



# PHYSICAL FACTORS IN THE TREATMENT OF OCCUPATIONAL SPINE INJURIES

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## Introduction

Musculoskeletal disorders are the most common occupational health problems in Europe. According to the European Agency for Safety and Health at Work in 2010, 62% of workers are exposed for a quarter of the time or more to repetitive movements of the wrists and hands, 46% to painful or tiring postures, 35% to carrying or moving heavy loads. 25% of workers in the Member States of the European Union complain of back pain and almost as many report muscle pain. According to the European Foundation for the Improvement of Living and Working Conditions, the Fourth European Working Conditions Survey 2007, back pain is the most common complaint among active workers.

Musculoskeletal disorders account for 59% of all recognized diseases covered by European occupational disease statistics in 2005. According to the World Health Organization in 2009, MSDs account for more than 10% of all incapacity for work. Musculoskeletal diseases (MSDs) harm the health of workers and increase the economic and social costs of society as a whole. MSDs disrupt the work process, reduce labor productivity and cause temporary and permanent incapacity for work of the affected persons.[1]

Overexertion of the musculoskeletal system leads to tropic disorders in the interstitial spaces, a consequence of aseptic inflammatory process and secondary degenerative structural changes - tendon, ligament, capsular, bone, cartilage and muscle. The spine is a major part of the musculoskeletal system, consisting of vertebrae that connect to each other through ligaments and intervertebral discs. Spinal cord injuries are often accompanied by dysfunction of the spinal cord and its roots.[2]

These injuries occur as a result of the action of a complex of occupational hazards, the most important of which are physical activity, vibration and unfavorable production microclimate.[3, 4] Modern forms of work, changes in the demographic characteristics of the population and technical progress have led to changes in the characteristics and the ratio of various injuries of the spine.

The considered diseases are a typical health problem for those working in different branches of the economy. In some professions there are certain injuries of the spine, the connection of which with the working conditions is indisputable.[5] According to data from the National Statistical Institute of Bulgaria, in 2017, patients with diseases of the musculoskeletal system and connective tissue, which include diseases of the spine, were 6.6% of all hospitalized patients aged 18 to 65 years. i.e. in working age.

## Aim

The aim of the study is to improve the treatment and prevention of occupational injuries of the spine.

## Materials and Methods

The subject of the study are 105 cases of spinal cord injuries in employees of various enterprises in Northern Bulgaria. The persons were hospitalized in the Department of Occupational Diseases and Clinic of Physiotherapy and Rehabilitation, University Hospital - Pleven in the period 2017 - 2020.

Clinical, laboratory, functional, imaging and statistical research methods were used.

The source of health information are the histories of the disease and the personal ambulatory cards of the patients. All participants signed declarations of informed consent for the study.

All persons used:

- Clinical methods of examination - history, recording of general and neurological status; [6]
- Laboratory methods - blood and urine tests; [7]
- Functional methods - electromyography, dynamometry, vegetative examinations of the limbs (capillaroscopy, water and cold sample, laser Doppler flowmetry); [8]
- Imaging methods - radiography and computed tomography.[9]

The data from the study were processed with software statistical packages Statgraphics Pro for Windows, MS Excel 2013.

Treatment with physical factors was performed.

## Results and discussion

The respondents are 64 women and 41 men. The age distribution is from 31 to 62 years, with a mean age of  $51.2 \pm 6.4$  years (n=105) (Figure 1).

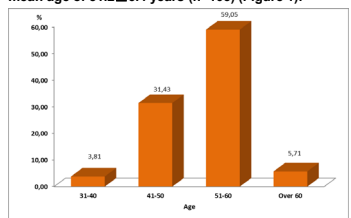


Figure 1. Distribution of cases by age

The distribution of the surveyed persons by length of service is presented in Figure 2. The mean duration was  $19.3 \pm 4.8$  years (n=105).

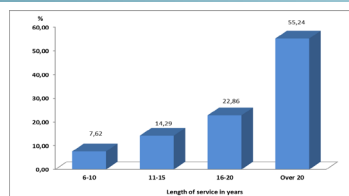


Figure 2. Distribution of cases by length of service

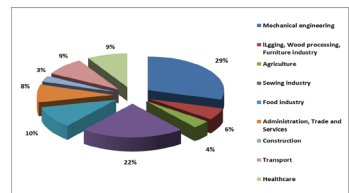


Figure 3. Distribution of cases by branches of production

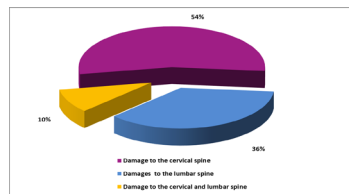


Figure 4. Distribution of cases by nosological units

The distribution of the examined workers by nosological units (Figure 4) includes: Injuries in the cervical spine (cervical spondylosis with radiculopathy, cervical nonvertebrogenic radiculopathy, cervical osteochondrosis with radiculopathy, cervicgia). Injuries in the lumbar and lumbo-sacral part of the spine (damage to the intervertebral discs in the lumbar or lumbo-sacral department with radiculopathy, lumbar or lumbo-sacral nonvertebrogenic radiculopathies, lumbalgia). Damage to the cervical and lumbar spine.

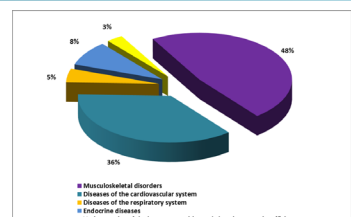


Figure 5. Distribution of cases by concomitant diseases

The following treatment with physical factors was performed: Physiotherapy with paraffin, meadows, therapeutic massage, therapeutic gymnastics, extension therapy, magnetic field, HDI, electrophoresis, interference current, ultrasound with NSAIDs was applied to 65 patients. In 40 patients with contraindications, physiotherapy without thermal procedures and magnetic therapy were applied.

The average stay of the hospitalized is 6 days. At discharge and on the 30th day after discharge, a clinical examination of the persons and a direct individual survey were conducted.

Improvement was reported in 102 cases, and 3 of the patients had no significant change in condition. They are aimed at additional consultations and tests.

Statistical analysis was performed using a non-parametric Wilcoxon rank test for the development of the ability to perform daily living activities (DLA) for three control points - admission, discharge and control examination on the 30th day (Figure 6).

The Wilcoxon curve represents the results of DLA at the beginning, end of treatment, and on the 30th day after discharge, forming a peak and shifting to the right. The displacement of the Wilcoxon curve is an indicator of a significant improvement in the condition and independence of patients.

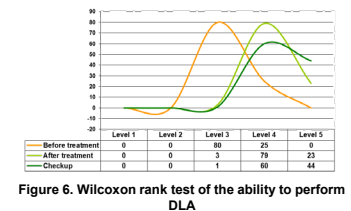


Figure 6. Wilcoxon rank test of the ability to perform DLA

## Conclusion

• Spinal injuries are a current health problem for those working in a number of areas of the economy.

• Treatment with physical factors is an appropriate and successful approach in the treatment of occupational injuries of the spine.

Recommendations

• It is appropriate to continue the treatment of patients with spinal cord injuries in connection with the profession with sanatorium and balneotherapy.

• It is necessary to carry out dynamic monitoring of the affected persons, accompanied by a rational regime of work and rest in order to avoid the occurrence of permanent incapacity for work

## References

1. Aleksieva Tsv. and team, Occupational Pathology, Sofia, 1982, pp. 206-238
2. Zhelev V., Physiotherapy in internal and surgical diseases, Sofia, 2013
3. Izmerov N.F., Occupational pathology. National Guide, GEOTAR-Media, 2011, pp. 784-785
4. Kostova V. and team, Occupational diseases, Sofia, 2007, pp. 120-145
5. Koleva I., Algorithms for physical prevention, therapy and rehabilitation of some common and socially significant diseases, Sofia, 2006, pp. 36-38, 114-116
6. Krastanova M., Complex therapeutic and rehabilitation approach in patients with arthroplasty of the hip joint, 2016, pp. 84-85.
7. Popov N., Spine - functional diagnostics and kinesotherapy, Sofia, 2002
8. Hygiene, nutrition and occupational diseases, edited by Prof. Buzhidar Popov. Sofia, 2009, pp. 563-581
9. Maigne R., Diagnosis and treatment of pain of vertebral origin: A manual medicine approach. Baltimore. Williams & Wilkins Co., 1996

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