

The Prevention of Tennis Players' Traumatism Using the Means of Stretching

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Abstract

The paper presents materials on the study of the problem of sports injuries in tennis. It has been studied the possibilities of stretching means in the prevention of injuries in tennis players.

The experimental technique included the use of stretching exercises in the preparatory and final parts of the training session. There were tested methods of active dynamic stretching, the method of agonistic stretching, and stretch exercises, performed in the mode of holding the maximum amplitude in different positions of the stall.

As a result of the introduction the stretching program into the training process, the number of injuries among tennis players was reduced by 21.1%.

Keywords: Lawn Tennis; Injuries; Stretching

Introduction

It is generally acknowledged that the greatest opportunities for activating the body's resources for increasing the special working capacity consist in improving the means and methods of training, the modes of operation and recovery, rational combinations of training loads of various orientations. Along with this, to increase the effectiveness of directed training effects on the body, are widely used nonspecific aids that prepare the athlete for the upcoming loads or stimulate and maintain at the necessary level of the body's reaction during training sessions or competitions and accelerate the recovery processes [1,2]. The purpose of such influences is to create the conditions for restoring the ability to maximize (or optimally) realize the athlete's motor potential. Thus, the prerequisites can be created for increasing the training effect of loads during the intensification of the training process and for a more complete realization of the athlete's potential in competitive activities.

Nowadays, sports science and best practice is reason enough justifying the problem of preparing the body for high loads and recovery.

It is established that the main task of all means, both preparation and recovery, is an axiom - to support the natural course of the physiological processes of the body of the training athlete. Such assistance can have a pedagogical, psychological or biomedical emphasis [3].

Meanwhile, the variety of physical exercises and loads makes it difficult to find universal criteria that determine the degree of preparedness of the organism for stress and recovery.

Analysis of recent research and publications

It is known that the ability of muscles to stretch, as well as the physiological processes taking place in this case, today are taken as a basis for solving the three most important tasks of sports training [2,4-7]: the development of flexibility; preliminary preparation of muscles for physical exertion, that is for warm-up for the purpose of injury prevention; recovery of physiological functions after big training loads.

Until recently, the dynamic exercises of ballistic nature were the main types of exercises for solving the above mentioned problems. These are hand movements by arms and legs, flexion and extension of the trunk, usually performed with a large amplitude and considerable speed. Here, the elongation of a certain group of muscles is comparatively short; it lasts as long as the swelling and flexion lasts. The rate of stretching of muscles is usually proportional to the speed of swings and flexions.

However, excessive stretching due to jerky movements can create microscopic ruptures in the muscles, which in turn leads to the formation of scar tissue in the muscles and a gradual decrease in its elasticity. Muscles become rigid and painful [8-10]. For the purpose of a more professional approach to elongation exercises, it is suggested to use stretching.

Currently, among athletes is extremely popular such form of preparation of the musculoskeletal device for training and competitive loads. And as a form of active rest - stretching is used by athletes to recover [11].

Despite the fact that a lot of work has been devoted to the stretching exercises, many questions do not have an exact answer yet. Nowadays the search for the most effective application of stretching in the sporting activity of highly qualified athletes is the most relevant.

In accordance with the prevailing views, the most common setting for the use of stretch exercises is the preparation of the organism for stresses, correction of the state of fatigue and acceleration of the recovery processes [12-14].

Materials and Methods

The problem of determining the place of stretching in the structure of the training process, revealing the level of the functional load of stretch exercises determined the purpose of the study: reducing the level of sports traumatism in tennis players.

The research used methods of theoretical analysis and generalization of data from specialized scientific and methodological literature, as well as analysis of the training process in tennis, materials of medical control; testing; experiment; methods of mathematical statistics.

The study was conducted on the basis of the non-commercial educational institution "Higher School of Tennis Mastery" Yantar, Moscow, Russia. The study lasted eleven months. In the experiment participated tennis players of 15 - 16 years (15 people) from training group at the stage of improving sports skills. Within the framework of the pedagogical experiment, the developed method of applying stretch exercises to prevent traumatism among tennis players was introduced into the system of training sessions.

Results and Discussion

Raising the level of the training process of tennis players is possible only with a constant condition of interest in new methods and forms of organizing classes. Enriching themselves with new information, the desire for creativity, the development of new techniques using a variety of means should increase the effectiveness of training sessions.

The study of the experience of tennis coaches, the analysis of their practical documentation (planning cycles of training sessions, work recordings of current classes), made it possible to establish that training programs have a sufficient arsenal of means and methods for their use. However, in practice they manage with a very scarce composition of funds, although they are traditional.

Materials of medical control of tennis players allowed revealing the nature of injuries and conditions for their receipt. However, the problem of injury prevention remains open for the training process in tennis, since the conditions for its implementation are not reflected in the documentation of coaches and athletes, nor in practical (training) activities.

It is known that stretching exercises contribute to the development of greater amplitude, and also form the motor freedom, which is reflected in the upbringing of coordination. All this in general contributes to the optimal technique of performing motor actions of tennis players, and hence to reducing the level of injuries in the training and competition period.

The experimental technique developed by us included the use of stretching exercises in the preparatory and final parts of the training session. The main part of the training of tennis players was directed to the development of motor activities and educational games.

The preparatory part of the training session lasted 20 - 30 minutes depending on the tasks assigned before the training, which was coordinated with the periods of the macrocycle of sports training of tennis players. A longer time (25 - 30 minutes) was assigned to the preparatory and transition periods of the macrocycle.

The warm-up consisted of three parts: variety of walking and running; a complex of aerobic exercises; stretch exercises.

The complex of aerobic exercises and stretching was performed under musical accompaniment, which provided aerobic conditions for the performance of the first group of exercises and conditions corresponding to the nature of the second group of exercises, and also helped stimulate those engaged in the forthcoming work in the main part of the session.

Stretch exercises were performed from a standing position in a dynamic mode. Stretching was applied to all joints, as well as muscle groups, which had a basic load in the main part of the workout. There was used the method of active dynamic stretching with the alternation of antagonists muscles. The technique of doing stretch exercises consisted in taking a posture defining the muscular group or joints for stretching, and further amortization movements of small amplitude.

The complex of stretch exercises supposed and the elongation of the neck and wrist joints muscles by the method of agonistic stretching.

The final part of the training consisted entirely of stretching exercises, supplemented by breathing exercises. Deep stretching was carried out in various positions of the stalls in the mode of holding the maximum amplitude.

Unlike the preparatory part, the stretch exercises of the final part of the session were determined by fixing the adopted posture from 20 to 30 seconds, for which the asanas of the Hatka Yoga were used. Some exercises were performed in anaerobic mode with a delay in breathing during inspiration and exhalation. Basically, this involved exercises on twisting the trunk and assuming the body's positions bent over.

In the end, relaxation exercises were performed, which also did not exclude stretch marks and breathing exercises. The positive effect of the introduction the stretch exercises in the training process is presented in table 1.

Parameters		№№	$\bar{X} \pm m_x$		t	ρ	
			Initial	Final			
Flexibility (cm)	cervical spine when the head is tilted	to the right	1.	2,08±0,58	4,0±0,67	3,249	< 0,01
		to the left	2.	2,0±0,58	3,83±0,69	2,943	< 0,05
		forward	3.	2,17±0,58	4,0±0,58	3,261	< 0,01
		backward	4.	10,75±0,93	12,92±0,84	2,380	< 0,05
	shoulder joint	the right	5.	26,08±1,45	20,89±1,23	3,961	< 0,01
		the left	6.	28,12±1,57	24,08±1,32	2,855	< 0,05
	the spine when the torso is tilted	to the right	7.	8,42±0,75	12,93±1,03	3,632	< 0,01
		to the left	8.	8,58±0,75	13,25±1,03	5,383	< 0,001
		forward	9.	2,65±1,17	7,67±1,38	4,025	< 0,01
	hip joint	right	10.	15,58±1,68	8,42±1,38	4,763	< 0,001
		left	11.	14,33±1,59	10,42±1,41	2,768	< 0,05

Table 1: Dynamics of the average group indicators of the flexibility development in the tested tennis players.

$n = 15$ ($f=14$) for $p < 0,05$, $t = 2,145$; $p < 0,01$, $t = 2,977$; $p < 0,001$, $t = 4,140$

Various sections of the spine and joints of the upper and lower extremities involved in the motor acts of tennis players were subjected to testing. All the end points of flexibility of different parts of the body of tennis players are represented by positive results. This is confirmed by the mathematical data of the investigated parameters of flexibility. Of the 11 analyzed parameters, two showed a level of statistical significance $\rho < 0,001$: flexibility of the spine with a torso to the left torso ($t = 5,383$) and right hip joint ($t = 4,763$). The data of the first of the presented parameters can be explained by the specific nature of the sport, where the basic element of technology is a wide amplitude swing, which includes not only the arm area, but also the corresponding side of the trunk. Another parameter determines the operation of the legs to receive the ball when performing attacks.

Five parameters demonstrated the level of reliability of the initial and final data at $\rho < 0.01$. Here you can pay attention that three of them represent the right side of the body of the athlete, which can be attributed, in our opinion, to the right-handedness of tennis players participating in the experiment, as well as two indicators for tilting forward, both the head and the trunk.

The remaining four parameters revealed statistical reliability at the level of $\rho < 0.05$ and are represented by the left side of the body and the inclination of the head back, which does not reduce the advantages of the stretch program for the physical fitness of athletes.

The effectiveness of the developed methodology can be viewed by the number of injuries received by tennis players before the introduction of the experimental stretching program into the training system and after its testing.

According to medical control and questioning of athletes, it was revealed that during the training year, the trauma of the tennis players studied was determined by four areas: the knee, ankle, elbow and wrist (Table 2).

Joints	The number of injuries during the training year	
	A year before the experiment	During the experiment
Knee	27	21
Ankle	40	36
Cubital	24	17
Wrist	18	12
Total	109	86

Table 2: Average group data on injuries received by tennis players who participated in the experiment during two years.

As a result of introducing the stretching program into the training process and performing mathematical calculations, it turned out that during the year of training sessions tennis players received 21.1% less injuries than in the previous one, when the experimental technique was not yet tested in the system of sports training of tennis players.

Conclusions and Prospects for Further Research

Thus, it can be stated that the developed methodology can be successfully applied in the system of training sessions of tennis players. Purposeful use of stretch exercises during the training contributes to reduce the level of injuries in athletes.

Further studies suggest improvement of the presented methodology in terms of its individualization, taking into account the enhancement of athletic skills of tennis players. In addition, the development of the problem of injury prevention athletes is possible and promising in the aspect of further research of non-traditional sports for fitness, allowing improving the process of sports training.

At the same time, the positive results obtained during the work give us the opportunity to recommend to the trainers of various sports to introduce stretching exercises into the teaching and educational process of their training sessions, both in the preparatory part and the final one in accordance with the tasks set before the training.

Stretching is recommended not only during the training process of the athletes. Stretch exercises give a great healing effect, so it is useful to include it in the health and therapeutic physical training, both to expand the motor capacity of those involved, and to correct any deviations in physical and physiological development.

The method of applying stretching in physical culture and sports is recommended to include in the programs of institutions for the upgrading of teachers and coaches.

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