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THE CONTRIBUTION OF WAIST FLEXIBILITY AND HAND-EYE COORDINATION TOWARDS THE FOREHAND SIDESPIN SERVICE ABILITY

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Abstract

This study aims to explain the contribution between waist flexibility and hand-eye coordination to the ability of the forehand sidespin serve of UNP In-depth Table Tennis Students. This research method is a correlational method. The population of this study was all UNP In-depth Table Tennis Students totaling 20 people, sampling in this study was carried out using the Total Sampling technique. The instrument used to measure waist flexibility was measured using sit and reach, for hand-eye coordination was measured using a sensor-based (RoRo test) and the ability of the forehand sidespin service with a forehand sidespin service ability test. Based on the results of the data analysis, it shows that: 1) There is a contribution between waist flexibility to the ability of the forehand sidespin service of 81.6%. 2) There is a contribution between hand-eye coordination to the ability of the forehand sidespin service of 91.7%. 3) Waist flexibility and hand-eye coordination contribute 93.0% to the forehand sidespin serve ability of UNP's Advanced Table Tennis Students.

Keywords: Waist Flexibility; Hand-eye Coordination; Forehand Sidespin Serve

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INTRODUCTION

Table tennis is one of the most popular racket sports in the world, both as a health sport, popular sport, competitive sport, and educational sport (Asri, 2020). In this game, high-speed forehand and backhand strokes are often repeated with various footwork such as one step, no step, pivot, side step, and cross step. This game often involves repeated fast-paced forehand and backhand strokes combined with various footwork such as one step, no step, pivot, side step, and cross step (Frayogha, 2019). Someone in playing table tennis requires training. Training is a systematic process to improve physical quality and aims to improve sports performance (Abrar, 2018).

In table tennis, basic techniques must be mastered to play well and correctly. Basic table tennis techniques include holding the racket/bed, serving, hitting the ball, and several other special techniques. The most important thing to start a game in table tennis is the serve, this service consists of forehand and backhand serves. Forehand is a technique to hit the ball from the right side. This forehand stroke is a stroke that begins with facing the table, the right foot is pulled back

slightly, the body rotates to the right with support at the waist. Forehand strokes are usually more powerful than backhand strokes because the body does not block when the player swings the arm back and the muscles used are usually stronger. Having a good shot is the desire of every table tennis player, this ability does not just come naturally; it requires several supporting elements such as arm muscle strength, hand-eye coordination, waist muscle flexibility, and others.

Based on observations made by the author on Padang State University Table Tennis Study Students, these students were still not good or perfect in their forehand sidespin serves. This is because the basic technical movements are still not well mastered. Therefore, on this occasion the author wants to conduct research aimed at finding out and revealing the true facts. So this can be used as a solution to solve existing problems so that it will be better for players and athletes in the future.

According to (Pujianto, 2015) table tennis is played on a hard table, with a net dividing the table into two equal parts. According to (Santosa, 2015) table tennis is a type of game that uses a table as a place to bounce the ball. Meanwhile, according to (Saifudin, 2013) table tennis is a sport played using a rubber-coated bat to hit the ball so that it passes over the net stretched on the table.

To start a game in table tennis, a serve must be performed first. According to (Iqbal, 2015) a serve is a hitting technique to serve the first ball into play, by first bouncing the ball to the server's table, then it must pass over the net and finally bounce on the opponent's table. According to (Janin Fana, 2015) a serve is a hit performed to start or open the game with each part of the bat starting over the net. According to (Lina, 2018) a serve is the first hit performed by a player to start a table tennis game. Based on this opinion, the author concludes that the definition of a serve is a first hit performed to start or open the game with each part of the bat starting over the net, after the ball is thrown in the service area.

According to Simpson (2015), a forehand sidespin serve in table tennis is a type of serve that uses the front side of the racket and spins the ball to the side. This stroke creates the effect of the ball moving sideways, making it difficult for the opponent to return it. The forehand sidespin serve is one of the important

serving techniques in table tennis and can provide an advantage for players who master it well. The player's position when performing this serve is standing with the right foot in front and the ball beside the body. The ball will move sideways after bouncing on the table, making it difficult for the opponent to read the direction of the ball.

To create a good and correct sidespin forehand serve, players must master several physical conditions, one of which is good waist flexibility. The flexibility a person has will make it easier for them to move, their movements will appear more flexible and not stiff, as according to (Widiastuti, 2011:14) states that flexibility is the ability of the joints to carry out movements within the joint's range of motion optimally. Flexibility shows the maximum amount of joint movement according to the possibility of movement. According to (Shodikin, 2013: 113) flexibility is the ability of the wrist or joint to be able to move in all directions with a large and wide range of motion amplitude according to the function of the joint being moved. Another term for flexibility that is often found is suppleness, suppleness, flexibility. According to (Widiastuti, 2017:16), flexibility is the ability of a joint to move within the joint's maximum range of motion. Meanwhile, according to (Amin et al, 2012: 4) flexibility is a person's effectiveness in adapting to all activities with wide body extensions because in futsal when making movements if you do not have a wide range of joint movement it will be very hampering and disturbing and can even cause injury.

Apart from having good waist flexibility, players must also have balanced hand-eye coordination. According to (Agus, 2012) coordination is a person's ability to integrate various different movements into a single movement pattern effectively. Coordination is a process of muscle cooperation that will produce a structured and directed movement which aims to form the movements needed in the implementation of a technical skill. The better the coordination of all the movement elements involved, the better the movements that can be made or displayed, Irawadi (2014: 196). Good physical condition is the main prerequisite for mastering and developing technical skills (Afkhar & Rosmaneli 2019). Meanwhile, according to (Setiawan, 2021) physical condition is an important

aspect that relies on the development of the biological abilities of the body's organs, with more concentration on increasing the efficiency of the body's physiological functions with all its aspects.

METHOD

This research is a type of correlation research that aims to determine the closeness of the relationship between variables. This research was conducted at the Faculty of Sport Science, in May 2026. In this study, the sample was all 20 In-depth Table Tennis Students of Padang State University. In this study, the instrument used to measure waist flexibility was measured using sitting and reaching, for hand-eye coordination was measured using sensor-based (RoRo test) and forehand sidespin service ability with forehand sidespin service ability test. The technique used in processing this research is correlational analysis in order to prove the proposed research.

RESULTS

The normality test was conducted using the Liliefors test with a significance level of $\alpha = 0.05$. The test criteria are: If the Observation (LO) is greater than the Ltable (Lt), then the data is not normally distributed, but if the Observation (LO) is smaller than the Ltable (Lt), then the data is normally distributed.

Table 1. Data Normality Test

Data	Lo	Lt	Information
Waist Muscle Flexibility (X1)	0,122		Normal
Hand Eye Coordination (X2)	0,094	0,190	Normal
Forehand Sidespin Serve (Y)	0,141		Normal

The table above shows that the measurement value of Lo is smaller than Lt, so it can be concluded that the data is normally distributed.

Table 2. Hypothesis Test Results

Correlation Between	R _h	R _t	Koefisien Determinasi (r ²)
X1 dan Y	0,903	0,444	0,816
X2 dan Y	0,957	0,444	0,917
X1, X2 dan Y	0,964	0,444	0,929

Based on the table above, it shows that the contribution of X1 and Y is 81.6%, the contribution of X2 and Y is 91.7%, while the contribution of X1, X2, and Y is 93.0%. This means that waist flexibility (X1) and hand-eye coordination (X2) contribute positively to the ability to serve forehand sidespin (Y).

DISCUSSION

According to (Paulo, 2007) flexibility is the body's ability to stretch itself as wide as possible, closely related to the movement ability of large muscle groups and its performance capacity which is supported by the breadth of movement in the joints. The relationship between waist flexibility and the ability to serve forehand sidespin in table tennis according to (Achmad, 2013: 45) flexibility or flexibility is very much needed in performing a good forehand sidespin serve because almost all table tennis stroke techniques must have good flexibility.

Coordination is a component that supports technical skills in tennis (Nugroho, 2011:22). Meanwhile (Abrar, 2018) coordination is a series of elements of eye and foot movements that form a movement or combine several movements into a certain movement quickly, efficiently, and with full precision. The eye is the sense used for seeing. The hand is a body part from the elbow to the fingertips or from the wrist to the fingertips (Wiku, 2013). Hand-eye coordination is the ability of the eye to transmit the received stimulus to the hand that functions to carry out the movement that must be done. Table tennis is a very complex game in performing each stroke technique. Basically, every stroke in table tennis can be done in a forehand position. In a game, a player must be able to arrange a technique with the direction of the ball dropped ⁴ to the opponent's playing field, making the ball difficult to return. Players who have the ability to coordinate well between the eyes and hands will produce forehand shots that are more accurate on target, compared to players who are less able to coordinate both organs well. To do this, players are required to have good eye-hand coordination.

A forehand sidespin serve is a service technique in table tennis where the ball is struck using the front side of the racket (forehand) with a swiping or sideways motion. This stroke produces a sideways spin (sidespin) on the ball, which usually causes the ball to deflect and bounce wildly after hitting the opponent's table. In an effort to have good serving skills, mastering or mastering the technique alone is not enough because the ability to serve the upper hand is influenced by many factors, including physical condition (Irawan, 2019). With this service technique, it will be easy to deceive the opponent and will easily gain

points. From the explanation above, it has been proven through this study that waist flexibility³ and hand-eye coordination significantly contribute to the ability of a forehand sidespin serve in table tennis.

CONCLUSION

³Based on the research results that have been put forward the following conclusions, there is a significant contribution between the correlation of the contribution of waist flexibility (X1) with the ability of forehand sidespin service (Y) Students of UNP in-depth table tennis, this is indicated by the results obtained $r_{count} = 0.903$, $r^2 = 0.816$ and a large contribution of 81.6%. There is a significant contribution between the correlation of the contribution of eye-hand coordination (X2) with the ability of forehand sidespin service (Y) Students of UNP in-depth table tennis, this is indicated by the results obtained $r_{count} = 0.957$, $r^2 = 0.917$ and a large contribution of 91.7%. There is a significant contribution between the correlation of the contribution of waist flexibility (X1) and eye-hand coordination (X2) with the ability of forehand sidespin service (Y) Students of UNP in-depth table tennis, this is indicated by the results obtained $r_{count} = 0.964$, $r^2 = 0.929$ and a large contribution of 93.0%.

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