smirnov<sup>a</sup>

	Statistic	df	Sig.
PreTest	,168	30	,081
PostTest	,185	30	,060

a. Lilliefors Significance Correction

From the results of SPSS 26 in Table 1, it is found that the data is normally distributed as seen at the sig value > 0.05 so that it can be concluded that the data is normally distributed.

**Table 3. Test Homogeneity**

Levene Statistic	df1	df2	Sig.
.790		1	58 .378

Based on Table 2 above, the data is declared homogeneous because the significant value is greater than 0.05, which is 0.378. The conclusion is that the pretest and posttest data have the same variance (homogeneous).

**Table 4. Date of effect Test Result**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Pretest	,867	,019	,993	45,621	,000
Post Test					

From the results in Table 3, it can be seen that the results of data analysis are less than 0.05, namely 0.000, so H<sub>a</sub> is accepted and H<sub>o</sub> is rejected. So it can be concluded that there is a significant effect of zigzag running training on increasing the VO<sub>2</sub>max of the mega futsal club athletes. In line with the research conducted by the researcher, the results of the research conducted (Bernhardin & Fauzi, 2022) show that zig-zag training can affect the agility of futsal athletes. The difference between the researcher and the previous research is that the researcher provides zigzag training to increase VO<sub>2</sub>max while the previous research provides zigzag training for the agility of futsal athletes, so it can be concluded that zigzag running training can affect the improvement of the athlete's physical condition. futsal.

Endurance Aerobic (VO<sub>2</sub>Max) is the ability of the lungs and heart to take in and process oxygen so that the body is able to carry out physical activities or sports that involve large muscles for a long time without experiencing significant fatigue (Didi Yudha Pranata, 2020). Coaching and physical exercise really need to be done during training which is an important stage in achieving sports achievement and improving the physical condition of athletes (Fletcher et al., 2018) (Aldapit & Suharjana, 2019).

At the time of training, the cardiovascular in futsal athletes determines how much VO<sub>2</sub>max, which will then determine the endurance capacity or body fitness, so that the value of VO<sub>2</sub>max is directly related to the cardiovascular system during exercise,

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assuming that the heavier the intensity of the exercise, the higher the intensity of the exercise. a lot of oxygen is needed, which indicates that athletes who exercise consistently have higher VO<sub>2</sub>max values than athletes who rarely exercise (Kavcic, Milic, Jourkesh, Ostojic, & Ozkol, 2012). The advantage of this zig-zag exercise is that when athletes dribble past obstacles after making movements without using obstacles, athletes will not feel tired easily during training or matches (Novsir et al., 2020).

The more often a futsal athlete performs or applies good training skills to complete an exercise or match, the heart and lung system to take in and circulate oxygen throughout the body is maximized, so a good VO<sub>2</sub>max ability is needed (Wiriawan & Sukmananda, 2017). In line with the opinion above, the opinion (Nusri & Panjaitan, 2019) VO<sub>2</sub>Max is very closely related to endurance and has a big impact on the appearance of an athlete where athletes who have low VO<sub>2</sub>max will have difficulty in making movements when appearing in the field so that training discipline will increase VO<sub>2</sub>max.

Zig-zag running training for futsal players has an impact on increasing the athlete's VO<sub>2</sub>max because the athlete moves to run which will unknowingly increase the athlete's VO<sub>2</sub>max. Cardiovascular increases also occur due to an increase in heart rate during exercise, so this alternate exercise helps the body increase the volume in consuming oxygen during exercise at maximum volume and capacity (Wiswadewa et al., 2017). Many literatures and research results explain that increasing VO<sub>2</sub>Max with zigzag training will improve athlete performance. Exercises to increase VO<sub>2</sub>Max usually last for a long duration and the presence of various forms of movement or variations of exercise at each post makes athletes feel challenged and motivated to undergo the training process (Bahtra, Fahrozi, & Putra, 2020). Opinion (Kusumawati, 2013) to increase VO<sub>2</sub>max physical exercise must be done regularly and disciplined so that increasing VO<sub>2</sub>max should be done by means of a structured exercise program.

Efforts to achieve a good performance require physical condition training to increase the VO<sub>2</sub>max of futsal athletes. The zig-zag running exercise carried out by the author can increase the VO<sub>2</sub>max of the mega club futsal athletes as shown in Table 3, so that the implementation of the exercise is based on a structured training program with athletes enthusiastic in carrying out the exercise program. VO<sub>2</sub>max cannot be formed by itself, so it is necessary to practice in increasing VO<sub>2</sub>max for futsal athletes so that athletes do not get tired easily during matches. In line with the opinion above, (Bahtra et al., 2020) if the VO<sub>2</sub>max of the player or athlete is not at a good level, it will interfere with the performance of the player in the match.

## CONCLUSION

The zig-zag running exercise is an exercise to increase VO<sub>2</sub>max by rapidly changing direction and based on running as fast as possible. Based on the results of data analysis and discussion, it is concluded that; 1) There is an effect of zig-zag running training on increasing VO<sub>2</sub>max of mega club futsal athletes, 2) zig-zag running exercise proven to improve the physical condition of mega club futsal athletes, 3) zig-zag running exercise can also increase the spirit of mega club futsal athletes to increase VO<sub>2</sub>max.

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