Osteopathic treatment and medical rehabilitation of military personnel after mine blast injury

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SUMMARY

During 2008-2012 at the Institute of Osteopathic Medicine (St. Petersburg) together with the branch number 2 of the Federal State Institution “3 Central Military Clinical Hospital named after A.A. Vishnevsky Ministry of Defense of the Russian Federation ”, a comprehensive experimental examination of servicemen who were undergoing rehabilitation treatment due to disorders of the musculoskeletal system due to a mine-explosive injury and a mine-explosive wound with a detachment of one of the lower extremities was carried out.

The study involved 106 servicemen, who had and did not have a history of mine-explosive trauma and injury, at the age from 30 to 45 years. The functional state of the body was assessed, including the osteopathic status before and after the medical rehabilitation program. Psychophysiological testing of servicemen was carried out using the hardware-software psychodiagnostic complex of the APK “Multipsychometer”. Comparative assessment of the analyzed indicators of the functional state of the body and the osteopathic status of patients with mine-explosive injury was carried out before rehabilitation treatment and 2 months after.

The program of rehabilitation treatment for servicemen with signs of musculoskeletal disorders in MVT and MVR included dry-air autogravitational traction ("FAC couch") and osteopathic treatment. The standard treatment program included prosthetics, physiotherapy, exercise therapy and massage.

Key words: functional state of the body, medical rehabilitation, osteopathic status, mine-explosive injury, psychophysiological testing.

RESUME

In the period of 2008-2012 Saint-Petersburg Institute of Osteopathic Medicine in cooperation with the Second branch of Vishnevsky Military Clinical Hospital of the Russian Defense Ministry carried out a complex experimental research of military servicemen who were undergoing rehabilitative treatment after the disorders of locomotor apparatus as a result of mine-blast traumas and explosive wounds with detachment of a lower extremity.

106 servicemen, aged between 30 and 45, both with and without mine-blast traumas and wounds in their medical history were examined. The examination focused on their

body's functional state, including osteopathic status before and after medical rehabilitation programs. Psychophisiological testing of the military servicemen was performed with the hardware-software psychodiagnostic system Multipsychometer. The comparative evaluation of the relevant functional status and osteopathic status indicators in patients with mine-blast traumas was made before the treatment and 2 months after the rehabilitative treatment.

The rehabilitative treatment program of military servicemen with signs of locomotor apparatus disorders as a result of mine-blast traumas and explosive wounds included dryair self-gravity counterextension (so-called “aircraft commander's couch”) as well as osteopathic treatment. Standard treatment program included prosthetics, physiotherapy, exercise therapy and massage.

Keywords: Body functional state, medical rehabilitation, osteopathic status, mineblast trauma, psychophisiological testing.

Introduction

In the context of local armed conflicts, the most frequent injuries to military personnel, as well as from terrorist acts, to civilians are mine trauma (MBT) and mine explosive injury (MBW) with the separation of one or both lower limbs.

Special attention should be paid to changes in the state of health, including disorders of the musculoskeletal system in servicemen with a history of MVT. For former participants in modern wars at the age of 23–33 years, signs of spinal osteochondrosis were detected in 25% of cases [4]. With MVR with limb avulsion, severe biomechanical disorders were determined in disabled people: changes in the tone of the muscles of the back and shoulder girdle, the development of osteochondrosis of the spine, flat feet due to foot overload, limited mobility of the hip joint, scoliotic deformity of the lower thoracic and lumbar spine [2, 3]. Disabled people who have undergone amputations of the lower extremities need adequate means of motor rehabilitation. In the rehabilitation process, one of the leading places belongs to adequate prosthetics.

It is known that, due to the loss of the lower extremities, the development of disorders of adaptive-compensatory reactions and autonomic functions, reflecting profound changes in the regulatory systems of the body, is possible. It was found that chronic stress after amputation of the lower extremities is accompanied by a complex of morphofunctional changes, significant physical activity (FN) associated with prosthetics, stress of adaptation mechanisms and other changes that enhance its negative effect.

There are a large number of methods for treating disorders of the musculoskeletal system, both conservative and operative [1, 8, 9, 11]. In recent years, much attention has been paid to manual therapy and osteopathy [10].

However, a number of aspects of the problem of health protection of servicemen with disorders of the musculoskeletal system, both the consequences of MVT and

due to limb separation in MVR, in relation to the frequency of occurrence and severity of changes in the functional state of the spine, to the assessment of changes in the psychophysiological and osteopathic status have not been fully investigated. Insufficient effectiveness of preventive and therapeutic and rehabilitation measures, including those for primary and repeated prosthetics, makes it expedient to conduct research on the development and substantiation of methods for the rehabilitation treatment of disorders of the musculoskeletal system in MVT and MVR with separation of one of the lower extremities. The effectiveness of manual treatment methods for correcting disorders of the musculoskeletal system (pelvis and all parts of the spine) in patients with MVR with avulsion of a limb has not been fully studied. There is a need for a comparative assessment of the effectiveness of standard methods and manual methods of restorative treatment of disorders of the musculoskeletal system in MVR with separation of one of the lower extremities. The organizational and methodological issues of increasing the effectiveness of rehabilitation treatment of disorders of the musculoskeletal system in MVT and MVR in military personnel have not been sufficiently developed, as important measures in the system of protecting their health.

Purpose of the study: to assess the nature and severity of signs of impairment musculoskeletal system in servicemen with mine and explosive trauma and injury to substantiate the effectiveness of treatment and rehabilitation measures to maintain and restore their health based on the use of modern technologies of rehabilitation treatment.

Materials and methods

A comprehensive experimental examination of servicemen who were undergoing rehabilitation treatment at branch No. 2 of the Federal State Institution “3 Central Military Clinical Hospital named after V.I. A.A. Vishnevsky Ministry of Defense of the Russian Federation "in connection with disorders of the musculoskeletal system due to MVT and MVR. Of these, three groups have been identified: servicemen without MVT (60 people), servicemen with MVT (46 people) and servicemen who had MVI with a detachment of one of the lower extremities (30 people).

To study the prevalence of signs of disorders of the musculoskeletal system, a screening questionnaire was conducted among servicemen with and without a history of MVT (106 people) at the age of 30 to 45 years. The features of the functional state of the musculoskeletal system of servicemen with MVT (n = 46 people) and without MVT (n = 60 people) were studied using the methods generally accepted in manual therapy, officially approved by the Ministry of Health and included in the International Professional Standard [7]. Signs of disorders of the musculoskeletal system were taken into account according to the data of clinical examination in the sagittal, frontal and horizontal planes in the standing and sitting position, as well as on the basis of dynamic tests in the same planes. The servicemen who had MVR with a detachment of one of the lower extremities were divided into three groups: control group - CG (10 people) - had prosthetics according to traditional schemes; main group 1 - MG 1 (10 people) - patients at the stage

primary prosthetics; main group 2 - OG 2 (10 people) - patients who are at the stage of repeated prosthetics.

The psychophysiological testing of the servicemen was carried out using the hardware-software psychodiagnostic complex APK "Multipsychometer". The indicators of mental state were determined according to the Luscher test, the severity of the level of reactive and personal anxiety according to the Spiberger-Khanin test, as well as personality traits according to the SMIL test. The study of subjective indicators of the quality of life of servicemen with musculoskeletal disorders was carried out using the SF-36 questionnaire [5, 6].

Osteopathic examination included an assessment of the state of the musculoskeletal, craniosacral and visceral systems according to generally accepted schemes. Functional tests were performed [12-14].

The program of rehabilitation treatment for servicemen with signs of musculoskeletal disorders in MVT and MVR included a set of measures aimed at eliminating pain syndrome, muscular-tonic tensions, disorders of postural muscle imbalance, and increasing the vitality of degenerative and fibrosed tissues. It included dry-air autogravity traction and osteopathic treatment. Dry-air autogravitational traction (AGV), based on the work of a person's own body weight, comfortably, taking into account anthropometric characteristics, is placed on a special supporting surface (conventionally called the "KVS couch"), which painlessly stretches through multidirectional polymer stiffeners (the patient is placed on them) physiologically relaxed body of the patient, and through the skin,

Osteopathic treatment was carried out differentially, depending on the pathobiomechanical disorders found. Patients of both main groups, in addition to the main treatment (prosthetics, physiotherapy, exercise therapy, massage), received osteopathic treatment, which was prescribed taking into account the revealed osteopathic lesions, the pathophysiology of the MR and the features of prosthetics.

Results and its discussion

It was found that the frequency of occurrence of signs of disorders of the musculoskeletal system in servicemen was significantly interconnected with the fact of the presence or absence of a mine-explosive injury in the anamnesis. The most pronounced signs of disorders of the musculoskeletal system were observed in servicemen with a history of mine-explosive trauma. This was manifested by the presence of a higher frequency of occurrence of signs of pain in the neck and back (1.9 times), frequent exacerbations (3 times), constant dull pain in the lumbar region that occurs during prolonged static or physical exertion, a high level (in 8.5 times) of the incidence of inpatient treatment in medical institutions in connection with diseases of the spine.

Based on the results of assessing the osteopathic status, it was found that

in military personnel with MVT, the most common signs of sacral dysfunction and L vertebral block$_{5}$ - S$_{one}$detected in 65–70% of cases. The frequency of occurrence of these signs in servicemen with MVT, compared with those without MVT, was, on average, 2 times higher ($p < 0.05$).

With a mine-explosive injury, osteopathic signs of vertebral block C$_{0}$ - WITH$_{one}$ met in 64% of cases, which is 2 times ($p < 0.05$) more often compared with military personnel without mine-explosive injury. Osteopathic signs of vertebral blocks C$_{7}$Th$_{one}$ and Th$_{one}$Th$_{2}$ with MVT also met in 2 times ($p < 0.05$) and 4.5 times ($p < 0.05$) more often, compared with persons without MVT.

In servicemen with traumatic amputation of the lower limb, phantom pains, pain in the lumbar region, torsion of the sacrum (in 100% of cases), signs of anterior or posterior rotation of the pelvic bone (depending on the time elapsed since the moment of injury - from 0.8 to 1 , 4 cm), dysfunction of the pubic symphysis (in 40-80% of cases) and whiplash (“wiplash”) (in 60-80% of cases), as well as “up sleep” dysfunction.

It was found that osteopathic treatment, in comparison with standard treatment, contributed to a significant improvement in the subjective state of patients and the normalization of most indicators of osteopathic status, which was manifested in the absence of complaints of phantom and vertebral pain, complete restoration of the mobility of the pubic symphysis, in the absence of signs of pathological rotation of the ilium. signs of whiplash and pelvic up sleep dysfunction. After the treatment, compared with the initial data before treatment, with MBT, there was a decrease in the frequency of occurrence of signs of structural dysfunctions: indicators of vertebral block C$_{0}$ - WITH$_{one}$ (v 12.8 times; $p < 0.05$), vertebrae L$_{5}$ - S$_{one}$ (v 6.5 times; $p < 0.05$) and Th vertebrae$_{one}$Th$_{2}$ (v 4.5 times; $p < 0.05$), as well as sacral dysfunctions (4.7 times; $p < 0.05$). Signs of vertebral block C$_{7}$Th$_{one}$ after treatment did not occur at all. By The results of the studies found that servicemen with MVT, compared with those without MVT, had lower values of indicators of mental state, as well as high levels of reactive and personal anxiety. The values of the indices of reactive and personal anxiety in servicemen without MVT corresponded to the optimal level, in servicemen with MVT - to an increased level of anxiety. The values of the indicators of well-being, activity and mood in persons without MVT, as compared with military personnel with MVT, were higher by 17.7% ($p < 0.05$), by 37.2% ($p < 0.05$) and by 20%. $p < 0.05$), respectively.

Evaluation of the mental state according to the Luscher test in servicemen without MVT, compared with servicemen with MVT, revealed higher values of performance indicators (1.8 times; $p < 0.05$) and vegetative coefficient (1.7 times; $p < 0$, 05) and lower values of indicators of anxiety (2.2 times; $p < 0.05$) and fatigue (1.5 times; $p < 0.05$). The values of the indicator of deviation from the autogenous norm (OAN) in persons without MVT, compared with military personnel with MVT, were also 3.5 times less ($p < 0.05$). Evaluation of the individual psychological characteristics of the personality of servicemen with MVT according to the SMIL test made it possible to identify higher, in comparison with persons without MVT, values of indicators on the scales

hypochondria (Hs) and hypomania (Ma), as well as low on the scales of depression (D), social introversion (Si) and schizophrenia (Sc), Excess values on the scales of hypochondria (Hs) and hypomania (Ma) in servicemen with MVT, compared with persons without MVT, was about 1.3 times ($p < 0.05$). At the same time, the decrease in the values of indicators on the scales of depression (D), schizophrenia (Sc) and social introversion (Si) in servicemen with MVT was 1.2 times ($p < 0.05$), 1.3 times ($p < 0 , 05$) and 1.5 times ($p < 0.05$), respectively.

It was found that the quality of life indicators of the SF-36 questionnaire were higher in healthy military personnel than in patients with a mine-explosive injury. The most significant differences were characteristic for the scales of pain (B), physical functioning (FF) and mental health (PZ). The values of the indices of these scales in healthy servicemen were higher than in combatants by a factor of 2.0–2.8 ($p < 0.05$). The excess of the values of indicators on other scales in healthy people was 1.2–1.7 times ($p < 0.05$).

Based on the results of the studies, significant differences were revealed in the values of the indicators of the quality of life among servicemen without MVT and combatants. Thus, in persons without MVT, the values of almost all indicators of the quality of life of the SF-36 questionnaire were higher than in servicemen with a mine-explosive injury. However, the most significant differences were characteristic for the scales of pain (B), physical functioning (FF) and mental health (PZ). The values of the indicators of these scales among servicemen without MVT were higher than in combatants by 2.8 times ($p < 0.05$), 2.5 times ($p < 0.05$) and 2.0 times ($p < 0.05$), respectively. The excess of the values of indicators on other scales among servicemen without MVT was 1.2–1.7 times ($p < 0.05$).

After the rehabilitation treatment of combatants in a military hospital, there was a significant increase in the values of the quality of life indicators. First of all, this concerned the indicators of pain (B) and mental health (PZ), the values of which increased 2.1–2.5 times ($p < 0.05$), as well as indicators of role emotional functioning (REF), physical functioning (FF) and viability (W) - their increase was 1.6–1.9 times ($p < 0.05$). The increase in the values of indicators of general health (OH), social functioning (SF) and role physical functioning (RFF) was also significant, although less pronounced, on average, 1.3-1.5 times ($p < 0.05$). Consequently, the combatants after rehabilitation treatment showed a significant increase in the values of indicators both on the scales of the physical component of health,

The presence of features in the quality of life in MBT before and after rehabilitation is also confirmed by the results of factor analysis (main components). In the structure of health factors before rehabilitation, 30.6% belonged to the psychological component of health. The physical component accounted for only 9.8%. After rehabilitation, the share of the psychological component of health in the structure of the health factors of these servicemen increased 1.4 times (up to 42%). At the same time, up to 12% accounted for the social component of health.

High efficiency of methods of osteopathic diagnostics and correction

disorders of the musculoskeletal system in servicemen after a mine-explosive injury indicates the advisability of including them in the list of medical and health-improving measures of medical rehabilitation at the late hospital stage.

Received data testify O expediency psychophysiological correction as an important component of medical rehabilitation of servicemen after a mine-explosive injury.

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