

Training Of The Aerobic Zone 2 Model On The Skills Of Kicking The Ball In Football Of Students At SMP Negeri 1 Gondang

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Abstract

This study aimed to examine the effect of a zone 2 aerobic training model on kicking (shooting) skill among students participating in the soccer extracurricular program at SMP Negeri 1 Gondang. A one-group pretest-posttest design was used, involving all 15 male students enrolled in the extracurricular program as the total sample. Kicking skill was measured using the Bobby Charlton shooting test before and after a 16-session zone 2 aerobic training program (jogging at 60–70% of maximum heart rate). Data were analyzed using the Shapiro-Wilk normality test, Levene's homogeneity test, and the Paired Sample T-Test. The results showed a significant increase in mean shooting score from 118.00 (pretest) to 160.67 (posttest), with a t-value of -9.158 and a significance value of 0.000 ($p < 0.05$). These findings indicate that the zone 2 aerobic training model has a significant effect on improving the kicking skill of soccer extracurricular students, suggesting that aerobic endurance training can be used as a foundational component of technical skill development programs at the junior high school level.

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1. INTRODUCTION

Education is a conscious and planned effort to create an effective and appropriate learning process, so that students can actively develop their potential. In education, there are educational, teaching, and training activities that run in an integrated manner to form positive values. (Roberto et al. 2023). In the context of physical education, the affective, cognitive, and psychomotor aspects are important elements that are interrelated and receive special attention in the learning process and assessment. Some experts define sports as various physical activities whose energy source comes from the human body itself. In addition, sports are also seen as a form of play and activity that involves efforts to overcome challenges from oneself, opponents, and the environment in order to achieve victory. (Paiman 2009).

Football is a sport that incorporates various basic skills. Mastering these basic skills in football can build teamwork, cohesiveness, and improve the quality of play, leading to victory (Kuswoyo 2019). Football is a game that demands solid teamwork and strong individual skills to achieve victory. The main objective of the game is to keep the goal unconceded and score as many

goals as possible against the opponent. To achieve this, excellent physical condition and a good mastery of basic techniques are required (Haryanti et al. 2021). Football is not only popular among the general public but is also part of the learning material in formal education. However, students' understanding of basic techniques and soccer training in schools is still limited, as the primary focus is on improving fitness and physical activity. Therefore, school time alone is insufficient to master the various techniques in football.

Kicking the ball is one of the basic skills every soccer player must have, as shooting on goal is the primary means of scoring goals—a crucial aspect of a team's success. A player's ability to accurately direct a kick to the target is known as shooting accuracy. In soccer, shooting requires a high level of accuracy to produce goals, and to achieve this, training is needed to improve the accuracy of kicks on goal. Basic technical skills in soccer are stand-alone skills; one of them is the ability to shoot the ball (*shooting*). When kicking the ball and scoring a goal, the goal is what makes you win the game. However, shooting skills in class are indeed one of the few techniques that are quite difficult for junior high school students to master. This shows that shooting techniques are not simple movements for junior high school students and require systematic and continuous practice efforts. (Damai Syah Halawa et al. 2025).

The technical quality of shooting skills in soccer is crucial to learn and practice. To score goals, you need to have the ability to shoot under pressure in a game with limited time, limited space, physical fatigue, and aggressive opponents (Karim, Syafruddin, and Asri 2021). Physical training in soccer is crucial. The goal of this physical training is to prepare for the physical demands of the game and to enable the effective application of various technical skills and strategies during the match. When a player has an optimal level of fitness, they will be able to effectively apply soccer techniques, such as dribbling, passing, shooting, and others.

Extracurricular activities are carried out by students outside of regular school hours and during school holidays, carried out on school premises or outside of school, to deepen and broaden students' knowledge, recognize the relationship between several subjects, channel talents and interests, and complement efforts to develop whole people. According to Astuti (2020), in Permendiknas No. 22 of 2006, the principles of extracurricular activities consist of: 1) Individual, namely the principle that adapts to the potential, talents, and interests of each student. 2) Choice, namely the principle that is in accordance with the wishes of students and is followed voluntarily. 3) Active involvement, namely the principle that requires students to participate fully. 4) Fun, namely the principle that creates a pleasant atmosphere and makes students feel happy. 5) Work ethic, which is a principle that encourages students' enthusiasm to work well and achieve success. 6) Social benefits, which are principles that are held for the benefit of society. This activity aims to form a movement. There are several types of extracurricular activities followed by students at SMP Negeri 1 Gondang, one of which is the extracurricular sport of soccer. Soccer is a sport that uses a ball, which is usually made of leather, and is played by two teams, with each team consisting of 11 (eleven) main players and substitute players. To be able to play well, a person needs to master or have basic skills in soccer techniques. Based on the results of initial observations conducted at SMP Negeri 1 Gondang, where most extracurricular students still experience difficulties in kicking the ball, especially in terms of accuracy and kick power. This is in line with research by Aristianto, Jance J Saputete (2019), also conducted at the high school level. Analysis of extracurricular students at

SMA Negeri 12 Samarinda showed that their kicking and heading skills were considered poor. This indicates that the training program implemented in extracurricular activities has not optimally addressed the physical conditions that support kicking technique.

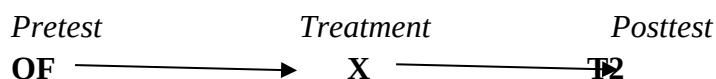
One of the elements that plays a role in the ability to kick a ball is physical condition, especially aerobic endurance. Aerobic capacity (VO₂Max) has been shown to have a significant relationship with skill in playing soccer (Aprizalmi 2016). Aerobic exercise is categorized into several zones determined by the percentage of maximum heart rate. One of the zones identified in this study is zone 2, which includes an intensity of 60–70% of maximum heart rate. This is in line with the view that the aerobic recovery zone is in the range of 60%–70% of maximum heart rate. In addition, an intensity level between 60 and 70 percent is also classified as a category of moderate physical activity that has a positive effect on improving body health and is known as the area of fat reduction (Rihatno 2017). Therefore, carrying out activities within this range is very suitable for junior high school students because it is considered quite safe and does not cause excessive fatigue. The selection of zone 2 is determined based on physiological properties, where in this zone the body utilizes oxygen efficiently as the main energy source. This allows students to carry out activities for longer periods of time without feeling excessive fatigue, so that the training process can take place more effectively.

Although numerous studies have been conducted on the relationship between aerobic exercise and soccer playing ability, there are still several limitations and shortcomings in previous research. Most studies emphasize the improvement of aerobic endurance (VO₂Max) without directly linking it to technical skills, especially kicking skills (*shooting*). On the other hand, researchers who specifically apply aerobic training methods based on heart rate zones, especially zone 2 (60–70% of maximum heart rate), are also still very few. However, zone 2 is considered the most ideal training intensity to increase stamina at a young age without causing excessive fatigue. Furthermore, there are still few studies that combine zone 2 aerobic training with technical elements in soccer, especially the ability to kick the ball in schools for junior high school. Nevertheless, technical aspects and physical condition are two factors that are closely related in improving performance in playing soccer.

Based on the explanation above, the purpose of this study is to determine the impact of the zone 2 aerobic training model on the kicking ability of students at SMP Negeri 1 Gondang. This study is expected to provide an overview of the effectiveness of zone 2 aerobic training in increasing student stamina, which in turn has an impact on improving technical abilities, especially in kicking (*shooting*).

2. METHOD

The research design used in this study is a *one-group pretest-posttest design*, namely a research design that includes a pretest before being given treatment and a posttest after being given treatment. This design is an experimental design that uses one sample group and takes measurements before and after being given treatment to the sample. (Annisa Tri Astuti & Yasir Arafat, 2024) This study aims to determine how much influence the zone 2 aerobic exercise model has on improving ball kicking skills in students of SMPN 1 Gondang. The illustration of the design of the *pretest-posttest design* in this study is presented as follows:



Research Design Image

Information:

T1 :Initial test

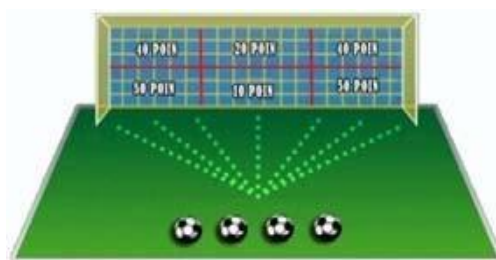
T2 :Final Test

X : Aerobic Zone 2 Exercise Model

The population referred to in this study is the 15 students of the football extracurricular activity at SMPN 1 Gondang. The sample is part of the population or several population members that represent the population. Budiwanto (2014:93). Sugiyono (2014) explains the saturated sampling approach as a sample selection technique when the entire population is used. Due to the relatively small population, the author selected the sample using a total sampling strategy, so that a total of 15 participants were used as samples for this study. This research will be conducted on the Gondang football field and basketball court of SMPN 1 Gondang, located in Gondang Village, Gondang District, Tulung Agung Regency. This research was conducted for 2 months with details: one week for preparation for the initial test (*pretest*). 16 meetings for treatment (*treatment*). The final test was conducted in the last week (*posttest*), along with the preparation of research reports.

The instrument used is a psychomotor test, which is defined as follows: the psychomotor domain refers to areas related to skills or abilities to perform actions after an individual has undergone a certain learning process (Risnawati et al. 2024). In the context of physical education, psychomotor tests have a crucial role because they are directly related to students' practical abilities. The test covers several aspects, namely: the position of the body and feet when kicking, whether they are in a balanced state or not, whether the body is facing the target, and whether the supporting foot is placed next to the ball. This psychomotor test uses a test *shooting by Bobby Charlton*, as proposed by Mielke (2007:76), which has a validity of 0.771 and a reliability of 0.898. This test aims to measure shooting ability and skill. The test procedure is as follows:

1. The test was conducted by dividing the goal area into six scoring zones. The top corners were scored 40 points, the bottom corners 50 points, the top center 20 points, and the bottom center 10 points. Each player was given 4 balls placed in front of the goal, and this instrument was modified to accommodate the number of balls and the limited facilities available. The distance between the players and the goal was adjusted to their respective abilities, with the distance of 12 meters for boys and 8 meters for girls. Each student was given 15 seconds to kick the ball towards the goal. The scoring norms can be seen in the image below.
2. Participants who kick 5 times are considered valid if they meet the criteria above.



Football Shooting Test source: (Mielke, 2007: 76)

In this research, researchers used the SPSS 2016 version to analyze the data to obtain and process the data for later analysis. This study used the t-test. However, before using the t-test, prerequisite tests such as normality and homogeneity tests must be performed. This study used the Shapiro-Wilk formula because the sample size was >50 . This study used the SPSS 2016 version *Levene's test*. This testing process was conducted on the treatment group in the study. With a sig value > 0.05 , it can be concluded that the data is homogeneous. The hypothesis test used a t-test using the Compare Means Paired Sample T-test. The hypothesis is as follows:

- 1) H_0 : There is no significant effect
- 2) H_1 : There is a significant influence

With testing criteria:

- 1) If sig. (2-tailed) > 0.05 then H_0 is accepted and H_1 is rejected.
- 2) If sig. (2-tailed) < 0.05 then H_0 is rejected and H_1 is accepted.

3. RESULTS AND DISCUSSION

This study aims to determine the influence of the training *aerobic* Zone 2 model on kicking skills in extracurricular soccer students at SMP Negeri 1 Gondang. The population of this study was all 15 male students participating in extracurricular soccer activities at SMP Negeri 1 Gondang, aged 13–16 years, and all of them were sampled using a total sampling technique. Kicking skill data were obtained through a test *shooting* Bobby Charlton, which was executed before (*pretest*) and after (*posttest*) students underwent a training program in *aerobic* zone 2 for 16 sessions.

Table 1. Descriptive Statistics of Pretest and Posttest of Ball Kicking Skills

Statistics	Pretest	Posttest
N	15	15
Mean	118,00	160,67
Median	120,00	160,00
Std. Deviation	18,205	14,376
Minimum	80	130
Maximum	150	180

The results of the descriptive analysis in Table 1 show an increase in the average score of kicking the ball by 42.67 points, namely from 118.00 in the *pretest* to 160.67 in the *posttest*, accompanied by a decrease in standard deviation from 18.205 to 14.376, which indicates that student performance became more consistent after being given treatment.

Before hypothesis testing is carried out, the data is first tested with prerequisite tests in the form of a normality test and a homogeneity test. The results of the Shapiro-Wilk normality test *Shapiro-Wilk* shows a significance value of 0.589 for the *pretest data* and 0.234 for the *posttest data* ($p > 0.05$), which means that both groups of data are normally distributed. The results of the homogeneity test with *Levene's Test* showed a significance value of 0.129 ($p > 0.05$), so the data variance was declared homogeneous. With the fulfillment of these two assumptions, further hypothesis testing was carried out using the *Paired Sample T-Test*.

Table 2. Results of Paired Sample T-Test Pretest and Posttest

Pair	t count	df	Sig. (2-tailed)
Pretest – Posttest	-9,158	14	0,000

Based on Table 2, the t-value was obtained at -9.158 with a significance level (Sig. 2-tailed) of 0.000 ($p < 0.05$). These results indicate that H_0 is rejected and H_1 is accepted, so there is a significant difference between the pretest and posttest results of the kicking skills of extracurricular soccer students at SMP Negeri 1 Gondang. Thus, the training *aerobic* Zone 2 model was proven to have a significant effect on improving students' ball kicking skills, and the research hypothesis (H_1) proposed in the introduction was accepted.

These findings strengthen the evidence that aerobic endurance capacity is closely related to the quality of kicking technique in soccer. Zone 2 training, which occurs at an intensity of 60–70% of maximum heart rate (Rihatno 2017), allows the body to efficiently utilize oxygen as its primary energy source and optimizes metabolic capacity and cardiovascular efficiency (Mann 2018), enabling students to perform physical activities for longer durations without experiencing excessive fatigue. This improved physical condition, in turn, supports students in maintaining the quality of their kicking movements—both in terms of body balance, accuracy of ball direction, and consistency of foot contact with the ball—repeatedly throughout training sessions and during data collection, given that physical condition is a comprehensive, inseparable unit (Herpandika, Yuliawan, and Rizky 2019).

The results of this study align with those of Helgerud (2001), who demonstrated that increasing the aerobic capacity of junior soccer players significantly contributes to match performance, including distance covered, work intensity, and frequency of ball interaction. Crawford and Coker (2026) also reported that a five-week zone 2 training program improved the cardiovascular capacity of high school soccer players, but that study did not link aerobic capacity increases to specific technical skills. This study addresses this gap by demonstrating that increased aerobic capacity through zone 2 training significantly impacts technical skills, particularly kicking.

On the other hand, the debate raised by Buchheit, Vescio, and Laursen (2024) regarding the relevance of zone 2 training in modern football needs to be viewed contextually. For elite players with a predominance of fast-twitch muscle fibers, zone 2 training does run the risk of being suboptimal. However, for junior high school students in the early stages of developing their physical condition and technique, this training remains relevant as a foundation for aerobic endurance. This is confirmed by the results of this study, where students with a low aerobic base showed significant improvements in kicking skills after undergoing the zone 2 program.

This finding is also relevant to the research findings of Daral Fauzi R. (2009) at SMP Diponegoro Sampang and Aristianto and Jayadi (2020) at SMA Negeri 12 Samarinda, both of which reported that the kicking skills of extracurricular students were still considered lacking, and attributed this condition to the suboptimal physical training program that supports the quality of kicking technique. This study strengthens this hypothesis by empirically proving that the implementation of a structured physical training program—in this case, kicking training—in *aerobic* zone 2 is able to overcome these limitations and significantly improve kicking skills.

The improvement in kicking skills in this study is also in line with the view (Hasanuddin 2018) who stated that executing shooting techniques becomes more challenging when players face pressure from opponents with limited time, space, and physical fatigue; better physical capacity is the result of training *aerobic* Zone 2 helps students overcome these challenges, thus maintaining kick quality. This aligns with the principle that holistically improving physical capacity is a crucial foundation before an athlete can move on to the next stage or periodization of technical training (Rizky 2021). Furthermore, stimulation through regular, measured, and sustainable physical activity also contributes positively to improving overall health and functional fitness (Lusianti, Setiawan, and Rifqi 2023), which in turn supports the consistency of students' technical performance during training sessions and data collection.

Overall, the results of this study answer the problem formulation and hypothesis proposed in the introduction, namely that the training *aerobic* Zone 2 model significantly influences the kicking skills of extracurricular soccer students at SMP Negeri 1 Gondang. These findings provide practical implications for coaches and physical education teachers to integrate pulse zone-based aerobic endurance training as part of basic soccer technique training programs, particularly at the junior high school level.

4. CONCLUSION

Based on the conclusions of the study findings and discussion, it is concluded that there is an influence of zone 2 aerobic exercise on the ball kicking skills of extracurricular students of SMP Negeri 1 Gondang. This is proven by the results of the Paired Sample t-Test test obtained a calculated t value of -9.158 with a significance value (Sig. 2-tailed) of 0.000. Because the significance value is smaller than 0.05 ($0.000 < 0.05$), H_0 is rejected, and H_1 is accepted. Thus, there is a significant difference between the results of the pretest and posttest of ball kicking skills in extracurricular soccer students.

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