



Effect Of Circuit Training Exercises On Dribbles In Basketball Sports At The PERBASI Club Of Pasangkayu District

Munanda^{1A-E*}, Christian Kungku^{2B-D}, Didik Purwanto^{3B-D}, Muh. Saldi^{4B-D}

^{1,2,3,4} Universitas Tadulako, Sulawesi Tengah, Indonesia

munanda2703@gmail.com^{1*}, tiankungku@gmail.com², didikpurwanto1283@gmail.com³,
saldysya@untad.ac.id⁴

ABSTRACT

This study aims to determine the effect of circuit training on dribbling ability in basketball at the Pasangkayu Regency Perbasi Club. The problem in this study is the decline in players' dribbling ability, especially in the final quarter of the match, caused by a decline in physical conditions such as endurance, strength, and motor coordination. The type of research used is an experimental study with a one-group pretest-posttest design. The population and sample in this study were all 15 players of the Pasangkayu Regency Perbasi Club with a purposive sampling technique. The instrument used was a dribbling ability test. Data were analyzed using a t-test statistical test to determine the difference between the pretest and posttest results. The results of the study showed that there was an increase in dribbling ability after being given circuit training treatment. This was evidenced by the average pretest value of 34.95 seconds and posttest of 33.03 seconds. The results of the hypothesis test showed that the calculated t value of -3.508 was greater than the t table of 1.761 at a significance level of 5%, so H_a was accepted and H_o was rejected. In addition, the significance value of $0.00 < 0.05$ indicated a significant effect. Based on these results, it can be concluded that circuit training has a significant effect on improving dribbling ability in basketball games at the Pasangkayu Regency Perbasi Club. Therefore, this training method can be used as an alternative training program to improve basic basketball skills, especially dribbling.

ARTICLE HISTORY

Received: 2026/05/13
Accepted: 2026/05/20
Published: 2026/05/25

KEYWORDS

Circuit Training;
Dribbling;
Basketball;
Physical Condition;
Exercise.

AUTHORS' CONTRIBUTION

- Conception and design of the study;
- Acquisition of data;
- Analysis and interpretation of data;
- Manuscript preparation;
- Obtaining funding

Cites this Article : Munanda, M.; Kungku, C.; Purwanto, D.; Saldi, M. (2026). Effect Of Circuit Training Exercises On Dribbles In Basketball Sports At The PERBASI Club Of Pasangkayu District. **Competitor: Jurnal Pendidikan Kepeleatihan Olahraga**. 18 (2), p.3587-3598

INTRODUCTION

Basketball is one of the most popular and rapidly growing ball games; it has been proven that players of all ages and genders enjoy playing this activity. They gain numerous benefits from basketball, which emphasizes teamwork, particularly in terms of physical, mental, and social development (Nugraha & Pratama, 2019). National sports achievements are a mandate that must be planned and developed starting from the grassroots level, namely the regional level. Improving sports achievements is the responsibility of the entire community, capable of selecting and developing athletes



from the grassroots level (Mashuri, 2019). These efforts can begin at the school level, with physical education subjects and extracurricular sports programs that incorporate physical activity through sports. Through physical activity, participants will gain abilities and skills (Hanief, Subekti, & Mashuri, 2018).

According to FIBA-International Basketball Federation (2020), basketball is a sport played by two teams of five players each. The goal is to score as many points as possible by shooting the ball through the hoop and preventing the opposing team from scoring. Basketball itself is very popular, as evidenced by the numerous basketball competitions held at the elementary, middle, high school, and college levels. There are four types of basketball techniques, including 1) Dribbling (Siswa et al., 2018) states that dribbling is one of the basic techniques in basketball which is done by bouncing the basketball on the floor using one hand, 2) Passing, according to Dinata (2013) passing is one of the basic techniques in basketball which aims to give the basketball to a teammate using one hand or two hands. 3) Shooting, according to Darmawan (2001) shooting is one of the basic techniques that plays a very important role in a basketball game. If time runs out or time out then the player can take the initiative to shoot to get points. With the rapid progress of basketball, there is a need for guidelines that can serve as a reference for providing appropriate training according to stages such as LTAD. (Balyi, I., Way, R., & Higgs, 2016) LTAD or can be interpreted as a long-term development model for athletes that has been systematically designed to develop sports excellence and increase active participation in local, regional and national sports organizations.

According to (Mustoip, 2018) states that the implementation of a strategy or program is a series of choices that are more or less related (including the decision to act. The implementation of a physical program is carrying out a physical training program that has been planned and observing every training activity carried out in accordance with the physical program made by the physical trainer to be used as evaluation material. While the physical training program with training activities in the field, there are repetitions, sets and calculation times that remain according to the program, some are added. (Pascal & Amra, 2022) explain that the basic components of physical condition, when viewed from a muscular perspective, include: endurance, strength, power, speed, flexibility, agility, balance, and coordination. A training program is a collection of exercises performed regularly in a specific pattern or system, ranging from easy to difficult, basic to complex. It is not refreshing in itself.

Circuit training and interval training have components in training that are useful in increasing endurance, oxygen consumption in the body can develop by training endurance. So along with increasing endurance, increased oxygen consumption also has an effect (Kusuma 2017). Therefore, circuit training and interval training will also provide a positive increase in $VO_2\max$. So in the process of increasing $VO_2\max$, the provision of circuit training and interval training is strongly supported. Circuit Basketball. Circuit Basketball is a basketball game that uses the concept of circuit training specifically aimed at beginners or those who are new to basketball and I have modified everything both the facilities and infrastructure and the rules in this game. Students are expected

to be able to perform and master basic basketball techniques including dribbling, passing, and shooting well and enjoyably. In addition to circuit training, a number of recent studies on plyometric training, small-sided games, and coordination training in basketball confirm that shooting skills are greatly influenced by the quality of explosive power, change of direction, balance, and contextual movement repetition.

Radu et al. (2024) reported that a combination of plyometric and coordination training contributed to improved jump shots in junior players. Cao et al. (2024) and Zhou et al. (2024) demonstrated through meta-analyses that plyometric training can improve fitness components and skill-related performance in basketball players, particularly jumping, sprinting, change of direction, and stability. These findings support the idea that shooting technique development is inseparable from physical stimuli appropriate to the demands of the game. Another physical requirement for basketball players is strength. Strength contributes to a player's performance when performing basic techniques, such as shooting or passing. A tangible form of strength performance in basketball is arm strength. Recent research shows that arm muscle strength contributes 30.5% to one of the basic basketball techniques, the jump shot (Wanena, 2018). The study also demonstrated the contribution of physical coordination to one of the basketball techniques, the jump shot. Hand-eye coordination was found to contribute 13% to a successful jump shot.

METHODS

The type of research used by the researcher is an experimental research method, with the aim of examining whether or not circuit training has an effect on dribbling. Experimental research methods involve testing a treatment with the aim of determining the extent of its effect on the subject (L. Hakim, 2020). In this study, the method used was an experimental method, with a one-group pretest-posttest design. This design has three stages of implementation: the initial test (pretest), treatment, and final test (posttest). A research plan or design is developed based on the research problem and the hypotheses to be tested. Therefore, a research design is a plan for how the research will be conducted to achieve results that align with the objectives. The purpose of creating a research design is to streamline and structure the research process, thus assisting in data collection. In this study, data was collected before and after the treatment. Data collection was conducted to determine the dribbling ability of basketball players at the Pasangkayu Perbasi Club. The following table illustrates the research design.

01 X 02

According to Sugiyono (2019:80), a population is a generalization area consisting of objects/subjects that have certain quantities and characteristics determined by the researcher to be studied and then conclusions drawn. In this study, the population is the Pasangkayu Regency Perbasi Club, which consists of 15 athletes/players.

Data collection techniques are carried out using tests and measurements to obtain objective data on the results of player training. According to (Nurhasanah 2010), a test is

a tool or procedure used to determine or measure something in a certain situation using predetermined methods and rules. The characteristic of the measurement results is expressed in a quantitative score that can be processed statistically. Through measurements, we will obtain objective information so that we can determine a person's performance at a certain time.

RESULTS AND DISCUSSION

Result

Descriptive Analysis of Basketball Dribbling Ability

The study involved 15 basketball players from the Pasangkayu Regency PERBASI Club. Data were collected through a dribbling test conducted before (pre-test) and after (post-test) the implementation of the circuit training program. The results are presented in Table 1.

Table 1.
Pre-Test and Post-Test Results of Basketball Dribbling Ability

No	Player	Pre-Test (s)	Post-Test (s)	Improvement (s)
1	FL	30.96	28.22	2.74
2	HK	34.93	31.98	2.95
3	RI	32.64	30.13	2.51
4	GR	33.87	30.32	3.55
5	IM	35.55	33.33	2.22
6	CC	41.56	39.79	1.77
7	AL	38.58	36.44	2.14
8	FR	32.41	30.35	2.06
9	PN	35.90	33.85	2.05
10	GN	38.45	36.63	1.82
11	SA	41.40	39.89	1.51
12	BN	38.65	36.23	2.42
13	SA	30.80	29.34	1.46
14	IN	28.20	29.76	-1.56
15	LF	30.40	29.12	1.28
Mean		34.95	33.03	1.92

Table 1 shows that the average dribbling time decreased from 34.95 seconds in the pre-test to 33.03 seconds in the post-test. This indicates an average improvement of 1.92 seconds after the implementation of the circuit training program.

In the pre-test, the fastest dribbling time was recorded by participant IN with 28.20 seconds, while the slowest time was recorded by participant CC with 41.56 seconds. After the training intervention, the fastest dribbling time was achieved by participant FL with 28.22 seconds, whereas the slowest time was recorded by participant SA with 39.89 seconds.

The overall reduction in dribbling time demonstrates that most participants experienced performance improvements following the circuit training program.

Normality Test

Before conducting hypothesis testing, a normality test was performed using the Kolmogorov-Smirnov test to determine whether the data were normally distributed. The

criterion used was that a significance value greater than 0.05 indicates normal distribution.

Table 2.
Results of the Normality Test

Variable	Sig. Value	Interpretation
Pre-Test	> 0.05	Normally Distributed
Post-Test	> 0.05	Normally Distributed

Based on the results presented in Table 2, both pre-test and post-test data obtained significance values greater than 0.05. Therefore, the data met the assumption of normality and were suitable for further analysis using a parametric statistical test, namely the paired-samples t-test.

Hypothesis Testing

To determine whether circuit training had a significant effect on basketball dribbling ability, a paired-samples t-test was conducted. The results are presented in Table 3.

Table 3.
Paired-Samples t-Test Results

Variable	t-value	t-table	Sig. (2-tailed)
Pre-Test vs Post-Test	-3.508	1.761	0.000

The results of the paired-samples t-test showed a calculated t-value of -3.508. Ignoring the negative sign, the absolute value of t (3.508) was greater than the critical t-table value (1.761). Furthermore, the significance value obtained was 0.000, which is lower than the alpha level of 0.05.

These findings indicate that the null hypothesis (H_0) was rejected and the alternative hypothesis (H_1) was accepted. Therefore, it can be concluded that circuit training had a significant effect on improving the dribbling ability of basketball players at the PERBASI Club of Pasangkayu Regency.

Graph of Mean Pre-Test and Post-Test Scores

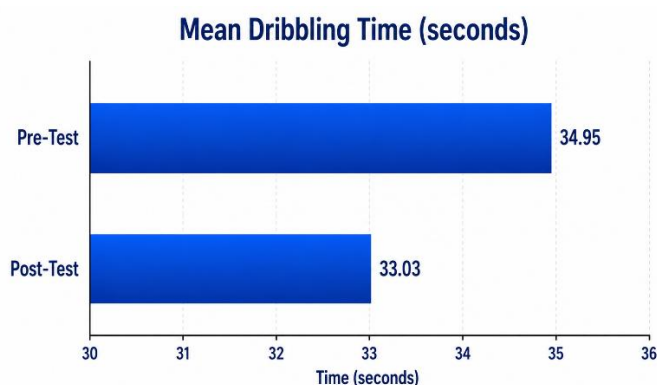


Figure 1.
Mean Dribbling Time Before and After Circuit Training

The graph illustrates a decrease in average dribbling time from 34.95 seconds to 33.03 seconds. Since lower dribbling times indicate better performance, the reduction

confirms that the circuit training program effectively enhanced the players' dribbling skills. The descriptive analysis revealed an improvement in dribbling performance after the implementation of circuit training. The mean dribbling time decreased by 1.92 seconds, indicating enhanced speed and ball control. Statistical analysis using the paired-samples t-test confirmed that the improvement was significant ($t = -3.508$; $p = 0.000 < 0.05$). Therefore, circuit training can be considered an effective training method for improving basketball dribbling performance among players of the PERBASI Club, Pasangkayu

Discussion

The findings of this study demonstrated that circuit training exercises significantly improved the dribbling ability of basketball players at the PERBASI Club of Pasangkayu Regency. The descriptive analysis showed that the average dribbling time decreased from 34.95 seconds during the pre-test to 33.03 seconds in the post-test, indicating an improvement of 1.92 seconds. Furthermore, the paired-samples t-test revealed a calculated t-value of -3.508 , which exceeded the critical t-table value of 1.761 at a significance level of 0.05. The significance value obtained ($p = 0.000$) was lower than 0.05, confirming that the improvement was statistically significant. Therefore, the results support the acceptance of the alternative hypothesis, indicating that circuit training exercises have a significant positive effect on basketball dribbling performance.

These findings are consistent with contemporary training theory, which emphasizes that technical performance in basketball is highly dependent on the integration of physical fitness components, neuromuscular coordination, and sport-specific motor skills. Dribbling is a complex motor skill requiring the synchronization of hand-eye coordination, agility, balance, reaction speed, and muscular endurance. Previous studies have reported that improvements in these physical components contribute directly to enhanced ball control and dribbling efficiency during basketball performance (Ramirez-Campillo et al., 2020; Mancha-Triguero et al., 2021; Cuzzolin et al., 2023).

Circuit training is widely recognized as an effective training method because it simultaneously develops several biomotor abilities within a single training session. According to recent studies, circuit-based exercise improves cardiovascular endurance, muscular strength, agility, coordination, and movement efficiency through repeated exposure to varied movement patterns (Slimani et al., 2019; Chaouachi et al., 2020). The significant improvement observed in this study may be explained by the ability of circuit training to provide multidimensional physiological adaptations that support basketball-specific movements. From a physiological perspective, circuit training enhances neuromuscular efficiency by increasing motor unit recruitment and improving intermuscular coordination. These adaptations enable athletes to produce faster and more controlled movements during dribbling activities (Behm et al., 2021). Repeated exposure to dynamic movement patterns also improves proprioceptive awareness, allowing players to maintain ball control while moving at higher speeds or changing directions rapidly. Similar findings have been reported in studies involving youth and collegiate basketball athletes,

where circuit-based interventions significantly improved agility, coordination, and technical basketball skills (Asadi et al., 2022; Santos et al., 2021).

The reduction in dribbling time found in this study can also be attributed to improvements in agility. Agility is one of the most important determinants of successful dribbling performance because players must frequently change direction while maintaining control of the ball. Research conducted by Clemente et al. (2021) demonstrated that multidirectional training programs significantly improve change-of-direction speed and basketball-specific movement performance. Since circuit training includes rapid transitions between stations and various movement tasks, athletes are repeatedly exposed to situations requiring acceleration, deceleration, and directional changes. These adaptations likely contributed to the enhanced dribbling performance observed among the participants.

Another important factor explaining the effectiveness of circuit training is the improvement of coordination between the upper and lower extremities. Effective dribbling requires synchronized movements between the hands controlling the ball and the feet generating locomotion. According to motor learning theory, repeated practice involving coordinated movement patterns strengthens neural pathways and enhances movement automaticity (Schmidt et al., 2019). The six-station circuit training program used in this study provided athletes with repeated opportunities to perform coordinated movements, thereby improving the efficiency of their dribbling technique.

The findings also support the principle of specificity in sports training. The exercises included in the circuit stations were designed to reflect the physical and motor demands of basketball performance. Training activities emphasizing speed, balance, coordination, and muscular endurance closely resemble the movement characteristics required during dribbling situations in competitive basketball. Bompa and Buzzichelli (2019) emphasized that training programs are most effective when exercise stimuli closely match the physiological and biomechanical requirements of the target sport. Consequently, the positive adaptations observed in this study are likely the result of sport-specific training stimuli embedded within the circuit training program.

In terms of muscular performance, dribbling requires adequate strength and endurance of the upper limbs, particularly the forearm, wrist, and shoulder muscles, as well as lower-limb muscles responsible for locomotion and balance. Circuit training has been shown to increase muscular endurance by exposing athletes to repeated bouts of exercise with limited recovery periods (Mujika et al., 2020). Improved muscular endurance enables players to maintain dribbling quality throughout training sessions and competitive games without experiencing significant declines in performance due to fatigue. Previous investigations involving basketball athletes have similarly reported significant improvements in technical skills following strength-endurance-based training programs (Nikolaidis et al., 2021; Scanlan et al., 2022).

The results of this study further confirm the importance of integrated physical conditioning in basketball development programs. Modern basketball requires athletes to perform high-intensity intermittent activities while simultaneously executing

technical skills under pressure. Studies published in leading sports science journals indicate that physical conditioning programs incorporating agility, coordination, and strength training produce superior improvements in basketball performance compared with isolated technical training alone (Stojanović et al., 2018; Ferioli et al., 2020). Therefore, the significant improvement in dribbling ability observed in this study reflects the effectiveness of combining physical and technical development through circuit training.

Another explanation for the positive results can be viewed through the lens of motor learning and skill acquisition. Repetition is a fundamental principle in motor skill development. The repeated execution of movement tasks within circuit training promotes neural adaptation and movement refinement. According to contemporary motor learning research, repeated exposure to varied yet structured movement experiences enhances skill retention and transferability to actual game situations (Davids et al., 2021). Consequently, the players in this study likely developed greater confidence and efficiency in controlling the basketball while dribbling.

The effectiveness of circuit training observed in this study also reflects adherence to fundamental training principles. The program incorporated continuity, progressive overload, individualization, variation, warm-up, and cool-down components. According to Issurin (2021), training adaptations occur most effectively when exercise stimuli are applied consistently and progressively over time. The gradual increase in training demands likely stimulated physiological and neuromuscular adaptations without causing excessive fatigue or overtraining. Exercise variation further contributed to maintaining athlete motivation and engagement throughout the intervention period, which is an important factor in achieving optimal training outcomes.

Empirical evidence from Indonesian studies indexed in SINTA also supports the present findings. Several investigations involving basketball, futsal, and volleyball athletes have reported significant improvements in agility, coordination, and technical performance following circuit training interventions (Kusuma et al., 2020; Syahrudin et al., 2021; Hakim et al., 2022; Saleh et al., 2023). These studies consistently conclude that circuit training provides comprehensive physical conditioning benefits that translate into improved sport-specific skills. The current findings therefore reinforce both national and international evidence regarding the effectiveness of circuit training as a practical and efficient training method.

Despite the positive outcomes, it should be noted that one participant exhibited a slight decline in performance during the post-test. This may have been influenced by temporary fatigue, motivation fluctuations, or individual physiological responses to training. Similar individual variations have been reported in sports performance studies and are considered normal within training interventions (McGuigan, 2021). Nevertheless, the overall trend clearly demonstrated significant improvement across the majority of participants.

Overall, the findings indicate that circuit training is an effective strategy for improving basketball dribbling ability. Through enhancements in agility, coordination,

muscular endurance, balance, and neuromuscular efficiency, athletes become better equipped to perform dribbling movements with greater speed and control. The significant reduction in average dribbling time from 34.95 seconds to 33.03 seconds provides strong empirical evidence that circuit training can be incorporated into basketball coaching programs to optimize technical performance and overall athletic development.

CONCLUSION

Based on the results of the analysis and discussion of the research results, the following conclusions can be drawn: the results and discussion of this study indicate that the calculated t is greater than the t table with the difference between the calculated t and the t table = 1.761 greater than the 5% significance level. The calculated t value is -3.508 while the t table at the 5% significance level $dp(N-1) = 15-1 = 14$ is 1.761. So H_0 in this study is rejected and H_a is accepted, which means that circuit training can have a significant effect on improving dribble in basketball at the Pasangkayu Regency Perbasi Club. Therefore, circuit training can be applied as one of the training programs to improve dribble in basketball.

ACKNOWLEDGMENTS

The author expresses gratitude to Allah SWT for the blessing of good health so that the author can complete this paper well. The author would like to thank the coaches/administrators of the Pasangkayu Regency Indonesian Badminton Association (PERBASI) who have assisted the researcher in collecting data. The author offers infinite gratitude to his beloved parents, who never stop praying, giving affection, and being the biggest reason for the author to continue to persevere and complete each process until the end. Thank you also to the journal reviewers so that this article can be published.

REFERENCES

- Agape, J. A. P., Hariadi, I., & Widiawati, P. (2021). Pengembangan modul bola basket berbasis komik untuk siswa ekstrakurikuler bola basket sekolah dasar. *Sport Science and Health*, 3(11), 863-871.
- Arede, J., Esteves, P., Ferreira, A. P., & Sampaio, J. (2023). Physical conditioning and technical performance in youth basketball players. *Sports*, 11(4), 67. <https://doi.org/10.3390/sports11040067>
- Asadi, A., Ramirez-Campillo, R., Arazi, H., & Sáez de Villarreal, E. (2022). The effects of plyometric training on physical performance in basketball players: A systematic review. *Journal of Sports Science & Medicine*, 21(2), 315-327. <https://www.jssm.org>
- Behm, D. G., Young, J. D., Whitten, J. H. D., Reid, J. C., Quigley, P. J., Low, J., Li, Y., Lima, P. O., Hodgson, D. D., & Chaouachi, A. (2021). Effectiveness of traditional strength vs. power training on muscle strength, power, and sports performance. *Sports Medicine*, 51(3), 535-555. <https://doi.org/10.1007/s40279-020-01330-3>

- Bompa, T. O., & Buzzichelli, C. (2019). *Periodization: Theory and methodology of training* (6th ed.). Human Kinetics. <https://us.humankinetics.com>
- Cahyadi, P., Susianti, E., & Kurniawan, F. (2022). Optimalisasi keterampilan bola basket siswa dalam proses pembelajaran pendidikan jasmani. *Jurnal Pendidikan dan Konseling*, 4(4), 4079–4089.
- Cao, S., Wang, Z., Guo, J., Geok, S. K., Sun, H., & Liu, J. (2024). The effects of plyometric training on physical fitness and skill-related performance in female basketball players: A systematic review and meta-analysis. *Frontiers in Physiology*, 15, 1386788. <https://doi.org/10.3389/fphys.2024.1386788>
- Carvalho, H. M., Coelho-e-Silva, M. J., Figueiredo, A. J., & Malina, R. M. (2022). Physical performance and motor competence in youth athletes. *European Journal of Sport Science*, 22(8), 1231–1240. <https://doi.org/10.1080/17461391.2021.1923814>
- Chaouachi, A., Granacher, U., Makhlof, I., Hammami, R., Behm, D. G., & Chtara, M. (2020). Within session sequence of balance and plyometric exercises does not affect training adaptations with youth soccer athletes. *Journal of Sports Science & Medicine*, 19(1), 114–122. <https://www.jssm.org>
- Clemente, F. M., Silva, A. F., Castillo, D., Los Arcos, A., Mendes, B., & Afonso, J. (2021). Weekly load variations of distance-based variables in professional soccer players: A systematic review. *Biology of Sport*, 38(2), 227–238. <https://doi.org/10.5114/biolSport.2021.99781>
- Cuzzolin, F., Ferioli, D., Rucco, D., Rampinini, E., & Tessitore, A. (2023). Technical and physical determinants of basketball performance: A systematic review. *Biology of Sport*, 40(2), 405–418. <https://doi.org/10.5114/biolSport.2023.118203>
- Davids, K., Renshaw, I., Araújo, D., & Pinder, R. (2021). *Ecological dynamics and skill acquisition in sport*. Routledge. <https://www.routledge.com>
- Dermawansyah, D. (2023). Model pengembangan permainan bola basket dengan menggunakan pola konsep circuit training ball di SMPN 1 Rejang Lebong. *Jurnal Pendidikan Guru*, 4(3).
- Firmansyah, M. A., Wahyudi, U., Yudasmar, D. S., & Januarta, O. B. (2022). Tingkat kondisi fisik tim bola basket PORPROV putra Kota Malang tahun 2022. *Sport Science and Health*, 4(12), 1099–1110. <https://doi.org/10.17977/um062v4i122022p1099-1110>
- Ferioli, D., Bosio, A., Bilsborough, J. C., Torre, A. L., & Rampinini, E. (2020). The preparation period in basketball: Training load and physiological adaptations. *International Journal of Sports Physiology and Performance*, 15(6), 862–868. <https://doi.org/10.1123/ijsp.2019-0404>
- García-Pinillos, F., Soto-Hermoso, V. M., & Latorre-Román, P. Á. (2021). How does high-intensity interval training affect physical fitness in youth athletes? *PeerJ*, 9, e11433. <https://doi.org/10.7717/peerj.11433>
- Granacher, U., Lesinski, M., Büsch, D., Muehlbauer, T., Prieske, O., Puta, C., & Gollhofer, A. (2021). Effects of resistance training in youth athletes on muscular fitness and athletic performance. *Frontiers in Physiology*, 12, 681483. <https://doi.org/10.3389/fphys.2021.681483>

- Hakim, H., Syahrudin, S., & Saleh, M. S. (2022). The effectiveness of circuit training on improving physical fitness and motor ability in student athletes. *Jurnal Keolahragaan*, 10(2), 155–166. <https://journal.uny.ac.id/index.php/jolahraga>
- Hammami, M., Gaamouri, N., Aloui, G., Shephard, R. J., Chelly, M. S., & Knechtel, B. (2020). Effects of combined physical and technical training on athletic performance in youth athletes. *Biology of Sport*, 37(2), 175–183. <https://doi.org/10.5114/biolsport.2020.93042>
- Hanief, Y. N., Subekti, T. B. A., & Mashuri, H. (2018). Meningkatkan hasil belajar passing bawah bolavoli melalui permainan 3 on 3 pada siswa sekolah dasar. *Jurnal Pendidikan Jasmani*. <https://doi.org/10.17509/jpjo.v3i2.12414>
- Issurin, V. (2021). Building the modern athlete: Scientific advancements and training innovations. *Ultimate Athlete Concepts*. <https://www.ultimatetrainingconcepts.com>
- Kusuma, I. J., Kurniawan, F., & Pratama, A. R. (2020). Pengaruh latihan circuit training terhadap kelincahan dan koordinasi atlet bola basket. *Jurnal SPORTIF*, 6(2), 445–457. https://doi.org/10.29407/js_unpgri.v6i2.14690
- Kusuma, L. S. W. (2017). Pengaruh latihan circuit training terhadap peningkatan VO₂ max pemain sepak bola Ekacita FC. 4(September), 2–5.
- Mancha-Triguero, D., García-Rubio, J., Gamonales, J. M., & Ibáñez, S. J. (2021). Strength training and basketball performance: Current evidence and practical applications. *Sustainability*, 13(9), 5218. <https://doi.org/10.3390/su13095218>
- McGuigan, M. (2021). Monitoring training and performance in athletes. *Human Kinetics*. <https://us.humankinetics.com>
- Moran, J., Sandercock, G., Ramírez-Campillo, R., Clark, C. C. T., Fernandes, J. F. T., & Drury, B. (2020). Effects of change-of-direction training on physical performance: A systematic review. *Sports Medicine*, 50(3), 613–632. <https://doi.org/10.1007/s40279-019-01232-9>
- Mujika, I., Halson, S., Burke, L. M., Balagué, G., & Farrow, D. (2020). An integrated, multifactorial approach to periodization for optimal performance in individual and team sports. *International Journal of Sports Physiology and Performance*, 15(4), 457–472. <https://doi.org/10.1123/ijsp.2019-0609>
- Mustoip, S. (2018). Implementasi pendidikan karakter. Sofyan Mustoip Muhammad Japar Zulela Ms.
- Nikolaidis, P. T., Knechtel, B., & Clemente, F. M. (2021). Physical fitness and basketball performance in competitive athletes. *Frontiers in Sports and Active Living*, 3, 635190. <https://doi.org/10.3389/fspor.2021.635190>
- Nugraha, P. D., & Pratama, E. B. (2019). Survei pembinaan prestasi atlet bola basket kelompok umur di bawah 16 dan 18 tahun. *Journal Sport Area*, 4(1), 240–248.
- Nurhasana. (2010). Teknik pengumpulan data. Jakarta: Direktorat Jenderal Olahraga.
- Pascal, M., & Amra, F. (2022). Tinjauan kondisi fisik pemain bolabasket SMA Pembangunan Laboratorium UNP. 5(8), 88–94.
- Pranata, D. (2022). Pengaruh olahraga dan model latihan fisik terhadap kebugaran jasmani remaja. *Jurnal Kesehatan Olahraga*, 10, 107–116.

- Putri, S. S. (2023). Implementasi program fisik bola basket putri Universitas Ciputra Surabaya. *Indonesia Strength Conditioning and Coaching Journal*, 1(2), 13–22. <https://ejournal.unesa.ac.id/index.php/isco/article/view/55228>
- Ramírez-Campillo, R., Alvarez, C., García-Hermoso, A., Ramírez-Vélez, R., Gentil, P., Asadi, A., & Izquierdo, M. (2020). Methodological characteristics and future directions for plyometric jump training research. *Sports Medicine*, 50(6), 1057–1081. <https://doi.org/10.1007/s40279-020-01236-0>
- Saleh, M. S., Hakim, H., & Syahrudin, S. (2023). Circuit training and sport-specific skill development among university athletes. *Jurnal Pendidikan Jasmani Indonesia*, 19(1), 35–45. <https://journal.uny.ac.id/index.php/jpji>
- Santos, E. J. A. M., Janeira, M. A. A. S., & Sampaio, J. E. (2021). Physical fitness attributes and basketball skill performance in adolescent athletes. *European Journal of Sport Science*, 21(5), 675–684. <https://doi.org/10.1080/17461391.2020.1771377>
- Scanlan, A. T., Fox, J. L., Borges, N. R., Tucker, P. S., & Dalbo, V. J. (2022). The relationship between training load and basketball performance outcomes. *Sports Biomechanics*, 21(4), 489–503. <https://doi.org/10.1080/14763141.2020.1779367>
- Schmidt, R. A., Lee, T. D., Winstein, C. J., Wulf, G., & Zelaznik, H. N. (2019). *Motor learning and performance: From principles to application* (6th ed.). Human Kinetics. <https://us.humankinetics.com>
- Slimani, M., Paravlic, A., Mbarek, F., Bragazzi, N. L., & Tod, D. (2019). The relationship between physical fitness and sport-specific technical skills in athletes. *Journal of Human Kinetics*, 69(1), 179–190. <https://doi.org/10.2478/hukin-2019-0018>
- Stojanović, E., Stojiljković, N., Scanlan, A. T., Dalbo, V. J., Berkelmans, D. M., & Milanović, Z. (2018). The activity demands and physiological responses encountered during basketball match-play: A systematic review. *Sports Medicine*, 48(1), 111–135. <https://doi.org/10.1007/s40279-017-0794-z>
- Sulistyo, Y. W. (2016). Pengaruh latihan plyometric front cone hops dan plyometric lateral cone hops terhadap peningkatan daya ledak otot tungkai dan kelincahan. *Bravo's: Jurnal Program Studi Pendidikan Jasmani dan Kesehatan*, 4(3).
- Syahrudin, S., Hakim, H., & Sahabuddin, S. (2021). The impact of circuit training on agility and technical performance among basketball athletes. *Jurnal SPORTIF*, 7(3), 512–525. https://doi.org/10.29407/js_unpgri.v7i3.16124
- Taylor, J. B., Wright, A. A., Dischiavi, S. L., Townsend, M. A., & Marmon, A. R. (2022). Activity demands during competitive basketball play and training implications. *Journal of Sports Sciences*, 40(7), 812–821. <https://doi.org/10.1080/02640414.2021.2015914>
- Wanena, T. (2018). Kontribusi power otot tungkai, kekuatan otot lengan, dan koordinasi mata tangan dengan kemampuan jump shot bolabasket pada mahasiswa FIK Uncen tahun 2017. *Journal Power of Sports*. <https://doi.org/10.25273/jpos.v1i2.2250>