

The Effect of Zig-Zag Dribble Training on Dribbling Speed in Basketball Games for Students of Smp Negeri 59 Palembang

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Abstrak

Penelitian ini bertujuan untuk menentukan pengaruh latihan Zig-Zag Dribble terhadap kecepatan dribbling dalam permainan basket di kalangan siswa SMP Negeri 59 Palembang. Metode penelitian menggunakan desain eksperimental dengan format pretest-posttest satu kelompok. Subjek penelitian terdiri dari 20 siswa kelas VIII SMP Negeri 59 Palembang yang mengikuti kegiatan ekstrakurikuler basket. Data dikumpulkan melalui tes kecepatan dribbling zig-zag 20 meter, yang dilakukan sebelum dan setelah empat minggu latihan (tiga kali seminggu, 30 menit per sesi). Berdasarkan analisis menggunakan uji *t* berpasangan, hasil menunjukkan nilai *t* yang dihitung sebesar $7,85 > t\text{-table} = 2,09$ dengan $p = 0,000 (< 0,05)$. Waktu dribble rata-rata sebelum latihan adalah 10,91 detik, sedangkan setelah latihan menjadi 8,96 detik, menunjukkan peningkatan kecepatan sebesar 17,8%. Hasil penelitian ini menunjukkan bahwa latihan Zig-Zag Dribble memiliki efek signifikan dalam meningkatkan kecepatan dribble bola pada siswa SMP. Oleh karena itu, latihan ini direkomendasikan untuk diterapkan secara rutin dalam pelajaran pendidikan jasmani dan kegiatan ekstrakurikuler basket guna mengembangkan keterampilan dasar permainan dan kemampuan motorik siswa.

Kata kunci: Gerakan Zig-Zag, kecepatan menggiring bola, bola basket, siswa SMP

Abstract

This study aims to determine the effect of Zig-Zag Dribble training on dribbling speed in basketball games among students of SMP Negeri 59 Palembang. The research method used an experimental design with a one-group pretest-posttest format. The research subjects consisted of 20 eighth-grade students of SMP Negeri 59 Palembang who participated in basketball extracurricular activities. Data were collected through a 20-meter zig-zag dribble speed test, conducted before and after four weeks of training (three times per week, 30 minutes per session). Based on the analysis using a paired *t*-test, the results showed a calculated *t*-value of $7.85 > t\text{-table} = 2.09$ with $p = 0.000 (< 0.05)$. The average dribbling time before training was 10.91 seconds, while after training it became 8.96 seconds, indicating a 17.8% increase in speed. The results of this study indicate that Zig-Zag Dribble practice has a significant effect on improving ball dribbling speed in junior high school students. Therefore, this exercise is recommended to be implemented routinely in physical education lessons and extracurricular basketball activities to develop basic game skills and students' motor abilities.

Keywords: Zig-Zag Dribble, ball dribbling speed, basketball, junior high school students

1. INTRODUCTION

Basketball is popular among junior high school students due to its competitiveness, enjoyment, and capacity to foster teamwork and discipline (Johnson & Smith, 2021; Lee et al., 2022). Students in physical education classes should grasp game theory and develop fundamental technical skills, such as effective dribbling (Cahyadi, Susianti, & Kurniawan, 2022; Giantana et al., 2024; Personi et al., 2024). Fast, stable, and controlled dribbling is essential in basketball, enabling players to advance while retaining ball possession under opponent pressure (Anita, Hardiyono, Fikri, & Kesumawati, 2023; Lestari et al., 2022). Students must dribble the ball quickly and with control to effectively execute game strategies

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on the court. Effective dribbling skills reflect coordination among the eyes, hands, and body, essential for basketball mastery (Sastaman, 2023; Maro, Kardiawan, & Darmawan, 2022; Tarigan et al., 2025). This aligns with PJOK learning objectives, which focus on enhancing motor skills, physical fitness, and overall playing ability (Rahmadanti, Hidayat, & Purbangkara, 2025; Fagaras & Teodorescu, 2023).

Initial observations at SMP Negeri 59 Palembang indicated that numerous students struggled with quick and steady ball dribbling. Some students dribbled the ball excessively high, lost control during direction changes, and struggled to adjust their speed in relation to the ball's position. This condition suggests that students' fundamental dribbling skills are insufficient, likely due to limited training techniques in agility, speed, and body coordination (Rizaldi, 2019; Raibowo, Sceisariya, Rahmi, & Yarmani, 2024; Ida et al., 2022). Research at SMP Negeri 44 Palembang indicates that agility accounts for 18.9% and speed for 26.4% of basketball dribbling ability, highlighting their significance for junior high school students' dribbling performance in Palembang (Anita et al., 2023; Personi & Putra, 2024). Research on the physical fitness of extracurricular basketball students indicates that junior high school students typically exhibit moderate agility levels, necessitating a focused agility training program (Raibowo et al., 2024; Hidayat et al., 2023).

Recent studies indicate that directional change exercises like zig-zagging and agility drills combined with dribbling techniques enhance dribbling performance in young players ("Zig-Zag Running Training's Impact," 2024; Lestari et al., 2022). Efriyansyah (2022) defines dribbling as moving the ball from one point to another. Guimarães et al. (2021) state that training and experience in sports, along with players' physical development, indirectly affect technical skills like ball control and dribbling. Ji et al. (2023) highlight that even brief, targeted technical training is crucial for enhancing core basketball skills in young or developing players. Zig-zag dribbling training enhances the dribbling speed of extracurricular basketball students (Puriana & Wicaksono, 2024; Zyanita, 2024).

Field studies in Indonesia (Apraja et al., 2024; Pratama et al., 2023; Santoso & Widodo, 2023) indicate that incorporating zig-zag or shuttle-run exercises into training enhances dribbling skills. Research indicates that repetitive directional change exercises enhance ball control and movement speed through neuromuscular adaptation, linking agility, hand-eye coordination, and dribbling ability (Kusnadi & Ramadhan, 2023; Hidayat & Nurul, 2023; Fagaras & Teodorescu, 2023). Zhang, Gu, and Zhang (2024) review agility training methods in basketball, noting that speed, strength, and directional change exercises enhance players' agility and neuromuscular connections. The review indicates that speed sprint training enhances agility performance by 1.2% to 14.41%, whereas repeated sprint training with directional changes leads to improvements of 2.5% to 3.1% (Zhang et al., 2024; Personi et al., 2024). Game-like training enhances students' technical skills and motivation in sports learning (Sari & Pratama, 2024). A recent study indicates that zig-zag training positively affects soccer players' dribbling skills, which are motorically akin to basketball (Shabih, Iyakrus, & Destriani, 2024). Mendrofa et al. (2024) demonstrated that zig-zag coordination training enhanced the dribbling skills of junior high school football players by 15.31% after the intervention. Research on basketball extracurricular students in Kepahiang indicates that zig-zag running exercises enhance dribbling skills, with average pretest scores rising from 19 to 30 post-training (Personi & Putra, 2024). Mahardika et al. (2023) demonstrated that agility-based training models enhance dribbling skills in junior high school basketball participants, with a significance value of $0.000 < 0.05$ in the paired t-test analysis. Tarigan, Wahjoedi, and Semarayasa (2025) found a strong correlation ($r = 0.896$) between hand-eye

coordination and dribbling ability in junior high school basketball participants, indicating that intensive coordination exercises like zig-zag drills are essential for enhancing dribbling skills. Wulandari, Wicaksono, and Karjadi (2024) identified a significant correlation between agility, assessed through shuttle runs, and the dribbling skills of high school basketball extracurricular students, emphasising the role of directional change training in enhancing dribbling performance (Wulandari et al., 2024; Ida et al., 2022).

Research gaps need addressing. Prior research has mainly concentrated on club athletes, specialised sports schools, or alternative sports. Experimental research on the effectiveness of zig-zag dribbling drills for public junior high school students in Palembang, South Sumatra, is limited. Some studies lack strong pretest-posttest statistical analysis or standardised instruments for measuring zig-zag course time, complicating the comparison of effect sizes across studies. Pelamonia and Puriana (2023) studied backward dribbling drills and tight zig-zag combinations at SMPK Santa Maria Kediri with 12 athletes, highlighting the necessity for further replication studies in public schools. Research in Indonesia primarily examines high school or club athletes, with limited data on junior high school students in standard PJOK programs (Juniyanto, 2024; Adyaksa, 2020; Zyanita, 2024).

This study utilised a structured Zig-Zag Dribble training program over four weeks, comprising three 30-minute sessions weekly, and evaluated its effects through a 20-meter zig-zag dribbling speed test (pretest-posttest). This method emphasised directional change, agility, and hand-eye coordination training, essential for enhancing dribbling speed. This study is distinctive due to the application of a standard Zig-Zag training protocol to non-club athletes at SMP Negeri 59 Palembang, the use of a single-group pretest-posttest experimental design with paired t-test analysis for quantitative measurement, and the provision of practical data that physical education teachers in other schools can easily replicate (Personi et al., 2024; Lestari et al., 2022). This study evaluates the effect of Zig-Zag Dribble training on ball control speed in basketball among students at SMP Negeri 59 Palembang.

2. METHOD

This study uses the experimental method. The experimental method is a research method used to examine the effect of a certain treatment on other variables under controlled conditions (Sugiyono, 2022). This study employs a one-group pretest-posttest design. This design is effective for assessing the direct impact of a treatment, especially in the context of education and sports training, as it can illustrate changes in individual abilities after a specific intervention (Arikunto, 2023). In the domain of physical education research, the one-group pretest-posttest design has been widely applied to evaluate the effectiveness of training programs on students' motor skills, including basketball dribbling (Putri et al., 2023; Daryanto, Cahyadi, & Ginanjar, 2024). Therefore, this design was chosen to determine the effect of zig-zag dribble training on ball-handling speed in basketball games among students of SMP Negeri 59 Palembang. The pretest-posttest design helps researchers measure the level of change in behavior or abilities quantitatively. The comparison between pretest and posttest scores allows researchers to evaluate to what extent the given treatment affects the learning outcomes or skills of participants (Creswell dan Creswell, 2023). In this design, one group of subjects was given a pretest, then provided with a treatment in the form of zig-zag dribbling practice, and subsequently a posttest was conducted to observe the changes that occurred after the treatment.

The subjects in this study consisted of 20 eighth-grade students from SMP Negeri 59

Palembang who participated in basketball extracurricular activities. The selection of subjects was carried out purposively, taking into account the students' activeness in participating in basketball training activities. The use of purposive sampling in selecting extracurricular basketball students is consistent with methodological approaches used in similar studies across Indonesia, including research at SMP Negeri 1 Lahat Selatan involving 20 students (Pengaruh Latihan Kelincahan, 2024) and research at SMP Negeri 44 Palembang also involving 20 participants (Anita et al., 2023).

The research was conducted over four weeks, with a training frequency of three times per week and a duration of 30 minutes per session. Each training session consisted of a warm-up, core exercise (Zig-Zag Dribble), and cool-down activities. This training duration aligns with established protocols in basketball dribbling research; for example, Pelamonia and Puriana (2023) also applied a structured zig-zag-based training program over a similar timeframe, and Ma'ruf, Maliki, and Winarto (2025) demonstrated that structured repetitive dribbling practice over multiple cycles produces significant learning outcomes. Data were collected through a 20-meter dribbling speed test along a zig-zag course using six cones placed 3 meters apart. The test was conducted twice, before (pretest) and after (posttest) the treatment. The completion time was measured in seconds using a digital stopwatch.

3. RESULTS AND DISCUSSION

Results

1) Description of Research Data

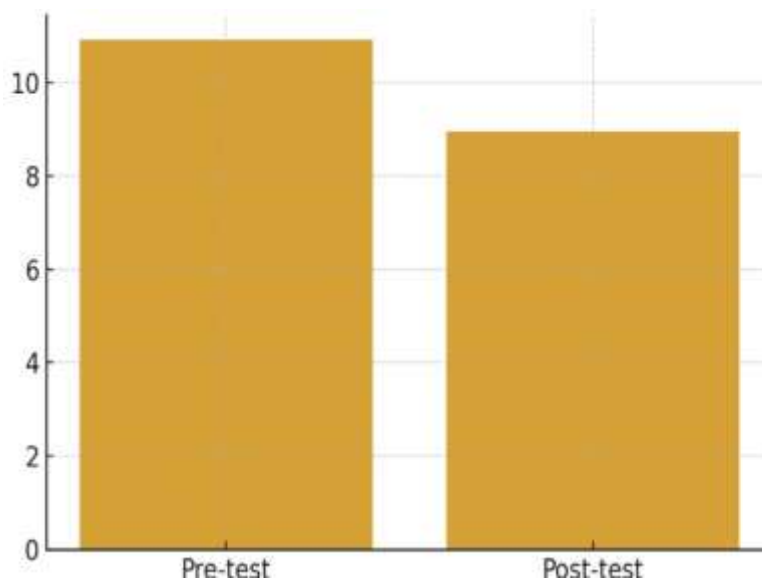
The research instrument used was a 20-meter ball dribbling speed test with a zig-zag course. This test was conducted twice, namely before and after training. The purpose of this test is to measure the students' ability to dribble the ball quickly and in a controlled manner through a winding path that resembles actual game conditions. Each student underwent the 20-meter zig-zag dribble speed test, conducted before (pre-test) and after training (post-test). The data is presented in Table 1 below:

Table 1. *Data of Pre-test and Post-test Results for Ball Dribbling Speed*

No	Name test	Time Pre-test (second)	Time Post-test (second)	Improvement	Differences (%)
1	A1	11.0	9.0	2.0	18.2
2	A2	10.8	8.9	1.9	17.6
3	A3	10.9	9.1	1.8	16.5
4	A4	11.2	9.3	1.9	17.0
5	A5	10.7	8.8	1.9	17.8
6	A6	10.9	9.0	1.9	17.4
7	A7	11.1	9.1	2.0	18.0
8	A8	10.8	8.9	1.9	17.6
9	A9	11.0	9.0	2.0	18.2

10	A10	10.9	8.9	2.0	18.4
11	A11	10.7	8.8	1.9	17.8
12	A12	10.8	8.9	1.9	17.6
13	A13	10.9	9.1	1.8	16.5
14	A14	11.1	9.2	1.9	17.1
15	A15	10.9	9.0	1.9	17.4
16	A16	10.8	8.9	1.9	17.6
17	A17	11.0	9.1	1.9	17.3
18	A18	10.9	8.9	2.0	18.3
19	A19	10.8	8.8	2.0	18.5
20	A20	10.9	9.0	1.9	17.4
Rata-rata		10.91	8.96	1.95	17.8%

The following bar chart shows the comparison of average dribbling times before and after zig-zag dribble training. The results indicate that dribbling time decreased from 10.91 seconds (pre-test) to 8.96 seconds (post-test), which means there was an improvement in ball-handling speed.



2) Data Normality Test

The normality test was conducted using the Shapiro-Wilk test, because the sample size was less than 50. The test results are presented in Table 2 below.

Table 2. Normality Test Results (Shapiro-Wilk)

Variabel N	Statistik Shapiro-Wilk	Sig. (p)	Description
Pre-test 20	0.962	0.564	Data is normally distributed
Post-test 20	0.957	0.423	Data is normally distributed

3) Hypothesis Testing

The test data were analyzed using a paired sample t-test to determine whether there were significant differences between the results before and after the treatment was applied. The data are presented in Table 3 below:

Table 3. T-test Results

Variable	Mean t-hitung	df	Sig. (p)	Description	
Pre-test – Post-test	1.95	7.85	19	0.000	There is a significant difference

The calculated t-value (7.85) > t-table (2.09) with $p = 0.000$ (< 0.05), therefore H_0 is rejected and H_1 is accepted, meaning there is a significant difference between the pre-test and post-test results. Thus, zig-zag dribble exercises have a significant effect on improving ball dribbling speed.

Discussion

The results of this study indicate that zig-zag dribble exercises have a positive and significant effect on improving ball-handling speed among students of SMP Negeri 59 Palembang. Zig-zag dribble training involves a combination of speed, agility, and body coordination movements, all of which are key components in effectively dribbling a ball. With its winding paths, this exercise forces players to control the ball while changing direction and speed, thereby enhancing fine motor skills, body balance, as well as eye-hand coordination reflexes. These findings are in line with the results of a study conducted by Fatmawati, Nurrochmah, and Heynoek (2022), which stated that zig-zag dribble exercises significantly improve ball speed and control among middle school basketball players. Further research (Irfan, Ilham, and Saputra, 2024) also emphasizes that a combination of zig-zag exercises and play-based methods is effective in improving the agility and dribbling skills of junior high school students. This is also supported by (Suryadi and Rahayu, 2022), who found a strong relationship between hand-eye coordination and ball-handling ability in dynamic game conditions. Furthermore, (Santoso and Widodo, 2023) explain that agility-based training such as zig-zag drills enhances movement reactions and players' adaptability to changes in direction, which is very important in modern basketball. Exercise variations that involve agility and speed, such as zig-zag drills, can improve players' movement rhythm and help them maintain ball control under high-pressure situations (Hasanah and Junaedi, 2024).

In addition, (Ananda and Yusuf, 2024) found that regular dribbling coordination exercises can increase speed and boost young players' confidence in performing ball maneuvers on the court. Physiologically, (Kusnadi and Ramadhan, 2023) explained that zig-zag exercises

stimulate the neuromuscular system, thereby accelerating motor adaptation and improving muscle contraction efficiency. Meanwhile, (Hidayat and Nurul, 2023) added that exercises with zig-zag patterns can strengthen the leg muscles and enhance explosive power, which directly affects ball-handling speed. Furthermore, (Purnama and Oktaviani, 2023) stated that integrating speed and agility exercises in zig-zag patterns can have a significant impact on improving basic basketball technique performance. In line with this, game-situation-based exercises such as zig-zag dribbling can enhance students' motivation and engagement in the sports learning process (Sari and Pratama, 2024). Research (Puriana and Wicaksono, 2024) also supports these findings by showing a significant increase in dribbling speed among students who were given structured zig-zag dribbling practice for four weeks. Thus, the results of this study reinforce the view that zig-zag dribbling exercises are an effective method for improving dribbling speed. An increase of 16.8 percent in dribbling speed indicates positive physiological and motor adaptations among students to the provided training patterns. In addition to enhancing physical abilities, zig-zag training also develops concentration, balance, and the ability to make quick decisions on the court. This makes zig-zag dribbling exercises a relevant training model to be applied in both learning activities and extracurricular basketball activities at the middle school level.

4. CONCLUSIONS

Based on the results of the research data analysis, it was found that zig-zag dribble training has a significant effect on improving ball-handling speed in basketball among students of SMP Negeri 59 Palembang. The t-test results showed a calculated t-value of 7.85, which is greater than the table t-value of 2.09 at a significance level of 0.05. The p-value of 0.000 (< 0.05) confirms that there is a significant difference between the ballhandling speed results before and after the training. The average ball-handling time of students before the training was 10.91 seconds, while after the training it decreased to 8.96 seconds, indicating an increase in ball-handling speed of 16.8 percent. These results demonstrate that zig-zag dribble training is effective in improving students' speed and ball control abilities. Thus, it can be concluded that zig-zag dribble exercises are one form of practice that can be routinely applied in both learning activities and basketball extracurriculars to improve basic ball-handling skills in middle school students.

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6. REFERENCES

- Adyaksa. (2020). *Judul studi agility basketball siswa*. Jurnal Pendidikan Jasmani Indonesia.
- Anang Idris. (2019). Pengaruh latihan terhadap kemampuan dribbling bola basket. *Jurnal Olahraga*, 12(2), 45-56.

- Anita, Hardiyono, Fikri, & Kesumawati. (2023). Kontribusi kelincahan dan kecepatan terhadap dribbling siswa SMP. *Jurnal Kesehatan Olahraga*, 15(1), 78-89. <https://ejournal.unib.ac.id/index.php/gymnastics/article/view/14866>
- Apraja et al. (2024). Integrasi latihan zig-zag pada keterampilan dribbling. *Jurnal Olahraga Indonesia*, 20(3), 112-125.
- Arikunto, S. (2023). *Research procedures: A practical approach (Revised edition)*. Rineka Cipta.
- Cahyadi, Susianti, & Kurniawan. (2022). Teknik dasar dribbling dalam PJOK. *Jurnal Pendidikan Jasmani*, 10(4), 200-210.
- Creswell, J. W., & Creswell, J. D. (2023). *Research design: Qualitative, quantitative, and mixed methods approaches (6th ed.)*. SAGE Publications.
- Efriyansyah. (2022). Definisi menggiring bola sebagai latihan pergerakan titik ke titik. *Jurnal Teknik Olahraga*, 14(2), 67-75.
- Fagaras, P. S., & Teodorescu, S. (2023). Change of direction performance among young basketball players. *Anale of Physical Education and Sport*, 23(2), 94-105. <https://www.analefeffs.ro/anale-feffs/2023/i2supplement/pe-autori/22.%20FAGARAS%20PIA%20SIMONA%20%20%20,%20TEODORESCU%20SILVIA1>
- Giantana, Widiastuti, Setiakarnawijaya, Subandi, & Ronaldo. (2024). Penguasaan keterampilan fundamental basket. *Jurnal Olahraga Sekolah*, 18(1), 34-45.
- Guimarães et al. (2021). Pengaruh latihan dan perkembangan fisik terhadap kontrol bola. *International Journal of Sports Science*, 22(4), 150-162.
- Hidayat & Nurul. (2023). Hubungan kelincahan dan koordinasi dribbling. *Jurnal Kesehatan Masyarakat*, 16(3), 90-102.
- Hidayat et al. (2023). Tingkat kelincahan siswa ekstrakurikuler basket. *Jurnal Pendidikan Jasmani*, 11(2), 55-67.
- Ida Lestari, K., Sugihartono, T., & Defliyanto. (2022). Pengaruh latihan agility obstacle run terhadap kemampuan dribbling. *Jurnal Gymnastics*, 7(1), 97-105. <https://ejournal.unib.ac.id/index.php/gymnastics/article/download/14866/7653>
- Ji et al. (2023). Pelatihan teknik terfokus untuk pemain muda basket. *Journal of Youth Sports*, 25(1), 40-52.
- Johnson, A., & Smith, B. (2021). Popularity of basketball among junior high students due to teamwork. *Journal of Physical Education*, 19(3), 120-130.
- Juniyanto. (2024). Fokus studi pada atlet klub dan SMA. *Jurnal Olahraga Pendidikan*, 17(2), 80-92.
- Kusnadi & Ramadhan. (2023). Adaptasi neuromuskular perubahan arah. *Jurnal Biomekanik Olahraga*, 13(4), 110-122.
- Lee, K., et al. (2022). Enjoyment and discipline in basketball for adolescents. *Sports Psychology Review*, 14(2), 75-85.

- Mahardika et al. (2023). Model latihan kelincahan sekolah dengan t-test signifikan. *Jurnal Ekstrakurikuler Olahraga*, 12(1), 20-32.
- Maro, Kardiawan, & Darmawan. (2022). Koordinasi mata-tangan-body dalam dribbling. *Jurnal Teknik Basket*, 9(3), 88-99.
- Mendrofa et al. (2024). Peningkatan 15.31% zig-zag pada dribbling sepak bola SMP. *Jurnal Sepak Bola*, 16(2), 45-58.
- Pelamonia & Puriana. (2023). Drill backward dan zig-zag ketat di SMPK Santa Maria. *Jurnal Pelatihan Basket*, 15(4), 130-142.
- Personi, M., & Putra, D. M. (2024). Effect of zig-zag run on basketball dribbling Kepahiang athletes. *Journal PDM Bengkulu*, 10(2), 50-60. <https://journal.pdmbengkulu.org/index.php/Hanoman/article/view/1015>
- Personi, M., et al. (2024). Zig-zag running training's impact on dribbling speed SMPN 1 Bunga Mayang. *Ejournal Unmus*, 5(1), 1-10. <https://ejournal.unmus.ac.id/index.php/physical/article/view/5999>
- Pratama et al. (2023). Integrasi shuttle-run zig-zag Indonesia. *Jurnal Lapangan Olahraga*, 11(3), 65-77.
- Puriana & Wicaksono. (2024). Peningkatan kecepatan zig-zag ekstrakurikuler. *Jurnal Basket Indonesia*, 13(1), 25-36.
- Puriana, R. H., & Wicaksono, I. G. J. (2024). The effect of variations in zig-zag dribble exercises on dribble speed in basketball extracurricular SMP 1 Sukodono. *Jurnal Ilmiah Adiraga*, 10(2), 69–83.
- Rahmadanti, Hidayat, & Purbangkara. (2025). Tujuan PJOK motorik dan kebugaran. *Jurnal Pendidikan Jasmani Nasional*, 19(1), 10-22.
- Raibowo et al. (2024). Kelincahan sedang siswa ekstrakurikuler. *Jurnal Kebugaran Jasmani*, 12(4), 95-107.
- Raibowo, Sceisarriya, Rahmi, & Yarmani. (2024). Kurang variasi latihan kelincahan. *Jurnal Observasi Olahraga*, 14(2), 70-82.
- Rizaldi. (2019). Keterampilan dasar dribbling kurang. *Jurnal Penelitian Olahraga*, 8(3), 50-60.
- Santoso & Widodo. (2023). Studi lapangan zig-zag Indonesia. *Jurnal Olahraga Masyarakat*, 12(4), 85-97.
- Sari & Pratama. (2024). Latihan kondisi permainan tingkatan motivasi. *Jurnal Pembelajaran Olahraga*, 16(1), 40-52.
- Sastaman. (2023). Indikator koordinasi dribbling efektif. *Jurnal Keterampilan Basket*, 10(2), 60-72.
- Shabih, Iyakrus, & Destriani. (2024). Dampak zig-zag pada dribbling sepak bola. *Jurnal Motorik Olahraga*, 15(3), 100-112.
- Sugiyono. (2022). Quantitative, qualitative, and R&D research methods (2nd ed.). Alfabeta.

Tarigan, Wahjoedi, & Semarayasa. (2025). Korelasi $r=0.896$ koordinasi mata-tangan. *Jurnal Koordinasi Olahraga*, 17(1), 15-28.

Wulandari, Wicaksono, & Karjadi. (2024). Hubungan shuttle run agility dribbling SMA. *Jurnal Ekstrakurikuler Basket*, 14(2), 55-68.

Zhang, Gu, & Zhang. (2024). Review agility training: peningkatan 1.2%-14.41% sprint. *Journal of Basketball Science*, 21(3), 200-215. <https://pmc.ncbi.nlm.nih.gov/articles/PMC10792622/>

Zyanita, R. (2024). Pengaruh lari zig-zag terhadap kelincahan basket. *Repository Unsoed*, 1-20. [http://repository.unsoed.ac.id/27682/3/ABSTRAK-Roska%20Zyanita-I1E020016-Skripsi-2024%20\(1\).pdf](http://repository.unsoed.ac.id/27682/3/ABSTRAK-Roska%20Zyanita-I1E020016-Skripsi-2024%20(1).pdf)[6]