Rehabilitation treatment of wounded with dorsopathies in case of combat trauma of the upper extremities

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Restorative treatment of the wounded with dorsopathy after upper extremity trauma

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SUMMARY

The article examines the effectiveness of the use of manual therapy (MT) and biomechanotherapy (BT) methods in the rehabilitation treatment of vertebrogenic complications in 124 wounded with combat injuries of the upper extremities at the late stage of medical rehabilitation in the period from 1.5 to 2 years after injuries.

Key words: manual therapy, biomechanotherapy, rehabilitation treatment, diseasesspine, medical rehabilitation.

RESUME

In article efficiency of application of methods of manipulation and biomechanotherapies is considered at regenerative treatment Illnesses of a backbone at wounded 124 men with a fighting trauma of the top extremities at a late stage of medical rehabilitation in terms from 1.5 till 2 years after wounds ...

Keywords: manipulation, biomechanotherapies, regenerative treatment, Illnesses of a backbone, medical rehabilitation.

Introduction

The efforts of military medical science and practice have achieved significant success in the treatment of injuries of the upper extremities [2, 3, 4, 13, 19, 22, 23]. At the same time, at the later stages of medical evacuation, new problems emerged associated with the development of complications from other organs and systems of the body, which greatly complicate the process of returning the wounded to full-fledged activity. These problems include dorsopathies [2, 3, 4]. According to modern concepts, one of the mechanisms for the formation of a functional blockade in the vertebral joint is the limitation of mobility associated with an asymmetric overload of the intervertebral discs. As a result, there is a restriction of joint movement, pain, etc. Factors contributing to the occurrence of a functional blockade are improper load on the joint, degenerative and structural changes in the joint. According to a number of researchers [4, 5, 7, 8, 18], the cervical-thoracic spine is exposed to significant overloads. Upper limb injuries contribute to the manifestation of a latent predisposition to dorsopathies [5, 22, 23]. K. Lewit [22, 23] does not associate all the diversity of the clinical picture in diseases of the spine with the pathology of the intervertebral discs and believes that the blockade of the facet and peripheral joints occurs reflexively, due to irritation of sensitive nerve endings in the joints, muscles, ligaments and tissues surrounding the joint, when there is a limitation of the joint clearance on a functional basis, and not as a result of degenerative changes. This functional block is initially compensated for by increased mobility in the adjacent areas of the spine. Then the functional block goes to the adjacent higher and lower vertebrae. This causes a number of disorders in the form of hypo- and hyperfunctions, which leads to morphological changes. In the future, functional disorders cause atrophic and degenerative changes that reduce the adaptive ability of the spine to subsequent functional loads. According to the literature, among the main etiopathogenetic factors that form this functional disorder, a large role is assigned to muscle imbalance [4, 5, 13, 19, 22, 23]. At the same time, many authors point to a decisive role in the formation of muscle imbalance of primary shortening and muscle spasm with In the future, functional disorders cause atrophic and degenerative changes that reduce the adaptive ability of the spine to subsequent functional loads. According to the literature, among the main etiopathogenetic factors that form this functional disorder, a large role is assigned to muscle imbalance [4, 5, 13, 19, 22, 23]. At the same time, many authors point to a decisive role in the formation of muscle imbalance of primary shortening and muscle spasm with In the future, functional disorders cause atrophic and degenerative changes that reduce the adaptive ability of the spine to subsequent functional loads. According to the literature, among the main etiopathogenetic factors that form this functional disorder, a large role is assigned to muscle imbalance [4, 5, 13, 19, 22, 23]. At the same time, many authors point to a decisive role in the formation of muscle imbalance of primary shortening and muscle spasm with

subsequent displacement of the nucleus pulposus and the development of compression syndrome [5, 14, 18, 20]. This approach determines the tactics of treatment - the elimination of functional blocks and stretching (relaxation) of the shortened muscles. At the same time, works appeared on the possibility of the formation of primary muscle relaxation in the formation of muscle imbalance and secondary shortening of muscles - antagonists [5, 13, 19, 22, 23]. In addition, works on viscero-motor effects in patients with dysfunction of internal organs are widely known [4, 18, 19, 21, 22, 25].

According to a number of authors [22, 23, 25], functional weakness of the muscles innervated by a specific spinal root occurs first as a result of root dysfunction of any genesis, before the appearance of clinical manifestations of compression syndromes in the form of impaired sensory or motor functions. It is hypoexcitability and a decrease in the contraction force of a functionally relaxed muscle that contributes to the fact that other muscle groups, compensating for biomechanical failure, subsequently lead to the formation of muscle pain syndromes in the place of their localization. Discogenic cervicothoracic radiculopathy (DSHR) occupy the leading place in terms of the severity of the process and biosocial consequences, the rehabilitation therapy of which continues to be an urgent problem [22, 23, 25].

The traditional scheme for the rehabilitation of wounded with the consequences of combat trauma of the upper extremities is not effective enough [14, 18, 19], which leads to the need for prolonged and often repeated treatment in hospitals, as well as the disqualification of military specialists. This category of patients needs not only adequate specific rehabilitation of the function of the upper limbs, but also the correction of complications, in particular vertebrogenic. The practice of treating patients with degenerative-dystrophic diseases of the spinal column shows that various modifications of manual therapy (MT) and biomechanotherapy (BT) methods are relatively inexpensive, accessible and at the same time effective methods of correcting the functional state of the spine [2, 3].

Purpose of the study

To assess the effectiveness of rehabilitation treatment of wounded with dorsopathies in combat injuries of the upper extremities using MT methods in combination with BT.

Materials and methods

The studies were carried out with the participation of 124 military personnel who were admitted to a rehabilitation center to treat the consequences of a combat injury of the upper extremities. The patients' age did not exceed 30 years (88.8%). The rest of the servicemen (12.2%) were in the 31-40 age group. The frequency of lesions of the right (51.9%) and left upper limb (49.1%) in the surveyed contingent practically did not differ (T92 - ICD-10). The time from the moment of injury to treatment in a rehabilitation center ranged from 8 months to 15 years, with 44.6% of patients receiving a combat injury before 2 years, 49% from 3 to 5 years, and 6.4% from 11 to 15 years.

The paper identifies the frequency and clinical features of vertebrogenic complications in servicemen with the consequences of combat trauma of the upper extremities, examines the development of violations of the functional and morphological state of the spinal column in this category of servicemen. Based on a clinical approach, medical histories, IHC reports were analyzed, complaints and anamnesis were analyzed. To solve the assigned tasks, in addition to a general clinical examination, including blood tests, urine tests, ECG in 12 conventional leads, X-ray of the spine, blood pressure measurements, patients underwent manual testing and biomechanical research using the David diagnostic system.

All the wounded with the consequences of a combat injury of the upper limb were found to have spinal disorders. In accordance with the accepted International Classification of Diseases and the causes associated with it, the tenth revision (ICD-10), 55% have spondylopathy. At the same time, 17% had spondylosis with radiculopathy, 23% had spondylosis without myelopathy and radiculopathy, 27% had deforming dorsopathy, 10% had intervertebral disc degeneration (other dorsopathies), and 8% had dorsalgia.

According to MRI data in the lumbosacral spine, against the background of degenerative changes in the intervertebral discs, the latter were affected at the level of the cervicothoracic region C0-C3 (41.8%) and C4-T1 (83.9%), their protrusion (2 –4 mm), without significant volumetric effect on adjacent structures. The studies were carried out in 2 groups: the main group - 62 patients with MRI-verified diagnosis of DSHR and the presence of severe and moderate pain

syndrome; the rehabilitation program included a complex of manual therapy and biomechanotherapy; a control group of 60 patients, representative in terms of age, severity of pain syndrome and MRI neuroimaging data; whose rehabilitation program included only manual therapy. Manual therapy (MT) was carried out according to the technique, which consisted of the following techniques: 1) post-isometric relaxation (PIR) to achieve sustained muscle hypotension and eliminate muscle soreness. Manipulations were performed on the trapezius, rhomboid muscles, rotators and extensors of the cervical spine, and the muscle lifting the scapula. The method is based on the physiological laws of reciprocal innervation of antagonist muscles. The essence of these activities consisted in a combination of short isometric work (5–7 s) and passive stretching of the muscle later (6–10 s), ie. sequential changes in muscle tension and relaxation; such combinations were repeated 4–6 times; 2) mobilization - in order to restore the mobility of the bone joints: sternoclavicular, costo-sternal, costo-transverse using rhythmically repeated passive movements within the physiological volume of the joint; 3) directed manipulations in relation to functional blockages to eliminate them with the help of a quick forced movement. Manipulations were performed in the cervicothoracic region on the C0-C3, C4-T1, T3-T4, T5-T12 segments. The procedures were prescribed daily or every other day; per course - 6–8. costal-transverse with the help of rhythmically repeated passive movements within the physiological volume of the joint; 3) directed manipulations in relation to functional blockages to eliminate them with the help of a quick forced movement. Manipulations were performed in the cervicothoracic region on the C0-C3, C4-T1, T3-T4, T5-T12 segments. The procedures were prescribed daily or every other day; per course - 6–8. costal-transverse with the help of rhythmically repeated passive movements within the physiological volume of the joint; 3) directed manipulations in relation to functional blockages to eliminate them with the help of a quick forced movement. Manipulations were performed in the cervicothoracic region on the C0-C3, C4-T1, T3-T4, T5-T12 segments. The procedures were prescribed daily or every other day; per course - 6–8.

The choice of the method of biomechanotherapy was justified by the fact that the cyclic load of the spine created by the simulators occurs under conditions of relaxation in optimal directions in combination with the correct functional position of the spine, while maintaining its physiological bends. The task of biomechanotherapy consisted in the original method of directed training of the spine, correction of its disorders and elimination of pain syndrome [1,2].

Biomechanotherapy was carried out as follows. The selection of patients for studying the methods of biomechanotherapy was carried out after a bicycle ergometric study of the adaptive capacity of the cardiovascular system to dynamic loads. Classes were held 4 times a week (Monday, Tuesday, Thursday, Friday) for one hour. The training program included the following elements: 1) warm-up - 15 min. (walking on a special exercise machine "stop walk", running on the spot); 2) exercise on simulators - 30 minutes; 3) stretching exercises - 10 minutes; 4) relaxation - 5 min. Load resistance was set based on the initial measurement of the ultimate isometric force and was 10% of the revealed level in the first week of training, 20% in the second week, and 30% in the third week.

Clinical and neurological examination of patients, as well as objectification of the effectiveness of the complex rehabilitation used, was carried out using a number of functional scales: the overall total assessment of the neurological profile. visual analogue pain scale.

Research results

In patients of the main group, the intensity of pain decreased, on average, 7.45 cm to 3.5 cm ($p < 0.05$), in the control group, positive changes were also significant, but expressed to a somewhat lesser extent - from 7.8 cm to 6.4 cm. The inclusion of biomechanotherapy (group 1) in the complex treatment significantly improved the clinical course of the disease. This was especially evident in the dynamics of pain syndrome. Thus, the basic rehabilitation complex (group 2) contributed to a decrease in the proportion of patients with pain syndrome at rest by 1.4 times compared with the background indicators, and the inclusion of BT (group 1.1) led to a decrease in this indicator by 2.7 times (Fig. 1). A similar trend was observed for pain that occurs during exercise. MT reduced the proportion of patients with such complaints by 1.8 times,
- 2.5 times (Fig. 1).

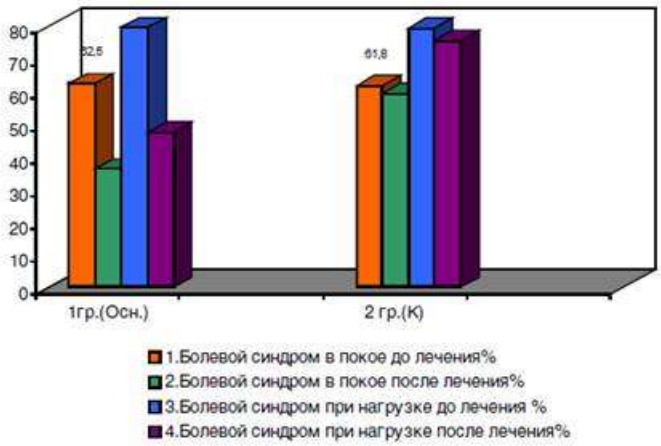

Fig 1. Dynamics of pain syndrome in wounded with dorsopathies with a combat injury of the upper limb.

Table 1 shows the indicators of changes in the mobility of the cervicothoracic spine in wounded with the consequences of a combat injury of the upper limb in the main group of groups and in the control group before and after treatment.

After a course of treatment with the use of experimental rehabilitation complexes (group 1), the indicators of mobility of the cervicothoracic region in all planes, as well as integral mobility, significantly increased. Thus, there was a significant significant increase in this indicator in the sagittal plane (MSw) in patients of group 1 by 16.5 ± 1.1% (p <0.001). In group 2, insignificant (by 1.5 ± 0.5%) growth was unreliable.

Table 1

Dynamics of indicators of mobility of the cervicothoracic spine in military personnel
with the consequences of a combat injury of the upper limb

	Показатели подвижности							
	Подвижность ш. отдела в сагиттальной плоскости (МСш) (°)		Подвижность ш. отдела во фронтальной плоскости (Мфш) (°)		Подвижность ш. отдела в трансверсальной плоскости (Мтш) (°)		Интегральная подвижность ш. отдела позвоночника (Миш) (°)	
Группы	основн.	контр.	основн.	контр.	основн.	контр.	основн	контр.
До лечения	90,1 ± 1,3	87,8 ± 1,5	71,8 ± 1,1	69,1 ± 1,6	119,3 ± 1,9	120,8 ± 1,5	93,8 ± 1,5	92,6 ± 1,3
После лечения	103,2 ± 1,1*	91,0 ± 19	81,0 ± 1,5*	72,1 ± 1,2	138,8 ± 1,2*	126,6 ± 1,2	107,7 ± 1,5*	96,6 ± 1,7

Примечание: * достоверность различия, p < 0,05.

Improved mobility in the transverse plane (MTS). In group 1 patients, mobility increased by 17.3 ± 1.2% (p <0.001). In the control (group 2), the difference is insignificant (by 1.6 ± 0.5%) and statistically insignificant (p> 0.05).

The mobility in the frontal plane (MFsh) significantly increased: in patients of group 1, the growth was 16.8 ± 1.1% (p <0.001). In the control (group 2), the difference is insignificant (by 1.6 ± 0.5%) and statistically insignificant (p> 0.05) (Table 1).

The change in the integral mean mobility of the cervical spine (MIsh) was calculated by the formula: MIsh = (MSw + MFsh + MTSh): 3, and was 16.9 ± 1.3% (p <0.001) in patients of group 1, and in patients 2 groups - 1.5 ± 0.5% (p> 0.05). After the course of treatment, changes in the indices of the mobility of the cervicothoracic spine MIS in group 1 were greater by 6.6% than in group 2 (Table 1).

Discussion and conclusions

It was found that when the main group of the rehabilitation program is used in the wounded with the consequences of a combat injury of the upper limb,

treatment, a gradual decrease in the intensity of the pain syndrome was noted. At the same time, the general neurological deficit in patients decreased, the symptoms of neuropathy decreased in the severity of symptoms of tension and tonic pain spasm. As shown by the results of the analysis based on the comparison of objective data, in the control group patients who underwent a rehabilitation program without biomechanotherapy, the effectiveness of the performed rehabilitation treatment is statistically significantly less pronounced than in the patients of the main group. This applies equally to the degree of decrease in the intensity of the pain syndrome, the total assessment of neurological deficit and the severity of tension syndromes in the wounded with the consequences of a combat injury of the upper limb.

Thus, on the basis of the results obtained, the method of combined biomechanical therapy (CBT) can be recommended as a “method of choice” for the rehabilitation therapy of servicemen with the consequences of a combat injury of the upper extremities.

The results of the studies carried out serve as the basis for the use of effective, scientifically grounded methods of mechanical impact on the paravertebral muscles and spinal motion segments of MT, BT, as well as their various combinations in the treatment of vertebrogenic complications in military personnel with the consequences of combat trauma of the upper extremities.

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