

The Effect of Zig-Zag Training on Dribbling Agility in Players of the Porses Football School, Suruh, Trenggalek

Eling Galih Santoso¹, Setyo Harmono², Mokhammad Firdaus³

^{1,2,3}Physical Education, Health, and Recreation Study Program, Faculty of Health Sciences and Sciences, Universitas Nusantara PGRI Kediri, Indonesia

Article Info

Article history:

Accepted: 03 Agustus 2026

Publish: 13 Agustus 2026

Keywords:

Zig-zag training;

Agility;

Dribbling;

Football.

Abstract

Football requires mastery of fundamental techniques, one of which is dribbling. Agility plays an important role in supporting successful dribbling because players must be able to change direction quickly while maintaining control of the ball. Observations at the Porses Football School (SSB) in Suruh, Trenggalek indicated that players' dribbling agility was not yet optimal. This study aimed to determine the effect of zig-zag training on the dribbling agility of players at SSB Porses Suruh Trenggalek. A quantitative approach with a quasi-experimental one-group pretest-posttest design was used. The population consisted of 30 players, all of whom were taken as the sample using a saturated sampling technique. The research instrument was a dribbling agility test measured in seconds. Data were analyzed using the Shapiro-Wilk normality test, Levene's homogeneity test, and a paired sample t-test with the aid of SPSS at a significance level of 0.05. The results showed that the average dribbling agility time before the zig-zag training was 19.20 seconds, decreasing to 17.00 seconds after treatment. The data were normally distributed and homogeneous. The paired sample t-test produced a t-value of 13.174 with a significance (2-tailed) of 0.000 (< 0.05), indicating that zig-zag training had a significant effect on improving the dribbling agility of players at SSB Porses Suruh Trenggalek.

This is an open access article under the [Lisensi Creative Commons Atribusi-BerbagiSerupa 4.0 Internasional](https://creativecommons.org/licenses/by-sa/4.0/)



Corresponding Author:

Eling Galih Santoso

Universitas Nusantara PGRI Kediri, Indonesia

1. INTRODUCTION

Football is one of the most popular sports in the world, including in Indonesia. It is played not only by adults but also by children and adolescents who join various Football Schools (Sekolah Sepak Bola/SSB). Maulana (2023) describes football as a team sport consisting of eleven players and a goalkeeper on each side, while Oktovianus and Jusuf (2024) regard football as part of physical education instruction. These views indicate that football is a physical-education activity carried out as a team sport with eleven players and one goalkeeper per team.

Several basic techniques support performance in football, one of which is dribbling. Heliza and Suganda (2024) state that dribbling ability can be trained through back-and-forth running, bodyweight training, obstacle running, and zig-zag running. Such training forms can therefore be used as tools to improve player performance, particularly agility in dribbling, and to address problems commonly found in the field. This problem was observed at the Porses Football School (SSB) in Kec. Suruh, Kabupaten Trenggalek, where empirical data showed that most players still struggled to dribble the ball agilely; they appeared unable to change direction quickly while dribbling, so the ball was easily taken by opponents.

This indicates that players' agility needs to be further optimized through an appropriate and well-planned training program. This observation was reinforced by a preliminary (pretest) dribbling-agility test administered to 30 players of SSB Porses Suruh Trenggalek prior to the zig-zag training treatment. The pretest produced an average time of 19.18 seconds, with 13% of players in the very good category, 27% good, 33% fair, 17% poor, and 10% very poor. Thus, most players were still in the fair-to-very-poor category, indicating that dribbling agility needed to be improved through a training program appropriate to the characteristics of football.

Zig-zag training is a form of dribbling training. Veron et al. (2023) state that zig-zag training is a means of optimizing agility because it contains agility elements such as running with turns while maintaining balance and changing direction and position relatively quickly. Veron et al. (2023) also explain that dribbling is the control of the ball while moving it from one position to another, which is useful for controlling the tempo of play and evading opponents; Shabih et al. (2021) similarly note that dribbling is a primary skill that must be mastered in football.

Based on the problems described above, the researcher was interested in examining "The Effect of Zig-Zag Training on Dribbling Agility in Players of the Porses Football School, Suruh, Trenggalek." The novelty of this study, distinguishing it from previous research, lies in the innovation applied to the zig-zag training by varying the distance and angle of the cones—narrowing the distance between cones at more advanced levels and varying the turning angles (45°, 90°, up to 135°)—so as to increase movement complexity and stimulate more varied movement patterns. In addition, competitive elements such as time trials or a game-based point system with rewards were incorporated so that the training would not only develop the physical aspect but also increase players' motivation, enthusiasm, and competitive spirit.

Critically compared with earlier studies, most existing work on zig-zag training—such as Shabih et al. (2021) among football athletes, Veron et al. (2023) at SSB Ogan Ilir, Oktovianus and Jusuf (2024) at Akademi Harbi Samarinda, and Maulana (2023) at SSB IMJ Grabag Magelang—applied the zig-zag drill using a fixed cone spacing and turning angle throughout the training period, without any progressive or competitive design element. Related studies by Ritonga and Ibrahim (2023) on circuit training and ladder drills, and by Daryanto and Hidayat (2023) on general agility training, likewise examined dribbling-related outcomes but did not focus specifically on a progressively varied zig-zag protocol. This body of literature has therefore not yet examined how progressively varied zig-zag training—incorporating incremental changes in cone distance and turning angle alongside competitive elements—affects dribbling agility, nor has such a design been tested on players at SSB Porses Suruh Trenggalek. This gap justifies the specific contribution of the present study.

Based on the background above, the research problem was formulated as follows: is there an effect of zig-zag training on dribbling agility in players of the Porses Football School, Suruh, Trenggalek? Accordingly, the objective of this study was to determine the effect of zig-zag training on dribbling agility in players of the Porses Football School, Suruh, Trenggalek. Theoretically, this study is expected to enrich knowledge for educators regarding the effect of zig-zag training on dribbling agility. Practically, it is expected to benefit SSB players by improving their understanding of dribbling technique, to help coaches develop the quality of their training programs, to serve as a reference for future researchers, and to add to the reference collection of Universitas Nusantara PGRI Kediri.

2. METHOD

This study used a quantitative approach with a quasi-experimental method and a one-group pretest-posttest design, in which measurement (pretest) was carried out first, followed by the application of a specific treatment for a certain period, and concluded with a final assessment (posttest) to compare conditions before and after the treatment.

The independent variable was zig-zag training, operationally defined as a form of training frequently used to train dribbling because it involves relatively rapid and repeated changes of body direction, designed to replicate real match situations that require agile and unpredictable movement (Alrizal & Muhafid, 2024), with indicators of frequency, number of sets, number of repetitions, and training duration. The dependent variable was dribbling agility, defined as skillful movement that can become explosive due to high speed and the ability of the body to

change position quickly (Veron et al., 2023), measured through dribbling speed, the ability to change direction, and ball control while dribbling.

The population of this study comprised all 30 players of SSB Porses Suruh Trenggalek. Referring to Dewi et al. (2025), when the number of research subjects is fewer than 100, it is preferable to use the entire population as the research subject; this is referred to as population research (census study). Because the population in this study consisted of only 30 people, the entire population was used as the research sample using a saturated sampling technique (Amin et al., 2023), consisting of 30 players aged approximately 10 to 15 years.

The research instrument was a dribbling agility test measured in seconds, adapted from Shabih et al. (2021). Equipment used included a football field, cones, one ball, a stopwatch, stationery, and a measuring tape. The ball was placed one meter from the starting cone; upon a starting signal, the player dribbled the ball through the cone course and back to the finish line using either or both feet alternately, while the stopwatch was started at the signal and stopped upon reaching the finish line.

The research was conducted at SSB Porses Suruh Trenggalek, with the pretest and posttest carried out on the village field in Kec. Suruh, Trenggalek. The study spanned 16 sessions-training three times per week plus one pretest day and one posttest day-conducted from 27 April 2026 to 6 June 2026.

Each training session lasted approximately 60–90 minutes, structured into a 10-minute warm-up, the core zig-zag drill segment, and a 10-minute cool-down. The zig-zag drill itself was performed in 3 sets of 4–6 repetitions per session, with an inter-set rest interval of 60–90 seconds to allow adequate recovery between repetitions. Training load was progressed every four sessions by narrowing the distance between cones (from approximately 3 m to 1.5 m) and increasing the turning angle (from 45° to 90°, and eventually 135°), consistent with the progressive design described in the Introduction. This gradual increase in movement complexity was intended to challenge players' agility incrementally while minimizing the risk of technique breakdown from excessive fatigue.

Data were processed through grouping, tabulation, presentation, and hypothesis testing. Prerequisite tests included the Shapiro-Wilk normality test (data considered normally distributed when significance > 0.05) and Levene's homogeneity test (data considered homogeneous when significance > 0.05), both performed with SPSS. Instrument reliability was examined using Cronbach's Alpha, with an instrument considered reliable when the coefficient exceeds 0.70. The hypothesis was tested using a paired sample t-test at a significance level of 0.05, whereby a significance value below 0.05 indicates a significant effect of the treatment.

3. RESULTS AND DISCUSSION

3.1 Results

SSB Porses Suruh Trenggalek is a football development institution for children and adolescents located in Kec. Suruh, Kabupaten Trenggalek, East Java, and is actively involved in youth football competitions in the region. Its facilities, including a field, cones, balls, training vests, and goals, adequately support the training program conducted several times per week.

Pretest data collected from the 30 players showed a highest score of 20.3 seconds and a lowest score of 18.4 seconds, with a mean of 19.2 seconds and a standard deviation of 0.58. The frequency distribution showed that 13% of players were in the very good category, 27% good, 33% fair, 17% poor, and 10% very poor, indicating that most players' dribbling agility was still at the fair-to-poor level before treatment.

Posttest data showed a highest score of 18.2 seconds and a lowest score of 16.1 seconds, with a mean of 17.0 seconds and a standard deviation of 0.57. The frequency distribution showed 23% of players in the very good category, 27% good, 27% fair, 17% poor, and only 6% very poor, indicating a marked improvement in dribbling agility after the zig-zag training. The decrease in the mean completion time from 19.20 seconds (pretest) to 17.00 seconds (posttest) indicates an improvement in players' dribbling agility following the treatment.

The Shapiro-Wilk normality test produced significance values of 0.080 (pretest) and 0.138 (posttest), both greater than 0.05, indicating that the data were normally distributed. Levene's homogeneity test produced a significance value of 0.799 (> 0.05), indicating homogeneous variance between the two data sets. The reliability test using Cronbach's Alpha produced a coefficient of 0.959 for both variables, indicating that the instrument was highly reliable and consistent.

The paired sample t-test produced a mean difference of 2.213, a t-value of 13.174, and a significance (2-tailed) of 0.000 (< 0.05) at $df = 29$. Because the significance value was below 0.05, H_0 (no effect of training on dribbling agility) was rejected and H_1 (there is an effect of training on dribbling agility) was accepted, indicating that zig-zag training significantly improved players' dribbling agility.

3.2 Discussion

Before the zig-zag training was administered, players' dribbling agility was still in the fair category, with an average completion time of 19.2 seconds. Observations during the pretest showed that several players had difficulty controlling the ball, uncoordinated footwork, and slow direction changes, and some players even lost balance while changing direction quickly. Dribbling agility is influenced by factors such as speed, balance, movement coordination, and leg-muscle strength; players with poor agility tend to struggle with sudden direction changes. This finding is consistent with Shabih et al. (2021) and Veron et al. (2023), who likewise found that dribbling ability among football-school athletes was not yet optimal prior to zig-zag training.

After the zig-zag training, players' dribbling agility improved, as shown by the decrease in average completion time from 19.2 to 17.0 seconds. Observations during the posttest indicated that players were more confident and coordinated, with faster and more directed footwork and improved balance during direction changes. Zig-zag training requires players to move quickly through a series of obstacles along a winding path, which helps develop muscular coordination, balance, foot speed, and ball-control ability while dribbling. This finding aligns with Shabih et al. (2021), who reported that zig-zag training significantly improved dribbling ability among football athletes, and with Veron et al. (2023), who found that zig-zag dribbling training significantly improved dribbling agility among SSB Ogan Ilir athletes.

The Shapiro-Wilk test confirmed that the pretest and posttest data were normally distributed (0.080 and 0.138 > 0.05), and Levene's test confirmed homogeneous variance (0.799 > 0.05), satisfying the assumptions for the paired sample t-test. The resulting t-value of 13.174 with a significance of 0.000 (< 0.05) confirms that zig-zag training had a significant effect on improving dribbling agility. Theoretically, agility is the ability to change body direction relatively quickly and accurately without losing balance; players with good agility can more easily control the ball, change direction suddenly, and maintain speed while moving. Because zig-zag training emphasizes rapid changes of direction, it is well suited to improving footballers' dribbling ability, and repeated practice allows the body to adapt to the movement pattern, resulting in more stable, faster, and more effective dribbling. These findings are in line with Shabih et al. (2021) and Veron et al. (2023), both of whom reported comparable improvements in dribbling agility following zig-zag training.

Mechanistically, the improvement can be explained by how zig-zag training targets the neuromuscular and biomechanical components underlying agility. The repeated, rapid changes of direction required by the zig-zag course place a specific demand on the stretch-shortening cycle of the lower-limb muscles, in which the eccentric braking phase before each turn is immediately followed by a concentric push-off in a new direction; repeated exposure to this cycle is understood to improve neuromuscular firing efficiency and reactive strength, allowing players to decelerate and re-accelerate with less time lost per turn. In addition, because the drill requires players to plan and execute each turn while simultaneously controlling the ball, it jointly trains proprioceptive control of the base of support and the perceptual-motor coordination needed to keep the ball close to the feet during a change of direction, rather than training footwork and ball control as separate skills. Progressive

narrowing of cone spacing and widening of turning angles across sessions is also likely to have driven this improvement, since each progression forced players to execute sharper, more frequent direction changes and thereby extended the training stimulus beyond what a fixed, unvaried course would provide. Taken together, these mechanisms offer a plausible explanation for why zig-zag training translated into faster, more controlled dribbling rather than isolated gains in either speed or ball control alone.

This study also has a limitation that should be acknowledged. The one-group pretest-posttest design did not include a control group that received no treatment or an alternative form of training. Consequently, the observed improvement in dribbling agility cannot be attributed to zig-zag training alone, since it may also be partly explained by familiarization with the test procedure, natural motor development over the eight-week period, or the general effect of regular practice and coaching attention rather than the zig-zag stimulus specifically. The absence of a control group therefore limits the internal validity of the causal claim, and the significant pretest-posttest difference should be interpreted as evidence consistent with, rather than definitive proof of, a specific zig-zag training effect. Future studies employing a control or comparison group are needed to isolate this effect more rigorously.

4. CONCLUSION

Based on the results and discussion, it can be concluded that zig-zag training has a significant effect on the dribbling agility of players at the Porses Football School, Suruh, Trenggalek. This is evidenced by the paired sample t-test, which produced a significance value (2-tailed) of 0.000 (< 0.05), so that H_0 was rejected and H_1 was accepted. The improvement in dribbling agility is reflected in the decrease of the average time from 19.2 seconds (pretest) to 17.0 seconds (posttest), indicating that zig-zag training improves players' direction-change ability, movement coordination, balance, and ball control while dribbling. Zig-zag training can therefore be recommended as an effective form of training for improving dribbling agility among young football players, particularly at SSB Porses Suruh Trenggalek. Coaches are encouraged to integrate zig-zag training regularly into their training programs, while future researchers are advised to use larger samples, longer training periods, control groups, and additional variables such as speed, balance, or passing accuracy to obtain more comprehensive findings.

5. ACKNOWLEDGMENTS

The author would like to express sincere gratitude to the Rector of Universitas Nusantara PGRI Kediri, the Dean of the Faculty of Health Sciences and Sciences, the Head of the PENJASKESREK Study Program, and the two thesis supervisors for their guidance, motivation, and support throughout this research, as well as to the coaches and players of SSB Porses Suruh Trenggalek for their cooperation during the data-collection process.

6. BIBLIOGRAPHY

- Akhmady, A. (2023). Hubungan kelincahan dengan keterampilan menggiring bola dalam permainan sepakbola. *Jurnal Ilmiah Wahana Pendidikan*, 9(19), 815–822.
- Alrizal, D., & Muhafid, E. A. (2024). Pengaruh latihan zig-zag terhadap kelincahan menggiring bola pada permainan sepak bola siswa putra. *CITIUS: Jurnal Pendidikan Jasmani, Olahraga, dan Kesehatan*, 4(2), 212–218.
- Amin, N. F., Garancang, S., & Abunawas, K. (2023). Konsep umum populasi dan sampel dalam penelitian. *JURNAL PILAR: Jurnal Kajian Islam Kontemporer*, 14(1), 15–31.
- Daryanto, Z. P., & Hidayat, K. (2023). Pengaruh latihan kelincahan terhadap kemampuan menggiring bola. *Jurnal Pendidikan Olahraga*, 4(12), 201–212.
- Dewi, I., Khotimah, H., Nasution, R., Zulpan, Z., Hariyati, T., & Rusli, A. (2025). Teori populasi dan pengambilan sampel. *Jurnal Literasiologi*, 14(2).

- Heliza, R., & Suganda, R. (2024). Pengaruh latihan zig-zag run dan shuttle run terhadap kemampuan menggiring bola pada pemain futsal siswa SMA Negeri 3 Kerinci. *Jurnal Edu Research*, 5(2), 339–347.
- Jud, J., Rusli, M., & Jumareng, H. (2025). Optimalisasi kelincahan untuk meningkatkan kualitas dribbling pemain sepak bola. *Sport-Mu: Jurnal Pendidikan Olahraga*, 6(1), 45–56.
- Kamus Besar Bahasa Indonesia. (2023). *Kamus Besar Bahasa Indonesia Daring*. Badan Pengembangan dan Pembinaan Bahasa, Kementerian Pendidikan, Kebudayaan, Riset, dan Teknologi Republik Indonesia.
- Maulana, K. A. B. (2023). Pengaruh latihan lari zig-zag terhadap keterampilan menggiring dalam permainan sepak bola kelompok usia 15-16 tahun di SSB IMJ Grabag Magelang [Undergraduate thesis, Universitas Negeri Yogyakarta].
- Oktovianus, & Jusuf, J. B. K. (2024). Pengaruh latihan lari zig-zag terhadap peningkatan keterampilan menggiring bola pada pemain Akademi Harbi Samarinda. *Journal Olahraga ReKat (Rekreasi Masyarakat)*, 3(2), 72–76.
- Ristawati, R. (2023). Analisis kelincahan siswa kelas X SMA Negeri 3 Bantaeng. *Jurnal Olahraga Papua*, 5(1), 1–8.
- Ritonga, H. B., & Ibrahim. (2023). Pengaruh latihan circuit training dan ladder drill terhadap kelincahan pemain sepakbola SSB Gumarang. *J2IO: Jurnal Jendela Ilmu Olahraga*, 1(1), 53–63.
- Shabih, M. I., Iyakrus, & Destriani. (2021). Latihan zig-zag terhadap kelincahan menggiring bola pada atlet sepak bola. *Jurnal Kejaora: Jurnal Kesehatan Jasmani dan Olah Raga*, 6(1), 145–152.
- Syahrir, A., Darminto, A. O., & Dos Santos, M. H. (2025). Analisis kecepatan dan kelincahan terhadap kemampuan menggiring bola dalam permainan sepakbola siswa kelas XI SMA Negeri 16 Bone. *Jurnal Pengabdian Masyarakat dan Riset Pendidikan*, 3(4), 3630–3635.
- Veron, J. S., Usra, M., & Victorian, A. R. (2023). Pengaruh latihan menggiring bola zig-zag terhadap hasil kelincahan menggiring bola. *Sriwijaya Journal of Sport*, 2(3), 154–163.
- Wanimbo, E., Widyanto, Z., & Islam, R. W. H. (2023). Hubungan antara kelincahan dengan kemampuan dribbling dalam permainan sepak bola pada mahasiswa Penjaskesrek Putra tahun akademik 2023/2024. *Jurnal Review Pendidikan dan Pengajaran (JRPP)*, 6(4), 3736–3744.