

THE USE OF MECHANOTHERAPY MEANS IN BASKETBALL PLAYERS RECOVERY AFTER THE INJURIES OF THE LOWER EXTREMITIES

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Annotation. The aim is to develop methods of physical rehabilitation of basketball players with injuries of the lower extremities. Summarizes the experience of use of mechanical therapy for the recovery of athletes with injuries to the lower extremities. Analyzed the nature of lower extremity injuries and their consequences. The methods of application of mechanical therapy using a simulator developed universal and local fatty clay as a means of physical therapy. It is proved that the method developed by the authors provided a mechanotherapy achieve the required level of mobility in the joints and improve range of body functions. Found that in the process of applying the developed program of rehabilitation basketball players with injuries of the lower extremities most effective in complex physical rehabilitation was value: therapeutic physical training with mechanotherapy + physical therapy with curative mud + therapeutic massage. Technique introduced to the work of medical and health-improving establishments and educational institutions of Ukraine Ministry of Education and Science of Ukraine.

Keywords: physical, rehabilitation, methodology, lower limbs, non-traditional means, mechanical therapy.

Introduction

Statistic data for several recent years confirm the process of constant increasing of traumatism among workable population [1]. The reasons of these phenomena increase and become more various; rather large portion of traumatized is students. In its turn among traumas distortions of supporting motor system (SMS) prevail [1]. From 60% to 72% of the traumatized are from groups of sports perfection in outdoor games. Most of students of Zhytomyr state technological university (ZhSTU) are not professional sportsmen, that is why they are restricted in the time and for mastering and improving of technical game techniques and it results in increasing of traumas' quantity in men basketball teams of ZhSTU. Regarding the problem in more detail way, we can affirm that any disorders of SMS and lower limbs in particular result in restriction of motion abilities for some period of time and cause sportsman's disability in educational and training processes. Rehabilitation of SMS functions without physical rehabilitation means (PR) is impossible. PR of patients with lower limbs abnormalities consists of [1,2,3]:

- Rising of muscles' tonus;
- Elimination of prevention form contractures in joints;
- Restoration of joints' motion activity.

Commonly used methods of treatment do not give always the desired results and that is why development of new efficient and simple methodic is of great urgency.

The research has been fulfilled as per plan of scientific & research works of physical education department of ZhSTU.

Purpose, tasks of the work, material and methods

The purpose of the work is development of efficient methodic of application of mechanic therapy for rehabilitation of sportsmen-basketball players after traumas of lower limbs.

The tasks of the research:

- Generalization of experience of application of mechanic therapy means for rehabilitation of sportsmen with traumas of lower limbs;
- Analysis of character of the above mentioned traumas;
- Development of methodic of application of author's simulator in complex with other mechanic therapy means.

Results of the research

Modern basketball is one of the most trauma-hazard kinds of sports. It is connected with the fact that basketball site is relatively small space for movement of ten players with maximal speed, considering that weight-height data of players are substantially higher than average values. With struggle for ball, spurts, passing under ring, defense play and quick attacks collisions are very frequent. In training process the scope and intensity of applied loads increase. Absence of individual approach to control of loads and training of techniques are the reason of overtiredness and overstrain that result in SMS traumas [1,2,10]. Games in competition period force sportsman to work at extreme of his physical and psychic abilities that also facilitate increasing of traumas' quantity. Besides the mentioned reasons, there are a lot of reasons, which have been studied insufficiently.

In the present researches basketball players, which were traumatized in the period from 2009 to 2011, took part. Statistic analysis of character, quantity and complexity of traumas of basketball players' of different roles lower limbs, which was fulfilled by the authors for this period, confirmed again the need in development of original PR methodic for the above mentioned contingent.

The character of the registered traumas, videlicet: close fracture of ankle joint, sprain of ligaments, shins', coccyx's and sacrum's fractures, traumas of meniscus, - implies intensive application of mechanic therapy means in PR program for the above enumerated cases.

Traumas of basketball players' supporting motor system are 70.09% of all pathologies. Among them traumas of meniscus, cross-like and side ligaments of knee joint and combined traumas of capsular-ligament apparatus are the most frequent.

54.93% of all pathologies are cute traumas of knee joints.

Analysis of the character of basketball players' traumas permitted to find out much bigger quantity of heavy traumas of supporting motor system. They are: fractures of long tubular bones and dislocations. Fractures, mainly, are located in zone of forearm, they appear with fallings down, which are caused, like in other kinds of sports, by using (often intentionally) of prohibited techniques. Dislocations usually are met in zone of hand fingers and are caused with ball's taking off in episodes of under backboard game. Traumas of м'язонозичного apparatus (4, 72% of all supporting motor system' pathologies) are found in zone of lower limbs. The most frequently Achilles tendon ruptures are diagnosed as well as hypodermic rupture of quadriceps muscle of thigh. Traumas of muscle are rather seldom and usually are found in zone of shin's muscle.

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For PR of basketball players with lower limbs' traumas the authors developed complex program, in which significant place was taken by mechanic therapy. Mechanic therapy permits to direct and to dose movements. The purpose of exercises is restoration of joints' mobility, elimination of contractures, strengthening of muscles increasing of blood and lymph circulations' intensity, improvement of local influence on tissues, increasing of muscles' and ligaments' elasticity, restoration of joints' natural functions. Action of different types' mechanic therapy apparatuses, which are used for this purpose, is based on bio-mechanical peculiarities of joints' motions. Most of apparatuses are used from early post immobilizing period: apparatuses of pendulum type - for development of joint mobility, apparatuses of pulley type - for strengthening of muscles. Apparatuses, which use principle of lever, or simulators for strengthening of different muscles' groups and improvement of CVS are usually used on the stage of sanatorium rehabilitation. The developed by one of the authors universal mechanic-therapeutic simulator (MTTA), to which patent МПК А 61H23/00, number 86320, dated 10.04 2009 was issued, is suitable for application from the first days of physical rehabilitation. Experimental PR program for sportsmen after traumas of lower limbs envisaged practicing of below described form of trainings and physical exercises.

Individual PR trainings for the mentioned contingent were the main form of trainings during all process of treatment. Besides trainings on MTTA and other simulators, individual TPC trainings included gymnastic, general trainings and breathing exercises. Duration of such trainings depended on the state of a patient and hid physical level. Trainings were conducted by the authors or by hospital instructor twice a day and took 20-30 minutes at the beginning of course and increased their duration up to 60 minutes and more. Duration of trainings increased with improvement of patient's state and if positive dynamic of motion indicators was observed.

It is known that complex application of all kinds of physical exercises, based on bio-mechanical laws and observance of hygienic norms, improve several times specific influence of physical exercises on patient's organism. On the stage of sportsmen' recovering the authors used available at ZhSTU domestic serial simulators [4,6,7,8].

Exercises on simulators were divided into 3-4 series, which were trained 3-4 times a week. Collection of simulators was changed every week. For example in main group the first series of exercises was fulfilled on simulators

Grace", „Health ” and „Rhythm -2"; on Thursday – on „Disk of health ", „Pulley expander ” and MTTA.

Next week: on Monday exercises were fulfilled on simulators „Collibris ", „Caucasian ” and „Health "; on Wednesday – on „Grace ", MTTA and „Disk of health "; on Friday – on „Roller ", „Pulley expander ” and „Rhythm - 2".

The third week: on Monday - На третій тиждень: у понеділок – „Collibris ", „Grace "; on Tuesday - „Health ” and MTTA; on Thursday - „Pulley expander ” and „Caucasian "; on Friday - „Roller ” and „Collibris ”.

All trainings and procedures, which were applied by the authors of the present article, were carried out under strict medical control. Application of the developed methodic positively influenced on efficiency of physical rehabilitation of sportsmen that is witnessed by the results, obtained in main pedagogic experiment. The authors recommend the most optimal intensity of MT procedures during periods with observance of general regulations of procedures (see table 1).

Table 1

Methodic of mechanic therapy for complex treatment of basketball players after traumas of lower limbs

Period	Order of procedures	Duration of procedure	Load, g	Purpose of procedure	Joint	Number of repetitions, duration of procedure	Notes

First	1-a	4	1000	Improvement of joints' mobility	Any of injured	2 x 2	For patients with weakened cardiovascular system
	2-a	6	2000			3 x 2	
	3-a	9	2000			3 x 3	
	4-a	6	2000			2 x 3	
	5-a	8	2000			2 x 4	
Second	6-a	10	3000			2 x 5	For all patients
	7-a	15	3000			3 x 5	
	8-a	9	1000			3 x 3	
	9-a	10	1000			2 x 5	
	10-a	9	4000			3 x 3	
	11-a	10	4000	2 x 5			
	12-a	10	5000	2 x 5	For patient with strong muscles		
	13-a	15	5000	3 x 5			
	14-a	18	5000	2 x 6			

Procedure of mechanic therapy must be preceded by different methods of physical treatment (paraffin, ozokerite applications, therapeutic gymnastic, electrophoresis and so on). Depending on conditions of fulfillment at the end of procedure manual or vibration segmental massage shall be carried out [1,10]

The rate of forced oscillations of apparatus's load pendulum shall be in average 60 oscillations per minute (± 3 oscillations per 1 minute l xb.).

Summary

In connection with new interpretation of pathogenesis of different loco-motor apparatus's diseases and appearing of new methods of conservative and surgical treatment of orthopedic and traumatized patients there appeared a need in further development and specifying of appropriate treatment methodic with the help of physical exercises, including mechanic therapy, as a method of special influence in cases of supporting and motion organs' traumas.

Duration and methodic of mechanic therapy with different SMS traumas require scientific foundation in strict compliance with dynamics of reparative processes and considering secondary changes in joints and muscles, which limit motion function.

Exercises on apparatuses of mechanic therapy are used as supplementary influence on separate links of SMS for development of motion function and muscles' strength.

The program, developed by the authors, with mechanic therapy and bolus therapy (clay treatment) in its base, influenced positively on efficiency of physical rehabilitation of basketball players with traumatized low limbs. Application of the authors' methodic resulted in shortening of physical rehabilitation period by 1-3 weeks for all patients of main group.

Owing to implementation of experimental methodic of physical rehabilitation, with complex approach to treatment in its base, we obtained new results of sportsmen's with traumatized lower limbs physical rehabilitation, videlicet:

- One of peculiarities of the offered methodic was the fact that the authors carried out preliminary analysis of traumas of lower limbs and determined rehabilitation measures;
- The authors developed methodic of application of mechanic therapy with the help of newly designed simulator and local fat clay as a method of physio-therapy;
- The developed by the authors methodic of mechanic therapy ensured achievement of appropriate joints' mobility and improvement of a number of organism's functions. These recommendations were tested in rooms of therapeutic physical culture and at places of some patients' residence with individual using it by them.

In the process of developed PR program by basketball players with lower limbs traumas it was established that in the complex of physical rehabilitation the most effective was correlation: therapeutic physical culture with mechanic therapy + clay treatment + therapeutic massage. With such correlation 77.7% of the traumatized sportsmen reached complete restoration of lower limbs' functions.

Traumatized basketball players, who trained by the developed by the authors program, restored stereotype of correct walking quicker, lost demand in auxiliary supporting means, that shortened period of returning to domestic and sports activity. Efficiency of the methodic was tested in medical and rehabilitation establishments, where efficiency and rationality of rehabilitation were proved; besides, different variants of mechanic therapy procedures were offered in their possible combination with other physio-therapeutic procedures for the given category of traumatized. The developed by the authors program can be applied of PR of sportsmen with traumas of lower limbs, which practice other kinds of sports.

Further researches imply profound study of structures and principles of action of new mechanic therapeutic apparatuses, composing of exercises' complexes for their using in PR program for traumatized basketball player of different roles, different physical level and different qualification.

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Cite this article as: Zheleznyj O.D., Zasik G.B., Mukhin V.M. The use of mechanotherapy means in basketball players recovery after the injuries of the lower extremities. *Pedagogics, psychology, medical-biological problems of physical training and sports*, 2013, vol.5, pp. 23-26. doi:10.6084/m9.figshare.707094

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Received: 05.03.2013
Published: 31.05.2013