USE OF MEDICAL DEVICES BY DORSALGIA RESULTING FROM WORKLOAD

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Abstract
The working environment is so automated nowadays that it requires employees to maintain a stereotyped position during work performance, often in a non-physiological work position. This results in overloading the musculoskeletal system and the emergence of painful conditions - the emergence of dorsalgia.
Objective: The aim of the work was to find out the amount and types of medical devices used by working respondents suffering from dorsalgia and to determine the location of pain depending on the nature of the work performed.
Methodology: The survey was carried out by questionnaire form of own construction. It was distributed in 6 companies in the district of Nove Zamky. It contained 20 multiple choice questions.
Sample: The survey sample consisted of 150 respondents divided into groups according to the working position of the body during the performance of work tasks.
Results: The results of the survey showed that 60 % of the respondents suffer from dorsalgia regardless of the position of the body while performing work tasks. Most often 56 % there was pain in the low back. Respondents used different types of medical devices to prevent or alleviate pain such as kosmodisc, anatomical pillow and lumbar belt. The most commonly used device 28 % was anatomical pillow.
Conclusion: Dorsalgia in our respondents was closely related to working in a stationary position. Despite the high incidence of pain in the shank area, only a small number of people use devices to alleviate these problems. No one was informed about the use of medical devices as a form of prevention.

Key words: Medical devices,.Dorsalgia. Work environment. Ergonomics. Prevention.

1 Introduction

The working environment includes all objective factors that have an impact on the human body during the work. Working conditions summarize factors related to work, such as adjustment of work place, hours worked and shifts.

Based on ergonomics, the workplace must follow a few principles to make work safe and secure. And for example: the size of the work area for the worker, the lighting of the work area, the breathability of the space, the size of the work space with the dimensions set according to the individual parameters of the worker. Adjusting the height of the work surface from the ground, the size of the foot space, the physiological posture of the body during work and, as far as possible, the most efficient and economical exercise, alternating static and dynamic muscle loads during work. Overloading the body during work creates the basic ergonomic assumptions of the working environment. Other parameters dealing with ergonomics are work with loads, lighting and coloring of the space, information obtained by sight, sounds, temperature in the working space, psychosocial conditions [1]. According to Hatiar [2], the most important parameter of the working environment in sedentary employment is to set the working height. The table height should be 70 cm for sitting work. The footrest is a good aid for lower persons. The desk should have a max. 5 cm thickness. The worktop was to be rounded to the worker. Work chairs that are both adjustable and firm with an adjustable backrest for the lumbar spine are best suited. The level of the desk depends on the type of standing job being performed. General desktop height adjustment requirements are e.g. The working area should be 5-10 cm lower than the height of the elbow joints. Adjustable workbenches ensure adaptation of the working environment to the specific requirements of the worker. If the height of the desk cannot be adjusted lower employees can use the washer to reach the required table level [1].

2 Pain

Pain is an unpleasant sensory or emotional event related to actual or potential tissue damage [3]. It appears most often in the locomotive system. Depending on the duration of pain, pain can be divided into acute and chronic [4, 5]. Suddenly occurring pain, lasting for a relatively short period of time, is called acute pain. Acute pain is a warning sign that warns us about possible tissue damage. If acute pain is of somatic origin, the pain site is easily delimited, sharp and burning. The pain of visceral origin has no clear manifestation, appears by blunt, pressure and stabbing pain [6, 5]. Chronic pain lasts longer than acute pain, occurs in the context of prolonged or incurable disease. Chronic pain can be defined as a pain affecting a person over 6 months. Periodic repetition is characteristic [4, 6].

The pain of the cervical, thoracic, or lumbar region of the spine can be termed dorsalgia. Dorsalgia is characterized as a sharp, prickly back pain that is limiting. The causes of dorsalgia are diverse, so we can call them

a multiethological problem. Dorsalgia is most common due to damage to vertebral and thoracic vertebrae. Poor posture, congenital and acquired anomalies, microtrauma, inflammatory conditions of the joints, severe fatigue, frequent stress, uncertainty, depression, lifting of heavy loads often cause back pain Back pain occurs after prolonged sitting, lying or standing in unsuitable position, after work in deep forehead or after improper lifting of heavy loads [7-9].

Most often we overload the cervical spine when we have a drooping back during work and then deepen the cervical lordosis. Excessive involvement of the neck and shoulder girdle causes headache, dizziness, radiculopathy that affects the upper limbs. They are functional disorders of the cervical segment. Characteristic in this area is hot, pain drills with a feeling of nausea, pain typically does not have a time of discovery. Functional disorders in the thoracic region are the result of congestion and muscle imbalance. In the hypocyphic position of the thoracic section, blockages and muscle rigidity often arise. Characteristic is the blunt and drilling pain, it can also be prickly. The most congested is the lumbar and sacral spine, both standing and sitting. The pain of the lumbosacral region is most often associated with diskopation. Pain is hardly identifiable, sometimes the sacrum hurts, sometimes the pain spreads throughout the lumbar region and can be fired into the lower limbs [10].

3 Seating

Many years of sedentary employment affects posture. Overloading the cervical spine often provokes headache. Poor posture during sitting causes retroversion of the pelvis, thereby smoothing the lumbar lordosis and hyper-kyphotic position of the thoracic spine, cervical spine deepens. The shoulders are often pulled forward and breathing difficulties occur. Poor posture is the cause of intervertebral plate damage. Poor seating causes an increased tension in the trapezium muscle and suboccipital muscles, and the shortening of the m. rectus abdominis [1, 10].

There are different positions of the body in the sitting position, the three most common positions are sitting front, middle and rear. A typical front seat posture is to move the torso forward and thereby move the center of gravity to the proximal thigh region. In this position, the pelvic anteversion and the entire torso bend are tilted. Seating on the tuber ossis ischia is characteristic for moderate sitting. Even in this position, proper posture is not ensured, as we often have to move the head in this position and thus deepen the cervical lordosis. The back sitting is characterized by the back of the torso, retroversion of the pelvis and hence the hypolordotic position of the lumbar region of the spine and head forwarding [1]. A specific group are taxi drivers and truck drivers who spend more than 8 hours behind the wheel every day. When sitting behind the steering wheel, we are most overloaded with the lumbar spine, so be careful about the steering wheel and seat adjustment [11].

4 Prevention of dorsalgia

Musculoskeletal disorders are most common in childhood. Some disorders during the development of the individual are corrected. Therefore, the prevention of back pain should begin as early as childhood. The effect of adverse conditions in adults may lead to the development or recurrence of pathological symptoms [12]. In preventive measures in adulthood, we can include the theme of the working environment, the right diet and also the elements of physiotherapy.

Adjustment of the working environment has an impact on the posture of the body, an incorrectly set working environment has a negative impact on the occurrence of pain in the locomotor system. The workbench must be set so that the elbows are laid on the table when the elbows are sitting. If the table is low man rakes in sedentary work is overloaded cervical and lumbar spine. Working at too high a working surface can cause pain in the cervical and lumbar spine and in the shoulder joints. When a person is standing at a low table, he has to lean forward and overload the lumbar spine. The height of the work chair must be adjusted so that the knees are flexed and the feet rest against the ground. The lumbar portion of the spine should rest on the chair back [12].

Healty life style does not only include diet but also stress relief. We feel stressed when we feel that we are no longer able to do our work. The reasons for stress are not only problems at work, but also family problems or difficulties in our private lives. The strategy to manage stress is different for each individual, each of us responds to stress differently, some are more sensitive, some more resilient. Other factors that affect us in coping with stress are self motivation, a good team, support for family and friends, health status and personality. Doctor's views on the relationship between stress and spinal pain are different. Excessive mental tension and stress can affect skeletal muscle tone. These factors may cause spinal pain or highlight already present pains [13, 14]. Healthy and balanced eating habits are essential for the functioning of the human body. Our bones, muscles and nervous system need vitamins, minerals to function properly. Bones need a sufficient supply of calcium, which we get from milk, dairy products and fish meat. Vitamin D is needed to process calcium from the body. Cereals, eggs, butter and some fish are rich in vitamin D. To protect our joints, among other things, a varied diet. The diet must include fatty fish, lots of fruits, vegetables and nuts [15]. Overweight or obesity is weight gain, and is one of the most common civilization diseases. Overweight has a negative impact on the entire human body. As a result of excessive body weight, weight-bearing joints and spine can be overloaded, leading to muscle imbalance. Lifestyle adjustments and regular exercise are prerequisites for reducing body weight [12].

The role of physiotherapy: Treatment of dorsalgia must be comprehensive. In acute spine pain, if less than 4 weeks, pain relief is most important. At the beginning of the onset of pain, a resting regimen is appropriate. Medication is the most appropriate at this stage. Subacute back pain is a pain lasting 4-12 weeks, at this stage of the disease physiotherapy must be aimed at achieving the right movement stereotypes and preparing the patient to return to work. For this, we use the means of therapeutic physical education and physical therapy. 12 weeks after the onset of complaints, we can talk about chronic problems. The treatment of chronic pain is carried out with the participation of several specialists [16]. An integral part of rehabilitation is protection, prevention of disease. Prevention has three phases. The primary phase, which includes measures to prevent the difficulty. The secondary phase deals with the reduction of secondary consequences of the disease. The tertiary phase aims to reduce the disadvantages caused by disease or trauma [5].

5 Medical devices

Rehabilitation aids can be divided into static and dynamic. Static aids are needed to maintain a given position without actively engaging the muscles. They are devices that have their fixed form, e.g. lumbar support, wedge, various splints and orthoses.

The lumbar support of the car ensures the physiological position of the spine while driving to prevent damage to the intervertebral discs and to maintain the physiological status of the individual joints of the spine. If we do not have an original shackle in the car, we can use over ball or pillow, rollers or semi-cylinders made of flexible material that adapts to body pressure [11, 12].

The lumbar belt is used in acute painful conditions in the lumbar spine and sacrum axis. The belt is set when the chest is in a breathed position to support the spine and thereby reduce pain in the area.

The seating wedge provides an ergonomic slope of the chair during sitting, resulting in gentle pelvic anteriority and back muscle activation. The seating wedge is a pad that helps to hold the body properly.

Dynamic aids force the client to maintain the correct position with the activation of the respective muscle groups e.g. hammock, dynamic seat wedge, gymnastic ball - fitball [11].

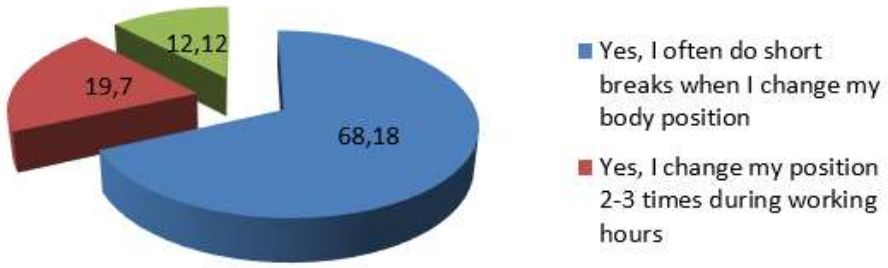
6 Results

Out of 150 respondents, 80 % of respondents participated in our survey. It was attended by 77 women and 73 men. In Table 1 we included numerical data on the amounts and percentages of respondents involved, as well as the distribution of the type of work performed.

Table 1 *Number of respondents*

Type of employment	Number of women	Number of men	Total	Number in %
Sedentary employment	33	13	46	31.00
Standing work	25	25	50	33.00
Mixed employment	19	35	54	36.00
Together	77 (51.00 %)	73 (49.00 %)	150	100.00

Graph 1 shows the answers to the question: "Do you have the opportunity to change your job position during your work?" 19.70 % of respondents can change their body position 2-3 times. The most common answer to this question, up to 68.18 % of respondents make short breaks many times during working hours.



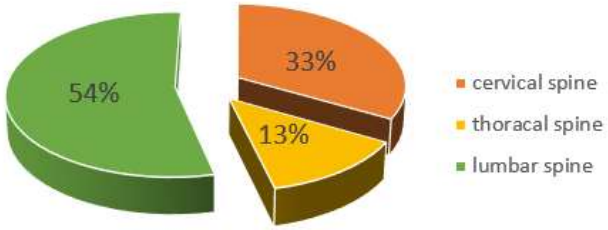
Graph 1 *Possibility to change body position during working hours*

We asked our respondents: “Do you suffer from back pain.” 87 (58 %) respondents said “yes” and 63 (42 %) did “no”. In the following table, we can see the percent evaluation of dorsalgia depending on the type of work position. These figures show us that standing back pains are the most endangered people.

Table 2 *Occurrence of dorsalgia by type of employment*

Dorsalgia	Type of employment					
	Sedentary employment	%	Standing work	%	Mixed employment	%
Yes	25	54.00	33	66.00	29	54.00
No	21	46.00	17	34.00	25	46.00
Together	46	100.00	50	100.00	54	100.00

In question no. 5. We asked about localization of pain. Of the 78 respondents, more than half describe problems with the lumbar spine (56.41 %). The second most common problematic segment is the cervical spine (33.33 %). The lowest incidence is in the thoracic region (10.26 %). Graphical representation of individual segments can be seen in graph 2.



Graph 2 *Occurrence of back pain according to the affected segment*

At the same time, we can see in the table 3 the evaluation of the factors of the back pain enhancement in individual work positions, when the respondents suffering from the back pain with sedentary employment feel the greatest pain during long sitting in the unchanged position, 15.00 %, of the standing workers feel back pain during long-term sitting , people with mixed employment is a little more 17.00 %. In a long-term state, they feel the greatest pain in standing, and in 31.00% of participants, participants with mixed employment feel a higher state of pain when standing. With greater physical exertion, respondents most often feel mixed pain growth 52.00 %. In Table 4, we worked out the answers to the question "When do you feel the greatest pain?" And compare the results for each type of job.

Table 3 *Circumstances of Back Pain by Employment Types*

Pain enhancement	Type of employment					
	Sedentary employment	%	Standing work	%	Mixed employment	%
For long sitting in fixed position	15	60.00	5	15.00	5	17.00
When standing long in unchangeable position	5	20.00	17	52.00	9	31.00
When changing position	5	20.00	11	33.00	15	52.00
Together	25	100.00	33	100.00	29	100.00

From other question assessments, we can conclude that, despite the absolute majority of people suffering from back pain, only 27 % of them have visited a doctor and only 11 % of them regularly go to rehabilitation. Up to 50 % of respondents with back pain dealt with one-time rehabilitation treatment. In 40 % of all respondents, spinal problems have returned over time.

They were interested in the use of medical devices in pain prevention or, even if they suffer from pain. In the highest number, our respondents (61.11 %) indicated that they did not use any aids to prevent back pain. Respondents most often use anatomically shaped pillow (20.83 %), fit ball (8.33 %), kosmodisc (4.17 %), hip belt (2.78 %), PC pillow (coccyx pillow) (1.39 %). 1.39 % of our respondents use other aids such as adjustable PC monitor, ergonomic chair. The individual items are clearly shown in Table 4.

Table 4 *Most commonly used medical devices*

Medical Devices	Number	%
Anatomically shaped pillow	30	20.83
PC pillow (coccyx pillow)	2	1.39
Fit ball	12	8.33
Hip belt	4	2.78
Kosmodisc	6	4.17
Any	88	61.11
Other	2	1.39

7 Discussion

The results confirmed the assumption that people with sedentary jobs have more problems with the cervical spine than working in another type of employment. At the same time, standing workers or people with mixed employment usually have problems with the lumbar spine. See Table 5.

Table 5 *Ratio of spine pain to sore area and job type*

Spine segment	Type of employment					
	Sedentary employment	*%*	**Standing work**	*%*	**Mixed employment**	*%*
Cervical spine	11	44.00	7	21.00	11	38.00
Thoracal spine	5	20.00	3	9.00	3	10.00
Lumbar spine	9	36.00	23	70.00	15	52.00
Together	25	100.00	33	100.00	29	100.00

The reason for this may be poor table setting and inappropriate monitor height, improper posture and poor head position during work, static spine overload, but of course genetic predisposition. People with mixed jobs and standing workers have the most problems with the lumbar spine. This can be justified by the fact that static standing load affects "locus minoris resistentiae". The weakest site of the lower lumbar region is the lumbosacral articulation [4].

Dr. Czigléczki [14] in his book, describes lumbar pain as the second most common spinal disease affecting the population over 14 years of age. According to Czigléczki, 32-33 % of the population have problems with the lumbar spine area during their lifetime. In our survey, 54.00 % of the respondents questioned have problems with the lumbar spine in particular. Significant differences may be due to the fact that in our survey we approached people from older age groups.

8 Conclusion

At work we spend a third of our lives. Therefore, the adjustment of the working environment plays a major role in our life in the development of dorsalgia. According to Anton Gúth [11], 60-90 % of the population have or have had spine problems in the past. Each person has his or her typical posture that is related to the individual's mental and physical condition. Each individual prefers a different posture. We can talk about proper posture when there is no imbalance between parts. In the presence of imbalance, bad stereotypes arise, as a result of the center of gravity deflection, thereby creating replacement mechanisms on the opposite side [10].

The best treatment for dorsalgia is prevention. Preventing pain should be part of our daily lives. This can be avoided by providing medical aids and ergonomic furniture as the basic equipment of the work area. Using medical devices and ergonomically adjustable equipment, not just at work but also at home. In our opinion, prevention should start as early as school education for children. Teachers and parents should be careful to develop proper postural and movement stereotypes. In physical education, children should learn the basics of proper posture, or the Back School.

The working environment should be "tailor-made", make to the individual's individual needs. There are films that focus on ergonomic environment and therefore work with experts in ergonomics to design a concept for improving the quality of the work environment.

For some of us, health is a matter of course and do nothing to preserve their health. A passive way of life can lead to hypotonia, with which we can go into a vicious circle, as a result of which muscle overload often occurs, which can lead to muscle imbalances. By regular physical activity we can improve the condition of our whole organism, not only from the physical but also from the mental side of health.

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