The speed and direction of the ball's rotation and its relationship to the accuracy of the front and rear side longitudinal blow in wheelchair tennis players.

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Abstract
The study aimed to identify the relationship between the speed and direction of the ball's rotation in the accuracy of the front and rear side longitudinal blow in wheelchair tennis players.
The descriptive approach wasused in the manner of correlations to suit the nature of the problem to be studied.
The research community identified the 32 players aged18 and over, and the search sample was selected from players with a local classification registered with the 2020 Wheelchair Ground Tennis Federation (2020) in the intentional manner of 8 players, using Smart Tennis Sensor technology to measure the speed and direction of the ball and test the accuracy of the front and rear side longitudinalstraightstrike. She conducted the reconnaissance experiment and then the main experiment, and the results were collected and statistically treated by spss.
The results obtained from Smart Tennis Sensor datashowthat these data are very important in measurement and training to give sufficient information about tennis strokes in terms of   the speed of the ball's rotation and rotation direction. The researchers therefore recommend that this technique be adopted during training for wheelchair tennis players because this information gives immediate feedback to the variables of each strike and thus directs the player to better performance.
Keywords : (ball rotation speed and direction -frontstrike accuracy and side longitudinal straight rear -wheelchair tennisplayers.   ).

1. Introducing research:
1-1   Introduction and the importance of research:
Wheelchair tennis is a sport that has witnessed the development of the level, and a wide scientific renaissance based on scientific research, standardized tests and training according to the technology of modern techniques. (Mohsen& Maleh:2020) Tools and devices take multiple shapes and sizes, serve different goals and enter the parts of motor skills, speed, accuracy and detail in form and content. (2018: Reid)Training and measurement with the help of modern technology tools and devices contributes to the increased response of the athlete as a result of the direct impact of sensory and moral effects, (2019: Iman and Fatima)and has effectiveness and effect on all muscles of the body in avariety of ways,(2019: Wajdan, Fatimah) As well as the information given to the coach about the abilities and possibilities of the player and the analysis and diagnosis of errors in the skilled and physical performance and the ability of the coach to correct those errors through measurement and results that show those tools.) 2009: Jayanthi)
The importance of research lies in the introduction of a modern technology technology ,smart Tennis Sensor,to the sport ofground wheelchair tennis in Iraq, and to take advantage of the information and data that appear through this technique and show its relationship in the accuracy of the front and rear side length of the wheelchair tennis players,and then guide coaches and players according to technical information in order to reach high levels of skill and athletic achievement in wheelchair tennis players.

1.2 Search problem:
When observing the training of wheelchair tennis players, it was noted that the accuracy of the   front and rear side longitudinal strikewas evident,   through the tests conducted for the sample, as well as relying on classical techniques in training and measurement and not investing in the modern technology used by most teams of the leading countries in the sport, so the researchers sought to identify the causes and introduce modern sports technology recognized from The

InternationalWheelchair Tennis Federation through Smart TennisSensortechnology, which provides instant feeding of many variables and affecting performance during training and measuring its impact, including (speed and direction of the ball),and finding solutions to the problems of weakness in the accuracy of the front and rear side longitudinal straight strike in wheelchair tennis players to advance the training process and achievement to reach international levels.

1-3   Search goal:
- Measuring the speed of the ball's rotation and its direction through Smart Tennis Sensor technology and finding its relationship in the accuracy of the front and rear side longitudinal front and rear of the wheelchair tennis players.

1-4   Search hypothesis:
- Thespeed of the rotation of the ball and the directionofeha has a moral link in the accuracy of the front strike and the back of the side longitudinal straight in the players of wheelchair tennis.

1.5 Areas of research:

Table 1 shows sample description in length, weight, time and training variables					
Variables	Units of measurement	arithmetic medium	Broker	Standard deviation	Sprain factor
Weight	kilogram	63.88	64	1.26	0.260
Total length	meter	171.22	171	1.09	0.188
Time age	year	29.77	30	1.39	0.146
Training age	year	13.22	13	0.66	0.254

1.5.1 Human field: club players and wheelchair ground tennis sub-committees.
1.5.2 Al-Zamani Field: Duration from 8-2-2-2021 to 15-2-2021.
1-5-3 Spatial field: ground tennis courts at the People's International Stadium in Baghdad province.
Researchmethodology and field procedures:

2.1 Research approach: Use the descriptive method in the manner of correlations to suit the nature of the problem to be studied.
2.2 The community and research sample:
The research community   identified the32players aged 18and over, and the search sample was selected from players with a local classification registered with the Ground Wheelchair Tennis Federation (2020) in the intentional manner of 8 players, and table 1 shows the sample description.
Table 1 found that the research sample was naturally distributed under the Kaus curve because the twisting coefficient values were confined between (+1).
2.3 The means, tools and devices used in the research:
- Arab and foreign sources and references.
- Electronic International Information Network (Internet).
- Note.
- The auxiliary[staff.]
- Smart Tennis Sensor
- International tennis court.
- Ground tennis rackets support Smart Tennis Sensor technology
- Bar measuring number (1).
- Smart Tennis Sensor
- Personal mobile device (DelliPadcalculator)
- Apple iPad

2-4 used tests:
2-4-1 Ball rotation speed and direction through Smart Tennis Sensor:
When performing the front and rear side longitudinal front and rear strike accuracy test in wheelchair tennis players, Smart TennisSensor technology is attachedto the bat in whichthe player is selectedto extract strike data according to the program associated with the technology sensors to transmit information during performance to the iPad, which includes the technology program via Bluetooth, and then stored It is extracted and extracted for each player and analyzed and shows the weaknesses and strength that the player should know about the performance of his strikes to improve his performance later during training, as well as these data were recorded to benefit from them as tests to

show the impact of this technique in the development of the skilled performance of wheelchair tennis players. The variables extracted are:

2-4-1-1 speed of rotation of the ball. They mean the speed of the ball's rotation after leaving contact with the bat. Susan, 2014.

2-4-1-2 ball rotation direction:

It includes the degree of rotation of the ball, which the less during the straight strikes was the better and the direction of the rotation of the ball that symbolizes it (+or-) so if it is (+) the direction of the ball clockwise and if (-) the direction of the rotation of the ball is counterclockwise.

2-4-2 Testing the accuracy of the front and rear side longitudinalblow.

 Testgoal: Measure the accuracy of the performance of the front and rear side straight strike.

 Test tools: tennis balls, tennis rackets, measuring tape, chargers, adhesive tape basket collection balls.

 Testprocedures: Two squares are drawn the length of each (3) m in each corner of the pitch and the grades are given as shown by the drawing in figure (1).

 The laboratory is given two experimental attempts, such as warm-up and adaptation to the test.

 Performance method: The lab stands in the chair on the middle area on the base line, and the assistant throws a ball to the lab to move the chair a little to the right to perform a straight forward blow lengthwise trying to drop it in a box and then move to the other side to perform a straight backhand and give the laboratory (10) attempts per strike. (Aman Saleh: 2003)

Test score: Give the score according to the value of the area shown in the drawing, and give zero to the ball inthe net or fall off the field and the final score (are the grades of each attempt from the right and left of the tenattempts).
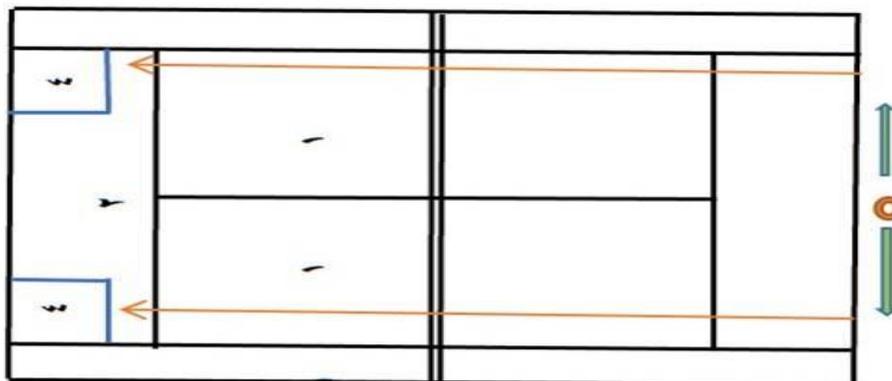
Shape(1)shows the test (safety valid) for the front and rear side longitudinal blow

2.5 Exploratory experience:

  The reconnaissance experiment was conducted on 8-2-2021 at 2 p.m. toidentify the disadvantages that may hinder the operation of Smart Tennis Sensor devices during tests and to ensure the work of the speculators used to support Smart Tennis Sensortechnology. Also make sure the Smart Tennis Sensor is connected to iPads through. Bluetooth and make sure that I record myvariables on the parent devices, and train the team to conduct tests.

2.6 Key trial procedures:

After the tests were determined and how they were conducted, and all the supplies and the auxiliary staff were prepared, the tests were conducted on Monday,   15-2-2021 at 2:00   p.m. on the ground tennis courts at the People's International Stadium on the research sample after the warm-up.   Four iPads were provided with four technically equipped rackets for testing.

2.7 Statistical means:

The results were statistically processed by spss and using the following laws:

- Arithmetic medium.   Standard deviation. Percentage law.

- Sprain factor.   -Simple correlation coefficient.

Presentation, analysis and discussion of results:

Table (3) shows computational circles and standard deviations of search variables

Statistical means	Frontstrike.			Backstroke		
	His speed is rotating.	Direction of rotation	Accuracy	His speed is rotating.	Direction of rotation	Accuracy
Mean	81.92	5.12	1.92	79.5	6.2	1.82
Std. Deviation	9.27	0.96	0.97	9.35	1.34	0.84

Table 2 shows that the search sample has a lower rotation speed during the 10 strokes performed by the player, thus requiring the player to remain at the same level at the speed of rotation of the balls during (10) consecutive strikes.

It also turns out that the direction of the rotation of the balls is always clockwise (+) and the direction decreases from10 degrees between the first strike 3 from the tenth strike for both the front andrear strokes.

Table (3)

Shows the results of the speed and direction of the ball and its relationship to the accuracy of the front and rear strike with ground tennis for the disabled.

Statistical means		Speed of rotation of balls	Direction of ball rotation	Correlation significance
Front-strike accuracy	Pearson Correlation	-0.789**	0.732**	Spiritual
	Sig. (2-tailed)	0.000	0.000	
Backstroke accuracy	Pearson Correlation	-0. 819**	0.682**	Spiritual
	Sig. (2-tailed)	0.000	0.000	
Correlation is significant at the 0.01 level (2-tailed).				

Table 3 shows a moral correlation between the results of the speed and direction of the ball and the accuracy of the front and rear strike with wheelchair ground tennis. The lower the speed of the ball's rotation and the lower the deviation of its direction, the more accurate the front and rear strike is in the ground tennis of the wheelchairs.

In order for strikes to be accurate and successful, the steering, speed and rotation factors of the ball must play an important role. (Qais, 2008:p. 65) As "the performance of the front and rear strikes accurately andwell increases the chance of the player winning the game with the least amount of physicaleffort, as well as affecting the morale of the opponent during the game so it is very necessary to skillfully take care of the accuracy of the front and back straight strikes and train them continuously and to ensure that they are mastered at a high level of stability in performance." (Zafer, 2002:p. 35)

The accuracy of the strike and its drop point vary depending on the rotation of the ball, as the progress of the ball after hitting is different depending on its direction and rotation speed, as the ball does not go straight but deviates towards the direction of its rotation. (Mark, 2006: p.59) "If we throw the ball that rotates to the left, that means that the ball will not go straight, but will veer tothe right and vice versa will veer towardsrotation." (Zafer,2014: p.43)

The researchers believe that the front and back straight strikes do not need any rotation in the ball, because they strike straight forward, so their walk is straight line.

To illustrate the rotation of the ball during the front and rear strokes, it appearsthrough the direction of the ball when itbounces off the ground after falling. (John, 2009 p. 128) Kfor this information provided bySmart TennisSensor to perform strikes and can be used in training andtesting wheelchair tennis players so we recommend using them in training and testing.

Conclusion:

The results obtained from smart Tennis Sensor data show that these data are very important in measurement and training to give sufficient information about tennis strikes in terms of the speed of rotation of the ball and the direction of its rotation the moment the ball touches the surface of the bat, as it turns out that these data have a moral correlation with the accuracy of the front and back straight strikes.

The researchers therefore recommend that this technique be adopted during training for wheelchair tennis players because this information gives immediate feedback to the variables of each blow and thus direct the player to the bestperformance.

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