

The interaction between serves and match winning in table tennis players in the London 2012 Olympic Games

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Abstract: the serve is a unique shot which is closely related to the player's technical and tactical strategy. The aim of this study was to assess the interaction between the serves and the match winning in high-ranking table tennis players. The sample consisted of 16 male and 16 female players who participated in the top-16 round in the single tournaments of the London 2012 Olympic Games. The chi square (χ^2) was firstly generated to analyze the mean values from the top-16 matches in relation to the gender. The Pearson's analysis was applied for the evaluation of the inter-correlation among the playing variables, while the factor analysis assessed the possible advantage of the serves win points during the matches. All statistical analyses were carried out with the SPSS-PASW 18.0 for Windows. From the results it is shown that the evaluated parameters did not differ in relation to the gender. The Pearson's coefficient presented that the earned points from the serves were significantly correlated with the overall playing performance in both male ($r = 0.98$, $p < 0.001$) and female ($r = 0.96$, $p < 0.001$) high-qualified table tennis players. Thus, the factor analysis confirmed that, with an accuracy of 93% to 94% in male and female world-class players, the successful serves lead to the win of the match regardless the number of the played games. In addition, the qualitative analysis of the winning points, when the players served, ranged between 62 % and 67 % in men and women medal winners respectively. In conclusion, the winning outcome in table tennis matches is strongly related to the successful serves of the world-class players. The findings of this study, which presented the serves advantage in the playing performance, could be valuable for the training orientation of the table tennis players.

Keywords: serves, return, technical efficiency, performance.

1. INTRODUCTION

The serve in racket sports is categorized as a special performance indicator which is related to biomechanical [1] tactical [8] and technical parameters [4]. The serve in table tennis is a unique shot which is closely related to the player's strategy, while the quality of the serve seems to be a critical factor that influences the result of the match. The essential elements in the successful serves are the combination of speed, spin as well as the depth of the ball to the table [9]. Accurate serves may offer the player an advantage in the strong third-ball attack and a direct scoring or point winning immediately after serving. With the application of the ITTF rules [6], serves implementation become more demanding because games are short and serves must be more effective and accurate. It is also of importance to note that the current ITTF regulations require that the ball must be visible as soon as it has been projected from the free hand, which means that the reaction of the opponent might be easier.

On the other hand, an effective return may balance the advantage of the player's serve. The effectiveness of a serve always depends upon the returning skills of the opponent, which means that only an outstanding serve might not be good enough to win a point [5]. Returning techniques require anticipation and concentration on serves. Similar to serves, the effective returns are the combined result of the spin, the speed and the direction of the ball which depend on the technical ability and tactical strategy of the receiver [9]. The proper combination of the accurate serves and the difficult returns may be the key factors of the ideal performance

in top-level table tennis players. Thus, the aim of this study was to assess the interaction between the serves and the match winning in table tennis players who participated in the men and women single tournaments in the London 2012 Olympic Games.

2. METHOD

2.1 Sample

It consisted of 32 players (16 male and 16 female) who participated in the top-16 single tournaments in the London 2012 Olympic Games. All of them were well experienced and high qualified players according to the 2012 ITTF world rankings.

2.2 Data collection

The analysed parameters of the matches were as follow: the games played - the games won - the points won from serves - the points lost from serves - the opponent wins points from serves - the opponent losing points from serves. The 2012 Olympic Games table tennis analysed data was derived from the official results presented by the International Olympic Committee.

2.3 Statistical analyses

The data normality was checked by using the Van der Waerden's method, while the variables' normal distributions were confirmed by the probability P-P plots. Descriptive statistics with exploration was firstly generated for all categorical variables. The chi square (χ^2) was firstly generated to analyze the mean top-16 matches data relative to the gender. The factor analysis assessed the possible advantage of the serves win points during the match, while

the Pearson's analysis was applied in order to measure the linearity in the interaction among the playing parameters. All statistical analyses were carried out by with the SPSS-PASW 18.0 for Windows. The statistical significance was set at $p < 0.05$.

3. RESULTS

From the results it is shown that the evaluated matches' parameters of the players who participated in the 2012 Olympic Games did not differ in relation to the gender. The Pearson's coefficient presented that the earned points from the serves were significantly correlated with the overall playing performance in both male ($r = 0.98$, $p < 0.001$) and female ($r = 0.97$, $p < 0.001$) players. Among the evaluated serving parameters, the highest correlations were observed between the "game-win" and the "serve-win points" in both male ($r = 0.98$, $p < 0.001$) and female ($r = 0.96$, $p < 0.001$) players. The inter-correlations of the playing parameters in relation to the evaluated serves variables are shown in Table 1.

Table 2 Total variance of the principal component analysis for male table tennis players

Component	Eigen values		
	Total	Variance (%)	Extraction
Game played	5.62	93.66	0.99
Game won	0.24	4.05	0.92
Serves won points	0.12	208	0.95
Serves lost points	0.08	0.14	0.86
Opponent's serve won	0.03	0.05	0.95
Opponent's serve lost	0.01	0.01	0.93

Table 3 Total variance of the principal component analysis for female table tennis players.

Component	Eigen values		
	Total	Variance (%)	Extraction
Game played	5.68	94.64	0.99
Game won	0.17	2.91	0.95
Serve won points	0.12	2.03	0.96
Serve lost points	0.01	0.29	0.89
Opponent's serve won	0.00	0.08	0.95
Opponent's serve lost	0.00	0.03	0.93

Table 1 Correlation matrix of the playing parameters in relation to the assessed serves variables.

	Game played	Game won	Serve won points	Serve lost points	Opponent serve won	Opponent serve lost
Game played	1	0.96**	0.97**	0.93**	0.96**	0.96**
Game won	0.96**	1	0.97**	0.84**	0.95**	0.90**
Serve won points	0.98**	0.97**	1	0.85**	0.93**	0.96**
Serve lost points	0.93**	0.84**	0.85**	1	0.94**	0.89**
Opponent's serve won	0.96**	0.95**	0.93**	0.94**	1	0.89**
Opponent's serve lost	0.96**	0.90**	0.96**	0.89**	0.89**	1

** $p < 0.01$

* $p < 0.05$

Furthermore, the principal component analysis reported that the players who won points from the serves will win more games. Thus, the factor analysis confirmed that, with an accuracy of 93 % to 94 % in male and female world-class players, the successful serves lead to the win of the match regardless the number of the played games. In addition, the qualitative analysis of the winning points, when the players served, ranged between 62 % and 67 % in both men and women medal winners during the single tournaments. The extraction method of the principal components analysis for the studied male and female players is presented in Tables 2 and 3.

4. DISCUSSION

From these results, serve and receive seem to be important indicators of performance in high-ranking table tennis players. The differences in performance related to the gender in rackets sports have been widely investigated under various conditions [3, 7, 10]. More specifically, the evaluation of the competitive performance in table tennis showed that there are not substantial differences in the way men and women approach the important points in the matches. Regarding the above findings, there are no differences in serving and winning between genders and this leads to the fact that the direct scoring from the serves is of similar importance in the performance of both male and female players [2].

According to the competitive performance of world-class players, it is noticeable that a high correlation is observed between the "game win" and the "serve win

points” and for this reason the players who won points by using their serves, had more chances to win the match. Also, the linking shots per rally and the serves can offer an overall analysis and provide a deep insight into the playing tactics used in the game. This verifies the fact that quality serves may give the advantage of direct point winning and control of games by using the preferred match tactics [5]. It is also noted that there is a high correlation between the “opponent serve win points” and the “game win” parameters. The “opponent serve win points” factor concerns the successful returns of the ball which can lead the player to win the point immediately after serving. The ability to anticipate an opponent’s intention is crucial to racket sports and the accuracy in the serve could be the “key” factor for successful results in high level players [11].

The evaluated factors of the current study cannot be directly related to the general analysis of the match. Thus, it is suggested that the interrelation of the style of the play (offense/defence) or the notational analysis of the shots regarding the win points from serves or receives should be assessed in future research.

5. CONCLUSION

This study has attempted to verify the perspective concerning the serving and the overall performance in male and female table tennis players. The conclusion is that the winning outcome in the table tennis matches is strongly related to the successful serves of the players who participated in the single tournaments of the London 2012 Olympic Games. Thus, coaches must emphasize in the development of accurate serves and efficient returns in order to technically orientate both the male and female players. So, the athletes and the coaches must analyse the appropriate practical data referring to the parameters of serves, such as the type, velocity, spin and placement of the ball on the table in order to gain the adequate quality and practical efficiency.

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