

Original Article

Features of preventive activity at the initial stage of training of many years standing of young basketball players

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Abstract:

The problem of injury to basketball players is very important today. Of particular importance, it acquires at the initial stage of training of many years standing for sportsmen, since young sportsmen are the most vulnerable during periods of sensible development of the organism. This requires the improvement of preventive activities in the training of young basketball players. *The purpose of the article* is a study of the features of preventive activity at the initial stage of training of many years standing of young basketball players. *Results.* The technology of prevention of disorders of the support-spring characteristics of the foot of young basketball players aimed at platypodia was presented. It is included: purpose, tasks, principles, orientation, stages of implementation and performance criteria. The map of physical games was developed. These games are implemented at the preparatory stage of the annual cycle of training young athletes in basketball. There are specially developed methodological maps "Source of health of the foot". These maps corresponded to of theoretical material and in the form available for understanding of young sportsman. They offered a theoretical material and contained tasks for consolidating theoretical knowledge and practical implementation Complexes of physical exercises on an unstable support were developed. They provided for the use of a balancing platform "bosu", at elastic and soft the support, as well as physical games aimed at preventing disorders of the support-spring characteristics of the foot. The use of the proposed technology contributed to the improvement of the indicators of support-spring characteristics of the foot and the resulting increase in the effectiveness of motor activity by young basketball players.

Key words: basketball, injury, platypodia, disorder, interaction, support, technology, prevention.

Introduction

Today, basketball is one of the most traumatic types of sport, due to the increased requirements for players who perform complex of techniques and active tactical interactions in conditions of force-pressure (Shynkaruk, 2012; Ghryban, 2017). As a result of these requirements, basketball is becoming more and more traumatic (Muzhichok, 2017).

A characteristic feature of this sport is a combination of shock-mechanical interactions of the foot with a support, which is in dynamics of the run, with repulsion from the support in various jumps, as well as during landing, which is accompanied by an increase in physical activity on the locomotor apparatus of athletes, the most vulnerable parts of which is the lumbar spine, knee and ankle joint and the foot (Laputin, 2003; Stepanov, 2016). The most widespread disorders in the health of young basketball players are injuries of the locomotor apparatus, fault in posture and platypodia (Stroganov, 2013; Vasylenko, 2016).

The lack of childhood preventive measures aimed at reducing the risk of injury can become a limiting factor for the continuation of a sports career for young athletes (Kostiukevych, et al. 2018).

The problem of prevention of disorders of the foot support-spring characteristics was investigated by a number of scientists (Zolotova, 2016). Experts point out the systematic monitoring of their condition in the training process, the use of orthopedic footwear, the use of biomechanical electrostimulation, physical education, in particular jumps on elastic support as the measures for the prevention of disorders of the foot support-spring characteristics (Kazantseva, 2015). Today, a technology of orthopedic sports insoles has been developed (Riabina, 2014), the effectiveness of rehabilitation treatment of longitudinal platypodia in athletes has been proved, a reasonable preventative and rehabilitation direction in the system of training sports reserves in basketball has been outlined, and ways, to improve the control of physical fitness of (Lahutin, 2009).

However, the issue of targeted prevention of disorders of the foot support-spring properties of young basketball players at the initial stage training of many years standing has not been studied enough. In particular,

the peculiarities of shifting in basketball and their influence on the state of the foot among beginner basketball players are poorly understood. The known methods for solving this problem do not consider the specifics of execution of motor actions in basketball and require improvement.

The purpose of the article is explore the features of preventive activities at the initial stage of many years of standing for young basketball players.

Material and methods

Used methods include the analysis and analysis of scientific and methodical literature, Internet data, documentary materials; biomechanical video-computer analysis of foot support-spring properties using the "BigFoot» program, strain-gauging using the data tensoplatform "Kisler", video-computer motion analysis using analysis system "Qualisys" and mathematical statistics methods (Byshevets, et al., 2019).

Results

Currently, there is an exacerbation of the problem of injuries in sports (Reeser, 2012; Schneider, 2013), and the team sports are the leaders in the number of injuries (Doroshenko, 2015; Kostiukevych, Shchepotina, Shynkaruket al. 2019), in particular, basketball. Excessive physical and psycho-emotional stress, combined with regular processes of growth and the formation of organs and systems, place increased demands on athletes and under adverse circumstances can entail a number of disorders in physical development and their health and negatively affect the morphofunctional state of the foot (Lahutin, 2009; Imas, et al., 2018).

To assess the load on the foot of young basketball players, we made pedagogical testing, 29 people took part in it. 17 of them had a normal foot, and 12 people had disorders of the support-spring properties of the foot. Table 1 presents the indicators of the test "Standing high-jump by two-feet take-off" among young basketball players, depending on the state of the spring support function of the foot (tab. 1).

Table 1. The indicators of the test "Standing high-jump by two-feet take-off" among young basketball players, depending on the state of the spring support function of the foot (n=29)

Measured indicators	Existence of the disorders of the spring support function of the foot			
	Undefined (n=17)		Defined (n=12)	
	\bar{x}	S	\bar{x}	S
Sportsman's weight (H)	69,98	,90	72,12	8,07
Max. strength of reaction of support while taking-off (H)	71,25**	,59	96,81	42,30
Force gradient (H·sec. ⁻¹)	624,32*	5,97	491,13	420,81
Impulse of force (H·sec.)	59,27*	,13	22,85	56,18
Max. strength of reaction of support while landing (H)	1026,92*	9,25	1106,67	161,12
Duration of the absorption phase(sec)	,19	,02	,20	,02
Duration of the take-off phase (sec)	,37	,04	,36	,04
Jumping height (m)	,31*	,02	,27	,04

Note: *p<0,05; **p<0,01 comparing average indicators for Student's t-test

The study showed that the indicators characterizing value of the load, exceeding the weight of the sportsman by 2.8 and 6.0 times. In addition, the value of the force gradient indicates a pronounced speed-strength character of the load. According to the results of the study, the maximum reaction force of the support during taking off in children with a normal foot exceeded the weight of the sportsmen by 3.6 times, and the maximum reaction force of the support during landing - 7.5 times. It is worth noting that the height of the jump in this group was higher than the height of the jump of young basketball players, with disorders of the support-spring functions of the foot. It is proved that the disorders of the support-spring properties of the foot leads to an increase in the load on the foot in the process of jumping and stopping, which negatively affects the executing of motor actions, as they are most often used in basketball.

However, today coaches do not pay enough attention to the problems of disorders of the support-spring function of the pupils' feet in the process of organizing the training activities of basketball players at the initial stage of many years of sports training. Therefore, the basis for preventive activities at the initial stage of many years of training for young basketball players should be the prevention of motor disorders of the foot support-spring of beginner basketball players.

It should be admitted, the implementation of the proposed technology was carried out systematically

during the preparatory, preventive and supportive periods. And its characteristic features were didactic content, specially selected means and methods for the prevention of platypodia, as well as pedagogical control and performance criteria. The main measures for the prevention of platypodia in young basketball players were the use of exercises on an elastic, soft and unstable surface and physical game. At the same time, exercise complexes were used in the preparatory part of the lesson, during the warm-up. In the process of implementing the proposed technology, the content of physical game changed in direct proportion to the growth of the movement experience of young sportsmen.

At the same time, in the process of extension the theoretical training, specially developed methodical maps "Source of Foot Health" were used, which, in addition to theoretical information, contained methodological guidelines for monitoring the condition of the foot and complexes of physical exercises for independent performance under parental control.

Jumping exercises were recommended for sportsmen with disorders of the support-spring properties of the foot on two soft mats barefoot. Complexes of physical exercises for self-fulfillment were complicated gradually, depending on the degree of mastering the technique of exercising under the control of a trainer.

Evaluation of the effectiveness of the introduction of technology for the prevention of disorders of the support-spring properties of the foot of young athletes was performed using a formative experiment.

25 young basketball players with disorders of support-spring function of the foot took part at the forming stage of the pedagogical experiment. They formed the control group (CG) consist of 12 people and the main group (MG) includes 13 people. In addition, we traced the dynamics of the support-spring foot function of 17 young basketball players with a normal foot, the indicators of which were taken as model ones. The participants of the MG were engaged according to the technology developed by us for the prevention of disorders of the support-spring function of the foot. This technology was integrated into the training process of young basketball players. Representatives of the CG were engaged in the generally accepted program of CYSS. After 40 weeks of regular classes, we made repeated determination and analysis of the influence of technology on the state of the support-spring characteristics of the foot of young sportsmen in the executing of motor actions in basketball.

Discussion

The obtained data of the formative study show that the sportsmen of the MG had a positive increase in the indicators characterizing the state of the support-spring properties of the foot. For sportsmen of the CG, the height of the arches increased by 4.0%, then for the sportsmen of the MG this increase was 33.3% at the end of the study. At the same time, the Kozyrev index in basketball beginners KG has not changed. At the same time, it has increased at the representatives of the MG by 35.3%. After the study, the Friedland index also increased statistically significantly ($p < 0.05$) of young basketball players and its average value was within the normal range.

In addition the efficiency of standing high-jump with take-off from both feet increased by 8.8% at the beginner sportsmen of the KG, while this indicator for MG was 24.2%. It should be noted that after the implementation of the technology, unlike the sportsmen of the CG, there was no any statistically significant differences that could be fixed between the indicators of beginner basketball players of MG and sportsmen with a normal foot ($p > 0.05$). At the same way, there was an improvement in the executing of jumping with take-off from one foot: for sportsmen of the CG, the jump height increased by 5.6%, for MG this indicator was 16.7%, and for beginner basketball players with a normal feet was 10.0%.

So, the technology of prevention of disorders of the support-spring properties of the foot of young basketball players can be recommended both to strengthen the foot arch, and to improve the executing of the player's basic techniques

Conclusions and perspectives of further research

In contemporary basketball, sportsmen are forced to withstand a high intensity of the game, to execute motor actions at maximum speed under the conditions of tough opposition of an opponent which leads to an increase in injuries of players. The problem of injury is of particular importance at the initial stage of long-term training of sportsmen, since young athletes are the most vulnerable during periods of sensitive development of the body.

It is proved that the disorders of the support-spring properties of the foot leads to an increase in the load on the foot in the process of jumping and stopping, which negatively affects the executing of motor actions, as they are most often used in basketball.

The technology of prevention of disorders of support-spring properties of the foot of young basketball players is introduced. It integrates into the training process and complements the program of the CYSS. Complexes of physical exercises on elastic, soft and unstable support, as well as mobile games aimed at preventing disorders of the support-spring properties of the foot of young basketball players, have been developed.

The implementation of technology has a positive effect on the restoration of the foot and promotes the strengthening of its arches in young sportsmen. Unlike the beginner sportsmen of CG, who had no statistically

significant differences in the state of the foot at the beginning and at the end of the study ($p > 0.05$), the following changes were recorded in the young sportsmen of the MG: the height of the arch of the foot increased statistically significantly ($p < 0,05$) and indicators that numerically characterize the performance of technical methods ($p < 0,05$). Efficiency of the executing of jumping and stopping at basketball players of the MG approached the executing of the indicated techniques in sportsmen with a normal foot.

The results and conclusions presented in this article do not exhaust the whole essence of the problem and point to many interesting directions for further research.

Conflict of interest: Authors state no conflict of interest.

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