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Research Article

Research of the Causes, Localization and Manifestations of Back Pain in Women-Athletes Weightlifting

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Abstract

Based on the analysis and generalization of literary sources, as well as the results of the pedagogical experiment and the conducted clinical study, the article provides data on the causes, prevalence and manifestations of back pain when practicing female athletic sports, and also analyzes the results.

Keywords: *Female Athletes; Athletic Sports; Back Pain; Myalgia; Musculoskeletal Pain; Lumbosacral Region; Protrusion; Vertebral Hernia*

Abbreviations

SMS: Spinal Motion Segment; CCM: The Candidate for Master of Sports; MS: Master of Sports

Introduction

Modern athletic sports, in which women of different age groups are involved, are represented mainly by weightlifting, kettlebell lifting, powerlifting, bodybuilding, arm wrestling and mas-wrestling, as well as triathlon and CrossFit. Although, there are other modern sports where female athletes actively work with weightlifting and have significant physical stress on the spine and its parts, especially on the lumbosacral region [1-7]. At the same time, many of them, as a result of long and intense training, when performing physical exercises with a different number and volume of the lifting weight of shells (barbell, weights), experience excessive, sometimes not always adequate loads on different parts of their skeleton, mainly on thoracic, lumbar and lumbosacral spine, if they have an insufficiently developed muscular "corset" of the back and lumbar region [1-7]. As a result, they often have back pain, often in the thoracic spine, lumbar and lumbosacral region, of varying intensity and duration, often with certain concomitant neurological symptoms [1-7]. Most often, the cause of these violations is an elementary non-observance of the technique of performing physical exercises, insufficient, in terms of volume and duration, warm-up before starting the basic exercises, during training, and lack of proper control over the technique of lifting weights and their volume, age-related and physiological changes in athletes, on the part of a coach and a sports doctor, as well as the lack of a proper level of physical fitness among the athlete herself [1-7].

Purpose of the Study

In this regard, the purpose of our study is to determine the changes occurring in the cervical and thoracic spine, lumbosacral region, their manifestations and prevalence, incl. and pain manifestations, existing anatomical and morphofunctional changes in female athletes involved in athletic sports.

Materials and Methods

To achieve the goal of the study, we used a set of scientific methods, including analysis of available scientific and scientific-methodological sources of information, determination of anatomical features and pathological changes in the spine, incl. and lumbosacral region in athletes, examination, palpation, neurological examination, data from medical records, incl. and the results of the examination by a neurologist, if necessary - X-ray or computed tomographic examination of the spine and all its structures, interviews. The experimental base of the research was sports sections, in which athletes of youth and I mature (reproductive) age trained, engaged in several athletic sports, such as weightlifting, kettlebell lifting and powerlifting. Measures were taken to identify pathological changes in the muscular frame of the thoracic and lumbar regions, the spine, in the studied groups of female athletes, incl. in its articular and ligamentous apparatus, especially in its thoracic and lumbar regions, from the side of the thoracic and lumbar vertebrae, with their articular and ligamentous apparatus, sacrum, intervertebral discs, peripheral nerves, degree, severity, localization and duration of pain syndrome. The experiment involved youth female athletes involved in weightlifting (n = 17), kettlebell lifting (n = 16), powerlifting (n = 18). The average age of female athletes of adolescence was 19.51 ± 1.17 years, which corresponds to this age criterion, and the average age indicators of female athletes from group I of mature (reproductive) age were 24.37 ± 1.14 years. Of these, 14 athletes are engaged in weightlifting, 12 in kettlebell lifting and 13 in powerlifting. The experience of practicing these sports ranged from 3 to 9.5 - 10 years. The level of sports qualifications of female athletes is from the II-I category to the candidate for master of sports (CCM) and master of sports (MS). The intensity and frequency of classes are 4-6 times a week, from 1.5 - 2 to 3 hours per class.

Results and Discussion

As a result of the studies, including questionnaires (author's questionnaire - Bugaevsky K.A., 2021 ©), survey, examination, palpation, neurological examination, X-ray and computed tomographic examination of athletes, it was revealed that the leading symptoms in athletes were: - skeletal pain, localized in the thoracic and lumbosacral spine, in nature - from acute, short-term, to constant, pulling-aching, with irradiation to the gluteal region, perineum and thigh, periodic phenomena of paresthesia in one or two lower extremities, in the area of the hips, up to the knee, a feeling of numbness and /or "crawling" creeps, aggravated when trying to resume physical activity and when lifting weights [3,5-7]. In the anamnesis, athletes of both groups have data on acute pain that arose for the first time, and then recurring, periodically, with different frequency and severity, subsequently, directly related to lifting inadequate weight, trying to start lifting weights, without prior adequate "warming up" and inadequate warm-up, the performance of loads and some exercises, with an uncomfortable position of the body, which confirms similar etiological factors identified by other researchers of this problem [1-8].

Palpation identified painful areas, both along the thoracic and lumbar spine, in segments from C I-VII, Th I-XII, LI-V, SI and below, as well as in the area of the spinal motion segment (SMS), with a predominance of pain sensations corresponding to the joints of the articular surfaces of the arches of the vertebrae, with clinical manifestations of spondylolysis and spondylolisthesis in a number of young athletes, objectively confirmed by radiography and /or computed tomography, in the lumbar spine [1-8]. The performed X-ray and computed tomographic studies indicated the presence of protrusions and spinal hernias in a significant number of athletes, localized in the thoracic and lumbosacral regions, clinical manifestations of spondylolisthesis and osteochondrosis, cervical, thoracic and lumbar spine, the phenomenon of dystrophic changes in the nucleus pulposus, articular surfaces of the vertebrae and their arches, disfixation and compression disorders, varying degrees of severity of destruction and deformities of the fibrous annulus and nucleus pulposus, which are often the result of acute, and later chronic (permanent) microtrauma, muscle, ligamentous and articular surfaces and formations of the spine.

Also, with a long training experience and many years of weightlifting, in a number of athletes, compression-degenerative changes in the vertebral bodies, in the lumbar spine, with the instability of the SMS are revealed [1-7]. After our study, in each of the age groups, the processing of the obtained survey data and additional data of objective research (X-ray and/or computed tomography), the data were obtained, which are presented in table 1 and 2. Table 1 data are presented for a group of adolescent female athletes.

Indicator name	Weightlifting (n = 17)	Weightlifting (n = 16)	Powerlifting (n = 18)
Pain in the cervical and /or thoracic spine	16 (94,12%) sportswomen	16 (100%) sportswomen	18 (100%) sportswomen
Pain in the lumbar spine	17 (100%) sportswomen	16 (100%) sportswomen	18 (100%) sportswomen
Pain in several parts of the spine	17 (100%) sportswomen	16 (100%) sportswomen	18 (100%) sportswomen
Paresthesias and/or irradiation of pain, neurological symptoms	14 (82,35%) sportswomen	12 (75,00%) sportswomen	15 (83,33%) sportswomen
Myalgia and /or musculoskeletal pain	17 (100%) sportswomen	16 (100%) sportswomen	18 (100%) sportswomen
Protrusions and/or spinal hernias, degenerative changes in the SMS	11 (64,71%) sportswomen	9 (56,25%) sportswomen	13 (72,22%) sportswomen
X-ray and/or computed tomography confirmed spondylolysis, spondylolisthesis, osteochondrosis	12 (70,59%) sportswomen	13 (81,25%) sportswomen	15 (83,33%) sportswomen
The presence of micro-and macro traumas of the neck, back and lumbosacral region when practicing these sports	7 (41,18%) sportswomen	5 (31,25%) sportswomen	7 (38,89%) sportswomen

Table 1: *Revealed disorders in adolescent athletes.*

The analysis of the results obtained from the examination of this age group of athletes, despite the insignificant duration of these athletic sports, already gives a rather "motley" picture, varied in clinical and anatomical and morphological manifestations, the pathology of the spine, in all its parts, with the involvement of the muscular - connective tissue and cartilaginous formations, with the presence of pain syndrome, paresthesias and neurologically confirmed phenomena, the inclusion of peripheral nerve fibers in the pathological process, at different levels of the SMS. The identified pathological processes were confirmed both clinically (symptomatology and objective examination data) and were recorded according to X-ray data and the results of computed tomography [1-7]. In the group of older athletes, of the 1st mature (reproductive) age, a similar study was also conducted, the results of which are presented in a table 2.

Indicator name	Weightlifting (n = 14)	Weightlifting (n = 12)	Powerlifting (n = 13)
Pain in the cervical and / or thoracic spine	14 (100%) sportswomen	12 (100%) sportswomen	13 (100%) sportswomen
Pain in the lumbar spine	14 (100%) sportswomen	12 (100%) sportswomen	13 (100%) sportswomen
Pain in several parts of the spine	14 (100%) sportswomen	12 (100%) sportswomen	13 (100%) sportswomen
Paresthesias and/or irradiation of pain, neurological symptoms	13 (92,86%) sportswomen	11 (91,67%) sportswomen	13 (100%) sportswomen
Myalgia and/or musculoskeletal pain	14 (100%) sportswomen	12 (100%) sportswomen	13 (100%) sportswomen
Protrusions and/or spinal hernias, degenerative changes in the SMS	13 (92,86%) sportswomen	12 (100,%) sportswomen	11 (84,62%) sportswomen
X-ray and/or computed tomography confirmed spondylolysis, spondylolisthesis, osteochondrosis	12 (85,71%) sportswomen	12 (100%) sportswomen	13 (100%) sportswomen
The presence of micro- and macrotraumas of the neck, back and lumbosacral region when practicing these sports	14 (100%) sportswomen	12 (100%) sportswomen	13 (100%) sportswomen

Table 2: *Revealed disorders in female athletes of the 1st mature age.*

As can be seen from the research data given in a table 2, the existing consequences of the transferred micro-and microtraumas, when practicing these athletic sports, as well as the degenerative-pathological processes of the musculoskeletal and connective tissue apparatus, dominate among the athletes of this age group in all the presented graphs of the study, reaching in most positions the maximum, 100, 00% of the result, which cannot but cause alarm. With the increase in sports experience and the level of sports qualifications, a decrease in the mass of adipose tissue in athletes and a shift in the values of their sexual somatotypes, a decrease in the saturation of their estrogenic background and the progression of their masculinization level, the process of traumatization and combined pathological changes in the muscular and musculoskeletal system of athletes increases [1-8].

Conclusion

1. Analysis of the causes of the appearance of pathological changes in different parts of the spine, incl. and at the level of SMS, back pain, different localization, in all athletes, in both age groups, it ambiguously indicates that the dominant causes of back pain are the injuries /microtraumas of the muscular, ligamentous and articular apparatus of the back suffered by them early, during training and performances and different parts of the spine, as a result of non-compliance with the adequacy during the warm-up and the athletes performing physical weight loads, with insufficient control over them, the coaching team, incl. and a sports doctor.

2. We believe that the pathological changes we have identified, both in the muscular system and in various parts of the spine and its formations, are due to inadequate strength, frequency and volume, physical exertion, which are a direct consequence of micro and macro injuries, hypoxia, impairment homeostasis in the affected areas of the spine, in the SMS of different localization, joints and muscular apparatus of female athletes.

Conflict of Interest

The author notes the complete absence of any conflicts of interest.

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