

Effectiveness of Zig-Zag Run Training Using Weighted Vests on the Agility of Futsal Extracurricular Players at MAN Kota Surabaya

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ABSTRACT

The agility skills of futsal extracurricular participants at MAN Surabaya City are not yet well developed. This study aims to evaluate the effectiveness of zig-zag run training using weighted vests in improving the agility of futsal extracurricular players at MAN Surabaya City. The main problem identified is the low agility of players, which affects the team's performance when facing opponents with better dribbling skills. The research method used is quasi-experimental with a matching-only design, involving 30 futsal extracurricular students as samples. Data were collected through agility tests conducted before and after an eight-week treatment period. The training was conducted three times a week with a specifically designed program and intensity. The results showed a significant increase in agility scores after the zig-zag run training with weighted vests. Before treatment, the average agility score was in the "poor" category (11 seconds), which improved to the "fair" category (9 seconds) after the treatment. This indicates that zig-zag run training with weighted vests is effective in improving agility through the strengthening of leg muscles such as the quadriceps femoris, hamstring, gastrocnemius, and soleus. Based on the significance value (2-tailed) of $0.000 < 0.05$, it can be concluded that the zig-zag run training has a significant effect on the agility of futsal extracurricular students.

Keywords: Zig-Zag Run, Weighted Vest, Futsal Extracurricular

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Introduction

Sport is an activity or bodily activity carried out by humans with the aim of maintaining and improving physical fitness and body health. According to Sitepu (2018), sports are a systematic activity in order to encourage and foster and develop physical, spiritual and social potential. Meanwhile, according to Hidayat (2017), one of the aspects of human development is no less important than other developments, which is a matter of achievement and development of Indonesia through sports, we can increase physical and spiritual freshness so that it requires sportsmanship.

Futsal in Indonesia has experienced very rapid growth, such as the existence of leagues that are often held, such as amateur futsal leagues held in regions throughout Indonesia, international tournaments to tournaments between students (Hilmi, 2017). One of the goals of sports is to achieve the highest achievement, but to achieve the highest achievement is not an easy thing. A continuous and consistent step-by-step training process is needed starting from physical, technical, tactical, and mental aspects.

This exercise involves rapid movements with repeated changes in direction, aiming to improve the ability of the body's muscles to respond quickly and effectively to changes in position. In the context of futsal, this agility is important because often players have to dribble in very dynamic and pressure-filled conditions. MAN Surabaya City has a futsal team that participates in various tournaments. But from observation and evaluation I found that one of the main weaknesses of the

team is the lack of agility in dribbling. This affects the team's overall performance, especially 2 against opponents who have better dribbling skills and agility.

Zig-zag training is a physical exercise involving back-and-forth movement between two or more points in a zig-zag pattern. It is commonly used to train coordination, flexibility, muscle strength, and to improve agility. This exercise is widely applied across different sports and fitness programs to enhance athlete performance or general fitness. The main objective of zig-zag training is to develop the ability to move quickly and efficiently in multiple directions and to improve the agility needed for sudden direction changes. Zig-zag running is a training method where athletes change positions by running in a zig-zag pattern. This type of movement is essential in football, particularly for dribbling (Larkins, 2012 in Yahya, 2014). Zig-zag running is considered one of the fundamental agility exercises, emphasizing that athletes or students run zig-zag through cones or obstacles arranged at specific intervals. It is highly beneficial for athletes and players who aim to improve agility performance due to its simplicity and accessibility, allowing it to be done anywhere and anytime (Mawardi, 2021).

A weighted vest is a training tool shaped like a regular vest but with added weights to increase physical training intensity. According to Bompa & Haff (2009), a weighted vest is used in strength and endurance training programs. By adding resistance to the body during training, individuals can enhance physiological adaptations and athletic performance. Faigenbaum et al. (2009) emphasized the effectiveness of weighted vests in improving athletic performance, especially in sports requiring speed and endurance. They stated that the added resistance increases the metabolic load, which helps in developing cardiovascular fitness and muscle strength.

Agility is the ability to move quickly, flexibly, and in a coordinated manner to change direction or body position responsively. It involves a combination of reaction speed, motor coordination, balance, and muscular strength to perform movements or direction changes efficiently. Agility is essential in various physical activities and sports, including football, basketball, tennis, badminton, and more. For athletes, agility allows them to evade opponents, react quickly to changing situations, and enhance overall performance. Agility training—such as the previously mentioned zig-zag drills—aims to develop these skills by challenging and improving the body's ability to adapt to directional and speed changes efficiently without losing balance or pace. Bafirman (2013) describes agility as the body's ability to shift positions and overcome obstacles in a short time. Agility is a combination of flexibility, speed, and even strength. It reflects a person's ability to change direction quickly while performing other movements, driven by explosive muscular power. The strength of these movements depends on the power generated by muscle fiber contractions (Syahara, 2011).

Based on these issues, this study aims to examine the effectiveness of zig-zag run exercises in improving the dribbling agility of futsal players at MAN Surabaya City. Through this research, it is hoped that an effective training method can be found to improve dribbling performance, thereby enhancing the quality of play and overall team performance. Hence, the researcher is interested in conducting a study titled: "The Effectiveness of Zig-Zag Run Training on the Agility of Futsal Extracurricular Players at MAN Surabaya City."

Method

This research is categorized as quantitative research. The selected research method is a quasi-experiment. This method was chosen because the researcher could not control other activities performed by the subjects outside of the training sessions in this study. For instance, activities carried out by the research subjects at home or at school cannot be supervised.

The research design used is the matching-only design. This design refers to the criteria that the subjects do not have equal abilities, so group assignment is not conducted randomly but instead uses the ordinal pairing technique.

The location for data collection and research was the sports field at MAN Surabaya City. The research was conducted from October 15, 2024 to November 10, 2024. The pre-test was conducted on October 15, 2024, and the post-test was carried out on November 10, 2024. The treatment lasted for eight weeks, with training sessions held three times a week, specifically on:

- Tuesday from 15:00 to 18:00
- Wednesday from 15:00 to 18:00
- Thursday from 15:00 to 18:00

Results and Discussion

The data collection technique in this study involved tests and measurements. The data generated came from agility test results taken before and after the treatment. The purpose of conducting these tests was to determine the outcomes achieved by the MAN Surabaya City futsal extracurricular participants. The experimental process included collecting data both before the treatment (pre-test) and after the treatment (post-test). The research was carried out smoothly without any significant obstacles. The following data were obtained regarding the effectiveness of zig-zag run training using weighted vests in the futsal extracurricular activities at MAN Surabaya City.

A. Descriptive Statistics

Tabel 1. Hasil deskriptif Statistic

		Descriptive Statistics				
		Minimum	Maximum	Mean	Std. Deviation	
		Statistic	Statistic	Statistic	Statistic	Statistic
		Statistic	Statistic	Statistic	Statistic	Statistic
pretest	0	1.00	1.50	1.2067	.02667	.14606
posttest	0	.00	.40	.2100	.02366	.12959
Valid N (listwise)	0					

B. Normality Test

Tabel 2. Hasil Uji Normalitas
Tests of Normality

	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
pretest	.1	3	.0	.9	3	.0
	48	0	90	22	0	30
posttest	.1	3	.0	.9	3	.0
	90	0	07	00	0	09

a. Lilliefors Significance Correction

Based on the above normality test analysis, the significance value for group A is $0.030 > 0.05$ and for group B is $0.090 > 0.05$. Therefore, in accordance with the decision rule for the normality test, it can be concluded that the data are normally distributed. Thus, further statistical analysis is feasible.

C. Homogeneity Test

Tabel 3. Uji Homogenitas
Test of Homogeneity of Variances

	Levene Statistic	df		Sig.
		1	2	
pretest	Based on Mean	.227	1	5
				8
				35
	Based on Median	.215	1	5
				8
			44	
	Based on Median and with adjusted df	.215	1	5
				6.539
				45
	Based on trimmed mean	.177	1	5
				8
				76

D. Paired T-Test

Hasil 4. Hasil Uji T

Paired Samples Test

		Paired Differences						
		Mean	Standard Deviation	Standard Error	95% Confidence Interval of the Difference		Sig. (2-tailed)	
					Lower	Upper		
air 1	pret est - posttest	.99667	.4138	.0756	-.98121	.01212	.642619	.000

The paired T-test is used to determine the effect of the treatment. If the Sig. (2-tailed) value is < 0.05 , there is a significant effect; if > 0.05 , there is no significant effect. From the data above, the Sig. (2-tailed) value is $0.000 < 0.05$, which means the zig-zag run training had a significant effect on the agility of the futsal extracurricular students.

Zig-zag run training with weighted vests has been shown to be effective in increasing muscle strength and speed, which directly impacts the agility of futsal players. The weighted vest provides additional resistance to the body during exercise. This added resistance forces the muscles to work harder, which ultimately increases both muscle strength and endurance. The leg muscles in particular are significantly impacted by the zig-zag run training with the weighted vest. The weighted vest used in this study contained 200 grams of weight in the chest area.

Penerapan metode latihan zig-zag run menggunakan rompi beban meningkat pada bagaian otot The application of zig-zag run training with a weighted vest primarily improves the leg muscles, which play a crucial role in agility. The muscles that contract during zig-zag running with a weighted vest include:

- Quadriceps femoris (located at the front of the thigh), which function to extend the knee (straighten the leg) and assist with hip flexion (raising the thigh),
- Hamstrings (located at the back of the thigh), which function to flex the knee (bend the leg) and extend the hip (push the thigh backward),
- Gastrocnemius (located in the calf), which functions in plantar flexion (lifting the heel off the ground) and assists in knee flexion,
- Soleus (located in the lower calf), which also functions in plantar flexion.

These four muscle groups work together to support the body's movement during zig-zag running in futsal.

The strength of this study lies in the use of a weighted vest as a training aid during zig-zag run exercises, which not only focuses on improving agility but also strengthens the lower body muscles. These muscles play an important role in enhancing endurance and agility during zig-zag movements. This study is relevant because it contributes directly to the development of efficient agility training for students in the MAN Surabaya extracurricular futsal program. If the study results show positive effects, this research can serve as the basis for designing more targeted and effective training programs for students. It also opens up opportunities for utilizing more efficient training aids in futsal sports.

The implications of this research can provide practical benefits for futsal coaches in designing training programs, by integrating zig-zag run training with weighted vests to improve lower body muscle strength—crucial for enhancing agility performance. Moreover, this study has the potential to improve futsal agility, especially for extracurricular students, by strengthening their physical ability to perform faster and more effective zig-zag runs. This study may also contribute to the development of new, more effective, and affordable training methods, and bring about a positive impact on future research and coaching practices.

Conclusion

Based on the results of this study, there is a significant effect of zig-zag run training on improving the agility of futsal extracurricular students at MAN Surabaya City. This conclusion is supported by the results of statistical tests, where the Sig. (2-tailed) value was 0.000, which is less than 0.05. This indicates that the zig-zag run training is effective in enhancing student agility.

Based on the pre-test and post-test data, the average agility time before the training (pre-test) was 11.21 seconds, while after the training (post-test) it improved to 9.21 seconds. This improvement indicates a significant change. Therefore, zig-zag run training resulted in an agility improvement of approximately 17.84%.

Conflict of Interest

No conflict of interest.

References

- Ahmad Yani, A. M. (2020). Pengaruh Latihan Kelincahan Lari Zig-Zag terhadap Kemampuan Menggiring Bola dalam Permainan Sepak Bola. *XX(X)*, 1–10.
- Akbar, Aldiansyah. 2021. Analisis Minat dan Perkembangan Sarana dan Prasarana Olahraga Futsal pada Klub Opanindo di Kota Banda Aceh. *Serambi Konstruktivis* 3(1), 17- 28.
- Ardianda, Eddy dan John, Arwandi, 2018. Latihan Zig-zag run Dan Latihan Shuttle Run Berpengaruh Terhadap Kemampuan Dribbling Sepakbola, *Performa Olahraga*, 3(1), 32-41
- Akmal, I, & Lesmana, H.S. (2019). Kontribusi kecepatan dan kelincahan terhadap 1 kemampuan dribbling', *Jurnal Patriot*, vol. 1, no. 3, pp. 1197-1210.
- Bernhardin, Dindin., dan Ahmad, Fauzi. 2022. Pengaruh Latihan Zig-Zag terhadap Kelincahan Bermain Futsal. *Journal of Physical and Outdoor Education* 4 (1), 1- 7.
- Bafirman, (2013). *Fisiologi Olahraga*. Padang : Wineka Media.
- Ding, D., & Feng, J. (2014). Analysis of Agility and Coordination Training Programs Effects on Football Skills Based on Comparative Experiments. *BTAIJ*, 10 (21).
- Danny, Mielke. (2007). *Dasar-dasar Sepakbola*. Bandung: Pakar Karya.
- Firky Ciptadi Rizki, D. (2015). Pengaruh Latihan Zig-Zag Terhadap Menggiring Bola di Ekstrakurikuler Sepakbola MTS Negeri 2 Pontianak. *Jurnal Prodi Pendidikan Jasmani Dan Kesehatan Rekreasi FKIP UNTA*

- Fetri, F., & Donie. (2019). Latihan kelincahan berpengaruh terhadap kemampuan dribbling sepak bola. *Jurnal Patriot*, 1/3, 1169–1178.
- Fenanlampir, A. & Faruq, M.M. (2014). *Tes dan Pengukuran dalam Olahraga*. Yogyakarta: CV, Andi Offset.
- Fetri, F., & Donie. (2019). Latihan kelincahan berpengaruh terhadap kemampuan dribbling sepak bola. *Jurnal Patriot*, 1/3, 1169–1178.
- Hidayat, Rachmat, A. Heri Riswanto, dan M. Iqbal Hasanuddin 2021. The Effect of Shuttle Run and Zig-zag run Training On Dribbling Skills. *Jurnal Pendidikan Jasmani, Olahraga Dan Kesehatan* 5(1), 113-125
- Hilmi, A. H. (2017). Penerapan Audio Visual Terhadap Hasil Shooting Pada Permainan Futsal (Studi Penelitian Pada Peserta Ekstrakurikuler Futsal Sma Negeri 1 3 Krembung Sidoarjo). *Jurnal Pendidikan Olahraga Dan Kesehatan*, 4(2), 327–332.
- Nabila, Tiara, Farizal Imansyah, dan Daryono Daryono. 2022. The Effect of Shuttle Run Training on Dribbling Speed in Futsal Games for Students of SMPN 06 Palembang. *International Journal of Religion Education and Law* 1(2), 102- 110.
- Nawir, D. A. (2016). Pengaruh Latihan Kondisi Fisik Atlet Terhadap Fleksibilitas, Kelincahan, Kecepatan Dan Daya Tahan Umum Atlet Kontingan Bayangan Pon Xix 2016 Cabang Olahraga Beladiri Koni Provinsi Sulawesi Selatan. Universitas Hasanuddin, Makassar.
- Ruslan, N. (2019). Peningkatan Pengaruh Latihan Kelincahan terhadap Kemampuan Menggiring Bola pada Siswa SMA Negeri 3 Samarinda. *Halaman Olahraga Nusantara Jurnal Ilmu Keolahragaan*, 3(2), 130– 140.
- Riyadi, N. (2013). Tingkat Keterampilan Teknik Dasar Bermain Futsal Pemain yang Menggunakan Lapangan Agung Futsal Arena Jatinom Klaten. Universitas Negeri Yogyakarta Yogyakarta.
- Sukma. (2015). Perbedaan Efektifitas Latihan Hexagon Drill dan Zig-Zag Run terhadap Peningkatan Kelincahan pada Pemain Sepakbola Sekolah Sepakbola Guntur Denpasar. Universitas Udayana.
- Spiteri, T., Newton, R. U., & Nimphius, S. (2015). Neuromuscular Strategies Contributing to Faster Multidirectional Agility Performance. *Journal of Electromyography and Kinesiology*, 25(4), 629–636. <https://doi.org/10.1016/j.jelekin.2015.04.009>
- Wiranto, Endri, Bertika Kusuma Prastiwi, dan Donny Anhar Fahmi. 2021. Pengaruh Latihan Passing Segitiga Dan Passing Zig-Zag Untuk Meningkatkan Teknik Passing Pada Ekstrakurikuler Futsal SMA Negeri 2 Kendal. *Journal of Physical Activity and Sports (JPAS)* 2(2), 189-194.