The Influence of Mental Imagery on Mastering Basic Forehand Groundstroke Skills in Tennis

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ABSTRACT

One of the sports that requires a good combination of technique, physical and mental abilities is tennis. One of the basic techniques that must be mastered is Forehand Groundstroke. To see the effect of mental imagery on Basic Tennis Forehand Groundstroke Skills. Methods: This research uses a quantitative approach, with a quasi-experimental design and pretest-posttest control group design techniques. This technique compares an experimental group that uses mental imagery and a control group that does not use mental imagery. The implementation of the research started from a pretest which was carried out before the treatment was applied. Then 4 weeks of training were carried out with the experimental group using mental imagery and the control group only doing conventional forehand groundstroke training without additional mental imagery. The data obtained was analyzed using the t-test statistical test to see whether there were significant differences between the experimental group and the control group before and after treatment. Analysis is carried out with the help of statistical software such as SPSS. Basic Forehand Groundstroke Tennis Skills The group that received the mental imagery method was better than the control class. Based on the results of research that has carried out data processing and analysis, it can be concluded that Mental Imagery influences Mastery of Basic Forehand Groundstroke Skills in Field Tennis. This can be seen from the results of hit accuracy (towards a certain target); Hit strength (ball speed after being hit); The consistency of strokes (the number of strokes that managed to enter the opponent's playing area) was significantly different when compared to the group that did not use the mental imagery method. From the results of this research, mental imagery can be used as an alternative to train students taking tennis courses.

Keywords: mental imagery; Forehand Groundstroke; tennis

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INTRODUCTION

One of the sports studied by physical education students is tennis (Zoki & Saputra, 2018). Field tennis is a sport that requires a good combination of technique, physical and mental abilities (Ion-Muşat & Tupan, 2022; Liu, Wu, Xiao, Liu, & Song, 2024; Robin & Dominique, 2022; Zhang & Chen, 2024). This is based on the fact that tennis requires good technique in playing in order to have accurate and effective shots. This technique can be practiced continuously through

scheduled practice so that the hitting technique becomes better. Another thing that needs to be considered is the physical aspect of the player, because playing tennis requires good agility and endurance to play tennis. Apart from these two factors, other factors that are quite influential are psychological factors starting from mental health and self-confidence when playing because it will affect the quality of a person's game.

Forehand groundstroke is one of the techniques in playing tennis that is very important for players to master (Depipesei, Sinaga, Lumbantobing, Silalahi, & Nurkadri, 2024; Jatra, Risma, & Saputra, 2020; Sinulingga & Nova, 2021; Uria & Murniati, 2024). Forehand groundstroke is a stroke that can be executed by a player by swinging the racket from the dominant side of the player's body to direct the ball into the opponent's area with optimal accuracy and speed (Agustiyanta & Doewes, 2024; Dimic, Furuya, & Kanosue, 2023; Pratama, Haryono, & Nurrachmad, 2021; Saleh, Syahruddin, & Saleh, 2023). This technique requires precision and good coordination between the hands, feet and body to produce an effective blow. Forehand groundstrokes can be used by players to control attacks well and set strategies when competing.

Forehand groundstroke is a basic technique in playing tennis. Therefore, mastering this technique is very important for someone who will play tennis. Players who have good groundstroke forehands will be able to control the game and deliver effective blows to their opponents. For example, in a match, a player who masters this technique can direct the ball into the corner of the opponent's court with a powerful and targeted blow, making it difficult for the opponent to return the ball. Apart from that, in learning for Physical Education students, mastering the forehand groundstroke will help them play with more confidence, improve the accuracy of their shots, and develop better playing strategies when competing.

Even though forehand groundstroke is a basic technique that a person must have when playing tennis, many people do not understand this technique well. This happens to physical education students who actually should have mastered the technique but many still have difficulty carrying out the technique. The biggest cause is the lack of structured and repetitive practice so that students experience difficulty in carrying out these techniques. Apart from the courses being taken, students rarely practice alone or with their peers outside of learning hours. Apart from that, body coordination that is not yet optimal, such as a lack of synchronization between hand movements and foot position, often makes punches less accurate and powerful. The psychological aspect also plays a role, where a lack of confidence can cause hesitation when making a shot, which ultimately affects the accuracy and power of the ball. Seeing this problem, it is necessary to have a focused and directed training method for students to be able to carry out this technique. Through the right method, students can perform the technique correctly and effectively to get points in the game of tennis.

Mental imagery is a technique used by athletes to imagine movements or situations in their minds with the aim of improving physical skills and performance in sports (Mulya, 2020; Nopiyanto et al., 2022; Saefullah & Setyawati, 2021; Wijaya, Solihin, & Syamsudar, 2024). This technique is very important and can help someone visualize each stage of movement in the Forehand groundstroke technique. Through visualization, it will help the brain strengthen neuromuscular connections before the movement is actually carried out. In several sports, including tennis, mental imagery is effective in improving player performance. This was reported by (Zoki & Saputra, 2018). Through mental training like this, players can increase their focus and confidence when playing on the field. Through a description of the background to the problem, the aim of this research is to determine the influence of mental imagery on the mastery of basic forehand groundstroke skills in field tennis.

METHOD

This research uses a quantitative approach, with a quasi-experimental design and pretest-posttest control group design techniques. This technique compares an experimental group that uses mental imagery and a control group that does not use mental imagery. The population in this study were students taking tennis courses. Through random sampling techniques, two classes were taken, namely class C as the experimental class and class A as the control class.

The research variable or focus consists of two independent variables, namely mental imagery and the dependent variable is mastery of the basic forehand groundstroke skills in field tennis. Measuring mastery of forehand groundstroke skills is carried out using a field tennis skills test which includes aspects: Stroke accuracy (towards a certain target); Hit strength (ball speed after being hit); Consistency of strokes (the number of strokes that successfully enter the opponent's playing area). The assessment instrument is based on tennis skill observation sheets and video recordings to analyze students' technical movements.

The implementation of the research started from a pretest which was carried out before the treatment was implemented. Then 4 weeks of training were carried out with the experimental group using mental imagery and the control group only doing conventional forehand groundstroke training without additional mental imagery. The data obtained were analyzed using the t-test statistical test to see whether there were significant differences between the experimental group and the control group before and after treatment. Analysis is carried out with the help of statistical software such as SPSS.

RESULTS

Findings

This research was carried out on two different groups who had different treatments. The first group as the experimental class was given mental imagery treatment while the second group was not given any treatment. The first and second groups first carried out forehand groundstroke measurements which included hitting accuracy (towards a certain target); Hit strength (ball speed after being hit); Consistency of strokes (the number of strokes that successfully enter the opponent's playing area). This research was carried out on an experimental group of 30 people and a control group of 32 people. The results of the pretest are as follows.

Table 1. Pretest Scores forehand groundstroke between the Experimental Class and the Control Class

	Experimental Class			Control Class		
	Hitting Accuracy (Scale 1-10)	Hitting Power (Speed km/h)	Hit Consistency (% successful ins)	Hitting Accuracy (Scale 1-10)	Hitting Power (Speed km/h)	Hit Consistency (% successful ins)
Mean	3,40	62,67	57,83	3,63	61,41	57,34
Greatest Value	5	75	65	5	72	65
Smallest Value	2	50	40	3	45	45
Standard Deviation	0,77	5,87	6,65	0,76	5,29	6,12

Table 1 shows the results of the pretest forehand groundstroke skills between the experimental class that was given the mental imagery method and the control class that did not receive this treatment. In terms of hitting accuracy, the experimental class has an average of

3.40, while the control class is slightly higher with an average of 3.63. This shows that before the treatment was given, the level of hitting accuracy in both classes was still relatively low and almost the same. For hitting strength, the experimental class had an average of 62.67 km/hour, slightly higher than the control class which had an average of 61.41 km/hour. However, the fairly large standard deviation indicates that there is variation between individuals in punching power abilities. In terms of hitting consistency, the experimental class achieved an average of 57.83%, while the control class had 57.34%, which shows that before the treatment was given, both classes had almost the same level of hitting consistency. Overall, this pretest data shows that the initial abilities of the two groups are relatively equal, so that the differences in results that emerge after treatment can be more valid for analysis. After the mental imagery method is applied to the experimental class, it is hoped that there will be a more significant improvement compared to the control class who did not receive this method. Then, after carrying out the pretest, the researcher carried out learning activities in the two groups.

Learning is carried out with two different treatments. The first group used Mental Imagery. The second group did not receive this treatment. Mental imagery is a learning technique that involves mental visualization of certain movements or skills without making direct physical movements. In the context of tennis, mental imagery is used to improve understanding and mastery of forehand groundstroke techniques by imagining the movement in detail before actually executing the stroke. The results of the posttest after learning is carried out are as follows:

Table 2. Posttest Values forehand groundstroke between the Experimental Class and the Control Class

	Experimental Class				Control Class		
	Hitting Accuracy (Scale 1-10)	Hitting Power (Speed km/h)	Hit Consistency (% successful ins)	Final Score (Average)	Hitting Accuracy (Scale 1-10)	Hitting Power (Speed km/h)	Hit Consistency (% successful ins)
Mean	7,50	82,23	83,90		5,34	71,53	66,88
Greatest Value	9	90	90		7	74	75
Smallest Value	7	72	80		4	65	55
Standard Deviation	0,57	3,19	2,62		0,67	1,98	4,87

Table 2 shows the results of the post-test for forehand groundstroke skills after the experimental class was given the mental imagery method, while the control class underwent conventional learning. In terms of hitting accuracy, the experimental class experienced a significant increase with an average of 7.50, compared to the control class which only achieved 5.34. This improvement shows that visualization of techniques before execution can help students direct punches more precisely. In terms of punching power, the experimental class recorded an average of 82.23 km/h, higher than the control class which only reached 71.53 km/h, which shows that the mental imagery method helps players optimize punching power. Meanwhile, hitting consistency in the experimental class also experienced a much better improvement with an average of 83.90%, compared to the control class which only reached 66.88%. The smaller standard deviation in aspects of accuracy, strength and consistency of blows in the experimental class also shows that the performance of students in this group is more uniform and stable compared to the control class. Overall, the results of this post-test show that

the application of mental imagery in learning tennis is effective in increasing the accuracy, strength and consistency of strokes, so that it can be an alternative method that supports more optimal mastery of basic forehand groundstroke skills. These results illustrate that mental imagery roughly influences basic forehand groundstroke skills. To see significant differences, a statistical test was carried out with the first step of the normality test. The results are as follows:

Table 3. Normality Test for Experimental and Control Groups

	Class	Say.	Conclusion
Hitting_Accuracy	Experiment	.000	Not Normally Distributed
	Control	.000	Not Normally Distributed
Hit_Strength	Experiment	.019	Not Normally Distributed
	Control	.005	Not Normally Distributed
Stroke_Consistency	Experiment	.000	Not Normally Distributed
	Control	.005	Not Normally Distributed

Table 3 shows the results of the normality test for data on punching accuracy, punching strength and punching consistency in the experimental and control groups. The results of statistical testing show that all variables in both groups have a significance value (Sig.) below 0.05, which means the data is not normally distributed. In the aspect of hitting accuracy, both the experimental class and the control class have a significance value of 0.000, indicating that the data distribution does not follow a normal pattern. A similar thing happens to punch strength, where the experimental class has a value of 0.019 and the control class 0.005, which also shows a discrepancy with the normal distribution. Meanwhile, for stroke consistency, the experimental class obtained a value of 0.000 and the control class 0.005, which again indicates that the data distribution is not normal. With these results, in further analysis, non-parametric statistical methods are more appropriate to use to test differences or influences between groups, because the normal distribution assumption is not met. Because the normality test was not met, the Mann Whitney U test was carried out to see the differences. The results were as follows:

Table 4. Difference Test Using Mann Whitney U Between Experimental and Control Groups

	Say.	Conclusion
Hitting_Accuracy	.000	There are significant differences between the experimental class and the control class
Hit_Strength	.000	There are significant differences between the experimental class and the control class
Stroke_Consistency	.019	There are significant differences between the experimental class and the control class

Table 4 shows the results of the difference test using Mann-Whitney U to compare punching accuracy, punching strength and punching consistency between the experimental class and the control class. The results of the analysis show that all variables have a significance value (Sig.) below 0.05, which means there is a significant difference between the two groups. In the aspect of punching accuracy, a significance value of 0.000 shows that the mental imagery method has a real influence on increasing punching accuracy compared to conventional methods. The same thing happened with punch strength, with a significance value of 0.000, which shows that students who used mental imagery were able to produce punches at a higher speed than the control class. Meanwhile, in hitting consistency, the significance value of 0.019 also shows that there is a significant difference between the two groups, although the

significance level is slightly higher than other variables. Overall, the results of this test prove that mental imagery is significantly more effective in improving forehand groundstroke skills, compared to conventional learning methods without mental imagery.

Discussion

The research results show that the mental imagery method has a significant influence on improving students' forehand groundstroke skills compared to conventional learning methods. This can be seen from the post-test results which show a greater increase in aspects of punching accuracy, punching strength and punching consistency in the experimental class compared to the control class.

In the aspect of hitting accuracy, the experimental class experienced an average increase from 3.40 in the pretest to 7.50 in the posttest, while the control class only increased from 3.63 to 5.34. The higher improvement in the experimental class shows that mental imagery helps students imagine the correct hitting technique, so they can control the direction of the ball better. This is in line with previous research which states that mental visualization can improve motor coordination and precision in racket sports.

In terms of hitting strength, the experimental class experienced an average increase from 62.67 km/hour to 82.23 km/hour, while the control class increased from 61.41 km/hour to 71.53 km/hour. The more significant increase in punching power in the experimental class shows that mental imagery helps students imagine the power that must be exerted when making a punch, so that they can optimize punching power more efficiently. This visualization helps the brain program more effective movements without the need for excessive physical exercise.

In the aspect of hitting consistency, the experimental class showed an increase from 57.83% to 83.90%, while the control class increased from 57.34% to 66.88%. This improvement shows that the mental imagery method not only improves hitting accuracy, but also helps in maintaining a more stable and controlled hitting pattern. By imagining the movement repeatedly before making a shot, students can improve their ability to control the ball so that it enters the opponent's playing area more consistently.

The statistical test results showed that the research data was not normally distributed, so the analysis was carried out using the Mann-Whitney U test. The results of this test showed that there were significant differences between the experimental class and the control class in all aspects measured, with a significance value of 0.000 for punch accuracy and punch strength, and 0.019 for punch consistency. This proves that the mental imagery method has higher effectiveness than conventional learning methods.

The results of this research provide confirmation that mental imagery influences basic forehand groundstroke skills. This is in accordance with research (Mulya, 2020; Zoki & Saputra, 2018) which shows that mental imagery influences a person's competence in playing tennis. The mental imagery method has various advantages in learning sports skills (Bedir & Erhan, 2021; Erickson, 2020; Frank, Kraeutner, Rieger, & Boe, 2024; Ladda, Lebon, & Lotze, 2021; Lochbaum et al., 2022), especially in tennis. One of the advantages is increasing the accuracy of movements, because visualizing the correct technique helps players direct the ball more precisely to the desired target. Apart from that, mental imagery also strengthens neuromuscular connections, where the nerve pathways related to motor movements become better trained even without doing direct physical exercise. This method also increases performance consistency, because players who routinely imagine the correct movements will be more stable in executing shots, thereby reducing errors when playing. From a psychological perspective, mental imagery helps increase self-confidence and focus, so that players are better prepared to face the match with a calmer and more optimistic mental condition. In addition, this method speeds up the process of

learning skills, because players can understand techniques better without having to constantly do physical training. Mental imagery is also very effective as additional training, especially when players are injured or want to improve their skills without overtaxing the body. In addition, this technique has been proven to increase strength and coordination of movements, because players can program more controlled and optimal movements. With these various advantages, mental imagery is a very effective method in improving basic forehand groundstroke skills in tennis, and can be used as a training strategy that supports learning sports skills as a whole.

CONCLUSION

Based on the results of research that has carried out data processing and analysis, it can be concluded that Mental Imagery influences Mastery of Basic Forehand Groundstroke Skills in Field Tennis. This can be seen from the results of hit accuracy (towards a certain target); Hit strength (ball speed after being hit); The consistency of strokes (the number of strokes that managed to enter the opponent's playing area) was significantly different when compared to the group that did not use the mental imagery method.

CONFLICT OF INTEREST
There are no conflicts of interest in this article.

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