



Available online at:

<https://ejournal.upi.edu/index.php/penjas/article/view/44577>

DOI: <https://doi.org/10.17509/jpjo.v7i1.44577>

Is dynamic rotation training able to improve futsal athlete performance?

Sugeng Purwanto*, Moch Fath Khurrohman

Department of Physical Education, Faculty of Sport Science, Yogyakarta State University, Indonesia

Article Info

Article History :

Received February 2022

Revised March 2022

Accepted March 2022

Available online April 2022

Keywords :

Dynamic rotation training, Futsal player playing performance

Abstract

The performance of an athlete is determined by their game skill and technique, which become important components to achieving the game's objectives. Empirically, this study aimed to test the effect of providing dynamic rotation training on futsal athlete playing performance. This experimental study involved 20 futsal athletes aged 16-19 years in Banyumas Regency (Age= M 17,6 ± BMI 20,3 kg/m²). Futsal special performance test was used to measure the futsal player playing performance. The analysis involved skill components (passing, controlling, dribbling, and shooting) and physical aspects (speed and agility). Furthermore, results showed that providing dynamic rotation training could significantly increase the performance of futsal athletes aged 16-19 years (p-value = 0,001). These findings become the foundation that a coach needs to be concerned with to select an effective exercise to impact the athletes positively.

INTRODUCTION

Futsal is a team sport with a high level of complexity (Beato et al., 2017). The intensity of this sport tends to be higher than in other sports (Barron, Collins, and Carling 2020). The game demands that require players to rotate to find space to control the ball as often as possible have become unique in the sport of futsal (Sarmiento et al., 2015). This makes the player's playing performance factor a critical thing to consider. Physical is preferred because this sport is included in high intensity, but each player's level of playing skills must be considered. A coach has more dominance to manipulate a form of training to support the performance of his players (Moore et al. 2014); this is still required as a whole investigation process.

The scheme of the training process must essentially be adjusted to the goals to be achieved. Futsal has fast game characteristics (Amani-Shalamzari et al., 2019); each player's physical and technical factors are the main thing (Sekulic et al., 2019). Therefore, each coach needs to consider the unification of these two aspects in determining the variety of exercises. Dynamic rotation training or player rotation-based games is manipulated to play a role in each player's physical and technical improvement (Gómez et al., 2015). The primary basis of applying this exercise is that each player rotates freely within the area of the field that has been manipulated from a small space to a wider field size. The goal is for the interaction of players with the ball to occur as often as possible because the higher the interaction between the player and the ball, the level of the physical and technical union of futsal becomes quickly achieved (Lapresa et al. 2013). Although previously, it has been tested that the application of games-shaped exercises can harmonize the game of professional players professional (Oppici et al., 2018). Another study suggests that the rotational exercise game-based form can increase futsal players' aerobic and anaerobic capacity (Amani-Shalamzari et al., 2019). This needs to investigate in a broader study to produce more specific results. In parallel with this, providing a suitable training program will progressively improve the quality of players without causing a high risk of injury, and the goals will be met (Zein et al., 2014).

The unification of physicality and technique is vital in the sport of futsal because it will affect the tactical of players in the games (Yiannaki, Carling, and Col-

lins 2018). The perfect physical and technical union will affect the efficiency of the player's movement and the attack's effectiveness in achieving the game's objectives (Gómez et al., 2015). However, the evaluation results of the previous exercises through specific training observation activities showed that 60% of the players in the team still had a performance at a low level. This is supported by problems that are still the same faced in 3 months of practice periodization, such as the accuracy of passing is still not on target, the way dribbling is always facing the ball, easy to lose the ball, too long in making decisions, and target shooting that still does not lead to the goal. A performance like this must undoubtedly be improved by implementing appropriate training to support the player's playing skills. Furthermore, exercises with specified targets must be achieved consistently and continuously (Barbieri et al., 2016).

A study is crucial to improve players' game performance from these problems. Several related studies have been conducted, such as the application of small-sided games-based exercises to improve the cognitive performance of futsal athletes (Khurrohman et al., 2021). Other research states that applying exercises with a smaller area can improve decision-making (Práxedes et al., 2018). Furthermore, training with manipulation of the field area can increase the understanding of the objectives in each player's position (Coutinho et al., 2019). However, it needs to be an in-depth study that the provision of practice variation is essential for players. Dynamic rotation training has been modified to stimulate the technical alignment of each athlete.

Spontaneous movement with high intensity becomes a characteristic of futsal sports (Sánchez et al., 2018). Dynamic rotation training is in control, i.e., the ball's movement is determined by the player himself during the implementation of the exercise. Technical errors will increase progressively by increasing ball interaction between players (de Pinho et al., 2020). Just like research (Caglayan et al., 2018) demonstrate that the application of ball possession exercises can improve the physical and technical alignment of the game. This study aims to determine the effectiveness of exercise on the performance of playing futsal athletes in adolescents.

METHODS

Participants

This study was conducted with total sampling techniques, totaling 20 male futsal athletes with an age range of 16-19 years, as a preparation event for the annual event in Central Java. The determination of the study subjects is based on the theory of exercise periodization that athletes are in the phase of improving the special training process and competition participation (Khurrohman et al., 2021; Wijayanti and Kushartanti, 2014).

Table 1. Characteristic of futsal player

N	Age	Height (cm)	Weight(kg)	BMI (kg/m ²)
20	17,6	168±2,69	57,3±3,51	20,3

Materials and Apparatus

The performance of athletes' futsal playing skills is measured by a special performance test that has been tested for validity and reliability of $r = 0.89$ (Farhani et al., 2019). The test method is carried out by measuring the player's success in completing various test items in units of time. This test has been specially designed by involving skill components (passing, controlling, dribbling, and shooting) and physical aspects (speed and agility). Measurements are taken before the exercise intervention and afterward to determine the effect of giving the exercise.

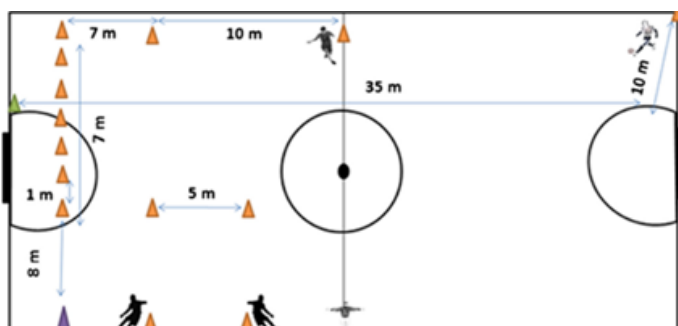


Figure 1. Futsal special performance test

Procedure

Observation, descriptive, and experimental activities are the designs used in this study. Sampling is done with total sampling or the total number of samples used

as a research subject. First, a brief explanation is done where the researcher describes the objectives and possible risks to players and coaches. Then approval was obtained between players, coaches, and researchers who continued measuring the athlete's body mass index.

In experimental studies conducted in this study, the goal is to determine the effect of providing dynamic rotation training on the performance of futsal athletes' playing skills. The study was conducted during 16 meetings; 2 meetings as a pre-post test measurement, and 14 sessions were used to provide exercise interventions.

Data Analysis

Data analysis methods are carried out with several stages, 1) Descriptive analysis, 2) Normality test (Shapiro Wilk test), 3) Homogeneity test (test of homogeneity), 4) Hypothesis test (paired t-test) with the help of SPSS 25.

RESULT

The average performance score of overall futsal skills athletes in the pre-test was 33 seconds (SD = 1.52), while post-test results experienced an improved performance with a score of 32.35 seconds (SD = 1.49), which can be seen in Table 2. Table 2 shows that the results of the application of exercise experience an increased effect on the performance of playing futsal athletes. There was an increase in time of 0.65 seconds from the difference in pre-test and post-test results.

Table 2. Descriptive statistic

Variable	Mean±SD		Mean Difference
	Pre-test	Posttest	
Athlete performance	33±1,52	32,35±1,49	0,65 s

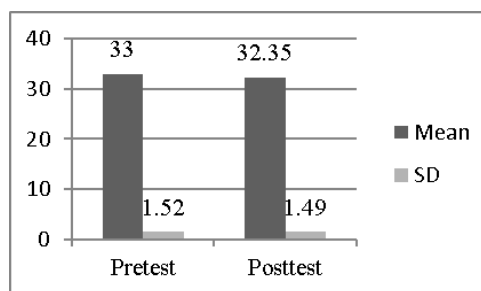


Figure 2. Result comparison pretest-posttest

Furthermore, a test of normality and homogeneity of the research data with a significance level of 0.05. The test shows a significant value (p -value > 0.05). This result states that both of the above data have normally distributed data and have the same variant. This test has been qualified to proceed to the hypothesis test results shown in table 3.

Table 3. Paired t-test

Variable	Paired T-Test		P-Value
	Pre-test	Posttest	
	M \pm SD	M \pm SD	
Athlete performance	33 \pm 1,52	32,35 \pm 1,49	0.001

In the previous test, there was an increase in performance of 0.65 seconds. This result was then strengthened by analyzing the effectiveness of applying exercises with paired t-tests with a p -value of 0.001 ($p < 0.05$). These results proved that dynamic rotation training effectively improves the performance of futsal athletes aged 16-19 years.

DISCUSSION

Based on the research data analysis results, it was mentioned that the application of dynamic rotation training-based exercises proved effective in significantly improving athletes' futsal playing skills. The effect is based on the actual pattern of futsal games. The pattern of play that emphasizes the overall technicality into unity to support the game (De Oliveira Bueno et al. 2014) refers to applying this form of exercise. This is supported by previous studies that state that implementing a training program tailored to the game will have a much better impact because players will get used to dealing with situations in matches (Naser, Ali, and Macadam 2017). Coaches must make breakthroughs because this will stimulate the development and unification of physical, technical, psychological, and understanding of the game's tactics.

Each player's performance can be improved by implementing an appropriate training program (Reis et al. 2019) because exercise is at risk (Sarmiento et al. 2015); appropriate training can improve each athlete's ability. For example, dynamic rotation training improved futsal athletes' performance significantly. Training patterns that aim to make the player's interaction

with the ball occur as often as possible will positively impact the physical unification and technique of the game (Karsten et al., 2017). Another finding is that the application of exercises like have a fantastic effect on decision-making in the game situation (Sparkes et al., 2018).

This study supports previous research, which showed that mini-area-based exercises could improve the understanding of each player's position and physical performance (Coutinho et al., 2019). Furthermore, there is an increase in effective passing ability after being given stimulation of small-sided games (Khurrohman et al., 2021). Furthermore, other research showed that the provision of exercise interventions in plotting field areas could improve the cardiovascular work system of futsal athletes (Moran et al., 2019).

Based on a review of some previous literature, researchers have tested the effects of providing dynamic rotation training-based exercises on the performance of athletes' playing skills. As a result, it was significantly able to improve the performance of futsal athletes aged 16-19 years. This finding is slightly different from previous studies (Coutinho et al., 2019; Khurrohman et al., 2021; Moran et al., 2019). The author found new results related to the performance of athletes with the provision of exercise patterns that are almost similar to previous studies. However, this needs to be verified on an ongoing basis, given the many forms of exercise that can be used in the sport of futsal. In addition, the coaching process must be carried out continuously, starting from an early age.

CONCLUSION

The application of dynamic rotation training-based exercises proved effective in enhancing the performance of playing futsal athletes. These results were shown from a significant increase based on the pre-post test value. This is attributed to the practice pattern applied emphasizes the interaction between players with the ball, which is much higher than in other exercises.

CONFLICT OF INTEREST

The authors declared no conflict of interest.

REFERENCES

- Amani-Shalamzari, Sadegh, Ehsan Khoshghadam, Adel Doniaee, Abdolhosseion Parnow, Mahdi Bayati, and Filipe Manuel Clemente. 2019. "Generic vs. Small-Sided Game Training in Futsal: Effects on Aerobic Capacity, Anaerobic Power and Agility." *Physiology and Behavior* 204(February):347–54.
- Barbieri, Ricardo Augusto, Alessandro Moura Zagatto, Fabio Milioni, and Fabio Augusto Barbieri. 2016. "Specific Futsal Training Program Can Improve the Physical Performance of Futsal Players." *Sport Sciences for Health* 12(2):247–53.
- Barron, David J., Dave Collins, and Christopher Carling. 2020. "Match Performance in a Reference Futsal Team during an International Tournament - Implications for Talent Development in Soccer - Christopher Yiannaki." *Biology of Sport* 37(2):147–56.
- Beato, Marco, Giuseppe Coratella, Federico Schena, and Andrew T. Hulton. 2017. "Evaluation of the External & Internal Workload in Female Futsal Players." *Biology of Sport* 34(3):227–31.
- Caglayan, Atakan, Kamil Erdem, Vedat Colak, and Nurper Ozbar. 2018. "The Effects of Trainings with Futsal Ball on Dribbling and Passing Skills on Youth Soccer Players." *International Journal of Applied Exercise Physiology* 7(3):44–54.
- Coutinho, Diogo, Bruno Gonçalves, Bruno Travassos, Eduardo Abade, Del P. Wong, and Jaime Sampaio. 2019. "Effects of Pitch Spatial References on Players' Positioning and Physical Performances during Football Small-Sided Games." *Journal of Sports Sciences* 37(7):741–47.
- Farhani, Farid, Hamid Rajabi, Raoof Negaresh, Ajmol Ali, Sadegh Amani Shalamzari, and Julien S. Baker. 2019. "Reliability and Validity of a Novel Futsal Special Performance Test Designed to Measure Skills and Anaerobic Performance." *International Journal of Sports Physiology and Performance* 14(8):1096–1102.
- Gómez, M., J. Moral, and C. Lago-Peñas. 2015. "Multivariate Analysis of Ball Possessions Effectiveness in Elite Futsal." *Journal of Sports Sciences* 33(20):1–9.
- Karsten, Bettina, Jonathan Baker, Fernando Naclerio, Andreas Klose, Bianco Antonino, and Alfred Nimrichter. 2017. "Small-Sided Games in Elite Soccer: Does One Size Fits All?" *International Journal of Sports Physiology and Performance* 14(2):156–162.
- Khurrohman, M. F., Sugeng Purwanto, Soni Nopembri, and Rifqi Festiawan. 2021. "The Effectiveness of Small-Sided Game Practice on Improving Basic Futsal Skills." *Jurnal Pendidikan Jasmani Dan Olahraga* 6(2):134–42.
- Khurrohman, M. F., Yudianto, Agus Susworo Dwi Marhaendro, Rifqi Festiawan, and Rohman Hidayat. 2021. "Small-Sided Games: Alternative Exercise to Improve Cognitive Performance of Youth Futsal Players." *Jurnal SPORTIF: Jurnal Penelitian Pembelajaran* 7(1):37–50.
- Lapresa, Daniel, Leandro Álvarez, Javier Arana, Belén Garzón, and Valvanera Caballero. 2013. "Observational Analysis of the Offensive Sequences That Ended in a Shot by the Winning Team of the 2010 UEFA Futsal Championship." *Journal of Sports Sciences* 31(15):1731–39.
- Moore, R., S. Bullough, S. Goldsmith, and L. Edmondson. 2014. "A Systematic Review of Futsal Literature." *American Journal of Sports Science and Medicine* 2(3):108–16.
- Moran, Jason, Richard C. Blagrove, Benjamin Drury, John F. T. Fernandes, Kevin Paxton, Helmi Chaabene, and Rodrigo Ramirez-Campillo. 2019. "Effects of Small-Sided Games vs. Conventional Endurance Training on Endurance Performance in Male Youth Soccer Players: A Meta-Analytical Comparison." *Sports Medicine* 1–12.
- Naser, Naser, Ajmol Ali, and Paul Macadam. 2017. "Physical and Physiological Demands of Futsal." *Journal of Exercise Science and Fitness* 15(2):76–80.
- De Oliveira Bueno, Murilo José, Fabio Giuliano Caetano, Tiago Julio Costa Pereira, Nicolau Melo De Souza, Gustavo Damasceno Moreira, FÁBIO Yuzo Nakamura, Sergio Augusto Cunha, and Felipe Arruda Moura. 2014. "Analysis of the Distance Covered by Brazilian Professional Futsal Players during Official Matches." *Sports Biomechanics* 13(3):230–40.
- Oppici, Luca, Derek Panchuk, Fabio Rubens Serpiello, and Damian Farrow. 2018. "Futsal Task Constraints Promote Transfer of Passing Skill to Soccer Task Constraints." *European Journal of Sport Science* 18(7):947–54.
- de Pinho, Silvia Teixeira, Silvia Letícia da Silva, Fabian Alberto Romero Clavijo, Daniel Alves, and Umberto Cesar Corrêa. 2020. "The Learning of Decision-Making on Interception and Passing in Futsal." *International Journal of Sport and Exercise Psychology* 0(0):1–17.
- Práxedes, Alba, Alberto Moreno, Alexander Gil-Arias, Fernando Claver, and Fernando Del Villar. 2018. "The Effect of Small-Sided Games with Different Levels of Opposition on the Tactical Behaviour of Young Footballers with Different Levels of Sport Expertise." *PLoS ONE* 13(1):1–14.
- Reis, Marcos, Jenisson Santos, Matheus Matos, Thayron Cruz, Fabricio Vasconcellos, and Marcos Almeida. 2019. "Assessment of the Performance of Novice Futsal Players in the Execution of Futsal-Specific Motor Skills." *Human Movement* 20(3):29–37.
- Sánchez, Javier, David Bishop, Jorge García-Unanue, Esther Ubago-Guisado, Enrique Hernando, Jorge López-Fernández, Enrique Colino, and Leonor Gal-

- lardo. 2018. "Effect of a Repeated Sprint Ability Test on the Muscle Contractile Properties in Elite Futsal Players." *Scientific Reports* 8(1):1–8.
- Sarmento, Hugo, Paul Bradley, and Bruno Travassos. 2015. "The Transition from Match Analysis to Intervention: Optimising the Coaching Process in Elite Futsal." *International Journal of Performance Analysis in Sport* 15(2):471–88.
- Sekulic, Damir, Nikola Foretic, Barbara Gilic, Michael R. Esco, Raouf Hammami, Ognjen Uljevic, Sime Versic, and Miodrag Spasic. 2019. "Importance of Agility Performance in Professional Futsal Players; Reliability and Applicability of Newly Developed Testing Protocols." *International Journal of Environmental Research and Public Health* 16(18):1–13.
- Sparkes, William, Anthony Turner, Matthew Weston, Mark Russell, Michael Johnston, and Liam Kilduff. 2018. "Neuromuscular, Biochemical, Endocrine, and Mood Responses to Small-Sided Games' Training in Professional Soccer." *Journal of Strength and Conditioning Research* 32(9):1–15.
- Wijayanti, Dian Ika Purba Ratna, and B. M. Wara Kushartanti. 2014. "Model Tes Keterampilan Dasar Futsal Bagi Pemain Ku 10-12 Tahun." *Jurnal Keolahragaan* 2(1):32–45.
- Yiannaki, Christopher, Christopher Carling, and Dave Collins. 2018. "Futsal as a Potential Talent Development Modality for Soccer—a Quantitative Assessment of High-Level Soccer Coach and Player Perceptions." *Science and Medicine in Football* 2(4):299–308.
- Zein, MI, J. Kurniarobbi, and N. Agung. 2014. "The Effect of Fifa 11+ As an Injury Prevention Program in Youth Futsal Players." *British Journal of Sports Medicine* 48(7):673.2-674.