Evaluation of the amplitude exercises use for the sports injuries prevention in basketball

Doroncev A.V.¹, Zinchuk N. A.², Yermolina N. V.², Yaroshinskaya A. P.²

¹Astrakhan State Medical University,
Astrakhan, Russia

ORCID: 0000-0002-9446-103X, aleksandr.doroncev@rambler.ru*

²Astrakhan State University,
Astrakhan, Russia

ORCID: 0000-0002-5680-3641, Niva-Zinchuk@mail.ru

ORCID: 0000-0001-9228-748X tomara-72_64@mail.ru

ORCID: 0000-0002-2793-8811 ayroshinskaya@mail.ru

Abstract. Survey analysis of 47 students (girls) aged 18 – 22 years, Astrakhan State Medical University and Astrakhan State University engaged in basketball sections showed that almost all athletes had sports injuries. They were recorded mainly in the competitive period. Special attention in the study was paid to the stretching of the musculoskeletal system, which dominate in the sports injuries structure. It was proposed to include amplitude exercises in the training sessions structure for basketball players. Two groups of athletes were formed – experimental group of 22 people (n1 – 22) who included amplitude exercises in the training structure and control group of 25 people (n2 -25) with a standard training method. **Materials.** Verified diagnoses data of regional sports and medical dispensary, current medical examination results, data from the athletes' questionnaire. **Research methods.** Generalized data from specialized scientific literature, analysis of female athletes' requests for medical care in the annual training cycle, testing of methods for an amplitude exercises set in the preparatory and final parts of training sessions. Statistical processing of the obtained data was performed using standard packages (Microsoft USA). The differences reliability in the studied indicators was established by generally accepted methods of mathematical statistics. The differences were considered significant when the probability of accepting the hypothesis was $p < 0.05$. **Result.** The amplitude exercises using method in the structure of basketball players' training showed a significant reduction in sports injuries of the musculoskeletal system in the annual training cycle. Conclusion. There was a mobility increase in the vertebral region, ankle and hip joints. The data indicate the musculoskeletal system elasticity increase. The study has practical significance on reducing sports injuries in basketball.

Keywords: basketball, sports injuries, amplitude exercises, prevention of sports injuries.

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INTRODUCTION

One of the urgent problems of modern sports is to increase the level of intensity and volume of training sessions, which significantly increases the risk of overtraining and sports injuries [9]. Sports injuries negatively affect the athlete's health and can cause pathological changes in the human body [7,8]. The recovery measures are paid much attention today. They allow to bring athletes to a high physical fitness level and preserve their health [6]. In basketball it is necessary to pay attention to improving sports skills, as well as to prevention injuries [2,5]. Researchers [3,10,11,15,] confirm the compensatory effect of amplitude exercises on increasing the regulatory adaptive status of the musculoskeletal system.

Analysis of foreign literature confirms the cumulative effect of strengthening the musculoskeletal system under the systematic stretch exercises influence [12,13,14,16,17,18]. We conducted a study of the amplitude exercises use in the training structure for women's basketball teams.

RESEARCH ORGANIZATION

The study involved national basketball teams, 47 girls aged 18 – 23 years, all students of the Astrakhan State Medical University and Astrakhan State University. The study analyzed official data on the students' initial attendance in the emergency trauma department and the doctors team accompanying official basketball competitions,

as well as the results of the annual medical examination. Following the recommendations of the all-Russian public organization "Association of traumatologists and orthopedists of Russia", sports injuries were classified as follows: 1. Superficial injuries (bruises, scrapes, and other minor damage) without the release of educational training 2. Injuries to the musculoskeletal system in the form of dislocations, sprains and overstrain of the musculoskeletal system, the release from training was from one to three weeks. 3. Injuries in the form of bone fractures, injuries to the hip joint and vertebral region that required immobilization of the limbs and hospitalization. Statistical processing of the obtained data was performed using standard packages (Microsoft USA). The differences reliability of the studied indicators was established using generally accepted mathematical statistics methods. The differences were considered significant when the probability of accepting the hypothesis was $p < 0.05$.

RESEARCH RESULTS

The sports injuries study in basketball for the 2017/2018 academic year showed that in most cases, bruises were recorded 73.34 %, superficial skin injuries 45.53%, sprains of the capsular ligamentous apparatus 37.70%, and bone fractures 0%. A characteristic feature of the sports injuries structure among basketball players was ankle sprain 67.5±5.9%, knee joint injury 22.5±3.7%, back muscle strain 12.2±2.7%, hand joint injuries 12.7±2.0%. The main share of the ankle injuries 69.3±7.5% was detected while performing jumps in the landing phase, knee injury in the form of bruises was 79.4±5.5%, sprained collateral knee joint ligaments was recorded as a result of falling or colliding with players 82.4±7.2%, injuries to the wrist joint ligaments were the result of a fall 47.3±4.9%, incorrect reception of the ball 18.5±3.0%, hitting the hands 19.2±2.1% and 16.3±3.5% of hands injuries were recorded as a result of a struggle for the ball. In the 2018/19 academic year amplitude exercises were included in the training sessions structure of the group ($n_1 = 22$). They were conducted in the preparatory and final parts of the classes. Amplitude exercises in the form of active and passive stretching were performed on the hip and knee joints, ankle, vertebral region and shoulder joints. High jumps with a change of push leg, as well as jumping rope were performed mainly in the preparatory part of classes. Active and passive amplitude exercises to increase mobility in the joints and vertebral region were included in the final part of the training. As a result, a significant reduction in capsular ligamentous

apparatus injuries in the experiment group ($n_1 = 22$) was found with the following localization: the ankle – 33.5±4.7% ($p < 0.033$; $r = 0.610$), the vertebral region in the form of back muscle overstrain – 21.7 ± 1.9%, ($p < 0.038$; $r = 0.502$). There was also a decrease in the musculoskeletal system sprains of the knee and hand joints, but not significantly. Surface injuries in the experiment group ($n_1 = 22$) did not have significant differences with the control group. Primary treatment for ankle musculoskeletal system sprains had a decrease tendency in the second half of the year to 27.5±3.9% ($p < 0.047$; $r = 0.422$) and reached the minimum values of 17.5±2.4% ($p < 0.039$; $r = 0.507$) at the end of the academic year. Depending on the playing role, the most common sports injuries of the ligamentous muscle apparatus in the form of sprains, bruises, and superficial skin injuries were observed in both study groups in heavy forwards 29.5±3.6% ($p < 0.042$; $r = 0.455$) and center players 22.3±2.5% ($p < 0.041$; $r = 0.475$). It is due to the nature of the playing functions and the rather large weight of athletes. The amplitude exercises use effectiveness in the injuries prevention showed that the minimum level of damage was detected in perimeter players of 11.3±1.2% ($p < 0.046$; $r = 0.439$) and attacking defenders 15.7±2.1% ($p < 0.042$; $r = 0.417$). That allows to link the players' positions in basketball with the level of sports injuries. During the study, there were no changes in sports injuries reducing in the control group ($n_2 = 23$). During the study, bone fractures injuries, the vertebral region injuries, as well as other injuries requiring hospitalization, were not observed.

CONCLUSIONS

The research allowed to determine that the amplitude exercises use helps to strengthen the ankle joint and vertebral region, increase the mobility degree in the joints and confirm the statistical significance of reducing sports injuries among female basketball players. The study revealed that the injury risk proportion in basketball has a high correlation with the players position/role and requires a corresponding structure change of athletes general physical training to strengthen muscle and ligament.

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Author's information:

Dorontsev Alexander Viktorovich - candidate of pedagogical Sciences, associate Professor head of physical culture Department, Astrakhan State Medical University, 121 Bakinskaya street, Astrakhan, Russia, 414136, e-mail: aleksandr.doroncev@rambler.ru

Zinchuk Nina Arcadieвна - candidate of pedagogical Sciences, associate Professor, head of the Department of AFC and sports games, Astrakhan State University, Astrakhan, Russia, 414028, e-mail: Niva-Zinchuk@mail.ru

Ermolina Natalia Vladimirovna - candidate of pedagogical Sciences, associate Professor, associate Professor of the Department of AFC and sports games, Astrakhan State University, Astrakhan, Russia, 414028, e-mail: tomara-72_64@mail.ru

Yaroshinskaya Alevtina Pavlovna - doctor of biological Sciences, associate Professor, associate Professor of AFC and sports games Department, Astrakhan State University, Astrakhan, Russia, 414028, e-mail: ayroshinskaya@mail.ru