

33 RESEARCH GRANT REPORT

Physical Preparation for Junior Tennis Players

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Introduction

The continuous transformation of competitive tennis and physical performances represent the starting point in finding solution to develop the physical preparation. In the last decade, an increase rate of specific injuries was considered the main limitation in achieving high level results. All these conducted to some physical tests implemented for all junior tennis players. For each test a scale was established in order to make a proper evaluation of tennis player that was investigated. The test scale allows the coaches to analyze the player physical performances and to set general training direction in order to improve the player results. All measurement is considered when analyzing a junior tennis player physical performance. By motivating the coaches and players to work and practice better, general and individual adjustments of the training programs are ensured.

To analyze the junior player long term development, initial measurements are mandatory. During the analyze, unique test procedures and complex test are used. All these data are further used to adapt the training and to make it more efficient.

The tennis match can be characterized by intermittent efforts of the whole body because it consists of alternating short attacks (that take between 1 and 9 seconds) with high intensity hits and short recovery (10-19 seconds). Between the games, when they are changing courts, the players have a longer rest period (90 seconds). The match duration is usually around 2 hours. During a point a player usually run 8-15 m with 3-4 changes of direction, hitting the ball 4-5 times (depending on the level of the player and the surface (slow or fast)). The players need to react quickly and to move multidirectional.

Thus, during the tennis match, the demands alternate between providing energy for high intensity attacks / strokes (through intramuscular phosphates and glycolysis) and replenishing energy sources and restoring homeostasis in time intervals (through oxidative metabolism). Therefore, in order to be successful in the competition and to tolerate the demands of intensive training, tennis players need a mixture of speed, agility and power, combined with medium-high aerobic and anaerobic capacities linked to whole body muscle groups.

Purpose

Test scales are used to examine the abilities of junior players for performances. We used laboratory tests for basic physical performances analyzes and specific tests for a better evaluation of the tennis players. The physical profile of the junior player was made based on the tests results. This profile was used to develop individual training program.

The objective of this research is to describe, evaluate and analyze physical test performances for different players and to use these results for physical training optimization. Specific methods are used in the training program to develop the technical skills of the junior tennis player.

Methods

Laboratory and specific tests are used to analyze the physical condition of the tennis player. We used laboratory tests to measure the aerobic power. The duration and the intensity of the test conducted to various results. We performed different incrementation steps, different time intervals and number of stages. The results obtained for the male tennis players in our club can be summarized as follow: for the anthropometry test we obtain height 148.9 cm for U12, 169.4 cm for U14 and 178.1 cm for U16, weight 44.8 kg U12, 56.3 kg U14 and 62.6 kg U16 and Body Mass Index 16.8 U12, 18.5 U14 and 19.9 U16; for the strength and power test we obtained grip strength (dominant hand) 21.3 kg U12, 23.5 kg U14 and 25.7 kg U16, counter movement jump 28.9 cm U12, 31 cm U14 and 36.5 cm U16, medicine ball throw 502.6 U12, 612.3 U14 and 713.2 U16.

These laboratory results were obtained that are further used to establish specific tests that are performed by each junior player on the tennis court. The endurance of the player is very important during a tennis match. So, this physical skill should be improved for every junior that perform competitive tennis. In the tennis literature we can find many resistance tests that can be used to evaluate a junior player. To evaluate the endurance of the tennis player we used the Hot and Return test and we obtained the values: level 12.5 for U12, level 14.2 for U14 and level 15.7 for U16.

The service velocity was also measured, and the following results were obtained: 131.5 km/h for U12, 157.7 km/h for U14 and 170.1 km/h for U16.

We also tested the speed and agility of the juniors in our club: for 10 m we obtained 2.05 s U12, 1.95 s U14 and 1.84 s U16; for 20 m we obtained 3.66 s U12, 3.37 s U14 and 3.22 s U16; for sprint forehand, we obtained 3.96 s U12, 2.93 s U14 and 2.73 s U16 and for sprint backhand we obtained 3.12 s U12, 3.08 s U14 and 2.94 s U16.

Main objective of these physical test was to make the junior tennis players aware of the importance of physical training in the process of training for the high-performance. Practical tests of the physical training level are used in order to accumulate concrete and specific data that are further used to develop optimal training programs. All tests' results, grouped by age and sex, are saved in databases and then they are analyzed. The correct quantification of physical training current level is ensured by physical trainers that support and manage the tests. During the analyzation phase, the evolution of each tennis player from one test to another (progress, regression, stagnation) was correlated with the past scale imposed for the player age and sex group. The increase of the values registered from year to year for each tennis player in relation to his physical potential and, at the same time, with the specific requirements of the international performance is a mandatory goal for achieving great

performances. The training program will include specific tennis lessons as well as physical training. It is recommended to have a reference physical trainer to deal with the programming and planning of physical training. The coach - physical trainer relationship is very important. The coach is the one that must coordinate the entire training, but he must be in permanent interaction with the physical trainer. Most physical trainers come from other sports, which leads to ignorance of the specifications, methods and means necessary to train a tennis player.

There is still no emphasis on the development of physical capacity gradually and methodically, from an early age, most tennis players starting too late to work physically. However, as a result of the introduction of physical tests, the tested tennis players registered higher values compared to the first indices, which denotes an increase of their interest towards the physical training segment.

Results

From our study, we can conclude that the level of physical training at the end of the competition season is greater compared to the beginning of the competition season. The tennis players are training very hard through summer competitions and do not have a proper training during the winter. If we make some evaluation tests, we can observe that the values recorded in the spring are often lower than in winter. The short-term objectives (the accumulation of national and international points) often represent real barriers in order to establish a competitive program suitable for each tennis player, the physical training becoming the most often completely ignored or neglected. The test results were used to develop an individual database that was further used to create an effective physical training program. Each individual result was compared with the category results, and, based on the percentages computed, the coaches and the physical trainers were able to create specific training sessions (based on weakness and strengths) that can conduct to physical performance improvement.

Conclusion/Discussion

This study was conducted in order to obtain physical improvement of junior tennis players related to their performance level, since the observed differences between performance levels of tennis players remain almost constant from when they pass from U14 category to U16 category. Since not all tennis performance can be explained by physical components, other performance parameters such as technique, tactical and psychological elements, need to be included in the evaluation program. The training must conduct to tennis performance improvement by taking in consideration these parameters.

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