The Effect of Training Methods and Hand Eye Coordination on the Accuracy of Backhand Drive in Table Tennis Athletes

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Info Artikel

Abstract

This study aimed to analyse the effect of the two-way and random feed drill training method on the accuracy of the backhand drive of PTM barokah Jaya Purwokerto, table tennis athletes. This study used an experimental method with a 2x2 factorial design and data analysis techniques using analysis of variance (ANOVA) at the significance level (α: 0.05). The population in this study were PTM Barokah Jaya Purwokerto table tennis athletes, totalling 28 people. The results of this study: There are differences in the effect of the random feed and two-way drill training methods on the backhand drive. Two-way bait drill exercise is better than unexpected bait drill on the accuracy of backhand drive PTM Barokah Jaya Purwokerto table tennis athletes. There are differences in the effect of high and low hand-eye coordination on the accuracy of the backhand drive. Athletes with high hand-eye coordination are better than athletes with low hand-eye coordination against PTM Barokah Jaya Purwokerto table tennis athletes. There was no interaction between training methods and hand-eye coordination on the accuracy of backhand drives in PTM Barokah Jaya Purwokerto athletes. The conclusions of this study are 1). The two-way feed drill training method is better than the random feed drill. 2). Players with high hand-eye coordination are better than those with low hand-eye coordination. 3). there was no interaction between training methods and eye-hand coordination on the accuracy of the backhand drive of PTM Barokah Jaya Purwokerto table tennis athletes.

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INTRODUCTION

Table tennis is one of the most popular sports among elements of society, especially in schools and colleges. One proof of the popularity of table tennis is that there are competitions in various regions, as stated by

Pratama & Budiman (2017). This proves that table tennis has been known to the public. This game is viral because it is easily played at home with relatively cheap and simple equipment that does not require a large room. Families can play table tennis and even provide game exercises at all age levels, including those with special needs (Salim, 2008). Table tennis matches have been held for a long time, starting at the village and regional levels, namely the Regional Championships (Kejurda) or the Championship Province (Kejurprov). Table tennis is also competed at the National level, namely the National Sports Week (PON). At the international level, table tennis competes at the Sea Games, Asian Games, Olympics and Championships worldwide.

Table tennis spread quickly in various regions because this sport knows no age, so children to adults to the elderly usually play it. The opinion (Agus Pujianto., 2015) is that some people who play table tennis are not a few who have the ambition to become an athlete. That they practice techniques to win a match in a tournament or achieve sporting achievements, it is a business that can be calculated carefully through development early childhood or early childhood, mastery of technical skills, tactics and strategies, and various approaches. Table tennis is a sport that can be played as a team or individually with games and fastball movements so that it can improve motor development and burn calories contained in the body (Carrasco et al., 2010). On the other hand, motor skills and sports per

formation require a combination of perception and action, or in other words, coordination of vision and movement (Sports et al., 2022)

Some basic table tennis techniques start from drives, blocks, loops, and lobs that produce topspin balls and push shots and chops that produce backspin shots (Pradas et al., 2021). Among them are other basic techniques, from serves, smashes and flips. Some of these basic techniques function in each attack or defensive situation (Ghoneim & Salem, 2010). There are several drill methods in practising table tennis to perform technical exercises.

The drilling method is a method in which a person performs continuous or repetitive movements according to opinion (Rahyubi, 2012), resulting in automatic movements. The advantage of this method is that it is easy to correct wrong movements. Table tennis has two drills: the constant feed drill method and variable bait. Both of these methods can be applied during Training. The bait drill method changes. That is, an athlete is ready to receive the ball where the movement of the ball is not constant in one direction but in two directions, one right and one left or vice versa (Edward, 2011). With a changing bait, an athlete must master or be able to do it in terms of accuracy so that in Training, using different movements, the exercise will vary without causing even according to the circumstances in which the athlete is competing. With the changing bait drill method, it is expected that athletes can master all aspects that have been trained because

players must be ready to face challenges that arise during the game and to adapt to any situation, regardless of the conditions (Mosoi, 2013).

With the changing bait drill method, it is expected that athletes can master all aspects that have been trained, both from individuals and achievements, so that ball training with two different directions can be applied in Training, with a well-structured, continuous training pattern it will have the impact that is expected. (Edward, 2011) "varied practice: A schedule in which the same skill is rehearsed in various ways".

It means an exercise in which the same skill is trained in various ways. In addition to the basic techniques, there are physical conditions in table tennis that affect biomotor performance. According to (Sajoto Mochamad, 1988), physical condition is a unified whole of inseparable components, both improvement and maintenance. The components of the physical condition include strength, speed, endurance, muscle explosive power, flexibility, balance, coordination, agility, accuracy, and reaction (Valdes-Badilla & Perez-Gutierrez, 2018). These components should have their respective roles for each sport, just like table tennis also requires elements of physical condition (Rachman et al., 2017)

Meanwhile, (Mahendra et al., 2014) explained that physical condition factors significantly influence table tennis performance: 1. wrist flexibility, 2. reaction time. 3. Hip flexibility, 4. Agility, 5. Hand-eye coordination, and 6. Arm muscle power. Table tennis achievements cannot be achieved speculatively, but must go through intensive Training with the correct training program (Santosa, 2016). Based on the overall components described above, they do not have to depend on them both physically and technically. A person who wants to practice table tennis must be nurtured early. The game of table tennis requires a fast rhythm to welcome and return the ball, so players must have a good level of coordination and speed.

Coordination here is more specific, namely eye and hand coordination. This is because to be able to hit the ball well, players must, of course, be able to see the direction the ball is coming from and then determine the distance to swing the bet and hit it back to the opponent's table towards areas that are difficult to reach. This is reinforced by the statement (Mahendra et al., 2014) that in the game of table tennis, eye and hand coordination has a significant role because when hitting the ball, the first thing to do is that the player anticipates the ball, sees the opponent's movement, reads the direction the ball is coming from, then determines the proper distance to hit the ball. Swing bets. Through good coordination, someone will efficiently perform high-level technical skills (Subagja et al., 2019). Eye and hand coordination will help make decisions so that it helps in the game and has no difficulty in hitting and returning the ball precisely from the opponent (Pritama et al., 2014)

Accuracy is where a person makes body movements to direct something according to the intended target. Slambang et al. (Palmizal, 2011) suggest that accuracy is a person's ability to control voluntary movements for purposes such as shooting a basketball, kicking the ball towards the goal, archery, golf, and others. An athlete must master accuracy so that he can make the right drive and get points in a match (Sudrajat et al., 2019)

A backhand drive is a stroke made by moving the bat to the left of the elbow for right-handed players and vice versa for left-handed players. (Larry Hodges, 2007). The backhand can be used to overcome the backspin, but usually, this shot is better against

the top round (Florendo, F and Bercades, 2007). Usually, the backhand is not as strong as the forehand (although it can be as strong forehand), but consistency and speed are usually more critical (Bańkosz & Winiarski, 2020). Table tennis achievements can be optimized as early as possible by applying basic techniques to athletes.

Based on the results of observations made by researchers in inter-club matches in Banyumas Regency. The problems that arose in the participants or athletes from PTM Barokah Jaya Purwokerto who took part in the match were three athletes where accuracy was still low, especially problems with backhand drive.

Table 1 Preliminary observation data and backhand drive accuracy test

No	Initial	Set	Number of Strokes	Score	Value
		B	B	B	
1	Pa	2	26	50	Less
2	Ul	3	25	55	Less
3	Ra	2	24	51	Less

(Azwar, 2016)

The three athletes consisted of 1. Pradipta Aliya Khairunnisa, in 1 set, hit the backhand drive 2 points on the target. 2. Ulil Al Amri in 1 set, three backhand drives right on target. 3. Rashid Rahadya Wijaya in 1 set, two backhand drives on target. The other points were off the table and also hit the net, so the researchers conducted a backhand drive accuracy test on the PTM members resulting in a value of $50 < X \leq 62$ (less) based on the

norm reference scoring formula. This is reinforced by the results of interviews with the table tennis trainer at PTM Barokah Jaya "Helmi Ramadhan". The PTM trainer said that so far, the dominant use of constant drills in the training process, namely, athletes standing does not move to the right or left, has not carried out eye and hand coordination tests and programs ineffective exercise. So it is necessary to study things that can improve

these abilities, considering how crucial good agility is in playing table tennis.

This study aimed to analyze the effect of two-way and random feed drill training methods on the accuracy of the backhand drive of PTM barakah Jaya Purwokerto table tennis athletes. Analyze the differences in the effect of high and low hand-eye coordination on the accuracy of the backhand drive at PTM Barokah Jaya Purwokerto. I was analyzing the influence of training methods and hand-eye coordination on the accuracy of the backhand drive at PTM Barokah Jaya Purwokerto.

METHODS

This study used a 2x2 factorial design that aims to compare the initial test (*pretest*) and the final test (*posttest*) using the 2-lane

ANOVA method. Factorial experiments are experiments where all levels are almost or combined and crossed with the levels of each factorial in the experiment (Hastjarjo, 2019; Ramadan & Juniarti, 2020).

This study's treatment uses the two-way and random feed drill training method). The level of each treatment in this study was the level of high and low eye-hand coordination possessed by athletes. The factorial experiment in this study paid attention to the possibility of an interaction between the three variables, namely training methods, hand-eye coordination, and table tennis accuracy. Furthermore, the research design that researchers will carry out is described in more detail in the following table.

Table 2 Research Design Framework

Exercise Methods (A)	Hand Eye Coordination	
	Tall (B_1)	Tall (B_2)
Two-way drill (A_1)	A_1B_1	A_1B_2
Random Drill (A_2)	A_2B_1	A_2B_2

The table above states that this study will be given treatment in Training through two groups of two-way bait drill training methods and random bait drills, which will be interacted with training methods on the accuracy of backhand drive table tennis athletes at PTM Barokah Jaya Purwokerto. The implementation of this research was carried out in the PTM Barokah Jaya building, Jl. Telephone gang one no 30 RT 05 RW 4

Kranji Village, Purwokerto Timur, Banyumas Regency for four weeks with a training frequency of 3 times a week, namely on Tuesdays, Thursdays and Saturdays at 16.00 to 18.00 WIB.

In this study, the population in this study were 28 Barokah Jaya PTM athletes. According to Suharsimi Arikunto (2017: 174), "The sample is part or representative of the population to be studied". The sampling

technique used in this study was a purposive random sampling technique consisting of 14 male athletes and six female athletes.

Based on ranking or according to the needs required in this study, namely with the consideration that the researcher has sample provisions by providing criteria including 1) willing to be a respondent, under 18 years of age and active in Training, 2) Do a high hand-eye coordination test and low. That is by ranking hand-eye coordination from the highest to the lowest 3) Using the 27% upper limit and 27% lower limit Active in following the exercise,

The entire population of 28 people will carry out a coordination test which aims to determine high and low coordination abilities based on ranking calculations. Eight tennis athletes with moderate speed are not included as a sample, namely samples with a ranking of 13-20 based on coordination measurements. Then each high and low coordination group is divided into two equal groups using ordinal pairing (A-B-B-A), namely group A, each consisting of 10 people. consists of 5 athletes who have high coordination and five athletes who have low coordination, then group B namely, five athletes with high coordination and five with low coordination.

Table. 3. Classification of K Abilityto coordinate

Total	Classification	Information
10	High Coordination	Used
10	Low Coordination	Used

The independent variables in this study are the two-way bait drill training method and random bait). Attribute independent variables (which are controlled), namely high and low coordination. The dependent variable in this research is the accuracy of the backhand drive. Data collection techniques were conducted with tests and measurements to obtain objective data. The characteristic of the measurement results is stated in a quantitative score that can be processed statistically. The role of instruments in research will determine the quality of the data obtained. Therefore the

determination of the research instrument should be adjusted to the problem and research objectives, and therefore, the instrument must be valid or calibrated.

The instruments used in this study were the accuracy of the forehand and backhand drives (Tomoliyus, 2014). This instrument has high validity (CVR=0.96) and a reliability of 0.96 for junior athletes (13-18 years). For backhand drives, Validity: Content Validity /CVR = 0.90 Reliability: 0.944 juniors and 0.934 beginners. Measured by doing a rally forehand drive and backhand drive, the bait

changed for 30 seconds. The data analysis technique used was the analysis of variance (ANOVA) 2x2 factorial design at a (significance level) = 0.05. If the obtained F value (Fo) is significant, the analysis is continued with the Hewmankeuls range test (Sudjana, 2002). To fulfil the assumptions in the Anava technique, a normality test (Kolmogrov-Smirnov test) and a Homogeneity Variance test (with Levene's test) were carried out (Sudjana, 2002, pp. 261-264). Test the hypothesis using the General Linear Model (GLM) - Two Way Anova analysis test with the help of the SPSS 25 program. The hypothesis is accepted if the Manova test value has significantly less than α (Sig < 0.05). Meanwhile, if the calculated significance value is more significant than α (Sig> 0.05), the hypothesis is rejected (Sugiyono, 2011).

FINDINGS AND DISCUSSION

Findings

1) There are differences in the effect of the random feed and two-way drill training methods on the backhand drive. A two-way bait drill exercise is better than a random bait drill on the accuracy of backhand drive PTM Barokah Jaya Purwokerto table tennis athletes. 2) There are differences in the effect of high and low hand-eye coordination on the accuracy of the backhand drive. Athletes with high hand-eye coordination are better than athletes with low hand-eye coordination against PTM Barokah Jaya Purwokerto, table tennis athletes. 3) There is no interaction between training methods and hand-eye coordination on the accuracy of backhand drives in PTM Barokah Jaya Purwokerto athletes.

Through SPSS statistical calculations, the first hypothesis can be described that the results of calculations on the training variable from the table data above obtained a sig value of 0.000 <0.05, this indicates that there is a difference in the accuracy of the backhand drive between the experimental group 1 and the experimental group 2 after being given adequate Training. Different, so Ho is accepted. With this, there are differences in the effect of the random and two-way feed drill training methods on the backhand drive. A two-way bait drill exercise is better than a random bait drill on the accuracy of backhand drive PTM Barokah Jaya Purwokerto table tennis athletes.

The second hypothesis can be explained that the hypothesis used in this study as follows: Ho: there is no effect of high and low eye-hand coordination on the accuracy of the backhand drive of PTM Barokah Jaya Purwokerto table tennis athletes. Ha: there are differences in the effect of high and low hand-eye coordination on the accuracy of the backhand drive of PTM Barokah Jaya Purwokerto table tennis athletes. The Sig = 0.010 <0.05 is obtained in the accuracy variable. This indicates a difference in the accuracy of the backhand drive between the respondents.

Table. 4. Test the Hypothesis using the General Linear Model

Tests of Between-Subjects Effects

Dependent Variable: backhand drive

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2932,000[a]	3	977,333	5,001	,012
Intercept	96327,200	1	96327,200	492,911	,000
metodelatihan	980,000	1	980,000	5,015	,040
koordinasi	1692,800	1	1692,800	8,662	,010
metodelatihan * koordinasi	259,200	1	259,200	1,326	,266
Error	3126,800	16	195,425		
Total	102386,000	20			
Corrected Total	6058,800	19			

a. R Squared = ,484 (Adjusted R Squared = ,387)

Who has high coordination with respondents who have low coordination, so Ho is accepted? The third hypothesis is from the table data above, that the results of the research from the data analysis that has been carried out can be seen that in the variables of two-way drills and random drills and coordination, the value of Sig = 0.266 <0.05 shows that there is no interaction between training methods and hand-eye coordination on the accuracy of backhand drive table tennis athletes at PTM Barokah Jaya Purwokerto.

Discussion

Based on the statistical analysis performed on the initial and final test for the accuracy of the backhand drive. In the following, a description of the data, analysis of requirements testing, hypothesis testing and discussion of the results of the research on the effect of the training method (two-way and random bait drill) are presented on the accuracy of the backhand drive of PTM Barokah Jaya Purwokerto table tennis athletes. This study divided the sample into high and low-eye-hand coordination groups. Both high and low-coordination groups will be researched by applying precision exercises. The high coordination group was divided into two groups, high group 1 will do a two-way bait drill, and high group 2 will do a random bait drill, likewise with the low coordination group. Low group 1 will do two-way bait drills, and low group 2 will do random bait drills. In the implementation process in the field for 14 meetings, it was found that the two-way bait drill exercise was better for increasing the accuracy of the backhand drive than the bait drill exercise. This can be stated and felt by the athletes because this two-way drill exercise is very competitive and efficient.

We must maintain concentration and footwork when moving quickly according to the mechanism of the exercise treatment.

This exercise is also included in the form of Training that is carried out, such as during a match, where the athlete moves without looking at the opponent's ball that will be directed. This is evident from the results of the ANOVA test with a Fount: of 6,975 with a significance value of 0.010 <0.05. The random feed drill training method is smaller than the two-way bait exercise in increasing backhand driveability. The two-way training method has an average increase in accuracy of 76.4, while the random training method has an average of 62.4. Researchers assume that in table tennis games, the eye-hand coordination is essential because having proper and good coordination will help the performance of hitting and placing the ball accurately. Good coordination skills and a few mistakes can make a game more enjoyable. "Coordination is a person's ability to integrate different movements into a single pattern effectively (Sajoto Mochamad, 1988). Everyone can perform movements or skills, from easy to complex, which are regulated and ordered by the central nervous system, which is already stored in memory. Coordination will be needed in almost every sport. The need for coordination in sports also trains the abilities of our motors to always move according to what is ordered (Haryanto & Amra, 2020). The main target of coordination exercises is to improve the ability to master ball motion, both balls that will be hit and those that come from all over the playing area (Alaswati, 2016).

The game of table tennis features many impressive moves. This is due to coordination abilities, one of which is the accuracy of placing the ball that athletes have. "If the ability to be precise in table tennis is scrutinized, it is supported by several elements of physical conditions and continuous Training. Coordination states a harmonious relationship between various factors that occur in a movement (Widy Astuty, Setya Rahayu, 2015). Therefore, coordination is always related to other motors, namely agility and dexterity Crespo and Milley and Bornemann et al., (Sukadiyanto, 2002). Regarding coordination indicators, it stated that the leading indicators of coordination are accuracy and economic movement. In table tennis, accuracy must be balanced with the technical support possessed by athletes to achieve achievements.

A player or athlete with good coordination, especially accuracy, is not only capable of perfect eye-hand coordination but also can easily and quickly make movements that are new to him. He can also change and move quickly, other movement patterns so that his movements become efficient. Training is a process of preparing physically and mentally systematically to achieve optimal quality performance by being given regular, directed, increasing training loads. (Samsudin, 2017). In addition, in the journal (Langga & Supriyadi, 2016), Training is the process of sports activities to improve the ability to move both

physically, technically, tactically, and mentally to support the success of athletes in obtaining maximum sports performance, which has been planned systematically and structured in the long run. Long time. Factors supporting physical elements and good Training will also spur athletes to win championships when competing. During the process carried out in the field, where players or athletes who have high and low coordination are given practice both with two-way bait drills and random bait drills, it gives satisfactory results, which can be seen from the progress resulting from the results of the tests given to at the end of this research. However, players with high coordination are better than players with low coordination before the treatment is carried out. So there is a significant difference in effect between high coordination and low coordination accuracy of table tennis backhand drive, as evidenced by the results of the ANOVA test with Fcount: 8.662 with a significance value of 0.004. With a significance level of 0.004 <0.05. Players or athletes PTM Barokah Jaya Purwokerto.

In this study, the athlete group using the two-way bait drill training method and high speed had an average training result of 89.20, and at low speed, they had an average training result of 63.60. Hence, the average difference in coordination ability results was 25. 6. Meanwhile, the athlete group with the random bait drill training method and high speed had an average training result of 68.00, while at low speed, the average training result was 56.80. So that the average difference in

coordination ability results is 11.2. The average difference between the two groups shows that the group of athletes with the two-way and high-speed drill training method has better coordination abilities than the children using the random and low-speed drill training method.

CONCLUSSION

This study concludes that there are differences in the effect of the random feed and two-way drill training methods on the backhand drive. A two-way bait drill exercise is better than a random bait drill on the accuracy of backhand drive PTM Barokah Jaya Purwokerto table tennis athletes. There are differences in the effect of high and low hand-eye coordination on the accuracy of the backhand drive. Athletes with high hand-eye coordination are better than athletes with low hand-eye coordination against PTM Barokah Jaya Purwokerto table tennis athletes. There was no interaction between training methods and hand-eye coordination on the accuracy of backhand drives in PTM Barokah Jaya Purwokerto athletes.

The researcher's suggestion from the research results for players needs to increase the accuracy of the backhand drive, considering the accuracy of the backhand drive is an essential component in supporting table tennis performance. Trainers should use bait changes and other training variations to improve the athlete's backhand drive accuracy. There needs to be additional complete

facilities and infrastructure to support Training to increase the quality of Training.

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REFERENCES

Alaswati, S. (2016). Journal of Physical Education and Sports. 5(2), 111–119.

Azwar, S. (2016). Norma Penilaian Forehand drive dan Backhand drive Tenis Meja. Pustaka Pelajar Offset.

Bańkosz, Z., & Winiarski, S. (2020). Kinematic parameters of topspin forehand in table tennis and their inter- and intra-individual variability. Journal of Sports Science and Medicine, 19(1), 138–148.

Carrasco, L., Pradas, F., Floría, P., Martínez, A., Herrero, R., Antonio, J., & Jurado, G. (2010). Grip Strength in Young Top-level Table Tennis Players. International Journal of Table Tennis Sciences, 6(6), 64–67.

Edward, W. . (2011). Motor learning and control: from theory to practice. Sacramento: California State University. California State University.

Florendo, F and Bercades, D. . (2007). The effectiveness of shadow practice in learning the standard forehand drive. April 2011, 105. http://www.ittf.com/ittf_science/SSCenter/Int_Journal6/table_tennis.pdf

Ghoneim, Y. K. M. S., & Salem, A. S. (2010). Analytical study for some offensive skills for advanced level junior players in the ITTF pro-tour Egypt 2008. International Journal of Table Tennis Sciences, 6(6), 83–93.

Haryanto, J., & Amra, F. (2020). The relationship of concentration and eye-hand coordination with an accuracy of backhand backspin serve in table tennis. International Journal of Technology, Innovation and Humanities, 1(1), 51–56. https://doi.org/10.29210/881701

Hastjarjo, T. D. (2019). Rancangan Eksperimen-Kuasi. Buletin Psikologi, 27(2), 187. https://doi.org/10.22146/buletinpsikologi.38619

Langga, Z. A., & Supriyadi. (2016). Pengaruh Model Latihan Menggunakan Metode Praktik Distribusi Terhadap Keterampilan Dribble Anggota Ekstrakurikuler Bolabasket SMPN 18 Malang. Jurnal Kepelatihan Olahraga, 1(1), 90–104.

Larry Hodges. (2007). Tenis Meja Tingkat Pemula. Raja Gravindo Persada.

Mahendra, I. R., Sugiyarto, S., & Kiyatno, K. (2014). FAKTOR KONDISI FISIK DOMINAN PENENTU PRESTASI BERMAIN TENIS MEJA (Analisis Faktor Fleksibilitas Pergelangan Tangan, Fleksibilitas Pinggul, Waktu Reaksi, Koordinasi Mata Tangan, Kelincahan , dan Power Otot Lengan Pada Mahasiswa Pembinaan Prestasi Tenis Mej. Indonesian Journal of Sports

Science, 1(1), 1–13.

Moso, A. A. (2013). Psychological and Motor-coordination Factors in Children Tennis Players. Procedia - Social and Behavioral Sciences, 78(February), pp. 220–224. https://doi.org/10.1016/j.sbspro.2013.04.283

Palmizal, A. (2011). Pengaruh Metode Latihan Global terhadap Akurasi Ground Stroke Forehand dalam Permainan Tenis. Media Ilmu Keolahragaan Indonesia, 1(2). https://doi.org/10.15294/miki.v1i2.2029

Pradas, F., Ara, I., Toro, V., & Courel-Ibáñez, J. (2021). Benefits of regular table tennis practice in body composition and physical fitness compared to physically active children aged 10–11 years. International Journal of Environmental Research and Public Health, 18(6), 1–11. https://doi.org/10.3390/ijerph18062854

Pratama, S. A., & Budiman, B. (2017). Hubungan Koordinasi Mata Tangan, Kekuatan Lengan dan Motivasi Berprestasi dengan Ketepatan Forehand dalam Tenis Meja. Jurnal Penelitian Dan Pengkajian Ilmu Pendidikan: E-Saintika, 1(1), 11. https://doi.org/10.36312/e-saintika.v1i1.2

Pritama, M. A. N., Sugiharto, & Rahayu, S. (2014). Pengaruh Metode Latihan Smash dan Koordinasi Mata Tangan dengan Menggunakan Umpan Langsung dan Tak Langsung Umpan pada Bulutangkis. Journal of Physical Education and Sports, 3(1), 46–50.

Pujianto, A. (2015). Profil Kondisi Fisik Dan Keterampilan Teknik Dasar Atlet Tenis Meja Usia Dini Di Kota Semarang. Journal of Physical Education Health and Sport, 2(1), 38–42. https://doi.org/10.15294/jpehs.v2i1.3941

Rachman, I., Sulaiman, & Rumini. (2017). Pengembangan Alat Pelontar Bola Tenis Meja (Robodrill IR-2016) Untuk Latihan Drill Teknik Pukulan Drive Dan Spin. Journal of Physical Education and Sports, 6(1), 50–56.

Rahyubi, H. (2012). Teori-teori belajar dan aplikasi pembelajaran motorik (Cet. 1). Referens.

Ramadan, Gilang & Juniarti, Y. (2020). Metode penelitian : pendekatan kuantitatif, kualitatif dan R & D. CV Sadari Press.

Sajoto Mochamad. (1988). Pembinaan Kondisi Fisik Dalam Olahraga (Depdikbud (ed.)). Dirjen Dikti.

Salim, A. (2008). Buku Pintar Tenis Meja. Penerbit Nuansa.

Samsudin. (2017). Pengaruh Latihan Kelincahan Terhadap Keterampilan Menggiring Bola Dalam Permainan Sepak Bola. Jurnal Pendidikan Olahraga, 7(1), 1–7.

Santosa, T. (2016). Pukulan forehand topspin masing- masing atlet. Kata Kunci: Pengembangan, Return Board , Top Spin , Tenis Meja 30. Jurnal Pedagogik Keolahragaan, 2, 30–48. https://doi.org/10.22245/jpor.v2i2.4513

Sports, A. J., June, M., Asar, S., Ezabadi, R. R., Baghini, A. S., & Maleksabet, N. (2022). The Relationship Between Reaction Time, Eye-Hand Coordination with Visual Field in Elite Tennis Tennis Players. 13(2). https://doi.org/10.5812/asjsm-115787.Research

Subagja, D. S., Kusmaedi, N., & Komarudin, K. (2019). The Effect of Learning Media and Coordination To Forehand Top Spin Accuration on Table Tennis. JUARA : Jurnal Olahraga, 4(2), 220. https://doi.org/10.33222/juara.v4i2.619

Sudrajat, A., Nasuka, & Awang Irawan, F. (2019). Development of ANS PONG as a Tool for Block Training and Smash in Table Tennis Games. Journal of Physical Education and Sports, 8(1), 19–25. https://journal.unnes.ac.id/sju/index.php/jpes/article/view/26164

Sukadiyanto. (2002). Pengantar Teori dan Metodologi Melatih Fisik. PKO FIK UNY.

Tomoliyus. (2014). Pengembangan instrumen kemampuan ketepatan fore hand, backhand drive dalam permainan tenis meja. 1–14. http://staffnew.uny.ac.id/upload/131121

717/penelitian/12.+Pengembangan+instrumen+Ketetapan+Forehand+dan+backhand+Drive+tenis+mejaNew+Microsoft+Office+Word+Document+_2_.pdf

Valdes-Badilla, P., & Perez-Gutierrez, M. (2018). Physical Conditioning for Combat Sports: Book review. Ido Movement for Culture, 18(1), 45–48. https://doi.org/10.14589/ido.18.1.7

Widy Astuty , Setya Rahayu, S. (2015). Pengaruh Metode Pembelajaran Dan Koordinasi Terhadap Hasil Belajar Bolavoli Siswa Smp 2 Mayong Jepara Tahun 2011/2012. Journal of Physical Education and Sports, 4(1, ISSN 2252-6412), 79–86.