

Playing the first or the second bounce in wheelchair tennis

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ABSTRACT

The objective of this article is to analyse the influence of the use of the bounce on the differences between the winner and the loser of a set during a tournament in wheelchair tennis (WT). A total of 16 international matches were recorded and analysed. The type of stroke and the number of bounces before hitting the ball were also studied. The results showed that WT players usually hit the ball after the first bounce (80.95%) and 97.19% of returns are hit after the first bounce. The second bounce is significantly used by the winners of the set. Furthermore, the use of the second bounce by WT players reduces the number of errors and increases the number of winners when compared with hitting the ball off the first bounce.

Key words: Adapted tennis, regulation, tactics.

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INTRODUCTION

Some sports have adapted their rules for persons with some kind of disability. WT has slightly modified its rules to maintain a structure that is similar to that of conventional tennis. In this way, in WT the ball can be hit after it has bounced twice (ITF, 2017). No study has been found that evaluates player performance when playing with either one or two second bounces. Thus, the objective of this study is to investigate the influence of hitting the ball after the first or the second bounce on performance at the top WT level.

METHODS

A total of 32 sets in 16 men's singles matches from the National Masters, in which the 8 top nationally ranked players played, were played and analysed. Four of the players were outside the top ITF 100, and the others outside the top ITF 200.

All matches were played on hard in-door surfaces. A best of three tie-break sets format was played, with a 10-point super tiebreak as the third set. Each match was filmed using a Panasonic HC- Panasonic HC-V700 (Panasonic-Japan) wide angle camera, which was placed in the corner of the court, so as to have a total vision of the court.

An excel sheet was designed to code actions. Each action was coded following the same process: 1) Player, 2) Number of

bounces before stroke hit or missed by player, 3) Type of stroke used (return, groundstroke or shot at the net, i. e. volley or overhead), 4) Stroke performance (error, continuity or winner), and 5) winner of the set.



Before coding matches, two observers were trained and inter and intra observer reliability tests were conducted generating values of 0.97 and 0.93 respectively using Cohen's Kappa, which are considered good values (>0.80) (Landis & Koch, 1977).

5720 strokes were hit in 32 sets over 16 matches. The study only analysed 4021 strokes, discounting first and second services, as they are hit with no bounce. The data was exported to SPSS 22.0 to calculate percentages, means and standard deviations for each variable. The Chi-squared test was used to

compare the differences between the number of bounces (0, 1, or 2) and the performance in the set (winner and loser). The significance level was set at $p < .05$.

RESULTS

Table 1 shows the percentage of the number of bounces used by players for each type of stroke. When returning, players hit the ball predominantly after the first bounce (97.19%). The same situation of predominantly hitting after the first bounce also occurred for groundstrokes (75.19%), although there is a greater presence than before in the number of double bounces. (24.81%)

	Number of bounces		
	0	1	2
Returns (%)	.00	97.19	2.81
Groundstrokes (%)	.00	75.19	24.81
Strokes at the net (%)	94.07	5.93	.00

Table 1. Relationship between the number of bounces and the type of stroke.

Table 2 shows the differences in the use of the bounce between the set winner and loser. The percentage of strokes with no bounce is 2.81%, while 81% are after the first bounce and 16% after the second bounce. The winner of the set plays a significantly lower number of strokes with no bounce (39.8% vs. 60.2%) and a greater percentage of strokes using the second bounce (44.6% vs. 55.4%) as compared to the set loser.

Figure 1 shows that WT players make a greater number of errors than winners regardless of whether they play the stroke off 0, 1 or 2 bounces. The greatest differences were found in the strokes played without a bounce before.

Number of bounces before stroke	Set performance		Total
	Loser	Winner	
			% of total/column
Shots	68	45	113
0 bounces	% of shots with 0 bounces	60.2%*	39.8%
	Adjusted residuals	2.2	-2.2
Shots	1657	1598	3255
1 bounce	% of shots with 1 bounce	50.9%*	49.1%
	Adjusted residuals	2.0	-2.0
Shots	291	362	653
2 bounces	% of shots with 2 bounces	44.6%	55.4%*
	Adjusted residuals	-3.1	3.1
Total	Shots	2016	2005
	% of all shots	50.1%	49.9%

* Significant difference ($p < .05$)

Table 2. Differences in the use of the bounce between the set winner and loser.

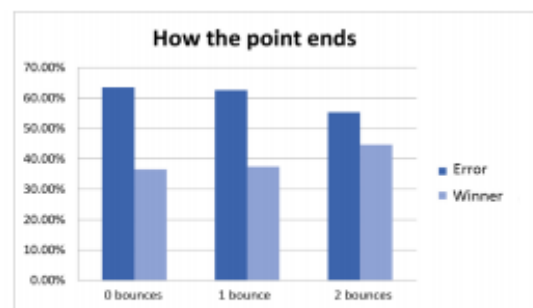


Figure 2. Percentages of how the point ends (winners and errors) for each bounce category of stroke (0, 1 or 2 bounces).

COMMENTS AND CONCLUSIONS

This study aimed to investigate the effect of using the first and second bounce in wheelchair tennis and observe the possible differences between the set winner and loser. As far as we know this is the first study that highlights the variables concerning the use of the bounce in WT.

WT players predominantly hit the ball after the first bounce (Table 1) and over 97% of returns are hit after the first bounce. This way, the receiver shortens the time the server has to react after they serve. This is very important in WT as after serving the player is in a more static position, so it is more difficult for them to move the chair quickly since the most effective propulsion strategy is to get to the maximum speed in the least amount of thrusts possible (Goosey-Tolfrey & Moss, 2005). This is easier from a dynamic position, similar to the split step in conventional tennis. Hitting the ball after the first bounce when returning could explain why WT players play a greater number of winners when returning than conventional tennis players (Sánchez-Pay, Torres-Luque, Cabello Manrique, Sanz-Rivas, & Palao, 2015).

25% of groundstrokes are hit after the second bounce (Table 1). The second bounce is normally used to play further behind the baseline in a more defensive style (Sanz, 2003); this is where players spend the most amount of time during points (Filipčič & Filipčič, 2009).



However, data from Table 2 shows that the winners of the set play more strokes after the second bounce than the losers do (55% vs 44%). On the one hand, this could be due to better space management, or even to the playing level of the players. In this sense, one could think that lower level players hit the ball with less power, so their opponent will need to return after the second bounce as this is when the ball will reach them at the baseline. Likewise, higher level players will hit the ball with greater power which means that their opponent will have to return after the first bounce, even if they are further back behind the baseline. Even though the stroke percentage after the second bounce is only 16%, the difference in the way the point ends (error or winner) is greater in the first bounce than in the second (30% vs. 10%), with the point more likely to end with a winner when the stroke is made after the second bounce (Figure 1).

Strokes at the net area do not seem to be very common in WT matches, as they only occur more or less 3 times per set (Table 2), a value which is similar to that of other studies (Sánchez-Pay, Torres-Luque, Fernández-García, Sanz-Rivas, & Palao, 2017). Besides, players do not seem to perform well using net strokes, as they are more commonly used by set losers (60%) than set winners (40%). Moreover, net strokes give a proportionally greater number of errors and smaller number of winners than strokes played after one or two bounces (Figure 1). As well as being uncommon, net strokes provide players with a lower success rate. This could be due to the fact that WT players take longer to get to the net than conventional players, as well as that they are in a lower position in comparison to players who are standing, so they can be more easily passed with a lob or passing shot.

This study provides values that can be used to help understand the use of the bounce by WT players. Although the ball is mainly hit after the first bounce, winners seem to make better use of the second bounce from a tactical point of view. Future research may investigate the relationship between the use of the bounce and the area of the court where shots are hit from, and then relate this to the level of the player. It would be necessary to analyse the use of the bounce in relation to the different levels of the players since the hitting power could influence whether the opponent hits the ball after the first or second bounce. Likewise, female, quad and doubles categories must be studied so as to be more specific when designing training plans.

REFERENCES

- Filipčič, T., & Filipčič, A. (2009). Analysis of movement velocity and distance covered in wheelchair tennis. *Kinesiologia Slovenica*, 32, 25-32.
- Goosey-Tolfrey, V. L., & Moss, A. D. (2005). Wheelchair velocity of tennis players during propulsion with and without the use of racquets. *Adapted Physical Activity Quarterly*, 22, 291-301. <https://doi.org/10.1123/apaq.22.3.291>
- Landis, J. R., & Koch, G. G. (1977). The measurement of observer agreement for categorical data. *Biometrics*, 33(1), 159. <https://doi.org/10.2307/2529310>
- Sánchez-Pay, A., Torres-Luque, G., Cabello Manrique, D., Sanz-Rivas, D., & Palao, J. M. (2015). Match analysis of women's wheelchair tennis matches for the Paralympic Games. *International Journal of Performance Analysis in Sport*, 15(1), 69-79. <https://doi.org/10.1080/24748668.2015.11868777>
- Sánchez-Pay, A., Torres-Luque, G., Fernández-García, Á. I., Sanz-Rivas, D., & Palao, J. M. (2017). Differences in game statistics between winning and losing for male wheelchair tennis players in Paralympics Games. *Motriz: Revista de Educação Física*, 23(3), 1-6. <https://doi.org/10.1590/s1980-6574201700030011>
- Sánchez-Pay, A., Torres-Luque, G., Fernández-García, Á. I., Sanz-Rivas, D., & Palao, J. M. (2017). Differences in game statistics between winning and losing for male wheelchair tennis players in Paralympics Games. *Motriz: Revista de Educação Física*, 23(3), 1-6. <https://doi.org/10.1590/s1980-6574201700030011>
- Sanz, D. (2003). Wheelchair tennis. Barcelona: Paidotribo.

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