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12. Diagnostics of Speed Abilities in Tennis

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Key words: tennis, reaction abilities, speed abilities, tennis skills

Abstract

The aim of this study is to offer and introduce a modern specific laboratory test. It is based on actual knowledge of tennis performance. Each player has specific technique and uses modern materials (racquets, balls). Actual top tennis players achieved better results in this test which consists new open and semi open stance. On the other hand, former top tennis players used to play mostly in close stance, were better in old style of laboratory test which has similar stance like old fashion style. That is why we recommend the modern laboratory test for diagnostics of speed abilities in tennis.

Introduction

The game in modern tennis is very fast with high accuracy, there is not enough time for fine preparation for every shot and the player has to react very fast and anticipate as well.

Because the tennis game is so fast and precise, the correct shot appears to be quite difficult motor task. This is based on common combination of reaction, speed and balance abilities which go hand in hand with sport skills and experiences. The level of these mentioned factors plays a key role in tennis performance. From different forms of speed at tennis game, the most often are reaction speed (immediately after appearing of stimulus and after its identification), starting speed (up to 2 seconds) and accelerating speed. Because of very short time before the shot there is impossible to achieve maximal speed, which can be reachable in range from 4 to 8 seconds at sprint runners. So in tennis it is better to talk about maximal fast movement with the correct timing during the shot (Psalman 2005).

Development of speed has some limits and tennis players need to change their techniques of shots and standing. This is the reason why we can see athletes playing and standing in open stance (Bollettieri 1999), which is more modern and what is important it takes less time and body position is more stable.

Aim

The aim is to suggest the new test for measuring tennis reaction and speed abilities and based on this results to improve training process.

Tasks

- Analyze tennis game of the best players from the aspect of reaction and speed abilities
- Choose an experimental group of top junior tennis players
- Choose tests for diagnostics of reaction and speed abilities
- Realize practical running tests
- Realize laboratory measurements for reaction and speed abilities
- Suggest and describe the modern specific laboratory test for diagnostics of speed abilities at semi open stance

Material and methods

Professional tennis players had been recorded and analysed. Records were taken from ATP tournaments.

Experimental group was tested in age of 15 years. All players are members of top tennis clubs in Slovakia.

For testing speed abilities we establish battery of these tests:

1. Running tests (sprints) for different distances from 10 to 50 meters.
2. Simple reaction time for the optical stimulus.

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3. Test for measuring reaction and speed abilities at semi open stance.

To avoid some bad start in running tests we realize two sprints on each distance and the better result was taken into the consideration.

The second test, the simple reaction time for optical stimulus has been chosen. Each attempt consisted of ten random stimuli, created with the help of computer.

The third test, motor test for measuring reaction and speed abilities at semi open stance is a special laboratory test for tennis players. It simulates two basic tennis strokes – forehand and backhand if there is not too much time for preparation. Description of this test is seen on figure 2. The criterion is the better mean value of two series of random 20 stimuli, 10 on each side.

Results and discussion

The analysis of the best world tennis players showed following time relations. Of course, it is clear that player has to react not only for ball velocity but for its rotation as well. The speed of serve is sometimes reaching values which are very close to 230 km/h and values about 200 km/h are very frequent. From this it is possible to calculate preparation time for return, which lasts about 0,5s. Receivers can gain some extra time if they are standing approximately 2 meters behind the base line. Average time from ball leaving the racket and crossing the net is only 0,21s. Another 0,1s is needed to fall down on the court in serve area. In case of some tennis rally, there is little bit more time (time for adequate reaction is between 0,5 to 1 second).

Some results in sprints we offer in figure 1 where we choose four very different players. Here we can see significant differences in standard 50 m sprint but in shorter distances performances are more equal and there is no significant difference in these short fast movements and in tennis performance as well. From this point of view it seems to be normal because in tennis game does not exist any 50 m sprints at once and running distances are much more shorter. In addition tennis movement is not only forward running but it is realised in different directions and ways.

Achieved results of simple reaction time showed a high level of reaction abilities at observed tennis players, especially if we compare their results to the other players. The results were in range between 0,099 and 0,168s with average value 0,138s in experimental tennis group. Each personal perfomance is related to testing experience and it is possible to develop reaction abilities up to 10 % in this age category (Kasa 2006).

Reaction and starting speed is often measured by agility test (Zemkova & Hamar 2004) which brings responsible results for athletes. But for tennis players was some specific test needed. Test for measuring reaction and speed abilities at semi open stance (Fig.2) indicates similar results like agility test but movement is like in tennis game. This specific test can be added to specific training means because it brings time benefits. The progress which was recorded in one sport season in our experimental group represents an average difference 0,051s. Such improvement can be considered for sufficient, which allows longer preparation for every shot or the fastest open stance with correct balance can allow return hardly achieving ball. Comparing to more often used close stance where the lower extremities are almost crossed, there is a time difference up to 0,1s and this is why the open or semi open stance represent the new modern style.

After one season of general and special speed trainings, experimental players differ and started to be apparently better prepared and achieved higher ranking.

Conclusions

1. High level of reaction and speed is needed because of less time for preparation.
2. We recommend to realize sprints for very short distances in different ways of running.
3. We recommend the modern laboratory test for diagnostics of speed abilities in tennis.

References

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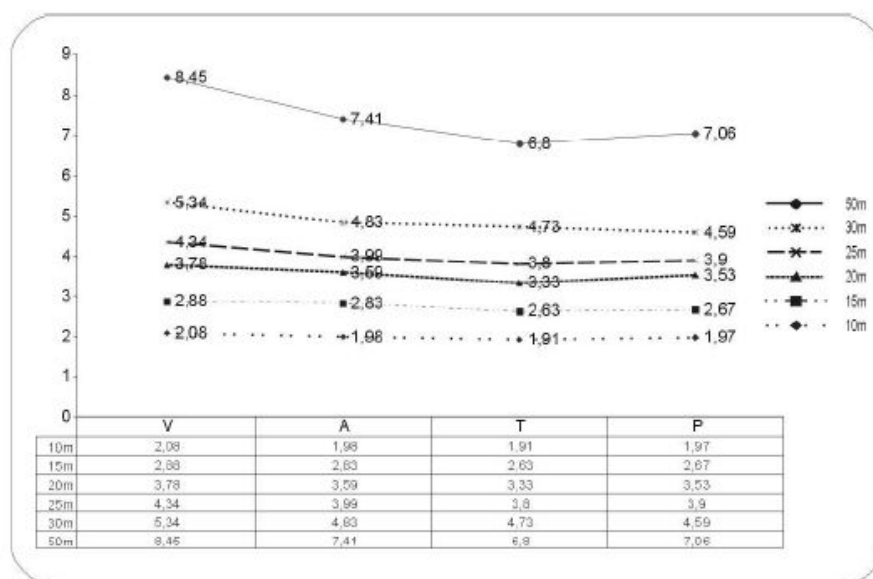|	V	A	T	P
10m	2,08	1,98	1,91	1,97
15m	2,88	2,63	2,63	2,67
20m	3,78	3,59	3,33	3,53
25m	4,34	3,99	3,8	3,9
30m	5,34	4,83	4,73	4,59
50m	8,45	7,41	6,8	7,06

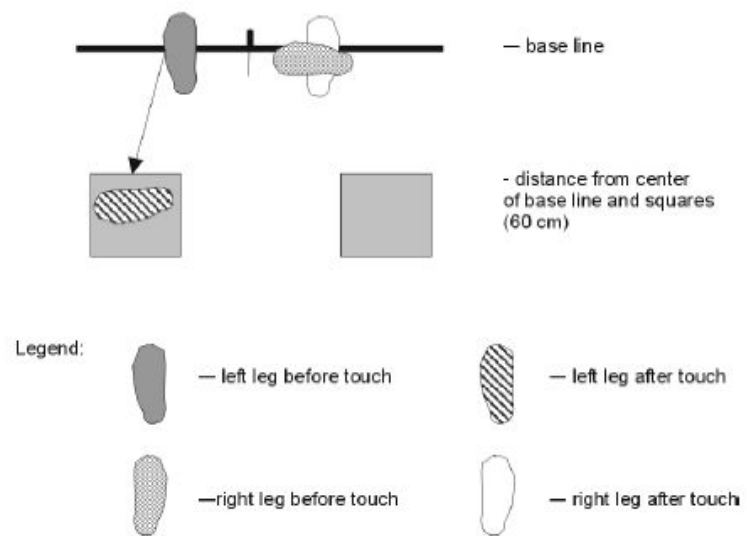Figure 1. Results in sprints for different distances

Figure 2. Test for measuring reaction and speed abilities at semi open stance