Baltic Journal of Health and Physical Activity 2018; 10(4): 119-130
Journal of Gdansk University of Physical Education and Sport
e-ISSN 2080-9999

ORIGINAL

doi: 10.29359/BJHPA.10.4.11

Workplace exercises. Improvement of postural stability of office workers with spine dysfunctions following a 21-week health training programme

Authors' Contribution:
A Study Design
B Data Collection
C Statistical Analysis
D Data Interpretation
E Manuscript Preparation
F Literature Search
G Funds Collection

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abstract

Background: The study sought to assess the postural balance of office workers with spine dysfunctions before and after 5-month health training designed to improve postural stability. The essence of the work was also to know the relationship between balance exercises and the changes of spinal pain.

Material and methods: Persons qualified for the study were those who had worked for, at least, 6 years in a sitting position for approximately 8 hrs/day, completed a full training cycle and fulfilled all participation criteria (women, n=15).

Results: Exercising resulted in improved balance parameters, with attendance at 56% and the task completion rate of 60% in each week. Reduced asymmetry of sensitivity to pressure on paraspinal tissues at C4–C5 and L3–L4 was observed, even though the 21-week exercise cycle was insufficient to raise the pain threshold in the study participants.

Conclusions: Multidisciplinary ambulatory rehabilitation (education + health training therapy) mobilises office workers and improves motricity, essential for a safe stable posture. Training reduces spine pain asymmetry in female office workers; however, the 5-month training programme lasting, on average, 35 min. twice a week is too short to reduce spinal pains significantly only by means of exercising.

Key words: office training, postural stability, spine pain prevention.

article details

Article statistics: **Word count:** 3,024; **Tables:** 6; **Figures:** 1; **References:** 35

Received: May 2017; **Accepted:** October 2018; **Published:** December 2018

Full-text PDF: http://www.balticsportscience.com

Indexation: Celdes, Clarivate Analytics Emerging Sources Citation Index (ESCI), CNKI Scholar (China National Knowledge Infrastructure), CNPIEC, De Gruyter - IBR (International Bibliography of Reviews of Scholarly Literature in the Humanities and Social Sciences), De Gruyter - IBZ (International Bibliography of Periodical Literature in the Humanities and Social Sciences), DOAJ, EBSCO - Central & Eastern European Academic Source, EBSCO - SPORTDiscus, EBSCO Discovery Service, Google Scholar, Index Copernicus, J-Gate, Naviga (Softweco, Primo Central (ExLibris), ProQuest - Family Health, ProQuest - Health & Medical Complete, ProQuest - Illustrata: Health Sciences, ProQuest - Nursing & Allied Health Source, Summon (Serials Solutions/ProQuest, TDOne (TDNet), Ulrich's Periodicals Directory/ulrichsweb, WorldCat (OCLC)

Funding: The research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflict of interests: Authors have declared that no competing interest exists.

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INTRODUCTION

Better postural stability means better spatial body control and, consequently, greater safety. Working while sitting for hours limits one's ability to control body movement and induces many postural and functional dysfunctions [1, 2]. Such changes may become fixed, causing the locomotor system's temporary inability to maintain an upright position and a stable body posture [3–6].

There have been numerous studies in recent years, aimed at assessing the control of the body's centre of gravity across different populations [7–10]. The interest in human body balance, as an injury predictor, has been partly sparked by the growing rate of dysfunctions of the entire locomotor system in an increasingly younger population [11–14]. If the pace of development of pathophysiological locomotor system changes in job market entrants is not curbed, the social systems will go bankrupt, given the current demographic forecasts [15, 16]. Therefore, searching for solutions consisting in specific activities preventing such limitations seems essential to improve the present physical condition of workers and to reduce labour and social costs. A relatively cheap solution to reduce such costs is preventive programmes implemented by employers, as part of obligatory occupational safety training. An example of such a programme is presented in this paper.

In 2013–2015, the authors cooperated with an agri-food processing company in Bielany Wrocławskie, which employs ca. 200 persons, including 140 office workers. The company's management was interested in implementing a preventive programme to find out whether health training on company premises would mobilise employees with spine dysfunctions and improve their safety during and after work. The cooperation consisted in incorporating a series of topics concerning spine injury prevention and work ergonomics into the obligatory training organised for the whole staff by the Cargill Poland, Branch Bielany Wrocławskie Enviromental, Safety and Health Department. The training was held twice a year, separately for production and office employees. Additionally, as part of annual "Health Week" campaigns, individual consultations were held with an expert on workplace ergonomics. As a result of those educational campaigns, a 21-week health training programme was completed on company premises, for office workers feeling functional pain in the spine and paraspinal tissues or discomfort in a sitting position.

The study sought to assess the postural balance of office workers with spine dysfunctions before and after 21-week health training designed to improve their postural stability. It also sought to answer the question whether the actual (implemented) dose of exercise would increase the subjects' physical activity, change sensitivity to the pressure on vertebral tissues at C4 and L3 and improve utilitarian motricity among the examined women and whether there are correlations between these changes.

MATERIAL AND METHODS

PARTICIPANTS

Following a 3-year training campaign aimed at injury prevention in the broad sense, 45 volunteers aged 23–59, with low physical activity levels (i.e. physical activity at leisure – 50–90 min a week or 15 min a day with a moderate intensity (e.g. walking) [17] and numerous general fitness limitations, joined the physical training programme. Ultimately, 15 women who had fulfilled the programme participation criteria were qualified for the study. Namely, changes in postural balance parameters were assessed in those who had fulfilled the following study criteria (in the order of importance):

- completion of a 21-week exercise programme,
- consent to participation in the study and personal data processing for research purposes,
- work in a sitting position for more than 5 years, at least 6 hours/day,
- age: 27-45,
- diagnosed spine dysfunctions, accompanied by pain, mild ROM limitation, defensive muscle tone, except for conditions resulting from a sudden, i.e. mechanical injury,
- perceived locomotor system ailments,
- reduced self-assessed physical fitness,
- reduced physical activity (MET-min/week < 600),
- body mass not exceeding 30% of the BMI norm.

The exclusion criteria were as follows:

- lack of chronic conditions in the muscular, articular and skeletal systems,
- lack of absolute contraindications to moderate and highly intensive effort,
- lack of chronic nervous, cardiovascular and musculoskeletal system and mental diseases,
- taking drugs affecting body balance, intensified vasomotor symptoms and being after a long illness that required staying in bed.

Table 1. Training priorities (highlighted) for the group, specified through the assessment of the presence of pain (after: Kałwa, Stefaniak [18])

No. of person studied	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Quantity of purpose-specific exercises in a macrocycle [%]
Wrist pain	1	1			1			1				1				33.3
Knee pain			1			1			2		1					26.7
Lumbar spine pain	1		1	1	1			1	1	1	1		1		1	**66.7**
Shoulder pain	1	1					1					1	2			40
Hip pain	2					1		1		1	1			1		**46.7**
Sacral spine pain	1		1	1					1	1				2	1	**53.3**
Cervical spine pain	1		1	1			1			1		1	1		1	**53.3**
Headache	1			1			1		1	1					1	40

Legend: 1-sided; 2-sided

RESEARCH METHODS

To assess postural balance, the stabilographic method was applied, with the use of a Kistler force platform, which measures a signal indicating movements of the centre-of-foot pressure (COP). The study was performed twice, before and after the 21-week exercise programme based on the training plan for persons with movement deficits [18] (Appendix 1).

The balance was measured by means of two 20-second trials of free standing on a sponge placed on a force platform. The feet position on the sponge was limited by the indicated lines, which accounted for the margin of tolerance of the distance of the feet from each other resulting from the width of the subjects' pelvis. That position was photographed to ensure the same feet position on the sponge in the final study.

Before the measurements, 10-minute relaxation exercises were performed in a sitting position, on a chair ensuring ergonomic body position with the legs rested on the ground. The subjects' body position could not cause them pain, discomfort or excessive body tension.

During balance assessment, changes in the centre-of-foot pressure (COP) position were recorded in the anteroposterior and mediolateral planes. The following were analysed:

- Standard deviation (mm), also known as COP signal variability or dispersion, specifies the degree of the difference of COP shifts from the mean COP value. The higher this value, the larger and more diverse the body sways in a standing position.

- Range (mm) – the distance between the threshold values of COP shifts on a given plane. The higher this value, the higher the maximum body posture sways.

- Mean velocity (mm/s) – the quotient of the COP path and the trial time. This parameter indicates the dynamics of the process of adjusting body balance in a standing position. The higher the mean velocity of sways, the more dynamic the balance adjustment process.

- Fractal dimension – a non-linear measure of COP dynamics. The higher the fractal dimension, the better the balance system is at adapting.

- Entropy – a non-linear measure of COP dynamics. The less attention is given to maintaining position (higher automatism), the larger the entropy (higher COP irregularity).

- Frequency (Hz) – describes the nervous system activity (the effects of a central nervous system decision undertaken to stabilise the body). The bigger the problems with maintaining trunk stability, the higher the frequency [19].

To assess selected motor skills, tests recommended by Lord et al. were used [20]: assessment of the force of knee joint extensors [21], simple reaction time and joint position sense – proprioception [22]. Spine pain threshold assessment was performed by means of algometry, which took into account a measurement of the force of pressure on the tissue at C4–C5 and L3–L4 on the spine's right and left side using an FDIX RS232 algometer [N/cm^2] [23]. Physical activity manifestations were assessed using an IPAQ-short test, with three categories: 1-non-active; 2-minimally active; 3-active [24].

The statistical analysis was performed using the Statistica 10 software, taking into account the t-test for dependent samples after a prior assessment of the results distribution with the Shapiro-Wilk test. The significance of differences in body balance parameters was determined using a single-factor analysis of variance (ANOVA), with the level of statistical significance adopted at $p \leq 0.05$. The relationships were assessed using the Pearson correlation.

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Training and study organisation

Group training was pursued for 21 weeks, with the progressive load volume and the learning of self-adjustable exercise planning. It was designed on the basis of systemic planning [18] (Appendix 1). Each week, one training unit was completed after work from 16:10 to 17:40, with an instructor who taught exercise techniques to be performed at home. The required techniques were photographed. The remaining units were to be completed by the participants on their own, based on the taken photographs and as instructed by the therapist. The subjects received a training plan with goals and exercise sets, taking into account individual contraindications to exercises. The measurements were made after work at a specially adapted conference room. During the studies on company premises the required testing standards were ensured, including proper space, temperature and air humidity as well as the lack of any disruptions by third parties.

Results

The average office work time in the observed group was 8.43 ±1.03 [hrs/day]. The planned health training macrocycle for that group included 63 training sessions over 21 weeks. The degree of training plan completion by the group amounted to 35.5 ±11.24 training sessions, which means a 56.35% ±17.84% attendance. This result determined the average level of the subjects' physical activity as twice per week. However, each week the subjects completed only 57% of the tasks within the average time of 34 minutes and 14 seconds ± 7 min. and 42 sec., which, nevertheless, proved effective attendance, resulting in a significant improvement of the participants' physical activity, manifested in a change of the IPAQ category (Table 2).

Table 2. Initial and final values of the assessed parameters. N = 15; T-test for dependent samples, with highlighted significant p values < .0500

Parameter	Study 1 Mean ± sd	Study Mean ± sd	t	p	Confidence level -95.000%	Confidence level +95.000%
Body mass [kg]	69.47 ±9.52	68.26 ±9.65	2.044	0.0603	-0.0593	2.4593
BMI [value]	24.86 ±3.85	24.43 ±3.65	2.105	0.0538	-0.0082	0.8759
MET [min/week]	442.97 ±293.20	1039.60 ±304.66	-5.411	**0.0006**	-1.0593	-0.3998
IPAQ [category]	1.07 ±0.60	2.06 ±0.74	-5.785	**0.0003**	-1.0621	-0.4046
Reaction time [ms]	0.265 ±0.042	0.261 ±0.039	-0.075	0.9411	-0.0278	0.0259
Leg strength_R [N]	38.80 ±12.23	45.50 ±13.83	-4.025	**0.0120**	-10.2703	-3.1297
Leg strength_L [N]	38.20 ±13.46	45.53 ±15.34	-3.105	**0.0148**	-12.3987	-2.2679
P-prio LL sym	1.12 ±0.66	1.06 ±0.95	0.245	0.8010	-0.4644	0.5844
P-prio 45° LL	4.71 ±3.60	2.96 ±3.29	2.604	**0.0208**	0.3078	3.1856
Bend forward* [cm]	10.90 ±6.91	2.13 ±8.55	6.774	**0.0000**	6.0137	11.5863
Sideway flexion R [°]	31.40 ±8.34	43.33 ±12.35	-5.198	**0.0001**	-16.8575	-7.0091
Sideway flexion L [°]	33.93 ±5.86	43.47 ±9.92	-4.232	**0.0008**	-14.3650	-4.7016

Increased physical activity of the subjects improved their body mobility, which manifested itself in a deeper trunk anteversion from a standing position and in a sideway bend with improved bilateral trunk flexion symmetry (Table 2). The training also significantly improved the force of the knee joint extensors in both legs (p = 0.0120; p = 0.0148) and the sense of position of the legs at the 45° angle. The reaction time and the sense of a symmetric position of limbs in space were not improved.

Increased physical activity failed to improve the threshold values of pain felt by the subjects. It is, however, noteworthy that the initial study demonstrated a large pain threshold asymmetry in the cervical and lumbar sections, which is statistically illustrated by a large results spread. Although the pain threshold medians and average values were not significantly increased, a higher results clustering in the final study was observed, which suggests reduced asymmetry of chronic pain experienced by the participants.

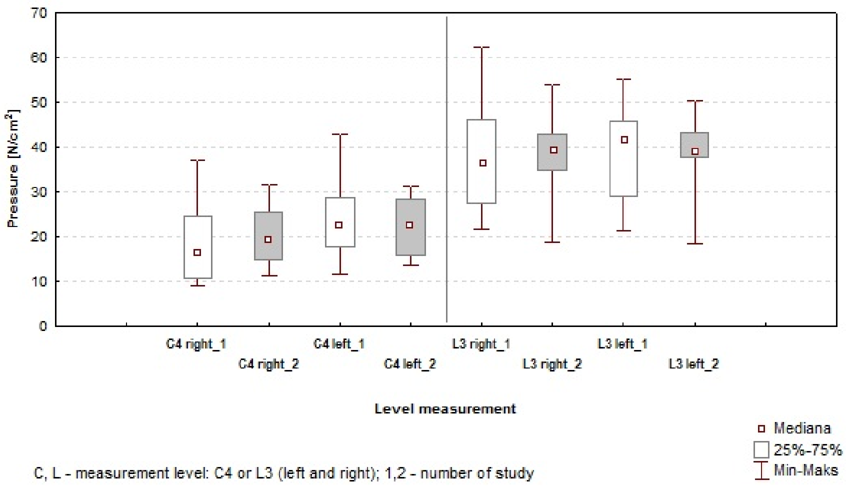

Fig. 1. Force of pressure on a tissue assessment. Changes in pain threshold values on individual spine levels, on both sides. A significantly decreased results spread in the second study is noteworthy.

After the training, a body balance improvement in a standing position on soft ground was also observed. An analysis of the average values of amplitude parameters showed a significant anteroposterior body stability improvement and a slight lateral stability improvement. During free standing on a sponge with eyes open in the anteroposterior plane, there was a significant change in two parameters: a decrease in the range ($p = 0.0420$) and in the mean sway velocity ($p = 0.0019$), whereas, in a test with eyes closed, there was a change in three parameters: a decrease in the sway variability (standard deviation) ($p = 0.0190$), the range ($p = 0.0167$) and the mean sway velocity ($p = 0.0034$) (Tables 3 and 4). No improvement in the frequency, fractal dimension and entropy was observed. The changes in the mediolateral plane after the training concerned: in the open-eye test – two parameters: a significant decrease in mean velocity ($p = 0.0330$) and entropy ($p = 0.0398$), while in the closed-eye test there was a significant decrease in the mean sway velocity only ($p = 0.0007$). Tables 3 and 4 present the initial and the final study results for the average values, accounting for standard deviations, of COP parameters and of the fractal dimension and entropy in the anteroposterior and mediolateral planes with eyes open and closed.

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e-ISSN 2080-9999

Table 3. Average values (±SD) of amplitude parameters of COP (sd) and of fractal dimension (fd) and entropy (se) during standing with eyes open (eo) and closed (ec) on soft ground (sponge) in the anteroposterior plane (ap) before and after therapy

	Standing on a sponge – Anteroposterior plane (ap)					
	Eyes open (eo)			Eyes closed (ec)		
Parameters – designation	Study I	Study II	p	Study I	Study II	p
Standard deviation [mm] – sd	7.70 ±2.71	6.49 ±1.56	0.2292	10.89 ±2.83	8.61 ±1.83	**0.0190**
Range of sways [mm] – ra	37.86 ±9.60	30.05 ±4.10	**0.042**	56.01 ±11.87	43.02 ±10.73	**0.0167**
Mean velocity [mm/s] – mv	16.96 ±3.20	13.70 ±2.26	**0.0019**	27.95 ±4.63	21.44 ±6.06	**0.0034**
Fractal dimension – fd	1.38 ±0.07	1.37 ±0.07	0.7963	1.40 ±0.07	1.42 ±0.05	0.3938
Entropy – se	0.81 ±0.22	0.71 ±0.15	0.3226	0.67 ±0.16	0.66 ±0.13	0.7956
Frequency [Hz] – fr	0.38 ±0.11	0.35 ±0.09	0.5097	0.43 ±0.12	0.40 ±0.09	0.3311

Table 4. Average values (± SD) of amplitude parameters of COP (sd) and of fractal dimension (fd) and entropy (se) during standing with eyes open (eo) and closed (ec) on soft ground (sponge) in the mediolateral plane (ml) before and after therapy

	Standing on a sponge – mediolateral plane (ml)					
	Eyes open (eo)			Eyes closed (ec)		
Parameters – designation	Study I	Study II	p	Study I	Study II	p
Standard deviation [mm] – sd	5.41 ±0.95	5.00 ±1.25	0.3759	8.13 ±1.4	7.01 ±1.61	0.1728
Range of sways [mm] – ra	27.25 5.49	23.98 ±4.07	0.1986	39.69 ±10.26	36.72 ±10.91	0.3616
Mean velocity [mm/s] – mv	14.48 ±2.94	12.27 ±2.79	**0.033**	23.62 ±7.56	18.81 ±5.43	**0.0007**
Fractal dimension – fd	1.41 ±0.05	1.43 ±0.06	0.4869	1.45 ±0.03	1.44 ±0.06	0.7495
Entropy – se	0.81 ±0.17	0.69 ±0.18	**0.0398**	0.69 ±0.08	0.62 ±0.11	0.2373
Frequency [Hz] – fr	0.43 ±0.10	0.43 ±0.15	0.9761	0.46 ±0.09	0.45 ±0.14	0.9315

An analysis of correlations between postural stability parameters and the results of motor skills assessed in the second study demonstrate an existing relationship between the strengthening of leg muscles in the study period and a decrease in the range, variability and velocity of posture sways in the anteroposterior plane. There was also a decrease in body sways dynamics in the subjects in the mediolateral plane and an improvement of nervous system adaptation to balance changes in the anteroposterior plane (the greater the leg force the smaller the fractal dimension).

An analysis of correlations between the average values of pressure [N/cm2] in sensitive points on the right and left side of the cervical and lumbar sections showed that an improvement in the body stability parameters following purpose-specific training reduces cervical spine pain (Table 5). Furthermore, an increase in the sensitivity threshold in the cervical section after an exercise programme depends on an increase in the pain threshold and lumbar spine mobility improvement (Table 6). This result confirms the correctness of the concept of exercises designed to have a comprehensive impact on the spine. Simultaneously, one notes a negative correlation between an improved sense of the symmetric position of legs and a pain threshold reduction in the cervical and lumbar sections on the left side. This result confirms the impact of proprioception improvement through training on a reduction of sensory sensitivity asymmetry.

Table 5. Correlation between the force of knee joint extensors, body mobility and pain threshold and balance parameters after the 21-week programme*

Parameters	Eyes open				Eyes closed		
	COP spread ap	Range ap	Mean velocity ap	Frequency ml	Frractal dimension ml	Fractal dimension ap	Mean velocity ap
Strength of right leg	**-0.62**	-0.58				**-0.72**	
Strength of left leg	-0.54	-0.55	-0.48	-0.47		**-0.71**	
Press C4 R			**0.64**	**0.69**	**0.67**	**0.66**	**0.83**
Press C4 L			**0.70**	0.58	0.56	**0.63**	**0.84**

Legend: ap – anteroposterior plane; ml – mediolateral plane

* *Statistically significant results: not bolded $p < 0.05$; bolded $p < 0.01$*

Table 6. Correlation between selected motricity parameters and sensitivity to pain after the 21-week programme. Bolded statistically significant results $p < 0.05$

Parameter	Attendance %	IPAQ category	Strength LL R	PPrio LLsym	Press C4 R	Press C4 L	Press L3 R	Press L3 L	Flexion R
Strength LLR	**0.72**	**0.76**							
Strength LLL	**0.64**	**0.79**	**0.99**						
PPrioLL 450	-0.37	-0.42	-0.43	**0.66**					
Press C4 R	-0.23	**0.59**	-0.09	-0.55					
Press C4 L	-0.36	0.51	-0.24	**-0.59**	**0.67**				
Press L3 R	0.09	**0.62**	0.23	-0.55	-0.07	0.06			
Press L3 L	-0.02	0.54	0.20	**-0.64**	0.10	0.38	**0.90**		
Bend forward	0.12	**-0.75**	-0.29	0.43	-0.45	**-0.57**	-0.24	**-0.59**	
Flexion _R	-0.37	**0.83**	-0.43	**-0.57**	0.03	0.43	0.38	0.51	
Flexion_L	-0.31	**0.87**	-0.40	**-0.60**	0.10	0.48	0.40	**0.76**	**0.91**

DISCUSSION

One can observe many ailments and dysfunctions resulting from the lack of a proper amount of physical activity among persons with a sedentary job. These include, without limitation, CLBP (chronic low-back pain), CNP (chronic neck pain) or MPS (myofascial pain syndrome) [1, 5, 6, 25]. They are complex dysfunctions, encompassing motor and sensory disturbances within the peripheral and the central nervous system. Prolonged pain may cause morphofunctional changes resulting from static loads on the spine. Pain aside, these syndromes are not a threat to the person's life, but may, nevertheless, significantly lower its quality and work performance [26]. They also often involve many other symptoms, such as weaker muscular force, limited movement range in joints or a sense of muscle stiffness, which is particularly strong after long periods of immobility [2, 4, 26].

Research shows that the above motor system ailments are best prevented by regular physical activity [1, 20, 27]. Kwon et al. asserts that persons with lumbar spine pain should exercise at least 3–4 times per week [28]. This study demonstrates that as little as half of that dose may improve a spine condition within approximately 5 months. International public health guidelines recommend promoting any type of physical activity, both leisure time- and work-related [29, 30]. Persons classified as minimally active (based on IPAQ) meet the WHO recommendations as to sufficient physical activity [31]. It follows, however, from the studies that the little physical activity declared by the studied office workers from a factory in Bielany Wrocławskie in the initial study was not sufficient, as they experienced spine pains. It was only a change of activity category to, at least, the second after 21 weeks that made it possible to reduce the dysfunctions felt. One should emphasise that, as recommended by the IPAQ Research Committee, only the lower threshold of high-level physical activity actually constitutes HEPA (Health-Enhancing Physical Activity) and positively affects one's health [29, 32]. Individual body areas exhibit different pressure sensitivity thresholds. Cervical spine tissues are more sensitive than lumbar spine ones [33]. A large asymmetry was observed in the assessment of a tissue's sensitivity to pressure in the studied group in the initial measurement. Admittedly, the 21-week programme did not significantly change pressure tolerance, but it clearly changed the pain threshold asymmetry and remains linked to basic motricity parameters. However, the lack of a significant difference between the medians and average values suggests training time prolongation, with the observed training regularity. The observation time is also important. Therapies of this type are meant not only to obtain the desired changes, but, most importantly, to maintain them. Therefore, single parameter-oriented therapies, e.g. pain elimination therapies, prove ineffective in the long term. Thus, an effective formula would provide for a parallel, comprehensive impact on several body areas, which induces the maintenance of favourable changes [9, 34].

The present-day challenges concerning treatment costs reduction, with the current health problems of working persons and the simultaneous economic and demographic changes in developed countries, impose a search for solutions that will be the cheapest from the social policy standpoint. Preventive programmes providing for compensation exercises for employees during or immediately after work may significantly reduce work-induced motor and functional limitations. The costs of such programmes are divided between the employer and employees and are a minor burden on social budgets. Multidisciplinary cooperation leading to an improvement in employees' health and, ultimately, reduced production costs is, however, only possible upon the adoption of a long-term policy by enterprises. The therapy proposed in this study, involving the process of teaching the principles of self-adjusted training [35], as a lifestyle changing measure, appears to meet the expectations of employees, employers and the state.

CONCLUSIONS

1. Health training consisting in a comprehensive impact on the passive and active locomotor system improves postural stability in the anteroposterior and mediolateral planes through a reduction of the range, variability and dynamics of body position sways. The greatest changes and improvement of COP amplitude parameters was observed in the anteroposterior plane with eyes closed.

2. There is a correlation between improved body stability and reduced pain intensity of spinal tissues.

3. There is a correlation between improved priopriореception of lower limb symmetry and reduce pain of the L3-L4 in office workers with static dysfunction.

4. Multidisciplinary ambulatory rehabilitation (education + health training therapy) mobilises office workers and improves their motricity, essential from the safety standpoint. In consequence, it reduces pain asymmetry in persons with sedentary work-induced spine dysfunctions.

ACKNOWLEDGEMENT

The authors wish to thank the management and employees of Cargill Poland Branch Bielany Wrocławskie for employees' participation in the health training program and the creation of conditions to carry out this research.

Consent to research was approved by the Ethics Committee of the University School of Physical Education

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APPENDIX

Period	Preparatory period				Principal period 1								Principal period 2						Active interim period		
Month	**07-Oct**	**14-Oct**	**21-Oct**	**28-Oct**	**04-Nov**	**11-Nov**	**18-Nov**	**25-Nov**	**02-Dec**	**09-Dec**	**16-Dec**	**23-Dec**	**30-Dec**	**06-Jan**	**13-Jan**	**20-Jan**	**27-Jan**	**03-Feb**	**10-Feb**	**17-Feb**	**24-Feb**
week	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
Goals, tasks	NC, Kw, Info	A: 1,2,3,4,5,6 Locomotor system preparation for purpose-specific exercises, diagnosis of motor capabilities and skills			Learning purpose-specific exercise techniques, learning to "isolate" working muscles															A: 1,2,3,4,5,6	
Check	Technique			a6:30%	a5		a6:50%				a1:50%				a6:70%		a3:50%			a2:60%	a4:20%
Tests	Bm, BMI, Pain, Balance				Control of the current exercise														Bm, BMI, Pain		Balance
mesocycle	PRELIMINARY MESOCYCLE				PURPOSE-SPECIFIC MESOCYCLE 1				MAINTENANCE & RECOVERY MESOCYCLE				PURPOSE-SPECIFIC MESOCYCLE 2				CHECK MESOCYCLE		INTERIM MESOCYCLE		
microcycle	Offloading, strengthening, elongation exercises - static force – corrective exercises				Spine mobility, offloading exercises – isolated positions, spine elongation – kinesitherapy				"Core stability" training, yoga			rest	Movement coordination + flexibility: balance exercises (for 4 body balance maintenance strategies). Comprehensive strengthening of postural muscles.						Movement diversity: many forms of exercises		
Train. units / week	1	2	3 (incl. 2 at home)		4 (incl. 3 at home) + 1 walk							0	3 (incl. 2 at home) + 1 brisk walk						2 (incl. 1 at home) + 1 brisk walk		
Train. unit time	45	50'+ 1x30'	60' +2x 30'	70'+2x 40'	1x 90 (with instructor) + 3x60 min (home)							0	1x 90 (with instructor) + 2x60 min (home) +20 min walk						45 - 60 min		
Activity purpose	Static force in concentric and eccentric work, education				Strengthening, endurance + unstable ground							0	Flexibility + abdominal muscles		Static force – back muscles, Endurance – abd. muscles		Flexibility + lesser pelvis muscles		Areo + Stretching		
Train. unit type	Preparatory				Shaping							Recovery	Maintenance		Shaping		Maintenance		Recovery & maintenance		
Train. measures / forms	Klapp exercises – low positions, balance exercises, office				Klapp exercises – mid-high & high positions + band TRX				Core stability - mid-high & high positions, 3 & 2 support points			None	Abs	Comprehensive exercises + A6W + obliques			Abs, PB + Kegel exercises		As big as possible		
Reps	from 8 to 12		from 12 to 16		Tension maintenance for 5 -10 s.		from 16 to 20		Tension maint. 5 s			0	Tension maint. 10 s		3x Tension maintenance 10 s		Back to the dynamic form of 16 replicates		Movement recreation		
Sets	1	2			1		3					0	2 sets		3 sets		2 sets		As one wishes		
Intensity	Low		Moderate		Mid and high		High + submax	Submaximum and maximum (muscle confusion rule)				0	Mid		Mid and high		Mid	Low	Moderate		
Ext. resistance	None	Exercise learning (office)			TRX band, wobble cushion – low positions				Wobble cushion – low and high positions + resistance band, chair			0	Equipment-free exercises – body mass						As one wishes		

Cite this article as:

Kałwa M, Ostrowska B, Żywień U, Stefaniak T.
Workplace exercises. Improvement of postural stability of office workers with spine dysfunctions following a 21-week health training programme.
Balt J Health Phys Act. 2018;10(4): 119-130.
doi: 10.29359/BJHPA.10.4.11