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RELATIONSHIP BETWEEN GRIP STRENGTH AND BADMINTON STROKE ACCURACY

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ABSTRACT:

The researcher intended to find the relationship between grip strength and stroke accuracy of badminton sport. For the purpose of the study ten (N=10) senior level and experienced badminton players were purposively selected. The mean age and experience of the participants were 23.8±1.54 and 6.5±0.99 years respectively. The researcher used 'Grip Dynamometer' to measure the grip strength of the participants and to measure the stroke accuracy the researcher conducted 'French Short-Serve test' and 'Scott and French Long-Serve test'. The result of the study revealed that there was a strong positive correlation between grip strength and badminton stroke accuracy at 0.05 significant level.

KEYWORDS: *Grip strength and Stroke accuracy.*

INTRODUCTION:

Stroke accuracy is one of the vital requirements of champion badminton player. While watching any international badminton tournaments, always we are wondered how the players are able to hit the shuttle to land right on the side lines/ base lines. It is not their luck but their ability to control where they want their shuttle to land. The ability to control the shuttle is not a result of one or two days practice. It is the result of the player's hard work throughout the years. Apart from this so many other factors are responsible for an accurate stroke. A good technique is a must of it. Apart from a good technique so many physiological, psychological and biomechanical factors are there which cumulatively affect the accuracy of a stroke.

In the sport badminton accuracy of stroke can be considered as a fundamental skill. An accurate down the line smash or an accurate drop shot always force the opponent to be imbalanced from his base position.

The following consequences are expected while delivering an accurate badminton stroke:
- Force the opponent to move from his base position.
- Force the opponent to be imbalanced.
- Force the opponent to work hard to reach the shuttle.
- Force the opponent to deliver a weak return.

Accurate reaction to powerful and rapid stroke from the opponent is another characteristic of badminton sport. The sport badminton requires quick decisions to perform movements while accuracy in the stroke has to be maintained (França et al., 2012). Performance level of a badminton player can be differentiated on the basis of so many factors and among them movement ability and placement accuracy are of great importance. To deliver any accurate stroke players must be possessed good strength. Previous studies found that grip strength is a predictor for total muscle strength (Wind et al., 2010). Grip strength correlates significantly with shoulder internal rotation and external rotation (Gary P. Chimes 2006). Grip strength has a strong correlation with total muscle strength (Wind et al., 2010). Though the importance of grip strength in racket sports is understood, little research has been found regarding the effect of grip

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strength on stroke accuracy.Therefore the researcher intended to study the effect of grip strength on stroke accuracy in the current study.

METHODS:
Selection of subjects:

Ten (N=10) senior level and experienced badminton players had voluntarily participated in the study. All the subjects (mean age 23.8 years (SD 1.54)) had participated in intervarsity level badminton tournaments and they had mean experience of 6.5 years (SD 0.99) playing the sport badminton. All the participants were found to be right handed player. The participants were explained about the protocol of the test and doubts were clarified beforehand. It was confirmed that the subjects had not taken any heavy meal before 2 hours of conducting the test.

Selection of test:

For the purpose of the study, the researcher had conducted two tests. The first one is right grip strength test and second one is the stroke accuracy test. To find the stroke accuracy the researcher used 'French short-serve' test and 'Scott and French long-serve' test separately and the mean of the both service test scores was recordedas the final score of badminton stroke accuracy test result.

Grip strength test:

To measure the right hand grip strength of the participants; standard hand grip dynamometer was used. Standard procedure was followed to record the grip strength of the participants. Out of three trials the best trial was recorded as the final score of grip strength. The grip strength was recorded in the unit kg.

French Short-Serve test (Scot et al. 1941):

French short-serve test is an established test to measure the ability of accurate placement of badminton short serve. The participants were well versed with the skill therefore there was no need of any specific instruction of how the participants need to execute the service during test. Standard equipments were used for the purpose of the study. Following the administration procedure of the test a rope was stretched 20 inches above the net. The rope was parallel to the net and was stretched directly above it. For the purpose of the test four arcs were marked around t junction of short service line on the right service court. The marking lines of the target or arcs were of 2 inches in width and were included in measurements. The participants were required to stand on the right service court of the opposite side of the marked target arcs and were required to serve twenty legal services. To be a valid score the shuttle must pass under the rope and land anywhere in doubles service area. The point (5, 4, 3, 2, 1 and 0) will be awarded according to the placement of the shuttle. Highest 5 point will be awarded if the shuttle lands on or inside the inner arc and 0 point will be awarded if the shuttle fails to pass under the rope. For an illegal serve and if the shuttle touches the rope while crossing the rope; the trial will not be counted and the participants will get another chance. The accumulated score of all the twenty services were recorded as the test score.

Scott and French Long-Serve test (Scott and French 1959):

The pattern of Scott and French long-serve test is quite identical to the French short-serve test but the objective of this test is to measure the accuracy of placement of long service. In this test the rope was stretched parallelly 14 feet away from the net and at a height of 8 feet from the ground. The procedure and measurements to mark the arcs were quite similar to the previous test but the placement of the arcs was different. The arcs were marked at the intersection of long service line for doubles and left side line for singles. Scoring system was similar to the previous test but to be valid score the shuttle must pass over the rope. For an illegal serve or if the shuttle touches the rope, the chance of service was not counted and the participants get another chance to serve. Sum of all the twenty serves was the test score.

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To find the relationship between grip strength and badminton stroke accuracy, Product Moment Correlation Coefficient test was used by means of SPSS software.

Results:

Table 1
Descriptive Statistics

	Mean	Std. Deviation
Grip strength	41.3900	2.22533
Accuracy	82.0500	3.38666

In the Table 1, the descriptive statistics of the variables grip strength and stroke accuracy can be seen. Table 1 indicates that the average grip strength of badminton players is 41.399±2.22 kg whereas the average score in accuracy test is 82.05±3.38.

Table 2
Correlation of Grip strength and Accuracy

		Accuracy
Grip strength	Pearson Correlation	0.818[**]
	Sig. (2-tailed)	0.004

**. Correlation is significant at the 0.01 level (2-tailed).

The Table 2 reveals the result of Product Moment Correlation Coefficient test. From the table it can be clearly seen that the correlation coefficient between the variable Grip strength and Accuracy is positive and it is significant since the p value associated with it is lesser than the level of significant ($p < 0.05$).

The researcher also explored the possibilities of relationship between the age and experience with the participant's stroke accuracy ability. The results are displayed in the following tables:

Table 3
Correlation of Age, Experience and Accuracy

		Accuracy
Age	Pearson Correlation	0.479
	Sig. (2-tailed)	0.162
Experience	Pearson Correlation	0.876[**]
	Sig. (2-tailed)	0.001

**. Correlation is significant at the 0.01 level (2-tailed).

The result displays in Table 3 reveals that the Pearson product moment correlation coefficient between the variable Age and Accuracy is not significant ($p > 0.05$) but the correlation coefficient between Experience and Accuracy is positive and significant ($p > 0.05$).

DISCUSSION AND CONCLUSION:

The researcher intended to investigate the influence of grip strength on badminton stroke accuracy. The main finding of the study reveals that the correlation coefficient between grip strength and badminton stroke accuracy (r=0.818)is positive and correlation is significant ($p < 0.05$). It explains that the players who are possessing higher grip strength, are tends to have greater badminton stroke accuracy. The descriptive statistics table reveals the resultant mean grip strength of the participants (41.39±2.22 kg). Similar kind of study reported that mean grip strength of collegiate level tennis players was 47.6 + 6.2 kg(Kramer & Knudson, 1992). The result in the table 3 indicates that accuracy of badminton stroke is positively correlated

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with experience level of the player (r = 0.876, p< 0.05) whereas with their age level the result was not found to be significant (p>0.05).

From the above discussion the researcher comes to the conclusion that-
- Grip strength has a positive influence on badminton stroke accuracy.
- Age of a (High school through college age) player has nothing to be related with his stroke accuracy.
- The experience level of a player positively influence on his stroke accuracy.

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