JUARA: Jurnal Olahraga
E-ISSN 2655-1896 ISSN 2443-1117
https://doi.org/10.33222/juara.v6i1.1180

The Effectiveness of the Triangle Run Exercise Method in Improving Aerobic Resistance Soccer Player

Riyan Hardinata[1], Uray Gustian[2], Rahmat Putra Perdana[3]
[1,2,3]Faculty of Teacher Training and Education, Universitas Tanjungpura, Jl. Prof. Dr. H. Hadari Nawawi, Bansir Laut, Pontianak City, West Kalimantan 78124, Indonesia
email: riyan.hardinata@student.untan.ac.id[1], uray.gustian@fkip.untan.ac.id[2], rahmatputraperdana@fkip.untan.ac.id[3]

Article Info

Article History.
Received 10 December 2020
Approved 30 January 2021
Published 05 February 2021

Keywords:
Aerobic Endurance, Triangle Run Method and Football

Abstract

The characteristics of soccer that have a vast field and a long duration of play require soccer players to have high aerobic endurance. Every player should own good aerobic endurance to support performance at the time of the field. There are so many exercises that can increase endurance, but there is no reference for effective and efficient training methods for developing aerobic endurance. This study aims to test appropriate and effective training methods to increase endurance. The experimental design was carried out by providing a triangle run training method through walking, jogging, and sprinting activities. The research was tried out on the Meniere BMC club, amounting to fifteen people. The results showed an increase in the aerobic endurance of soccer players. The increase occurred because the triangle-run training method had similar soccer activities, namely walking, jogging, and sprinting, which made players happy. The training process, training program, and appropriate training methods were possible to improve. The conclusion is that the triangle run training method can increase the endurance of soccer players.

✉ Alamat korespondensi: Jl. Prof. Dr. H. Hadari Nawawi, Bansir Laut, Pontianak City
E-mail : uray.gustian@fkip.untan.ac.id

INTRODUCTION

Sports is an activity that is often carried out to keep the body healthy. The more often someone does sports, it can be said that the person will have good endurance. Good endurance is being able to move for a long time without feeling excessive fatigue. Performance in football depends on many attributes, the main of which is an element of physical condition. One of them is aerobic stamina, which plays a vital role in holding back fatigue and recovering quickly (Vasileios et al., 2018).

Every sport requires aerobic endurance, especially soccer, because of its characteristics of having a large field and extended play duration. Football is an intermittent sport that requires players to perform short, high-intensity activities punctuated by more

extended periods of low-intensity training (Bangsbo et al., 2006). Therefore athletes need to have the fitness to support performance during training and competing.

Aerobic endurance is a component of physical condition which forms the foundation in a pyramid of achievement. As Vasileios et al. (2018) stated, physical condition is the main element in supporting the performance of football players on the field. This is because, to perform optimally during training and competing, players must have good physical endurance.

Given the importance of increasing aerobic endurance for soccer players, it should be the full attention of coaches to be creative in designing and providing appropriate and effective training methods to increase aerobic endurance. This is because team sports require every player to have qualified physical endurance (Busyairi & Ray, 2018). Strauss et al. (2014) stated that the physical capacity of soccer players affects their technical performance.

The importance of aerobic endurance in soccer is also due to the broad field factor that requires players to run all the time to move forward to attack scoring goals, such as dribbling, processing the ball, finding the correct position to shoot the ball into the opponent's goal and running backward for defending secures the goal prevents purposes such as chasing or seizing the ball from opponents, where it is played using a vast field. Apart from the field factor, the long duration of the game is also an essential factor of good aerobic endurance, which is very much needed in football.

The match's duration is so long that it is 90 minutes (average time) for two rounds. Suppose there is no winner in average time. In that case, there will be 30 minutes of extra time which is divided into two halves where each half has 15 minutes of playing time to determine who is the winner and not to mention the additional time (injury time) in each half from referees due to frequent violations, riots between players, injured players on the field, and moving injured players off the area for a medical treatment which causes wasted time.

Based on Arisman's (2019) research, it is explained that the body's resistance to fighting fatigue can be overcome by running training in a square (training square). After the exercise was carried out, it was seen that there was an increase in aerobic endurance with an average of 0.44 km. The square training method, in principle, gives freedom to athletes in doing exercises and exercises that are carried out with low intensity.

Based on Julianto (2016) research, he explains exercises that can increase physical endurance, especially endurance through running training to the points that have been prepared. The results of this study indicate that circuit training can improve physical fitness. The first physical fitness test results prove this before being given the action showing the value of 54.00%, while after being given the effort, the value rises to 58.54%. This exercise is low intensity by having specific points,

including jumping upright, lifting the body, running 50 m, and running 1000 m.

Based on research conducted by Heru and Agus (2019), it is clear that running in the wild such as climbing hills, mountains through and valleys, can increase physical endurance. Based on the analysis results, it is stated that outdoor running exercises can increase physical endurance. It can be seen that aerobic endurance is given a free-running exercise (cross country), namely from the pretest value of 1234.67 meters up to 1424 meters the posttest value. Training (cross country) is a jogging activity in cross country.

Based on the study results, it is stated that various ways can be used to develop physical endurance, especially endurance. However, no training method can be used to increase endurance effectively and efficiently and has other benefits, not only increasing aerobic endurance. In this study, the triangle run training method is a training method that can not only increase aerobic endurance but also has an influence on the ability to dribble (Samsudin, 2018), can increase the endurance of cricket athletes (Telles et al., 2019), and can lower the resting pulse rate (Budriarsa, 2013). Therefore, the triangle run training method is highly recommended to be included in training because it has a benefit or influence on athletes' ability and fitness, especially soccer players.

It is related to the absence of a reference that can be used as a reference for use during training for coaches to effectively develop aerobic endurance to support player performance during training and competing. As for doing proper aerobic endurance training, according to Rusell's (1993) opinion, the ideal aerobic activity is 1. It is providing the right intensity; 2. Most similar to the activity being engaged in (according to the sport); and 3. Most preferred.

Based on this, efforts are needed to find appropriate training methods to increase aerobic endurance in soccer players. In this research, the training method used is the triangle run training method. The basis for choosing the triangle run training method is because the activities in this exercise have in common with activities that are often done in playing soccer, namely walking, jogging, and sprinting. Typically, elite male players cover a distance of 9-14 km during matches, during which 600-1200 m (~ 6- 12%) are performed running at very high speeds (> 19.7 km.h-1) (Sarmento et al., 2014). Upper-class players run at a higher intensity (0.53 km or 28%) and run more (0.24 km or 58%) than moderate players (Mohr et al., 2003). Locomotor categories in soccer are used: standing (0 km), walking (6 km), jogging (8 km), low speed running (12 km), moderate pace running (15 km), high speed running (18 km), sprint (30 km) and run backward (10 km).

It is necessary to research to test the triangle run training method for soccer players. The aim is to increase the endurance of soccer players by using the triangle run training method, in which exercises and training programs are tailored to each player's needs and the team to be trained.

METHODS

Experiments were conducted using one group pre-test-post design. The study was conducted by providing the triangle run training method as a treatment for soccer players. The triangle run training method is carried out by combining motion between sprints, jogging, and walking. The distance covered when the sprint is 50 meters, jogging 40 meters, and walking 30 meters. In addition to a combination of sprinting, jogging, and walking, at the same time, players will also perform various basic techniques such as dribbling, passing, and control.

The research population chosen was the BMC Mensere club which took part in training camps to prepare for the match in the U 17 Soeratin Cup. The research subjects used were fifteen players. Samples were taken using sample random sampling. They were collecting data using test and measurement techniques using Yo-yo intermittent recovery test level 1.

(Krustrup et al., 2003) and (Castagna et al., 2008) say the level 1 yo-yo intermittent recovery test can be used by all players with testing procedures that are part of their fitness assessment program. The level 1 periodic yo-yo test (YIRTL1) has proven valid in measuring aerobic endurance. Based on research (Astagna et al., 2009) with the title effect of intermittent endurance fitness on match performance in young male soccer players and the results of this study indicate that the IR1 Yo-Yo test is a valid test to assess game readiness and guide training prescriptions on a young male football player.

The test implementation procedure, according to Astagna et al. (2006), The Yo-Yo IRTL1 test consists of a 20 m running track performed at an increased speed with 10 seconds active recovery between tracks spaced 5 m apart. The test is deemed to have ended when the participant twice failed to reach the front line in time (objective evaluation) or the participant felt unable to complete another shuttle at the specified speed (subjective evaluation).

The data normality test in this study used the SPSS version 20 application with the Kolmogorov Smirnov formula. They tested the truth of the hypothesis proposed in this study, using a different test (t-test) which is commonly used to test the difference between the two means. So in this study, various test tests were carried out using the paired sample t-test formula with the SSPS version 20 application.

FINDINGS AND DISCUSSION

Findings

Before the treatment of soccer players is carried out, the initial data collection is first carried out (pre-test). Based on the results of the pre-test, it shows the aerobic endurance of the soccer player at the BMC Mensere club, which consists of fifteen samples. The results obtained from the results of the aerobic endurance test showed that the dominant soccer player was in the poor category with 11 players (73.3%), with an average VO2Max

value of 39.8 ml/kg/min, and followed by the moderate category with 4 players. (26.7%). while the lowest VO2Max value was 38 ml/kg/min, the highest VO2Max value was 42 ml/kg/min. The pre-test results and the category of aerobic endurance for soccer players can be seen in table 2.

Retrieval of preliminary data pre-test) was conducted to determine the aerobic endurance ability of soccer players. The research data description was based on the pre-test results for a mean of 39.8, the lowest score of 38, the highest value of 42. After knowing the initial ability, there will be a treatment for 12 meetings. After the treatment is complete, the final data collection will be carried out (post-test). After the soccer players' treatment, then the last data collection will be carried out (post-test). Based on the results of the post-test, it shows the aerobic endurance of the soccer player at BMC Mensere club, which consists of fifteen samples. The results obtained from the results of the aerobic endurance test with an average VO2Max value of 40.1 ml/kg/min, while the lowest value remains 38 ml/kg/min and the highest value increases to 43 ml/kg/min. The results of the post-test of the football player's aerobic endurance can be seen in table 1.

The pre-test shows an average VO2Max of 39.8 ml/kg/min with 11 players in the poor category and 4 players in the moderate category. While the post-test shows that the endurance of dominant soccer players is in the poor category with ten players (66.7%) and the medium type, there are 5 players (33.3%) with an average VO2Max 40.1 ml/kg/min. The endurance category can be seen in table 2.

Based on the results of the pre-test and post-test data, it can be seen that there is an increase in VO2Max. In the pre-test, the average VO2Max is 39.8, while in the post-test, it is 40.1. there is an increase in the average VO2Max in diagram 1.

Table 1. Results of the Pre-Test and Post-Test of Aerobic Endurance

Findings	N	Minimum	Maksimum	mean
Pre-test	15	38	42	39.8
Post-test	15	38	43	40.1

Table 2. Aerobic Endurance Categories

Value Range	Pre-test		Post-test		Category
	f	%	f	%	
48.1 – 53.9	-	-	-	-	Very good
44.2 – 48	-	-	-	-	Good
41.0 – 44.1	4	26.7	5	33.3	Moderate
37.1 – 40.9	11	73.3	10	66.7	Less
Average	39.8	-	40.1	-	
Total	597	100	602	100	

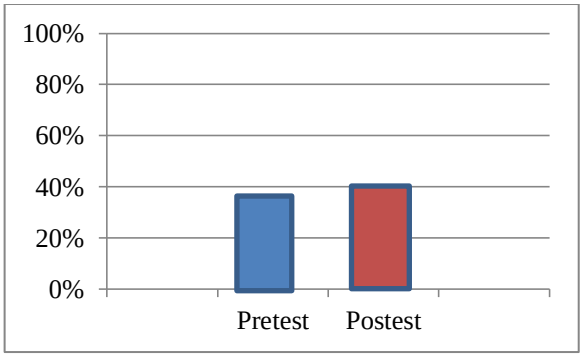

Diagram 1. Grafik Histogram Daya tahan aerobik

After the data is tested, it can be seen that this data is typically distributed with a significance value of 0.585. The results of the normality test can be seen in table 3.

After the information is tested for normality, then the data can continue to the hypothesis testing stage. The hypothesis test used is the t-test by looking for differences in the mean of a group with two standards. In the SPSS output table, the results of the Asymp value of aerobic endurance. Sig. (2-tailed) 0,000, which means that "Ha received." The Triangle Run training method affects increasing aerobic endurance. The results of data analysis on hypothesis testing are in table 4.

Table 3 Kolmogorov Smirnov Normality Test Results

Z	Asymp (2 tiled)	Distribusi
0.775	0.585	Normal

Table 4. Statistical Data Analysis of Paired Sample T-test

	Mean	Std.deviasi	T	Sig.(2 tailed)
Pretest- Posttest	0.306	0.237	5.00	0.000

Discussion

Retrieval of preliminary data pre-test) was conducted to determine the aerobic endurance ability of soccer players. The description of the research data is based on the table of aerobic endurance test results. It can be seen that the pre-test results for the mean are 39.8, the lowest value is 38, the highest value is 42, and the standard deviation is 1.35. After knowing the initial ability, there will be treatment (treatment) for 12 meetings. After the treatment is complete, the final data collection will be carried out (post-test).

The description of the research data based on the table shows the post-test results after endurance training using the triangle run method for an average of 40.1, the lowest value is 38, the highest value is 43, and the standard deviation is 1.51. Based on the descriptive analysis of the pre-test and post-test data in table 2, the difference between the mean is 0.3 ml/kg/min. Judging from the initial and final data shows that the triangle run exercise influences developing endurance.

The mean difference in the initial and final data occurs because of the training

process, the training program, the training method being carried out. Training is an activity that is planned and carried out by the cave to reach the highest possible peak of achievement. Therefore, endurance training must be done continuously, regularly, structured, and extended to achieve maximum performance. As stated by (Bompa & Buzzichelli, 2015), Organized training consisting of long duration or several repetitions can have a positive result in the development of endurance.

In addition to the training process, the correct training program or according to the team's needs also affects the training results that will be achieved later. The training program is a process where the coach makes the right training design to be used to be able to have a positive impact on the players. As stated by (Jeukendrup, 2011) supporting aspects in improving physical condition include routine and programmed exercise, maintained nutrition, and vitamin intake. Therefore, with the training program, achieving high achievement will be achieved, the training process becomes more precise and more focused.

Judging from the physical condition, especially aerobic endurance, there are many ways to increase it. Mylsidayu and Kurniawan (2015) provide many training methods in developing physical endurance, including 1. controlled speed polygon; 2.square; 3.quad '4. triangle run' 5.passing on the right.

In this study, the exercise method used was the triangle run training method. The triangle run training method is one of the exercises in which the movement activities are similar to those in football, namely walking, jogging, and sprinting. One of the keys to increasing aerobic endurance is choosing almost identical exercises, ranging from movements or situations that are often done in sports games. Based on the opinion of Rusell (1993) states that the ideal aerobic activity is one that: 1. Provides the right intensity; 2. Most similar to the activity being engaged in (according to the sport); and 3. Most preferred.

Aerobic endurance is the first fitness base for every player to support performance when competing, so the coach must provide appropriate and varied exercises to increase aerobic endurance. Endurance training using the triangle run method has a positive effect on increasing endurance. The triangular running training process has a positive impact on the body endurance of Bekasi male cricket athletes. An increase is due to an increase in routine and programmed training programs (Muhamad et al., 2019). Based on previous research that has been conducted by (Budiarsa, 2013), (Yunita and Hasan, 2016), and (Samsudin, 2018) with the same type of research, namely about the triangle run exercise. This study indicates that the triangle run exercise can be used as a physical exercise to increase endurance. Based on one task, there was an increase in VO2Max on the pre-test. The average VO2Max was 37 ml/kg/min. Then at the postest, it increased to 43.9 ml/kg/min. Based on previous research, it can be concluded that the triangle run exercise can be used to improve the aerobic endurance of football players.

Based on experts' reviews, this research was conducted to test and confirm that the triangle run exercise can increase physical endurance, especially aerobics, effectively. Based on the data, results showed an increase in the mean effect of aerobic endurance in the pre-test, namely 39.8, the lowest score was 38, and the highest was 42. While the mean post-test result was 40.1, the lowest score was 38, and the highest was 43. the initial test and the final test, thus the hypothesis ha is accepted with a significance of 0.000.

Previous research, the triangular running training method has benefits on the ability to dribble in soccer (Samsudin, 2018), can reduce resting pulse (Budriarsa, 2013), can increase cricket athlete's endurance (Telles et al., 2019), can decrease the index fatigue (Handayani, 2015), and able to increase the endurance of soccer players (Yunita and Hasan, 2016). This research aims to reinforce and prove that the benefits of the triangle run training method are not only able to dribble, can reduce resting pulse rates, can increase the endurance of cricket athletes, but also be able to increase the endurance of soccer players. This result is expected to help players improve their confidence during training and competing because players can play to their full potential without fear of fatigue.

CONCLUSION

From the statistical results of this study, it can be concluded that the triangle run method is not effective enough in increasing endurance. This can be seen in the increase between the pretest and posttest, namely 0.3 ml/kg/min.

AKNOWLEDGMENTS

Thank God Almighty for giving way and ease in completing the writing of the final project, research, and publication of an article entitled "The Effectiveness of the Triangle Run Training Method in Increasing the Aerobic Endurance of Football Players." In making this article, many parties helped so that the author could finish it, for that the author would like to thank: both parents who have provided motivation, prayer, moral and material; to Mr. Feri as chairman and manager of Club BMC Mensere who has permitted to the author to conduct this research; Therefore, the author can only pray that all the knowledge given will become deeds of worship and be accepted by Allah 'Azza wa jalla.

REFERENCES

Arisman, A. (2019). Pengaruh Latihan Square terhadap Daya Tahan Aerobic Atlet Sriwijaya Archery Club. *Gelanggang Olahraga: Jurnal Pendidikan Jasmani Dan Olahraga (JPJO)*, *2*(2), 45–53. https://doi.org/10.31539/jpjo.v2i2.720

Astagna, C. A. C., Mpellizzeri, F. R. I., Ecchini, E. M. C., Ampinini, E. R. R., & Lvarez, C. A. B. A. A. (2009). E i -e f m p y m s p. *October*, *15*, 1954–1959. https://doi.org/10.1519/JSC.0b013e3181b7f743

Astagna, C. A. C., Mpellizzeri, F. R. M. I., Hamari, K. A. C., & Arlomagno, D. O. C. (2006). *Aerobic fitness and yo - yo continuous and intermittent tests performances in soccer players : a correlation study*. *20*(2), 320–325.

https://doi.org/10.1519/R-18065.1

Bangsbo, J., Mohr, M., & Krustrup, P. (2006). Physical and metabolic demands of training and match-play in the elite football player. *Journal of Sports Sciences*, *24*(7), 665–674. https://doi.org/10.1080/02640410500482529

Bompa, T., & Buzzichelli, C. (2015). *Periodization training for sports: Human Kinetics Champaign*.

Budriarsa, G. (2013). Pengaruh pelatihan lari tiga sudut dan side jump sprint terhadap denyut nadi istirahat. *Jurnal Jurusan Ilmu Keolahragaan*, *1*, *No 1*.

Busyairi, B., & Ray, H. R. D. (2018). Perbandingan Metode Interval Training dan Continuous Run terhadap Peningkatan Vo2max. *Jurnal Terapan Ilmu Keolahragaan*, *3*(1), 76. https://doi.org/10.17509/jtikor.v3i1.10128

Castagna, C., Impellizzeri, F. M., Rampinini, E., D'Ottavio, S., & Manzi, V. (2008). The Yo-Yo intermittent recovery test in basketball players. *Journal of Science and Medicine in Sport*, *11*(2), 202–208. https://doi.org/10.1016/j.jsams.2007.02.013

Handayani, D. (2015). *Pengaruh Latihan Interval Dan 10 Minute Triangle Run Terhadap Indeks Kelelahan*.

Heru. Asriyan Ramadhan & Agus, Apri 2019. Pengaruh Latihan Cross Country Terhadap Daya Tahan Aerobik Atlet Sekolah Sepakbola (SSB) Pagaruyung FC Kecamatan Tanjung Emas Kabupaten Tanah Datar. Jurnal Stamina. 1 (2): 437-450. (http://stamina.ppj.unp.ac.id/index.php/JST/article/view/112/,.

Jeukendrup, A. E. (2011). Nutrition for endurance sports: Marathon, triathlon, and road cycling. *Journal of Sports Sciences*, *29*(SUPPL. 1). https://doi.org/10.1080/02640414.2011.610348

Julianto, Idi. 2016. Upaya Meningkatkan Kebugaran Jasmani Melalui Sirkuit Training Kids Pada Siswa SMP Negeri 4 Ciawi Gebang. JUARA: JurnalOlaharga. 3 (2): 7-14.(http://jurnal.upmk.ac.id/index.php/juara/article/view/56, diakses pada tanggal03/03/2020).

Krustrup, P., Mohr, M., Amstrup, T., Rysgaard, T., Johansen, J., Steensberg, A., Pedersen, P. K., & Bangsbo, J. (2003). The Yo-Yo intermittent recovery test: Physiological response, reliability, and validity. *Medicine and Science in Sports and Exercise*, *35*(4), 697–705. https://doi.org/10.1249/01.MSS.0000058441.94520.32

Mohr, M., Krustrup, P., & Bangsbo, J. (2003). Match performance of high-standard soccer players with special reference to development of fatigue. *Journal of Sports Sciences*. https://doi.org/10.1080/0264041031000071182

Muhamad, M., Kusumawati, M., Haqiyah, A., & Rosadi, H. U. (2019). *Modification of triangle run exercise to improve*. *4*(2), 292–295.

Mylsidayu, Apta & Kurniawan Febi, (2015). *Ilmu Kepelatihan Dasar.*Bandung:Alfabeta.

Rusell R. Pate, Bruce Mcclenaghan, & Robert Rotella. (1993). *Dasar-dasar Ilmiah Kepelatihan.*(Penterjemah: KasiyoDwijowinoto), Semarang:IKIP Semarang Press.

Samsudin. (2018). *Pengaruh Latihan Lari Segitiga terhadap Kemampuan Menggiring Bola dalam Permainan Sepak Bola pada Siswa Putra Kelas XI SMA Negeri 1 Hu ' u*. *8*(1), 44–51.

Sarmento, H., Marcelino, R., Anguera, M. T., CampaniÇo, J., Matos, N., & LeitÃo, J. C. (2014). Match analysis in football: a systematic review. *Journal of Sports Sciences*, *32*(20), 1831–1843.

https://doi.org/10.1080/02640414.2014.898852

Strauss, A., Jacobs, S., & Van Den Berg, L. (2014). The influence of anaerobic and aerobic fitness on the technical skill ability of national elite male under-18 african soccer players. *Mediterranean Journal of Social Sciences*, *5*(27), 1704–1711. https://doi.org/10.5901/mjss.2014.v5n27p1704

Telles, S., Reddy, S. K., & Nagendra, H. R. (2019). 済無 No Title No Title. *Journal of Chemical Information and Modeling*, *53*(9), 1689–1699. https://doi.org/10.1017/CBO9781107415324.004

Vasileios, A., Athanasios, S., Antonios, S., Nikos, G., & Giorgos, P. (2018). The increase of vo2 max variation and the specific biochemical parameters in soccer players after a pre-season training program. *Journal of Physical Education and Sport*, *18*(2), 686–694. https://doi.org/10.7752/jpes.2018.02100

Yunita dan Hasan. (2016). Pengaruh Metode Latihan Triangle Run Terhadap Daya Tahan VO2Max Pada Anggota Ekstrakulikuler Sepakbola SMA Negeri 1 Cabangbungin. *Motion*, 89–96.