Endurance Training Using Small Sided Games For Soccer School Players

Ricky Ferrari Valentino[1], James Tangkudung[1], Iman Sulaiman[1], Samsudin[1], Widiyastuti[1], Yasep Setiakarnawijaya, Albert Wolter Tangkudung[1]

[1]Jakarta State University
rickyferrarivalentino_9904919010@mhs.unj.ac.id

Abstract

This study is conducted to determine the endurance capacity (VO2Max) of soccer school pleyers (SSB) in small games. The research method used by researchers is descriptive-quantitative and SSB students are involved in this study. The sampling technique is a sampling technique. This research is a type of research and development (R&D) based on the Borg-Gall model, which requires ten steps to be completed during the research process. The model used is a block system consisting of: 1st Block System (SR), 2nd Block System (SR2), 3rd Block System (SR3) and 4th Block System (SR4). In this study, researchers used purposive sampling method. The research sample consisted of 70 SSB students. The instrument used in this study was the MFT (Multistate Fitness Test) or Yoyo test. The information obtained was analyzed according to the average, highest and lowest scores by calculating the percentage of soccer students. An endurance training model through small games for ages 14-15 years can be developed and applied to soccer training. The development is effective in increasing soccer endurance at the age of 14-15 years.

Keyword: VO2Max Ability, Soccer.

Introduction

Small sided games are a form of training that modifies soccer games with limitations, including limitations on the number of players, field size, and length of play. Smaller ball possession and throwing games (Small side games) with fewer players are excellent for improving tactical understanding and refining players' technical skills(Pembinaan & Indonesia, 2017). The activities included in the mini game are not much different from the actual soccer game. Small two-team matches (3 against 3-7 against 7) are actually more effective in many ways(Clemente

et al., 2019). The game can be played with all parts of the body except the arms (hands). "Every soccer match is officiated by a referee who has absolute power to enforce the rules of the game in the match assigned to him."(FIFA, 2016). In addition to playing eleven against eleven players, soccer is also managed by a referee as a referee which is a mandatory requirement for organizing official soccer competitions(Scheunemann, 2012)(Pembinaan & Indonesia, 2017).

Physical fitness plays a very important role in achieving maximum peak performance(T. O. Bompa & Buzzichelli, 2018). Physical fitness is a whole unit of components that cannot be separated for both improvement and maintenance. Stamina or higher endurance is a physical component called endurance (James, 2018) Players with great stamina offer a great advantage to a team. On the other hand, tired players lose concentration very quickly and usually make basic mistakes that really don't need to be made during a match. Good technique does not mean much if it is not supported by excellent endurance (Scheunemann, 2012).

With reduced stamina, technical and tactical errors often occur. The way to measure a player's endurance is to measure the player's Vo2max (Werner et al., 2019) explains: "Vo2max is the ability of the human respiratory system to inhale as much oxygen as possible during exercise (physical activity). "(T. Bompa & Buzzichelli, 2015). Many factors influence the increase in Vo2max, one of which is the exercise factor. The method used to determine Vo2max, the method, intensity of exercise and testing equipment all affect the level of exercise associated with increasing Vo2max.(T. O. Bompa & Buzzichelli, 2018)

Small sided games are a training variation that changes the game of 11-on-11 soccer. Each team consists of several players with a smaller field size. (Sarmento et al., 2018)(Arslan et al., 2020) With fewer players on each team, each player gets more opportunities to play the ball on defense and offense. Sometimes too many players on the field or too many opportunities or decisions can affect concentration and performance. Because there are fewer variables on the field, practice can encourage more positive play (Clemente, 2016) (Doewes et al., 2020). Small sided games are a form of training that changes the game of soccer with restrictions, including limits on the number of players, the size of the field and the length of the game (Fernández-Espínola et al., 2020). Smaller

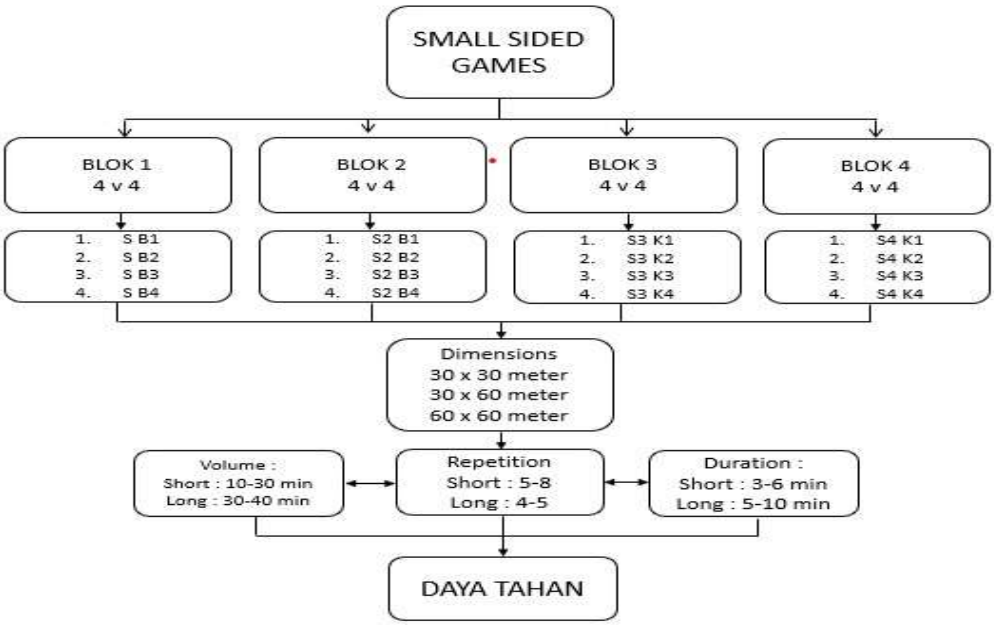
games and management games with fewer players are good for developing tactical understanding and improving players' technical skills. (Okba Selmi , Ibrahim Ouergui, Danielle E Levitt & Beat Knechtle, 2018). The activities contained in the Small sided games exercise are not much different from the actual soccer game. Matches between two small teams (3 against 3 to 7 against 7) are in many ways actually more effective allowing coaches to develop players' technical and tactical skills and simultaneously cause an increase in physiological parameters by increasing endurance, agility, and strength (Francesco Sgrò et al., 2018).

Several ways to improve endurance: (1) increase the intensity of endurance training, such as high-intensity interval training; (2) extend the distance of running or swimming, ensuring high speed, (3) strengthen the muscles needed for this work. For athletes, the higher the endurance factor required, the higher the VO2max value required (James, 2018). VO2max consumption is one of the important factors in supporting player achievement (Mackała et al., 2020).

Based on the findings in the area, the researcher suspects that the physical condition of the students does not meet the desired expectations. If this continues, it will have a maximum effect. Therefore, as students who want to excel in the field of soccer, it is necessary to increase the aerobic endurance of students that has never happened before(Di Giminiani & Visca, 2017).

Methods

The method used in this research is descriptive research method. Descriptive research is a type of research that aims to describe systematically, factually and precisely, the facts and characteristics of certain populations, or attempts to describe phenomena in detail. (Gane, R. M., Wager, W. W., Golas, K. C., & Keller, n.d.). The target group of this study were 180 students from SSB Siliwangi Cimah, SSB Mars and SSB Panama. This research is a type of research and development (R&D) with the Borg and Gall model, where there are ten stages that must be carried out during the research process (Gall et al., 2003). The training model used in this study used the small sided games endurance training design:



The model used is a block system consisting of; 1. Block system 1 (SR), 2. Block system 2 (SR2), 3. Block system 3 (SR3), and Block system 4 (SR4). The product produced in this research is a student-directed endurance exercise learning model based on the results of theoretical and empirical research that analyzes the needs of students, especially in sports, who want to learn about learning endurance exercise. The tasks are arranged in such a way that they better understand each phase of movement in a soccer game. The sampling technique used is a purposive sampling technique that surveys students outside of soccer. The sample is a portion or representative of the population being studied(William h Edward, 2011). The sample in this study was from each SSB as many as 20 people. The tool used in this study is a test to measure VO2MAX levels as follows: To obtain information about the VO2MAX levels of SSB students, the instruments used in this study were tested and measured using the Yoyo Test (Mackenzie, 2008). Data analysis is an effort or process that involves processing data into information in such a way that it is possible to understand the characteristics of the data and is useful for solving problems, especially research problems. The data analysis method of this research is as follows:1. Determination of the average value 2. Determination of percentage.

Research Results

This research is a descriptive quantitative test conducted from November 2022 to March 2023 on 70 students. The results obtained from the VO2Max ability through the Yoyo Test (Multistage Fitness Test) instrument(Mackenzie, 2008). Based

on the results of the N Gain score test calculation above, it shows that the average value of the Experiment group N-Gain score is 70.2 or 70.20% including in the effective category. With a minimum N-Gain score of 50.00 and a maximum of 83.50. Meanwhile, the average N-Gain score of the control group is 31.80 or 31.80%, including in the ineffective category. With a minimum N-Gain score of 14.40 and a maximum of 46.40.

Discussion

The endurance training model for students developed has gone through validation results from experts in the field of football, and has also been tested with the scope of small and large scales in several soccer schools. There are at least 16 activities or training models to learn endurance training that can be done either individually, in pairs or in groups. The 16 model activities are divided into several types of technical activities, namely, as many as 4 activities for block system 1, 4 activities for block system 2, 4 activities for block system 3, and 4 activities for block system 4. The entire activity has also been divided based on the characteristics of the model, ranging from easy, moderate, to difficult levels. And based on the results of validation and trials that have been carried out, overall that the endurance training learning model for students is suitable for use (Clemente et al., 2019).

This exercise model product is then packaged into printed books and electronic books with attractive and clear images, and is equipped with the name of the activity, level of difficulty, media used, number of participants, objectives, learning steps and also teaching points from each activity performed(Benavides-Ubric et al., 2020). Providing structured treatment can improve the structured motion planning process and provide long-term memory in motion skills (Wright et al., 2004). The appearance of attractive images will motivate learners to see and read the meaning of the image (Johnston & Davis, 2019). Attractive images tend to remain accessible in an individual's mind for longer and this has a powerful effect on one's imagination(Gibson & Zillmann, 2000). In addition, the hands-on learning process will provide feedback with a variety of models, and the division by individual, pair and group movement tasks further expands students' knowledge, which in turn can improve increasingly complex basic movement skills (Sigrist et al., 2013).

Based on the researcher's observations, most of the soccer school students looked quite physically active, completing the

training program and the playing test program three times a week and the competitions they participated in, but during the observation, the researcher did not find any special exercises to train aerobic endurance. (VO2 Max)(Mackała et al., 2020). In addition, several other factors that can affect the level of aerobic endurance fitness (VO2 Max) include food, rest and living habits and the environment. eating habits are one of the factors supporting aerobic endurance fitness (VO2 Max) (Prieto-González & Sedlacek, 2022). Good food is nutritious food, this will affect a person's physical fitness level. With good nutritional intake, the energy adequacy will be balanced, so that it makes the body healthy and fit. Seeing from these conditions, it is necessary to increase the VO2 Max level of students so that students who have moderate VO2 Max can improve to good and good can become very good and special and those who still have less VO2 Max can become moderate and even good, then the coach must include a special training program to increase VO2 Max in his routine training, and the coach must also educate students and parents of students to pay attention to nutritional intake, because at this age it is the time when a student experiences a growth period so that physical condition and nutritional intake determine future student achievement.

Conclusion

Based on the results of needs analysis, expert validation, field trials, effectiveness tests and discussion of the results of research and development on the product development of endurance training models through small sided games aged 14-15 years, the following conclusions can be drawn: 1. The endurance training model through small sided games aged 14-15 years can be developed and applied in soccer training 2. The developed endurance training model is effective for increasing endurance in soccer aged 14-15 years.

Bibliography

Arslan, E., Orer, G. E., & Clemente, F. M. (2020). Running-based high-intensity interval training vs. small-sided game training programs: Effects on the physical performance, psychophysiological responses and technical skills in young soccer players. Biology of Sport, 37(2), 165–173. https://doi.org/10.5114/BIOLSPORT.2020.94237

Benavides-Ubric, A., Díez-Fernández, D. M., Rodríguez-Pérez, M. A., Ortega-Becerra, M., & Pareja-Blanco, F. (2020). the Load-Velocity Relationship in Deadlift Exercise. In ©Journal of Sports Science and Medicine (Vol. 19). http://www.jssm.org

Bompa, T., & Buzzichelli, C. (2015). Periodization Training for Sports-3rd Edition. https://books.google.com/books?id=Zb7GoAEACAAJ&pgis=1

Bompa, T. O., & Buzzichelli, C. (2018). Periodization-6th Edition: Theory and Methodology of Training. In Human Kinetics. https://books.google.es/books?id=2f9QDwAAQBAJ&pg=PA343&lpg=PA343&dq=Bompa,+T.+(1983):+Theory+and+methodology+of+training.+Dubuque,+Iowa,+Kendall/Hunt+Pb.Co&source=bl&ots=rwTXVCr6Bk&sig=ACfU3U13j7m6y72KP2cirIGPjYpf3V0FcA&hl=es&sa=X&ved=2ahUKEwjYprD-4NjpAhW

Clemente, F. M. (2016). Small-Sided and Conditioned Games in Soccer Training The Science and Practical Applications. http://www.springer.com/series/8884

Clemente, F. M., Sarmento, H., Rabbani, A., Van Der Linden, C. M. I. (Niels., Kargarfard, M., & Costa, I. T. (2019). Variations of external load variables between medium- and large-sided soccer games in professional players. Research in Sports Medicine, 27(1), 50–59. https://doi.org/10.1080/15438627.2018.1511560

Di Giminiani, R., & Visca, C. (2017). Explosive strength and endurance adaptations in young elite soccer players during two soccer seasons. PLoS ONE, 12(2), 1–17. https://doi.org/10.1371/journal.pone.0171734

Doewes, R. I., Purnama, S., Syaifullah, R., & Nuryadin, I. (2020). The effect of small sided games training method on football basic skills of dribbling and passing in indonesian players aged 10-12 years. International Journal of Advanced Science and Technology, 29(3 Special Issue), 429–441.

Fernández-Espínola, C., Robles, M. T. A., & Fuentes-Guerra, F. J. G. (2020). Small-sided games as a methodological resource for team sports teaching: A systematic review. International Journal of Environmental Research and Public Health, 17(6). https://doi.org/10.3390/ijerph17061884

FIFA. (2016). Youth Football. Www.FIFA.Com, 257.

Francesco Sgrò, Salvatore Bracco, Salvatore Pignato, & Mario Lipoma. (2018). Small-Sided Games and Technical Skills in Soccer Training: Systematic Review and Implications for Sport and Physical Education Practitioners. Journal of Sports Science, 6(1). https://doi.org/10.17265/2332-7839/2018.01.002

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). Educational Research: An Introduction (Seventh Ed). Pearson Education, Inc.

Gane, R. M., Wager, W. W., Golas, K. C., & Keller, J. M. (n. d. . (n.d.). Principles of Instructional Design.

Gibson, R., & Zillmann, D. (2000). Reading between the photographs: The influence of incidental pictorial information on issue perception. Journalism and Mass Communication Quaterly, 77(2), 355–366. https://doi.org/10.1177/107769900007700209

James, T. (2018). SPORT PSYCHOMETRICS: Basics and Instruments of

Sports Psychometric. Jakarta: Edisi, 1.

Mackała, K., Kurzaj, M., Okrzymowska, P., Stodółka, J., Coh, M., & Rożek-Piechura, K. (2020). The effect of respiratory muscle training on the pulmonary function, lung ventilation, and endurance performance of young soccer players. International Journal of Environmental Research and Public Health, 17(1). https://doi.org/10.3390/ijerph17010234

Mackenzie, B. (2008). 101 Tests D'Évaluations.

Okba Selmi , Ibrahim Ouergui, Danielle E Levitt, P. T. N., & Beat Knechtle, A. B. (2018). Small-Sided Games are More Enjoyable Than High-Intensity Interval Training of Similar Exercise Intensity in Soccer. Journal of Chemical Information and Modeling, 53(9), 1689–1699. https://www.bodybuilding.com/content/how-to-bench-press-layne-norton-complete-guide.html

Pembinaan, K., & Indonesia, S. (2017). Kurikulum Pembinaan Sepakbola Indonesia PSSI.

Prieto-González, P., & Sedlacek, J. (2022). Effects of Running-Specific Strength Training, Endurance Training, and Concurrent Training on Recreational Endurance Athletes' Performance and Selected Anthropometric Parameters. International Journal of Environmental Research and Public Health, 19(17). https://doi.org/10.3390/ijerph191710773

Sarmento, H., Clemente, F. M., Harper, L. D., Costa, I. T. da, Owen, A., & Figueiredo, A. J. (2018). Small sided games in soccer–a systematic review. International Journal of Performance Analysis in Sport, 18(5), 693–749. https://doi.org/10.1080/24748668.2018.1517288

Scheunemann, T. S. (2012). Kurikulum Sepak Bola Indonesia.

Sigrist, R., Rauter, G., Riener, R., & Wolf, P. (2013). Augmented visual, auditory, haptic, and multimodal feedback in motor learning : A review. Psychonomic Bulletin & Review, 20, 21–53. https://doi.org/10.3758/s13423-012-0333-8

Werner, C. M., Hecksteden, A., Morsch, A., Zundler, J., Wegmann, M., Kratzsch, J., Thiery, J., Hohl, M., Bittenbring, J. T., Neumann, F., Böhm, M., Meyer, T., & Laufs, U. (2019). Differential effects of endurance, interval, and resistance training on telomerase activity and telomere length in a randomized, controlled study. European Heart Journal, 40(1). https://doi.org/10.1093/eurheartj/ehy585

William h Edward. (2011). Motor learning & control. United States.

Wright, D. L., Black, C. B., Immink, M. A., & Brueckner, S. (2004). Long-Term Motor Programming Improvements Occur Via Concatenation of Movement Sequences During Random But Not During Blocked Practice. Journal of Motor Behavior, 36(1), 39–50. https://doi.org/10.3200/JMBR.36.1.39-50

Arslan, E., Orer, G. E., & Clemente, F. M. (2020). Running-based high-intensity interval training vs. small-sided game training

programs: Effects on the physical performance, psychophysiological responses and technical skills in young soccer players. Biology of Sport, 37(2), 165–173. https://doi.org/10.5114/BIOLSPORT.2020.94237

Benavides-Ubric, A., Díez-Fernández, D. M., Rodríguez-Pérez, M. A., Ortega-Becerra, M., & Pareja-Blanco, F. (2020). the Load-Velocity Relationship in Deadlift Exercise. In ©Journal of Sports Science and Medicine (Vol. 19). http://www.jssm.org

Bompa, T., & Buzzichelli, C. (2015). Periodization Training for Sports-3rd Edition. https://books.google.com/books?id=Zb7GoAEACAAJ&pgis=1

Bompa, T. O., & Buzzichelli, C. (2018). Periodization-6th Edition: Theory and Methodology of Training. In Human Kinetics. https://books.google.es/books?id=2f9QDwAAQBAJ&pg=PA343&lpg=PA343&dq=Bompa,+T.+(1983):+Theory+and+methodology+of+training.+Dubuque,+Iowa,+Kendall/Hunt+Pb.Co&source=bl&ots=rwTXVCr6Bk&sig=ACfU3U13j7m6y72KP2cirIGPjYpf3V0FcA&hl=es&sa=X&ved=2ahUKEwjYprD-4NjpAhW

Clemente, F. M. (2016). Small-Sided and Conditioned Games in Soccer Training The Science and Practical Applications. http://www.springer.com/series/8884

Clemente, F. M., Sarmento, H., Rabbani, A., Van Der Linden, C. M. I. (Niels., Kargarfard, M., & Costa, I. T. (2019). Variations of external load variables between medium- and large-sided soccer games in professional players. Research in Sports Medicine, 27(1), 50–59. https://doi.org/10.1080/15438627.2018.1511560

Di Giminiani, R., & Visca, C. (2017). Explosive strength and endurance adaptations in young elite soccer players during two soccer seasons. PLoS ONE, 12(2), 1–17. https://doi.org/10.1371/journal.pone.0171734

Doewes, R. I., Purnama, S., Syaifullah, R., & Nuryadin, I. (2020). The effect of small sided games training method on football basic skills of dribbling and passing in indonesian players aged 10-12 years. International Journal of Advanced Science and Technology, 29(3 Special Issue), 429–441.

Fernández-Espínola, C., Robles, M. T. A., & Fuentes-Guerra, F. J. G. (2020). Small-sided games as a methodological resource for team sports teaching: A systematic review. International Journal of Environmental Research and Public Health, 17(6). https://doi.org/10.3390/ijerph17061884

FIFA. (2016). Youth Football. Www.FIFA.Com, 257.

Francesco Sgrò, Salvatore Bracco, Salvatore Pignato, & Mario Lipoma. (2018). Small-Sided Games and Technical Skills in Soccer Training: Systematic Review and Implications for Sport and Physical Education Practitioners. Journal of Sports Science, 6(1). https://doi.org/10.17265/2332-7839/2018.01.002

Gall, M. D., Gall, J. P., & Borg, W. R. (2003). Educational Research: An Introduction (Seventh Ed). Pearson Education, Inc.

Gane, R. M., Wager, W. W., Golas, K. C., & Keller, J. M. (n. d. . (n.d.). Principles of Instructional Design.

Gibson, R., & Zillmann, D. (2000). Reading between the photographs: The influence of incidental pictorial information on issue perception. Journalism and Mass Communication Quaterly, 77(2), 355–366. https://doi.org/10.1177/107769900007700209

James, T. (2018). SPORT PSYCHOMETRICS: Basics and Instruments of Sports Psychometric. Jakarta: Edisi, 1.

Mackała, K., Kurzaj, M., Okrzymowska, P., Stodółka, J., Coh, M., & Rożek-Piechura, K. (2020). The effect of respiratory muscle training on the pulmonary function, lung ventilation, and endurance performance of young soccer players. International Journal of Environmental Research and Public Health, 17(1). https://doi.org/10.3390/ijerph17010234

Mackenzie, B. (2008). 101 Tests D'Évaluations.

Okba Selmi , Ibrahim Ouergui, Danielle E Levitt, P. T. N., & Beat Knechtle, A. B. (2018). Small-Sided Games are More Enjoyable Than High-Intensity Interval Training of Similar Exercise Intensity in Soccer. Journal of Chemical Information and Modeling, 53(9), 1689–1699. https://www.bodybuilding.com/content/how-to-bench-press-layne-norton-complete-guide.html

Pembinaan, K., & Indonesia, S. (2017). Kurikulum Pembinaan Sepakbola Indonesia PSSI.

Prieto-González, P., & Sedlacek, J. (2022). Effects of Running-Specific Strength Training, Endurance Training, and Concurrent Training on Recreational Endurance Athletes' Performance and Selected Anthropometric Parameters. International Journal of Environmental Research and Public Health, 19(17). https://doi.org/10.3390/ijerph191710773

Sarmento, H., Clemente, F. M., Harper, L. D., Costa, I. T. da, Owen, A., & Figueiredo, A. J. (2018). Small sided games in soccer–a systematic review. International Journal of Performance Analysis in Sport, 18(5), 693–749. https://doi.org/10.1080/24748668.2018.1517288

Scheunemann, T. S. (2012). Kurikulum Sepak Bola Indonesia.

Sigrist, R., Rauter, G., Riener, R., & Wolf, P. (2013). Augmented visual, auditory, haptic, and multimodal feedback in motor learning : A review. Psychonomic Bulletin & Review, 20, 21–53. https://doi.org/10.3758/s13423-012-0333-8

Werner, C. M., Hecksteden, A., Morsch, A., Zundler, J., Wegmann, M., Kratzsch, J., Thiery, J., Hohl, M., Bittenbring, J. T., Neumann, F., Böhm, M., Meyer, T., & Laufs, U. (2019). Differential effects of endurance, interval, and resistance training on telomerase activity and telomere length in a randomized, controlled study. European Heart Journal, 40(1). https://doi.org/10.1093/eurheartj/ehy585

William h Edward. (2011). Motor learning & control. United States.

Wright, D. L., Black, C. B., Immink, M. A., & Brueckner, S. (2004). Long-Term Motor Programming Improvements Occur Via Concatenation of Movement Sequences During Random But Not During Blocked Practice. Journal of Motor Behavior, 36(1), 39–50. https://doi.org/10.3200/JMBR.36.1.39-50