

FINDING THE OPTIMAL POSITION FOR BETTER TENNIS SERVING

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## ABSTRACT

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This experiment was done to determine the optimal position for serving in tennis so that the serve is successful most of the time. Several different serve positions were tried and videotaped. These videotapes were then analyzed very closely, using different types of software, to find the distinctions in the serve positions and find out which serve position yielded the best results (the one that was successful mostly).

## 1. INTRODUCTION

The tennis serve is recognized as the most important shot in the entire game. If a player does not have a good serve, especially a good second serve, the entire match goes down the drain. There are many different serve techniques today and everybody has a different one that works for them. That is why we studied different serve angles, techniques, and body positions [Figure 1].



Figure 1: Picture of one of sample serves

## 2. BACKGROUND

Despite all the professional tennis players out there in the world today, only some scientific research has been done to figure out which body position is the best while serving. They all have their own methods, but most of these players' techniques are what they have learned from their coaches and trainers. Mostly all of these researchers say that the three most

important points of the serve are the starting position, the contact with the ball, and the follow-through. These are the three that were studied in this experiment.

### 3. METHODS

In this experiment, we studied the different types of techniques of serving in tennis and analyzed which one is the best that is which is successful most of the times. First, we videotaped different methods of serving and looked at them using Windows Movie Maker as shown in Figure 2.

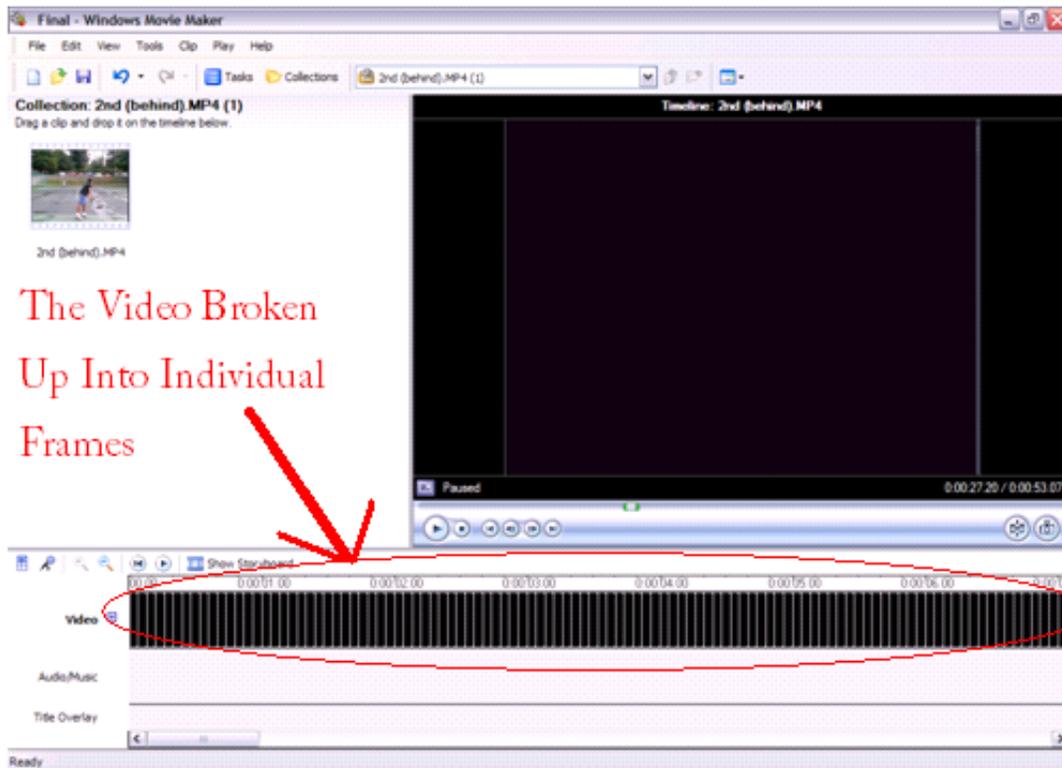


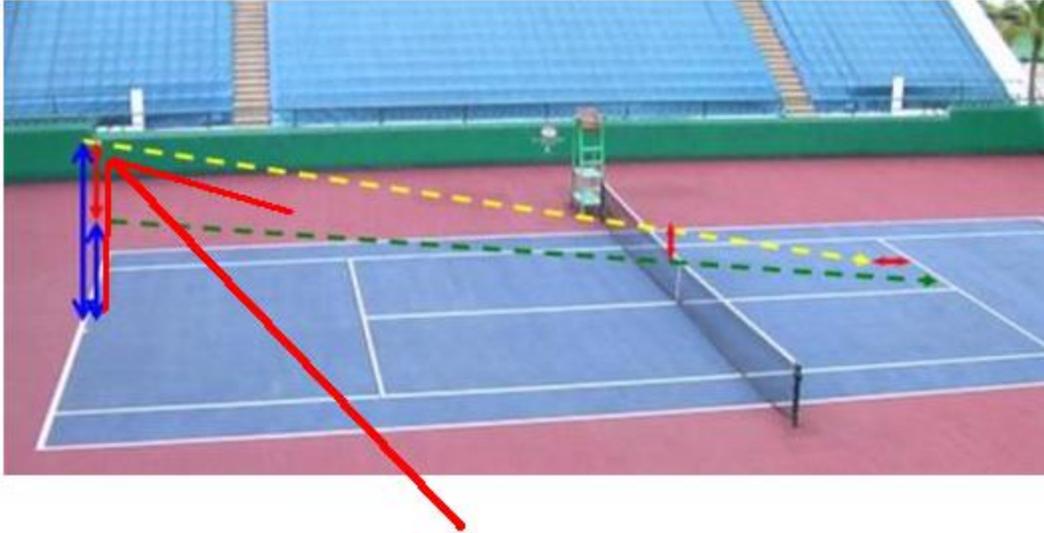
Figure 2: The video broken up into individual frames

This video was broken up into many frames and the needed pictures (Starting Point, Contact Point, and Follow-Through) were taken from these for further examination in MS Paint [Figure 3].



Figure 3: The pictures from the video were analyzed in MS Paint

As shown in Figure 3, lines were drawn on the posture of the serves and the angles between the lines were studied so as to determine the most favorable one. MS Paint was used as a tool to draw the lines. Most researchers say that the greater the angle of serve, the better it is due to more margin for error in consideration to the service line (horizontal line in the center of both sides of the court) and less risky when going over the net. The angle that they are talking about here is the angle at which you hit the serve (the angle between the ball and the player) as shown in Figure 4.



**This is the angle that I am studying**

Figure 4: This is the angle that I am talking about when I mention studying the angle

The pictures were then compared position by position, i.e. the starting point for the 1<sup>st</sup> serve on the 1<sup>st</sup> videotape was compared with the starting point for the 1<sup>st</sup> serve on the 2<sup>nd</sup> videotape and so on. The comparison is shown in Figure 5.

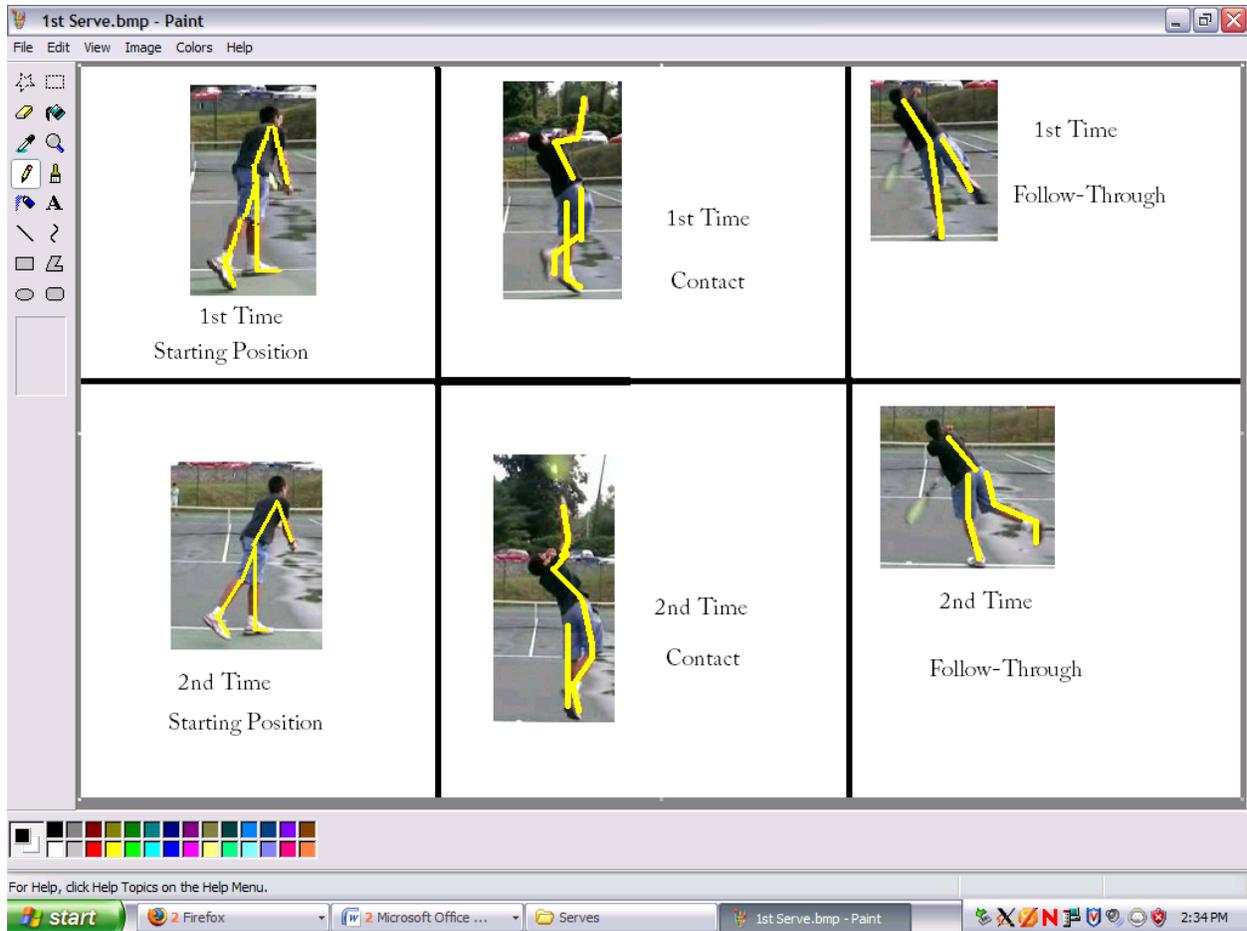


Figure 5: The correlating serves were compared to each other

We examined which tapes had the greatest angle and it was true that the greatest angled serves were the best serves.

#### 4. RESULTS

From this experiment, I found that if the player did not use the correct body position, the serve did not go in the sought after region (the diagonal box across from the server). At times when the serve was unsuccessful, the player did things differently from the one that made its way to the sought after region. Considering the starting position for unsuccessful serves, the player was facing more inwardly but for successful ones, the player was at a 90 degree angle with the

base line (the furthest back line on either side). Also, for the contact point, the player did not extend his arm on the one that did not go in, but did extend his arm on the one that did go in. Finally, on the follow-through, the player just pivoted after the serve on the one that did not go in, whereas the player actually made a full follow-through let his right foot come forward and stepped into the court to finish on the ones that were successful.

## **5. CONCLUSION**

After all this data was studied, we discovered that even the slightest mistake in any of the three important categories could mess up the serve no matter how much concentration was put on the other two, if one cannot master all three of these perfectly, then same results are not produced. We also figured out that the angle of the server's body is correlated to the net. And the angle at which the player hits the serve also matters so that he has enough room for error with the service line and it is not as risky. Also, from this experiment, it can be concluded that the player must start at a 90 degree angle with the net. He must also extend his arm in almost a straight line while hitting the ball in the right direction. Lastly, he must make a full follow-through by letting his right foot come forward and step into the court to make a full finish instead of just pivoting around on his left foot.

## **6. FUTURE WORK**

In the future, several more variables could be tested. These variables include the amount of skill and experience that the player has, as well as, racquet type, string type, the grip that the player is using and even weather conditions such as bright sun, rain, or temperature, which can affect the pressure inside the tennis balls and can have an effect on how far they go.

## 7. REFERENCES

[1] Petal. "Main points for topspin serve." *Tennis the game of passion*. 27 Jan 2009. 21 Jul 2009

<http://tennisbloghere.blogspot.com/2009/01/main-points-for-topspin-serve.html>