Indicator of depth for the return of serve.

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ABSTRACT
The analysis of the ball toss in service during competition matches of eight professional women players, with an average WTA ranking of 67.13 (s = 29.38) was meant to find perceptive indicators that facilitated the anticipation on the return of service. The findings have presented predictive values that stated that the height at which the player tosses the ball predicts the service depth. This paper discusses the relevance of this indicator for the return of service.

INTRODUCTION
The action of anticipating the ball in high speed situations requires an elaborate response in a short time; due to the constant evolution of the sport, it is a very interesting and important issue, both in didactic books as well as in scientific articles and specialized magazines as this one (Crespo, Reid, and Quinn, 2006; Crognier and Féry, 2005; Huys, Smeeton, Hodges, Beek, and Williams, 2008).

It appears to be very concrete, but its complexity becomes evident when we observe that in order to anticipate, it is possible to start either from the physical and psychological preparation or from the technical, tactical or strategic aspects.

When discussing perception of technique at a functional level, we mean perception of movement, where some changes in the stimulus values let player adjust their response in a faster way. Roca (2006) states that these stimulus values generate other stimuli and response values. This is defined as perceptive indicator.

This pilot study carried out with eight professional players (average WTA ranking 67.13, s = 29.38), targets ball toss in service during official competition, assuming that we could provide perceptive indicators on the service to facilitate anticipation on return.

Two dimension footage and predictive statistics were used. Findings were really surprising because not only did they show that ball toss provided different information for a player during a tournament (Zawadzki, Roca, and Vallejo, 2008), they also provided significant transversal values for all the group. (Zawadzki and Roca, 2008). This paper discusses these last values.

Perceptive indicator of depth
The findings were related to the depth of the service of women players, with special attention being paid to the relationship between the instant in which the ball leaves the player's hand and the beginning of the flight of the toss. Considering this relationship we have been able to predict 84% of the services, since the higher the ball was released, the shorter the service, and the lower, the deeper, (Figure 1), regardless of speed or type of service (first of second).

Figure 1. Perceptive indicator of depth for service return: In green, the lower the ball is released, the deeper the service will be, in yellow the reverse situation.

Besides, as Figure 1 shows, it is important for the return to notice the different heights at which the ball is hit, this will determine the depth of the serve, a fundamental concern.

The importance of the indicator of depth
Considering that the relationship we are setting explains a single aspect of the perception of the return, and that besides, this is related to other aspects that are also relevant, we will explain some basic implications on the technical and strategic actions of the return of serve.

Bollettieri (1995) recommends shortening the preparation of the return depending on the variation of the speed of service.
It is therefore important to take into account the height at which the service lands, and therefore, the depth of the bounce. A poor preparation may bring about two initial problems, presented in Figure 2.

![Figure 2](image)

**Figure 2.** Basic problems in the preparation; in a) the result of a lob return, and in b) a return directed to the ground or the net.

These problems might involve directly losing the point, putting the player in an emergency. In the case of advanced players, this probably helps to explain the reason for blocked returns and the sudden changes in spin and speed in their other strokes during the match.

Coming back to the indication of depth, the ups and downs in performance is conditioned by other important factors: let us consider two different services with the impact point at the same height, but because they differ in spin and speed they bounce with different depths, causing the same problem as shown in Figure 3a.

A second variation of the bounce could happen if two different services, hit at different heights, were just as deep, as shown in Figure 3b.

![Figure 3a and 3b](image)

**Figure 3.** In a) variation of the height for return according to the depth of the bounce, and b) the same variation resulting from the variation of the impact height in service.

But when watching professionals, it is possible to define two different types of common strategies: 1) those who get into the court to return; normally fast court players, who consciously or not, reduce this opening angle as well as the height angle resulting from the bounce. This indicates that these players can benefit from the relevant perceptive indications of the opponent’s service; and 2) the players that go back to gain time to return, usually clay court players. It is obvious that, on the other hand, they have more court to cover for a successful return.

Normally, this strategy is more common in clay because it allows for a more aggressive return and adds pressure to the opponent.

But when the player chooses this second strategy on fast courts, we ask the following questions: is it because of the certainty of a better return or simply because they are not able to anticipate their opponent’s service? Or, is it both?

The least we can say is that the findings of the research presented in this paper set a limit to some factors that impact on the return of serve and help us increase our knowledge to prepare training and competition plans to improve this stroke that is so important in modern tennis.

ACKNOWLEDGMENTS

To the research and tuition departments of the Catalan Tennis Federation (FCT), the Real Federación Española de Tenis (RFET) and the International Tennis Federation (ITF), represented by Josep Campos, David Sanz and Miguel Crespo, for their institutional support, and the Agency for University Help (AGAUR) and the Cataluña National Institute of Physical Education (INEFC) for funding this research. (DOGC 5010-16/11/2006).

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