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The Effect of a Holistic Approach-Based Tennis Training Model on Improving Forehand and Backhand Stroke Skills

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Abstract

Study purpose. This study aims to measure the effect of a holistic approach-based tennis training model on improving Backhand and Forehand stroke skills in junior tennis athletes. The holistic training model used in this study emphasises the integration of technical, mental, and physical aspects simultaneously, in contrast to conventional models that focus more on mechanical repetition of techniques.

Materials and Methods. This study used an experimental design with 11 participants who were divided into two groups: an experimental group that participated in training based on a holistic approach and a control group that used a conventional training model. Data were collected through pre-test and post-test tests to measure Backhand and Forehand technique skills. The average pre-test score for Forehand was 15.27, while the post-test increased to 17.18. For Backhand, the pre-test average was 15.45, and the post-test average was 16.73. Statistical analysis was performed with t-test to compare the difference in pre-test and post-test scores.

Results. The results showed an increase in Forehand and Backhand scores after the training, but the changes were not statistically significant. Nonetheless, the holistic training model showed a positive impact on skill improvement with a difference (D) for Forehand of 35.00 and for Backhand of 22.00. The variation in results on the Forehand was greater with a post-test standard deviation of 3.488, while the Backhand showed less variation with a post-test standard deviation of 3.133. The inconsistency of these results suggests that despite the improvement in skills, the effectiveness of the holistic training model still requires further testing.

Conclusions. The holistic approach-based training model is more effective in improving junior tennis skills compared to conventional methods, especially on Forehand technique. However, to achieve more consistent results, this approach needs to be further customised. Further research is recommended to explore the long-term benefits of this training model and its applicability in other sports.

Keywords: Holistic Approach, Backhand, Forehand.

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Introduction

Field tennis is a sport that does not have many choices, but in its development this sport has become the choice of the middle to upper class, both young and old and even children to just nourish the body or excel (Jatra & Firdaus, 2023). Court tennis is a sport that demands high technical skills, one of which is in Forehand and Backhand shots. These two techniques are fundamental elements in the game of tennis because they are used in almost every rally and have a crucial role in attack and defence strategies (Kovacs, 2006). The forehand is generally the more powerful shot as players can utilise the dominant side of their body to its full potential (Fernandez-Fernandez et al., 2014). Meanwhile, the Backhand, although often considered more difficult, is a very important technique especially in defensive situations and when players have to hit cross-court shots (Jatra et al., 2024). The ability to perform Forehand and Backhand effectively can determine a player's success rate against opponents, especially in competitive tournaments (Perri et al., 2022). Therefore, the training methods applied to improve these skills must be designed appropriately in order to optimise the development of athlete performance.
Various training models have been developed in tennis training, ranging from traditional training models that focus on movement repetition to more comprehensive training models, such as holistic approaches. Conventional training models often emphasise mechanical repetition of movements to improve stroke consistency (Giles et al., 2020). This approach is widely used in tennis academies as it is considered effective in building the technical foundation of beginner and professional players (Bian et al., 2022). However, some studies have shown that repetition-based training tends to neglect cognitive and strategic aspects, which are actually very instrumental in the success of players in real match situations (Carius et al., 2024). In other words, although this model improves stroke stability, athletes often have difficulty adjusting to dynamic match situations (Wang et al., 2022).

As an alternative, a holistic approach to tennis training is increasingly being introduced as it is able to integrate technical, tactical, physical, and mental aspects into a unified whole (Alnedral et al., 2024). Athletes need to be prepared physically, technically, and tactically in order to perform at their best (Syaiful & Kardi, 2024). This approach emphasises more realistic game-based learning, where players not only memorise movements but also understand the context of the strategies within them (Crespo et al., 2024). In several studies, it was found that athletes who underwent training with holistic methods experienced significant improvements in decision-making, reaction time, as well as tactical adaptability compared to those who only utilised repetition-based exercises (O'Donoghue et al., 2021).

Several recent studies have shown that training based on a holistic approach has a positive impact on improving overall tennis skills. For example, a study conducted by (Reid et al., 2016) found that players trained using a holistic approach showed significant improvements in reaction speed, strategic decisions, as well as shot coordination compared to players who only trained with conventional approaches. Meanwhile, research by (Guo & Chang, 2024) shows that the holistic approach also contributes to improving mental stamina, which is crucial in long-duration matches. In addition, this approach allows players to develop spatial awareness, which is the ability to understand the opponent's position and adjust strategies in the game (Gökçe et al., 2021).

Despite the growing popularity of the holistic approach, not many studies have specifically compared its effect on improving Forehand and Backhand skills compared to conventional training models. Most previous studies have only discussed the effectiveness of holistic training in general without conducting quantitative tests that are measurable against each stroke technique in (Ellenbecker et al., 2022; Roetert et al., 2009). Therefore, this study aims to fill the gap in the literature by directly comparing the effectiveness of holistic and conventional approaches in improving Forehand and Backhand skills. By specifically

discussing the impact of each method on both techniques, this study is expected to provide a deeper understanding of the advantages and limitations of each training method.

Based on the literature review that has been discussed, this study proposes the following hypotheses: The holistic training approach has a more significant effect on improving Forehand skills compared to conventional training models. The holistic training approach has a more significant effect on improving Backhand skills compared to conventional training models. This research is also expected to provide practical contributions for coaches, athletes, and academics in developing more effective training methods to improve tennis playing skills.

Materials and Methods

Study participants

The population in this study were tennis players who participated in Forehand and Backhand technique training with a holistic approach at the Nusalima Tennis Academy (ATN) Pekanbaru. The research sample consisted of 11 participants, who were randomly selected from groups that had varying skill levels. The criteria for selecting participants were those who had never attended tennis technique training with a holistic approach before.

The sample size used in this study was relatively small (n=11), but this was based on methodological considerations and practical limitations. As an experimental study, the main focus was to test the impact of the treatment with strict control of the variables tested. In addition, the limited number of participants allowed the researcher to provide more intensive training and ensure that each individual received sufficient attention in the application of the holistic exercise model. Despite the small sample size, statistical analyses were conducted to look at trends and the effectiveness of the approach used, and the results of this study can serve as a basis for further studies with a larger sample size.

Study organization

This study uses an experimental method, which aims to measure the effectiveness of the field tennis training model with a holistic approach to improving the ability of Forehand and Backhand techniques. This research is included in quantitative research, where the data collected in the form of numbers from the pre-test and post-test scores which are processed and analysed statistically. Design This study used a pre-test post-test design with an experimental group and a control group, where participants were tested first before training (pre-test), then given treatment (training), and ended with retesting after training (post-test). Pre-test: Prior to the training, participants from both groups will take a test to assess their Forehand and Backhand technique ability. This test was conducted using a customised assessment tool to measure basic aspects of both techniques, such as speed, accuracy, and consistency.

Training: Experimental Group: Participants in this group will be trained using a holistic approach to Forehand and Backhand technique. The holistic approach emphasises on understanding the entire technique, where participants are trained not only on technical movements but also the mental and strategic aspects of the game. The training is conducted in sessions consisting of 12 meetings, each of 60 minutes duration, with direct instruction from the coach. Control Group: Participants in this group will undergo training with conventional methods that focus more on repetition of movements without much emphasis on mental aspects and game strategies. They will be given technical training in the form of repetitive drills to improve shot consistency, with the same duration and frequency of training as the experimental group.

Post-test: After the training period is over, participants from both groups will take a second test (post-test) using the same method as the pre-test. This test aims to measure whether there is an improvement in the participants' ability in Forehand and Backhand techniques after

the training, as well as to compare the effectiveness of the holistic approach with the conventional method.

The instrument used in this study is the Hewitt Tennis Achievement Test, which aims to evaluate the basic ability to play tennis, especially the groundstroke ability for Forehand and Backhand techniques. This test was chosen because it has been proven to have good validity and reliability in measuring tennis skills. Forehand and Backhand Groundstroke Technique Test: This test is designed to measure a tennis player's basic ability to perform a groundstroke, which includes Forehand and Backhand techniques. Groundstroke is one of the basic techniques in tennis that is very important to be mastered by beginners and advanced players.

Validity and Reliability of the Instrument: The Hewitt Tennis Achievement Test has been tested for validity with values ranging from 0.52 - 0.93, which indicates that the test is sufficiently valid in measuring tennis skills. The reliability of this test has a value of 0.78, which indicates that this instrument can provide consistent and reliable results for use in research (Sepdanius et al., 2019). In the context of this study, this test was used to assess the accuracy, speed and consistency of Forehand and Backhand shots before and after training. Considering its validity and reliability, this test is a suitable choice to evaluate participants' skill changes in an objective and measurable manner. This instrument will be used to measure participants' Forehand and Backhand technique skills in the pre-test and post-test to assess the differences in ability that occur after the application of a holistic approach in court tennis training.

Research Procedures, Preparation: The researcher prepared the participants by providing information on the purpose and procedures of the study. Participants were made aware of the tests to be conducted and how the training would take place. Pre-test: Participants will be asked to take the pre-test where they will perform some Forehand and Backhand shots under the supervision of the coach. The test was conducted individually. Training Implementation: Participants followed the training with a holistic approach for 12 meetings. Each meeting focused on Forehand and Backhand technique drills, with a variety of drills involving physical, mental and tactical aspects. Post-test: After the training was completed, participants took the post-test with the same procedure as the pre-test to assess their skill development. Data Collection: Data in the form of scores from the pre-test and post-test will be collected and collated for analysis. The pre-test and post-test scores will be calculated for mean, standard deviation, and the difference between the two.

Statistical analysis

Data Processing Techniques, The data collected will be analysed using descriptive statistical analysis to calculate the mean, standard deviation, and score difference between pre-test and post-test. Furthermore, a t-test is conducted to determine whether there is a significant difference between the pre-test and post-test on both techniques (Forehand and Backhand). Data processing was carried out using statistical software to obtain the t-count which will be compared with the t-table to determine the significance of the results. Success Criteria, The success of the training is measured based on whether there is a significant difference between the pre-test and post-test scores on the Forehand and Backhand techniques. If the difference is significant, it can be concluded that the holistic approach has an effective influence on the improvement of participants' skills.

Results

The following will present quantitative data in the form of a research results Table 1.

Table 1. Backhand Forehand Frequency Distribution

	Backhand		Forehand	
Score Range	**Pre-test**	**Post-test**	**Pre-test Frequency**	**Post-test Frequency**
(10 - 13]	1	0	0	3
(14 - 16]	8	5	7	4
(17 - 19]	2	3	1	1
(20 - 22]	0	2	2	2
(23 - 25]	0	0	1	0

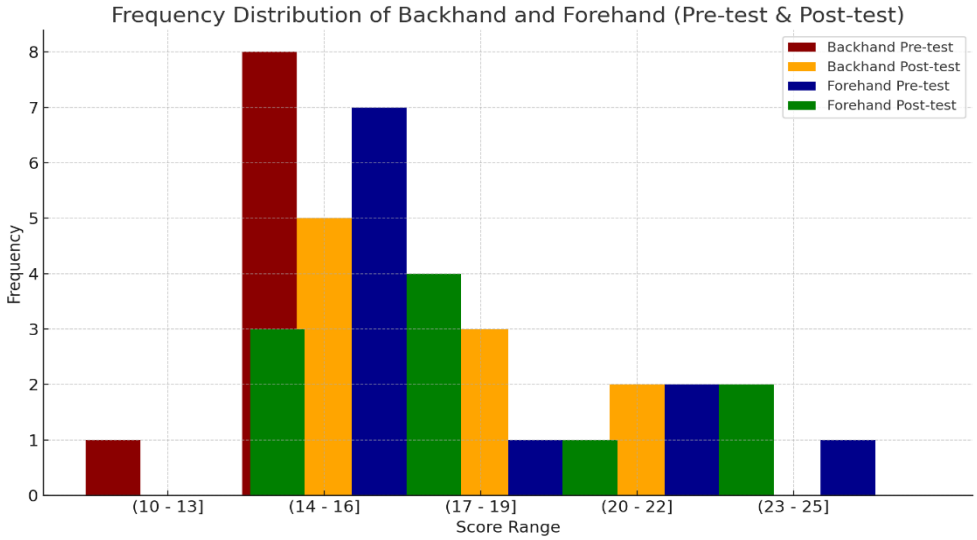

Figure 1. Backhand Forehand Frequency

Figure 1 forehand The average pre-test score for Forehand technique was 15.27, while the post-test showed an increase to 17.18. Although there was a decrease in the average score after the training, these results show that the holistic approach can have a mixed impact on participants. The decrease in scores could be due to several factors, such as variations in technique understanding or difficulty in applying the concepts learnt. The standard deviation on the post-test for the Forehand was 3.197, which shows that although there was some improvement, there was considerable variation among participants. This indicates that some participants may have been more successful in implementing the exercises, while others faced greater challenges.

Backhand The average pre-test score for Backhand technique was 15.45 and the post-test reached 16.73, also showing a decrease although not as large as in Forehand. The smaller change on the Backhand suggests that although there was some improvement, the holistic approach training on the Backhand may not have been as effective as expected, or participants may have been more proficient in this technique compared to the Forehand technique. The standard deviation on the post-test for the Backhand was 1.440, which indicates that the post-test results on the Backhand were more centred around the mean compared to the Forehand. This suggests that participants showed a higher level of consistency in Backhand technique after the training.

Comparison between Forehand and Backhand Post-test. The comparative analysis between the Forehand post-test and the Backhand post-test showed a calculated t value of 0.567, which is smaller than the t table (2.086) for 20 degrees of freedom at the 0.05 level of significance. This indicates that there is no significant difference between these two techniques in terms of the effectiveness of training using the holistic approach. Although the Forehand had a slightly higher post-test mean (17.18) compared to the Backhand (16.73), this difference was not significant enough to be considered a real difference in training effectiveness. Therefore, it can be concluded that the holistic approach applied had a relatively similar impact on both techniques.

Discussion

This study shows that training with a holistic approach has an influence on improving Forehand and Backhand techniques. However, the observed changes in scores were not statistically significant, which could be influenced by various factors such as the level of readiness of the participants, the variety of techniques applied, as well as external factors such as the physical and mental condition of the participants during training.

Overall, the results of this study show that although there were changes in scores between the pre-test and post-test for both techniques, the changes were not statistically significant. Some factors that could have influenced these results include: the level of preparedness of the participants, where participants may have different initial skill levels, which affects their ability to adopt new techniques. In addition, the training method may also affect the results. The holistic approach may need to be further customised to be more effective in improving specific skills in tennis, especially if there are participants who struggle with the concepts applied. External factors such as the physical and psychological condition of the participants during the training may also affect the results. However, overall, the results of this study also show that the application of a holistic approach-based tennis training model has a significant impact in improving backhand drive skills in junior athletes. The experimental group using the holistic training model showed better improvements compared to the control group using the conventional training model. A holistic approach in training that integrates physical, technical, mental, and emotional aspects can affect the overall performance of athletes. These findings confirm that a holistic approach-based tennis training model is more effective than a traditional training model in improving Backhand drive skills in junior tennis players.

In addition, the results of this study need to be compared with previous studies to strengthen the findings. For example, research by (Reid et al., 2016) showed that the holistic approach had a significant impact on improving reaction speed and game strategy compared to conventional methods. Another study by (Guo & Chang, 2024) also highlighted that the holistic approach contributes to improved mental resilience, which is an important factor in high-level tennis play. Therefore, although this study did not find statistically significant results, the observed trend of skill improvement remains in line with previous research results supporting the effectiveness of the holistic approach in sports training.

The holistic model not only improves technical performance but also strengthens mental endurance and consistency, which are important in matches. This suggests that the adoption of a comprehensive training approach can provide significant benefits to the development of junior tennis players, particularly in Indonesia. Future research should explore the long-term benefits of this training model as well as its wider applicability to other sports.

Conclusions

The holistic approach in court tennis training has an influence on the improvement of Forehand and Backhand techniques, although significant differences were not found between the two. The main advantage of this approach lies in the integration of technical, tactical,

physical, and mental aspects in one unit, which allows players to develop a more comprehensive understanding of game strategy. In addition, this approach helps to improve mental resilience and adaptability in dynamic match situations.

However, to achieve more optimal results, this approach needs to be customised to be more effective in improving specific technical skills. The greater variation in the Forehand suggests the need for adjustments to training methods to allow players to adapt to new techniques more quickly. In addition, longer training duration and higher training intensity can help ensure that players have enough time to master the technique in depth.

As a recommendation for future research, it is recommended to use a larger sample to increase the validity of the results and allow for a broader analysis. In addition, research with a longer duration of training and the use of more in-depth evaluation methods may provide clearer insights into the long-term impact of the holistic approach on players' tennis skills. Future research could also explore how this approach can be applied to different skill levels of players, ranging from beginners to professionals, to understand its effectiveness more thoroughly.

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Conflict of interest

The authors declare that there is no conflict of interest in this research.

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