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Training Methods and Speed on Agility in the Tennis Community Ages 21-24

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Abstract

The purpose of this study was to analyze the effect of the training method, namely the three-cone shuttle and J.P. shuttle (60-yard shuttle) on-court tennis agility, to analyze the effect of high and low-speed on-court tennis agility, and to analyze the interaction of training methods (three-cone shuttle and J.P. shuttle (60-yard shuttle)) and speed on skill. Agility in the Unimed Tennis Community Ages 21-24. This study uses an experimental method with a 2x2 factorial design, and the data analysis technique uses Analysis of Variance (ANOVA) at the significance level (α: 0.05). The population in this study were members of the Unimed Tennis Community Age 21-24 in 2022, totalling 32 people. The sampling technique used purposive random sampling consisting of 24 male athletes. The results of this study: (1) There is a significant difference between the Three cone shuttle training method and the J.P. shuttle (60-yard shuttle) on-court tennis agility, (2) There is a difference in the effect of high and low-speed on-court tennis agility, (3). There is an interaction of training methods (three-cone shuttle and J.P. shuttle (60-yard shuttle)) and the speed of court agility ability. This research concludes that the three-cone shuttle training method has an average increase in court tennis agility of 14.27 seconds, while the J.P. shuttle (60-yard shuttle) averages 12.91 seconds. Unimed Tennis Community Players or athletes aged 21-24 in 2022 who have high speed have an average increase in agility ability that is greater than players/athletes who have a low rate, but the difference in growth is significant. The results of agility abilities in the Unimed Tennis community aged 21-24 in 2022 experienced a significant increase in the athlete group using the J.P. training method. Shuttle (60-yard shuttle) and high speed.

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INTRODUCTION

Sport is one form of improving human quality directed at the formation of character and personality and high sportsmanship, as well as increasing achievements that can evoke a sense of national nationality. The goals of sports vary according to the sport being carried out. Still, sports generally include maintaining health and physical fitness and a person's achievement to improve sports performance as high as possible. The goal has become the essential part of achieving in general, but the specific goal is more important is to win a match. This success will be achieved if the training is carried out according to the principle of gradual, programmed movement with a specific purpose.

Tennis court is one type of sport popular and much-loved by all levels of society worldwide, especially in Indonesia. In (Chadefaux et al., 2017) that the game of tennis, the field is very dependent on the players and the racket used. (Marland, 2019) The purpose of playing tennis is not only for achievement but also for health. Until now, field tennis has proliferated and has been completed as an achievement sport. (Krause et al., 2018; Ramadan & Ningrum, 2019) one of the supporters of achievement sports is having excellent abilities and skills. Achievement sports are characterized by a highly competitive climate that encourages athletes to continue to practice and improve their abilities. (Siahaan, 2022; Nurdiansyah, 2018) Professional tennis players will always follow tennis matches worldwide, such as Grand Slam matches, ATP Master 1000, ATP Master 500, ATP Master 250, ATP Challenger Tour, and ITF Men's Circuits. (Gescheit et al., 2017; Ramadan et al., 2020) stated that while playing tennis, getting points is closely related to the emotional attitude and technique of hitting the player. Directing the correct basic technique early is needed so the technique can be mastered well. Likewise, the development of correct physical elements from an early age according to the training principle is the principal capital in building achievement. To be able to play tennis well, it is necessary to have the ability to support the technique of hitting the ball, supporting the game of tennis well.

Court tennis is a sport that requires a tennis court, racket, net and ball. The principle of playing tennis is hitting the ball using a racket over the net and into the opponent's court line, directing the ball to the empty side of the opponent's field so that it cannot be returned by the opponent and getting points for victory. The sport of tennis requires four supporting factors that need to be understood and understood, namely: technical, physical, tactical, and mental. The tennis player's biomotor component is influenced by two things, namely energy fitness and muscular fitness. Energy fitness consists of aerobic capacity and anaerobic capacity. Effective and efficient steps in the training process determine the quality of an achievement (Perikles et al., 2016; Reva et al., 2022). The

physical condition of tennis athletes is based on the energy system used and the characteristics of movement in the sport; broadly speaking, the physical components needed for tennis athletes are endurance, strength, agility, speed, power and flexibility, but the most dominant and essential are tennis players is agility. Agility itself can be interpreted as a person's ability to make changes in direction quickly and without losing balance.

The sport of games, especially field tennis, must have a very complex physical component. The physical component in question is agility in particular. Agility is one thing that is very important to support the performance of athletes in carrying out attacks on opponents and also defending in play. So that to achieve optimal physical components and significantly increase agility, appropriate training methods are needed.

A trainer uses the training method in carrying out the exercise so that the exercise can run well and the training objectives can be achieved. Agility is the ability to change direction quickly while maintaining balance when moving (Maryono et al., 2017). If a tennis player has good agility, it will make it easier for players to chase and reach the ball in the correct position when hitting the ball.

Agility is related to the body's movement, which includes movement of the feet and rapid changes in body position (Arjun et al., 2021). Agility requires a person to change direction and body position quickly without experiencing balance disorders, so agility also depends on one's body condition, such as height, body mass or weight, age, and gender, dramatically affecting balance. With the agility that players have, they can make movements quickly, freely and controlled (Adindra et al., 2016). There are many forms of agility training in sports, but for the context of this research, the training model in question is the three-cone shuttle and J.P. shuttle (60-yard shuttle and will be speed as an attribute variable.

Speed is a person's ability to change direction or carry out the same or not the same movement as quickly as possible (Rizaldianto, 2016). Therefore, someone with high speed can perform a short movement or in a short time after receiving a stimulus. Speed is also one factor determining a person's ability to play soccer. Players with speed will be able to quickly reach the ball or change body movements to make the ball into the opponent's area and make it easier to get points.

Based on the training method explained in this study, there are two training models, namely the Three-Cone Shuttle training method, which is a form of exercise with three cones as obstacles/posts as the cone positions have been placed at different distances and positions. Three-Cone Shuttle Exercises are Pro-Agility Drill, 90-Degree Round and L Drill. In this training model, the athlete can efficiently run well and effectively; many of the advantages of this training model are that when done regularly, all the thigh muscles will be formed, the movement of the legs and arms

will be a fast reflex, the legs and arms will be easier to move. In all directions, and have good endurance or stamina.

From this analysis, it is hoped that it can improve agility skills in field tennis. While the J.P. The shuttle (60-yard shuttle) is a training model designed to test lean body and posture, straight running speed, muscle quality, and ability to adjust stride for acceleration and deceleration and to change direction using differences in starting flight distances.

This training method is an agility exercise that requires players to have excellent physical condition, which aims to determine agility and speed. So the role of coaches and athletes must also have a very close collaboration to achieve good results. Regular and continuous exercise will affect increasing agility, and the athlete will be easy to dribble. Meanwhile, there are several forms of training, including M Drill, Star Drill With Bear Crawl and Butterfly Drill.

According to Wakeham and Jacobs (2009: 86) in the journal (Udyoga, 2019), the fast-paced character of a tennis game will require movement, coordination, agility, explosive strength, and endurance abilities. Good quality abilities will be followed by optimal achievement. In the modern era of tennis, as described above, good agility is one factor that can affect a player's quality in this era. According to (Arianda et al., 2021), speed is a person's ability to carry out activities continuously in the form of the same movement in the shortest possible time. Research results (Mulya, 2020) show that tennis drill exercises with footwork can significantly improve junior tennis players' agility. The implication is that choosing the proper training method with varied training patterns can affect the athlete's performance and avoid burnout. The study's results (Agustryani, 2020) show that the agility drill program provides a significant difference in agility in KU-10-year-old tennis athletes, despite the low level of objectivity among observers/coaches. Then the results of research from (Ratno & Simanjuntak, 2020) show that ladder drill exercises and routine exercises increase the agility of the Medan State University tennis community, and ladder drill exercises have a more significant effect than routine training.

Furthermore, the results of research (Ayu. & Haryono, 2019) research and discussion can be concluded that there is a relationship between kinesthetic ability, agility, and the results of tennis forehand groundstrokes at the Widyatama Club. Based on the results of previous studies, several variables are the same as the research that the researcher will carry out. Some of these variables are training methods, speed and tennis agility abilities. The variables in question are not all in the study, so there is a difference between the research above and the research the researcher will conduct.

In training and developing basic technical and physical abilities in tennis, a container or place is needed that can be used as facilities and infrastructure to support the athletes' achievements. One of them can be

found at the Faculty of Sports Science, State University of Medan. The UNIMED tennis community is one of the Medan tennis communities that accommodates the interests and talents of students in playing tennis. The members of this community are FIK UNIMED students who participate in the afternoon training.

Researchers have made several observations and observations in this community when doing routine exercises. Based on the results of observations and observations made by researchers in this community, when doing routine training, several problems might cause the athlete's performance to decline, including training programs that are less effective and unsustainable, causing the athlete's ability to not increase from month to month and poor physical condition. Not by the portion of tennis athletes. After observing and observing, the researchers conducted interviews with the trainer, David Siahaan; he said that the physical condition of the athletes in this community was low and needed maximum improvement, including agility because agility is an essential component in tennis. In addition to observing and interviewing, researchers also conducted agility tests to ensure the athlete's physical condition. In the tests and measurements carried out by researchers on members of the Unimed tennis community, which aims to measure agility by using the Planned agility test, from the table data above, the average agility ability of members of the men's Unimed tennis community is 33.38 seconds overall. If the results are classified by gender using normality in the planned agility test, if the agility test is carried out at the age of 12 to 16 years, the result is still 28 to 26 seconds, while members of the tennis community aged 21 to 24 years, it is 33.38 seconds. Ages 21 to 24 years should have more minor results than those aged 16 to 18, so it can be concluded that all Unimed tennis athletes have less agility. So it is necessary to study things that can improve these abilities, considering how vital good physical agility is in playing tennis in the field.

The aims of the study were 1) to analyze the differences between the three-cone shuttle training method and the J.P. shuttle (60-yard shuttle) on the agility ability of the Unimed Tennis community aged 21-24 in 2022. 2) analyzing the difference between low and high speed on agility ability in the Unimed Tennis community aged 21-24 in 2022. 2) analyzing the interaction of training methods (three-cone shuttle and J.P. shuttle (60-yard shuttle)) and speed on agility skills in the Unimed Tennis community aged 21-24 in 2022.

METHODS

This experimental research looks for the effect of independent and dependent variables with a 2x2 factorial (Ramadan & Juniarti, 2020). The way to obtain data in this study is to use a 2-way ANOVA method with a Block 2x2 factorial design, using a pretest (pretest) and a posttest (posttest), which is then analyzed using the SPSS version 22 two-way

Annava statistic (Two Way Anova). The treatment in this study, namely the treatment with the three-cone shuttle training method and J.P. shuttle (60-yard shuttle). The level of each treatment in this study was the athlete's high and low-speed levels. The factorial experiment in this study paid attention to the possibility of an interaction between the three variables, namely the training method, speed, and tennis agility ability. Furthermore, the research design to be carried out by the researcher is described in more detail in the following table.

Table.1. Research Design Framework

	Exercise Method	
	Three Cone Shuttle (B_1)	*J.P. shuttle (60-yard shuttle)* (B_2)
Speed (A)	A_1B_1	A_1B_2
High (B)	A_2B_1	A_2B_2

The table above states that this research will be given treatment in training through two groups of training methods, three-cone shuttle and J.P. shuttle (60-yard shuttle), which will be interacted with speed on the ability of agility in the Unimed Tennis community Ages 21-24 in 2022. This research was carried out on the Medan State University tennis court, Jl. Postal 1589, Postal Code 20221, Tel. (061) 6613365, Fax. (061) 6614002 / 661331. This treatment will take place from March 26 to April 25, 2022, for four weeks with a frequency of training three times a week, namely on Tuesdays, Thursdays and Saturdays from 16.00 to 18.00 WIB.

The population in this study were members of the Medan State University Tennis Field Community, amounting to 32 people. The sampling technique used in this study is a purposive random sampling technique consisting of 24 male athletes; what is meant by the purposive random sampling technique is a sampling technique based on ranking or according to the needs needed in this study, namely with considerations made by researchers having sample provisions with provides criteria including 1) Men's Tennis player, 2) Has mastered Groundstroke, 3) Active in training, 4) Willing to be a sample in the study. 5) Healthy condition, 6) Age 21-24 years.

The entire population of 32 people will conduct a speed test to determine the ability of high speed and low speed based on ranking calculations. Eight tennis athletes with moderate speed are not included as samples, namely samples with a ranking of 13-20 based on speed measurements. Then each high and low-speed group was divided into two equally large groups through ordinal pairing (A-B-B-A), namely group A, each consisting of 12 people consisting of 6 athletes with high speed

and six athletes with low speed. Then group B, namely six athletes with high speed and 6 with low speed.

Table.2. Speed Capabilities Classification

Total	Classification	Information
12	High speed	Worn
12	Low Speed	Worn

The independent variables in this study are the three-cone shuttle exercise model and the J.P. shuttle (60-yard shuttle). Attribute independent variables (which are controlled), namely high and low speed. The dependent variable in this study is the result of agility ability. The data collection technique was performed with tests and measurements to obtain objective data. The distinctive feature of the measurement results is that it is expressed in a quantitative score that can be processed statistically. The role of the instrument in research will largely determine the quality of the data obtained. Therefore, the determination of research instruments should be adjusted to the problem and research objectives, and therefore the instrument must be valid or have been stamped.

The instrument of this research includes measures of measurement of the research variables. To measure the agility in tennis is the Planned Agility Test (Siegenthaler, 1997), while to measure the speed in this study is the 5-meter sprint (5-meter run) (Reid, 1998). The data analysis technique used is 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 meet the assumptions in the ANOVA technique, a normality test (Kolmogorov Smirnov test) and a Variance Homogeneity test (with the leaven's test) were carried out. Hypothesis testing using the General Linear Model (GLM)-Two Way Anova analysis test with the help of the SPSS 22 program. The hypothesis is accepted if the Manova test value is significantly less than (Sig < 0.05). Meanwhile, the hypothesis is rejected if the arithmetic significance value is more significant than (sig > 0.05).

FINDINGS AND DISCUSSION

Findings

There is a significant difference in the effect between the Three cone shuttle training method and the J.P. shuttle (60-yard shuttle) on Field Tennis Ability in Tennis Unimed Community Ages 21-24 in 2022.

There is a difference in agility and tennis ability between respondents with high speed and respondents with low speed. There is an interaction between training methods and

speed in influencing agility abilities in the Unimed Tennis community aged 21-24 in 2022.

Table.3. Hypothesis Testing using General Linear Model
Tests of Between-Subjects Effects
Dependent Variable: Agility Tennis Ability

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1.221[a]	3	.407	2.549	.000
Intercept	40.794	1	40.794	255.488	.000
Speed	1.114	1	1.114	6.975	.001
Method	1.088	1	1.088	10.560	.004
Speed * Method	1.085	1	1.085	1.534	. 026
Error	3.193	20	.160		
Total	45.209	24			
Corrected Total	4.415	23			

a. R Squared = .277 (Adjusted R Squared = .168)

Through SPSS statistical calculations, the first hypothesis can be described that the results of calculations on the exercise variable from the table data above obtained a sig value of 0.001 < 0.05, this indicates that there is a difference in agility tennis ability between experimental group 1 and experimental group 2 after being given different exercises. So Ho is accepted. With this, it can be concluded that there is a significant difference between the Three cone shuttle training method and the J.P. shuttle (60-yard shuttle) on Field Tennis Ability in Tennis Unimed Community Ages 21-24 in 2022.

The second hypothesis can be explained by the hypothesis used in this study: Ho: There is a difference in agility ability in the Unimed Tennis Community aged 21-24 in 2022, which has a high and low speed. Ha: There is a difference in agility ability in the Unimed Tennis Community aged 21-24 in 2022, which has a high and low speed. In the speed variable, the Sig = 0.004 <0.05 shows a difference in agility tennis ability between respondents with high speed and respondents with low speed, so Ho is accepted.

The third hypothesis 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 training variables (Three cone shuttle, as well as the J.P. shuttle (60-yard shuttle)) and speed, Sig = 0.026 < 0, 05, this shows that there is an interaction between training methods and speed in influencing agility abilities in the Unimed Tennis Community Ages 21-24 in 2022.

Discussion

The discussion is based on the findings of the data above, based on the statistical analysis carried out on the initial and final test of agility tennis accuracy. The following is a description of data, analysis requirements testing, hypothesis testing and discussion of research results about the effect of training methods (Three cone shuttle and J.P. shuttle (60-yard shuttle)) and speed on Court Tennis

Agility Ability in Unimed Tennis Community Ages 21-24 2022. This study's sample was divided into two groups: high and low-speed. Both the high and low-speed groups will conduct research in the form of applying agility exercises. The high-speed group was divided into 2 groups, high group 1 would do the Three cone shuttle exercise, and high group 2 would do the J.P. exercise. Shuttle (60-yard shuttle). Likewise, in the low-speed group, low group 1 will do the Three cone shuttle exercise and low group 2 will do the J.P. exercise. Shuttle (60-yard shuttle). Furthermore, this exercise is also included in the form of exercise that is very energy and energy-consuming in carrying out short movements, and this form of exercise is a very complex activity with high mobility to change the position of the body in all directions by running or stepping forward, right, left and backwards.

Hypothesis 1 states a significant difference in effect between the Three cone shuttle training method and the J.P. shuttle (60-yard shuttle) on agility ability in Unimed Tennis Community Ages 21-24 in 2022. It is proven from the results of the ANOVA test with Fcount: 6,975 with a significance value of 0.001 < 0.05. The Three cone shuttle exercise method is smaller than the J.P. shuttle (60-yard shuttle) in improving the ability of tennis courts. The three cone shuttle training method has an average increase in court tennis agility of 14.27 seconds, while the J.P. shuttle (60-yard shuttle) has an average of 12.91 seconds. The average increase in Court Agility Tennis Ability in the Unimed Tennis community aged 21-24 in 2022.

Researchers assume that in the tennis game, agility is critical because having complex and good agility will help the performance of physical endurance to be able to play longer, then make it easier for athletes to change positions and steps of players to reach and return the ball to the opponent's field. Good agility skills with a few mistakes can make a game more interesting. "The definition of agility is the ability to change the direction and position of the body or its parts quickly and precisely. An agile player is a player who moves without losing his balance and awareness of his body position" (Ismaryati, 2008). The role of agility is used directly to coordinate multiple movements, making it easier to practice high techniques; movements can be efficient and effective, facilitating orientation and anticipation of opponents and the competing environment, avoiding injury (Subagja & Komarudin, 2019). The game of court tennis showcases a lot of unique moves. This is due to the ability of physical conditions, one of which is the agility of the athletes. "I sifted through, the agility ability in tennis is supported by several elements of physical condition, including flexibility which functions when changing directions, which allows an athlete to move flexibly" (Arifianto, 2015; Oktirani et al., 2020).

The second hypothesis states a difference in the effect of high and low speed on agility ability in the Unimed Tennis

Community Age 21-24 in 2022. In the implementation process in the field for 16 meetings, it was found that J.P. the shuttle (60-yard shuttle) is better for improving court tennis agility than the Three cone shuttle exercise; this can be stated and felt by athletes because of J.P. This shuttle (60-yard shuttle) is a very competitive and explosive exercise where we are required to maintain body balance when moving quickly according to the training mechanism. In tennis, agility is an essential element in improving the physical condition of players or athletes. Therefore, agility is vital in supporting athletes' performance (Arifin & Warni, 2019).). In tennis, fostering a high sense of competitiveness within the team and matches is very important. This induces motivation to practice or compete to achieve sports targets (Mashud & Karnadi, 2015). One of the physical conditions needed to improve the ability to play tennis is agility. The agility that has been trained will be in harmony with fast, accurate and powerful strokes (Jatra & Rezki, 2022). In playing tennis, agility cannot be separated from the technical support possessed by athletes to achieve achievements. A player or athlete with good speed, especially speed, is not only able to perform a physical component, namely agility tennis perfectly, but also easily and quickly can perform movements that are still new to him; he can also change and move quickly, other movement patterns so that movement is efficient. An excellent physical component of agility will also spur athletes to become champions when competing for a long enough duration. During the process carried out in the field, where players or athletes who have high and low speeds are given training, both with three cone shuttle exercises, and J.P. shuttle (60-yard shuttle) gives satisfactory results, which can be seen from the developments that resulted from the test results given at the end of this study. However, players with high speed are better than players with low speed before the treatment is carried out.

So it can be concluded that there is a significant difference between high-speed and low-speed agility tennis ability, as evidenced by the results of the ANOVA test with Fcount: 10,560 with a significance value of 0,004. With a significance level of 0.004 <0.05. Unimed Tennis Community Players or athletes aged 21-24 in 2022 who have high speed have an average increase in agility ability that is greater than players/athletes who have low speed, but the difference in increase is significant.

The third hypothesis states that there is an interaction of training methods (three-cone shuttle and J.P. shuttle (60-yard shuttle)) and the speed of agility in the Unimed Tennis Community Ages 21-24 in 2022. In this study, a group of athletes used the three-cone shuttle training method. Moreover, high speed has an average training result of 25.41 seconds, and low speed has an average training result of 26.14 seconds, so the average difference in agility ability results is 0.73 seconds. While the group of athletes with the J.P. shuttle (60-yard shuttle) and high speed have an average

training result of 25.77 seconds, low speed has an average training result of 25.88 seconds. So that the average difference in agility ability results is 0.11 seconds. The average difference between the two groups indicates that the athletes using the J.P. shuttle (60-yard shuttle) and high speed have faster agility than the children using the three-cone shuttle and low-speed training method.

Based on the description above, this shows that athletes are not only carried out using training methods but are also influenced by speed to increase agility abilities. The findings in this study are the results of the agility ability of the Tennis Unimed community aged 21-24 in 2022, experiencing a significant increase in the group of athletes using the J.P. shuttle (60-yard shuttle) and high speed.

Previous research conducted by (Ratno & Simanjuntak, 2020; Zubaida et al., 2021) "The effect of Ladder drill exercises on increasing the agility of the Tennis Community of Medan State University 2019". The study results were that the increase in ladder drill exercises was 5.01 while the increase in the routine exercise group was 3.22. This shows that ladder drill exercises and routine exercises increase the agility of the Medan State University tennis community, and ladder drill exercises have a more significant effect than routine exercises. Then it is related to the agility training method of the previous research by Muhamad Rohadi 2019 "The influence of the distance drill training method and agility level on the accuracy of the forehand strokes of the National Tennis Club male tennis players aged 10-12 in Samarinda". The results show (1) there is an effect between short and long-distance drilling on the accuracy of the forehand strokes of the players aged 10-12 years with a total of 25,689 ($p = 0.000 < 0.05$), (2) there is an effect between the forehand speed of players with high agility is much better than those with low agility, and (3) there is a significant interaction between short and long-distance drilling and the level of agility on the accuracy of forehand strokes. It is recommended for coaches to choose long-distance drilling to improve the accuracy of tennis players' forehand strokes.

CONCLUSSION

The conclusion from the research results contains 3 main things or research results. The three main results of the research are: 1) There are differences in the effect of training methods on court tennis agility abilities in the Unimed Tennis community aged 21-24 in 2022. J.P. The shuttle (60-yard shuttle) has significantly faster agility results than the three-cone shuttle. 2) Speed Affects Agility Ability in Unimed Tennis Community Ages 21-24 in 2022. High speed has significantly faster agility than low speed. 3) There is an interaction between training methods and speed on agility ability in the Unimed Tennis Community aged 21-24 in 2022.

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