

CIVILIZATION DISEASES AND THEIR RELATION TO INTERIOR DESIGN OF WORKING SPACES

VERONIKA KOTRADYOVÁ – IVAN PETELEN – ZUZANA ŽÚŽIOVÁ

Abstract

The paper deals with the relation of interior design and civilisation diseases, the possibilities of their prevention and treatment through the physical environment. It is the main topic of the research project APVV 0469-11 – Interior design as a tool for prevention and treatment of civilisation diseases, from 2012 at the Faculty of Architecture Slovak Technology University (STU) in Bratislava. Through detailed analysis we have identified two main problems concerning the physical/built environment and human health – environmental stress, which it is possible to prevent and reduce by more friendly environmental settings, and the passive/sedentary life-style, which it is possible to prevent and eliminate by dynamisation of the environment.

We demonstrate this approach in the example of one of the most common civilization diseases – depression and behavioural addictions such as work addiction. In the paper there are also presented recommendations and practical examples on how to prevent and eliminate it via the physical environment. Since time we spend most of the working day at working places, this approach is necessary to implement especially in the work environment.

Key words: interior design, civilisation diseases, depression, environmental stress, dynamisation of interior, motivation, movement, prevention.

Classification JEL: M12 – Personnel Management; M140 – Corporate Culture, Social Responsibility.

1. Introduction

The connection between the living environment and human health is the focus of scientific research in many different research fields – medicine, epidemiology, ecology, and sociology, as well as those dealing with the built environment such as architecture, urban planning and design.

The environment where humans live, work and perform their daily activities has a physical as well as a social dimension. These two environments are interconnected, are dependent and influence each other. Physical and social environments do not exist separately or independently; the living environment is rather the result of a constant interaction between natural elements, elements built by humans, and social ties and relationships between individuals and groups (*Syme, 1992, p. 953*). Physical and social environments in this interaction constitute major determinants of the quality of life and the health of the population (*Skar, 2002; Baggott, 2000, p. 23*).

Factors and impacts of the physical environment to the health of human being are quite well explored. It is possible to find studies confirming direct impact of noise (*Babisch, Beule, Schust, Kersten & Ising, 2005, p. 33; Jarup, Dudley et al., 2005, p. 1473*), air quality (*Brunekreef & Holgate, 2002*), lighting (*Ott, 1973*), physical qualities of living and working environment, environmental ergonomics or long-term interaction with toxicity in environment (*Wojtczak-Jaroszowa & Kubow, 1989, p. 141*). The complex approach to this issue we can find also by Jolk (*2002*).

Impacts of social environment in relation to public health and civilisation diseases are the matter of interest shorter period, but the number of studies in this field is increasing.

The environment influences (affects) our behaviour and well-being in the short term, during our stay in the environment, and physical and mental health in a long – term interaction. Westernized humans are unique in living well enough and long enough to pay a

price for this. Thanks to progress in psychosomatic medicine there occurred a change of view on the matter of physical (artificial) environment. The psycho-social context of a person has begun to be taken seriously by diagnosis and subsequent treatment, respectively therapy. This also indirectly paved the way for body conscious design/human centred design.

Human – Homo sapiens have existed among predators in open nature for 6 million years, preferring environments supporting survival, but have lived in buildings for just 10,000 years (*Hildebrandt, 1999*). However, our nervous system has remained almost the same. This basic fact explains our instinctive behaviour in some environments. Moreover the human being is both a biological organism and a cultural creature belonging in the same time into certain environments (*Hall, 1989, 1990*). Finish architect Juhani Palassmaa (*2005*) is dealing with these human aspects by creating spaces for living in his books about architecture. Theories of environmental psychology are also exploring the relation of human beings with their environment (*Gilford, 1996*) and studies of well-being are supporting these ideas (*Diener, 2009, McAllister, 2005, Trendburo, 2010*).

We have certain inborn instincts, behaviour patterns and emotions that we can overcome thanks to consciousness and also guided by the autopilot of our culture. In our western culture consciousness and inner instincts are often in conflict. It is quite common that environments are created by more and more distinctive products that distort the human body, or there is tolerated or created an environment producing environmental stress (*Kotradyova & Teischinger, 2014, p. 2*). Being forced to remain long-term in a situation that is stressful at the workplace or at home can cause e.g. raising blood, pressure, or frustration and dissatisfaction which in turn lead to depression (*Tolja, 2010*).

The decision whether or not to create a supportive environment for human development, for its maturation, or rather only tempt the paths of consumption by chasing for better and more fashionable icons for which we want to be admired by "the others", is a serious matter, and it is in our power to have impact in both directions. People unconsciously learn from the environment and build the stereotypes that directly affect their health. In order to embrace this issue comprehensively, it is necessary to resort to knowledge of human sciences such as psychosomatic medicine, orthopaedics, physiotherapy, experimental anatomy, psychology, sociology and anthropology, as well as applied sciences such as ergonomics/neuroergonomics and especially neurosciences.

Here it is worth mentioning Thorwald Dethlefsen and Rudiger Dahlke, experts on the phenomenon of disease who can be regarded as pioneers of psychosomatic medicine. In their book, *Illness as a Way (Dethlefsen & Dahlke, 2011)*, was first published in 1983. It was a breakthrough in the understanding of classical Western medicine, which often deals with the symptoms but not the real cause of a disease. According to them a disease is a general state, a manifestation of life stress and discomfort, and all diseases are only the tangible expression of the message of the spiritual realm, which tells us what in life has to be changed.

A similar approach to the notion of human health comes also from Jader Tolja, a physician, psychotherapist, neuroergonomist, pioneer of psychosomatic medicine in Europe. In his book *Bodythinking (Tolja & Speciani, 2003, p. 32)*, based on years of research and practical experience as a physician and psychotherapist, he sees the cause of diseases precisely in the schism between the real "Self" and the pressure of the society in which the person lives. According to him, every physical problem, from cervical spine tension to acne, and every disease from heart attacks, cancer through to mental illness can be interpreted in this context as an expression of the conflict between what a person thinks he is and what he actually is (which is also his main understanding of the occurrence of schizophrenia).

And all alienation from certain aspects can be considered as a precise message that, the image of the self is not corresponding with reality. Usually it is necessary to integrate into one's own family and culture in order to determine what kind of person a man really is. In this process, the individual begins to distort and manipulate his own psyche and body, to meet as closely as possible the expectations of others.

In general, the process continues until it reaches a critical point when who we think we are is so very different from whom we really are, and so a breakpoint has to come. Why is it necessary to analyse all the connections between the physical environment and civilization diseases? It is because it is in our competence to create an environment and to move towards it, to have a minimum of environmental stress and the stress of an unhealthy social environment. It is about not only the general welfare, and prevention against diseases of civilization, but also the sustainability of our civilization and life on earth in general. If a human is truly inside of his body, he will feel even more a part of the natural environment, and this will also strengthen his environmental thinking.

2. Interior design and diseases of civilization

This topic is the subject of the research project APVV 04969-11, Interior design as a tool for prevention and treatment of disease of civilization carried out by the Faculty of Architecture at the Slovak Technology University in Bratislava. In 2012 the Body Conscious Design Laboratory (BCD Lab) was established at the Faculty of Architecture of Slovak University of Technology. BCD Lab is a multi-disciplinary research and educational center focused on body conscious design and the relationship between humans and their environment. It creates a platform for this research project.

In the first phase of the research a range of civilization diseases were analyzed; causes, symptoms and consequences were examined in relation to physical environment factors. The interdisciplinary and transdisciplinary review of literature concerning the relevant research fields (architecture, social sciences, psychology, medicine, psychosomatics) was performed in order to get a comprehensive image of the research topic.

Based on the findings, the key hypotheses concerning the individual's lifestyle, social, psychosocial environment and especially his physical environment were set.

The first phase helped to narrow the scope of the researched diseases of civilization. The findings show a strong correlation between certain diseases and the physical environment settings of housing and working spaces. In the next steps the research will be focused on the following diseases that may be influenced by the design of the living environment:

1. Mental disorders – depression, neurosis and phobias.
2. Behavioural addictions – work addiction.
3. Autoimmune disease.
4. Perennial allergic rhinitis and contact dermatitis.
5. Chronic respiratory diseases – bronchial asthma, COPD.
6. Circulatory system disease – hypertension, circulatory diseases.
7. Metabolic disorders – obesity, ulcers and digestive disorders.
8. Neurological disorders – migraine.
9. Certain types of cancer.
10. Musculoskeletal system disorders – degenerative joint disease, osteoporosis.
11. Functional disorders of spine and musculoskeletal system – repetitive stress injuries.
12. Injuries.

In Table 1 there is also included a preliminary summary of the relation to life style, social and psycho-social conditions, as well as impacts of the physical environment that are related to the possibilities of prevention and treatment. This one shows the connection between relation of dynamisation of environment and the civilization, whereas most of the civilization diseases it is possible to influence in a positive way by adding more movement into the ordinary environmental settings. We shall demonstrate this approach in an example of one of the most common civilization disease – depression. The last two columns present possibilities of prevention and treatment, which are very often the same; difference can be seen in the intensity of assessment.

This type of analysis has been applied in all cases of researched diseases of civilization. The first three columns contain collected information on causes, risk factors and symptoms. In the fourth column there are hypotheses related to lifestyle conditions, behavioural risk factors, and social and psychosocial environmental factors. The data in this column describes the potential psychosomatic background of the disorder. In the fifth column are listed hypotheses concerning the physical environment conditions.

The last two columns suggest methods of prevention and therapy/treatment by design of the physical environment. The data listed here will serve as the basis for development of an interactive software. Those hypotheses will be verified by experiments in the next phase of the project (*Petelen, 2013, p. 90*).

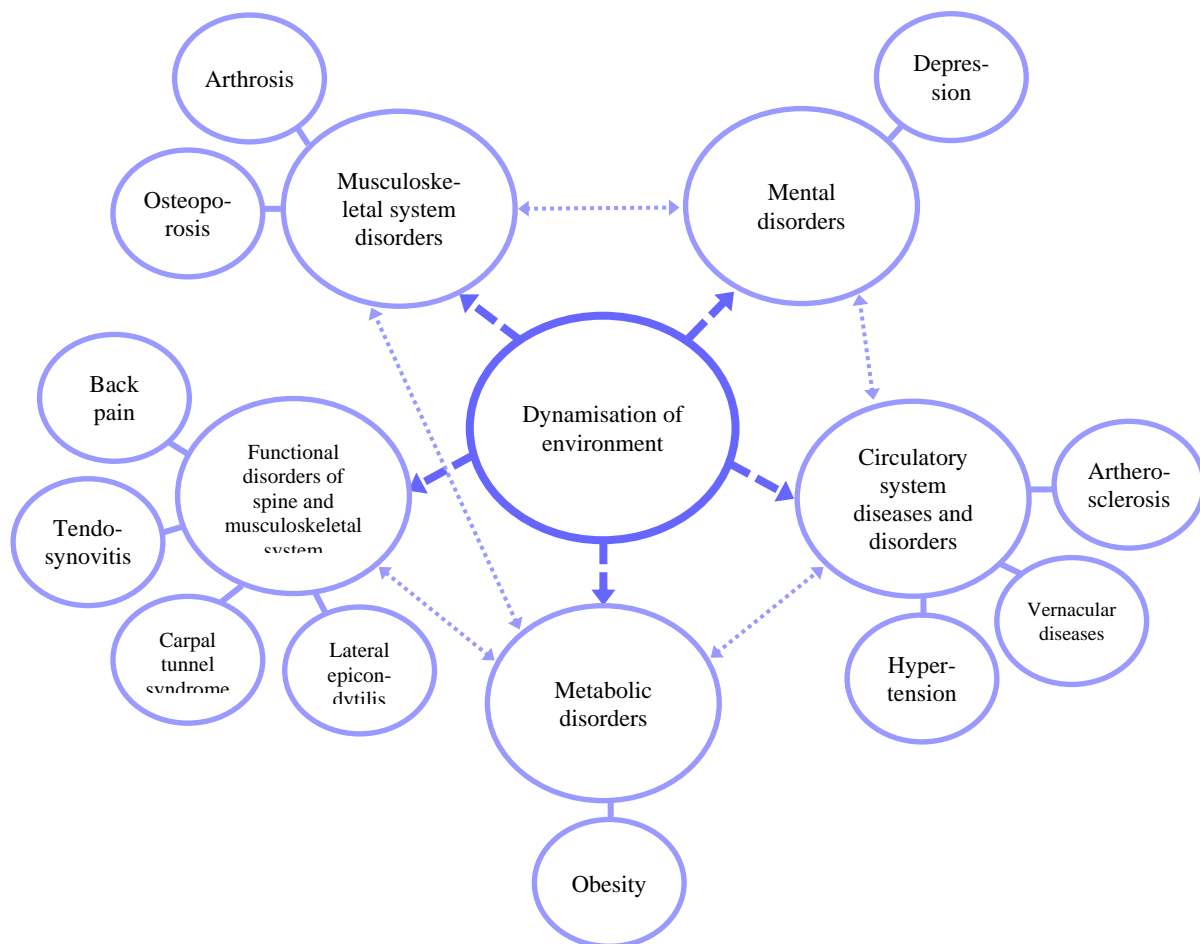


Figure 1: The connection between relation of dynamisation of environment and the civilization (own study)

Figure 2 shows the connection between environmental stress reduction and most of the diseases prevalent in the developed world, where this reduction has a positive impact by contributing to the prevention and elimination of these health problems. In addition, they show the existing relationship between the diseases; it shows that some circulatory system diseases, metabolic disorders or musculoskeletal system disorders are related to each other; the suggested methods of prevention and therapy might be similar in those cases.

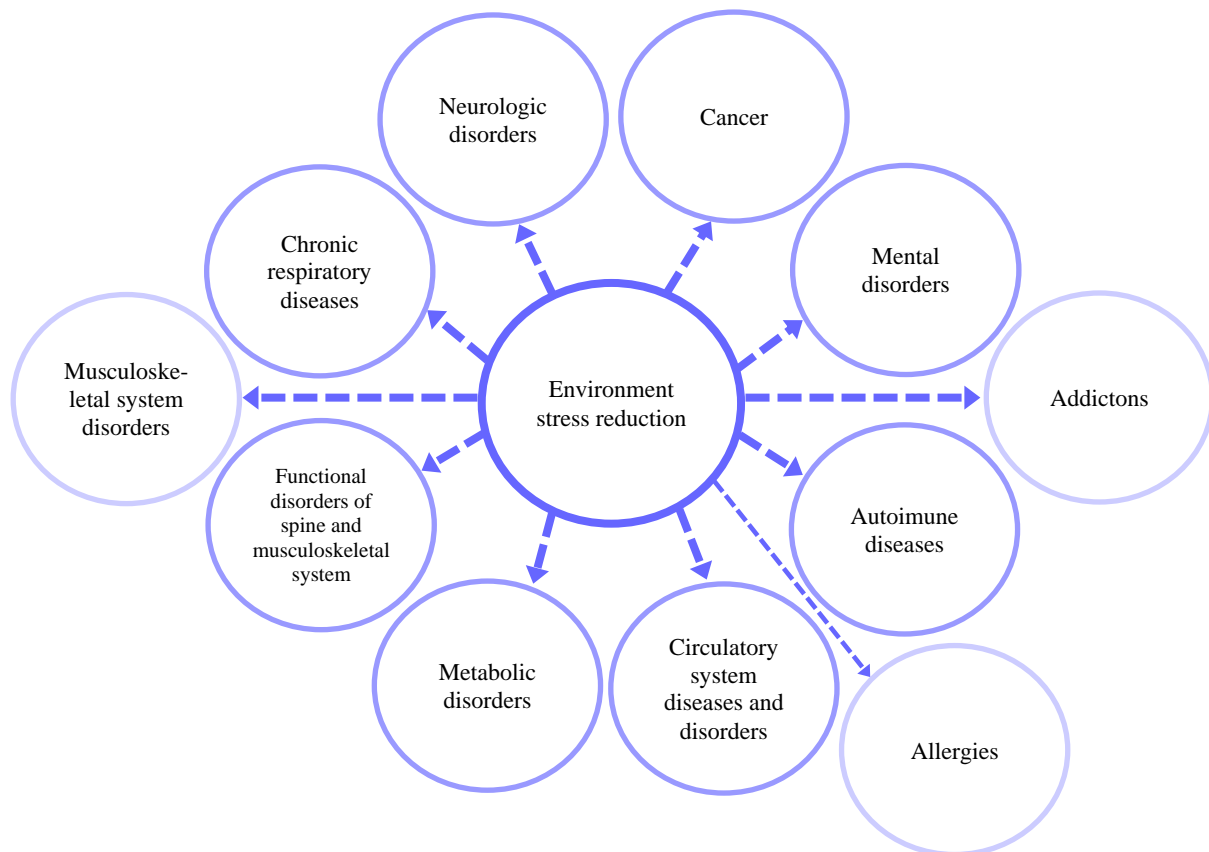


Figure 2: The connection between environmental stress reduction and most of the diseases prevalent in the developed world (own study)

Table 1 shows the summary of findings – the connection between the causes and risk factors of depression and the hypothesis that it is related to the physical environment, together with possibilities for the prevention and treatment of depression, a disease of the modern world.

A direct connection between a disease and the design of the living environment can be seen in the example of behavioural addictions such as work addiction. Long-term stress exposure, high expectations and the pressure of the social environment, combined with environmental stress factors, are generally the causes of this type of disorder. Free-lancers and people who have home offices are especially susceptible to work addiction. This is often a consequence of an inability to set borders – mentally as well as physically – between work and personal life. Therefore, setting borders physically and the strict separation of working and living spaces are important both for the prevention and treatment of this disorder.

Table 1: Summary – connection between the causes and risk factors of depression (own study)

	Hypothesis: Lifestyle, social and psychosocial risk factors	Hypothesis: Environmental risk factors	Prevention suggestions related to design of environment	Therapy suggestions related to design of environment
DEPRESSION	Consumerism	Lack of physical exercise and outdoor activities, lack of provision of green space	Reduce the time spent in shopping malls with too many stimulating elements (especially for children under 12), environment that supports intuitive use and orientation, provision of direct daylight and views of nature, support haptic and visual contact with nature and green, open spaces	Environment stimulating physical exercise, natural environment and provision of green spaces, use more interior plants
	Passive way of life	Lack of physical activities	Alternate body postures while working	Alternate body postures while working
			Environment stimulating physical exercise and activity	Environment stimulating physical exercise and activity
	Sedentary lifestyle	C-shaped spine – pressure on inner organs	Minimize pressure on inner organs – proper ergonomics, alternate body postures and activities	Minimize pressure on inner organs – proper ergonomics, alternate body postures and activities
	Under-stimulation or over-stimulation by environment	Darker colours in interior	Use brighter colours for interior surfaces and furniture	Use brighter colours for interior surfaces and furniture, Use vivid colours for interior accessories
			Use earth tone colours	Use earth tone colours
		Insufficient interior lighting	Use artificial sources of light similar to daylight in colour and intensity	Use artificial sources of light similar to daylight in colour and intensity
		Lack of (direct) daylight	Increase daily light exposure	Increase daily light exposure, provide direct daylight in interior
		Lack of fresh air, green spaces and contact with nature	Provide good ventilation and indoor environmental control, daylight and natural views of exterior spaces, pleasant sensory environment	Provide good ventilation and indoor environmental control, daylight and natural views of exterior spaces, pleasant sensory environment
	Frustration and dissatisfaction	Limited possibilities to express one's personality in living and working environment	Provide possibilities to personalize the environment to support a sense of identity, ownership and belonging	Provide possibilities to personalize the environment to support a sense of identity, ownership and belonging
	Exposure to social stress	Permanent social-environmental stress exposure, territoriality	Create a safe environment that will help mediate social tension and pressure	Create a safe environment that will help mediate social tension and pressure
	Social isolation, social discomfort	Living or working environment doesn't provide space for social interaction (home office)	Create an environment that will provide space for social encounters and interaction	Create an environment that will provide space for social encounters and interaction
	Excessive working hours, overwork	Lack of daylight, limited possibilities to alternate body postures and activities during the day	Spend more time outdoors	Spend more time outdoors
		Lack of borders between working environment and personal space, space for relaxation	Separate workspace and private space for relaxation	Separate workspace and private space for relaxation

Table 2a: Scheme of recommendations for the prevention of depression and work addiction in relation to long-term extreme workloads, overwork and stress diseases, and the environment (own study)



Hypothesis: Lifestyle	Hypothesis: Environmental risk factors	PREVENTION AND ELIMINATION/THERAPY SUGGESTIONS related to design of environment
Excessive working hours, overwork, no separation between work and private life	Spending majority of time in artificial light, lack of daylight, limited possibilities to alternate body postures and activities during the day	<ul style="list-style-type: none"> - Reduce the time spent in shopping malls with too many stimulating elements (especially for children under 12) - Regular access to outdoor spaces with sufficient daylight in public and private spaces (terraces, balconies, loggias) - Prefer environments that stimulate physical exercise - Reduce time spent at the place of work and instead stay outdoors and engage in active pursuits - Choose environments that support intuitive use and orientation and provide direct daylight and natural views - Support haptic and visual contact with nature and include open green spaces (green walls, green roofs) - Create environments suitable for planting indoor plants - Provide sufficient (visual) contact with the outdoors – access to windows, especially at workplaces; it is ideal to have the possibility to open windows according to actual needs. 
	Lack of borders between working environment and personal space, space for relaxation	<ul style="list-style-type: none"> - Separate working and private spaces and activities - For home-office and especially for home-based workers, separate the workplace with physical limits/barriers (doors, dividing walls) or have at least psychological barriers (paravans, shelves, etc.), and minimally a dedicated working table; do not work in bed or at the dining table. 

Table 2b: Scheme of recommendations to prevent remaining long-term in a static right-angle sitting position and to prevent a lack of physical activity (own study)

<p>Passive and sedentary lifestyle</p> <p>Sustaining a right-angle sitting posture over a long period by wrong body position-pressure to the inner organs (C-shaped spine)</p>	<ul style="list-style-type: none"> - Design environment and seating elements to allow changes in body posture (especially while working) (e.g., design floor space or seating steps covered with carpet in order to provide a surface comfortable to sit or lie on) - Support correct sitting posture in order to reduce pressure on internal organs - Constantly change body position (posture) both at rest and during work: the healthiest is a saddle seat position, especially as achieved by perching, with the legs tucked under at a 45° angle; implementation of the Mandal seat in schools - Provide the possibility to put the feet up, to sit or lie on the ground/floor and to assume a constructive rest position which helps to relieve the back /spine - Use interior elements and furniture which supports the development of gross motor skills - Prefer clothing, accessories or hand luggage which allow to free movement and changes in body position. <p>Mandal seat:</p> <p>Schematic of the proposal for dynamisation by Galen Cranz (2000):</p>
<p>Lack of physical activities, difficulty in switching between activity and passivity</p>	<ul style="list-style-type: none"> - Create an environmental setting that stimulates physical activity and allows alternation between activity/work and rest periods - Use a higher work desk or a tabletop suitable for working in a standing position in both home and office workplaces, create an environment for stand-up meetings - Design staircases and ramps as attractive interior elements which are inviting and welcoming for users

Table 2a displays schematic recommendations for the prevention of depression and work addiction in relation to long-term extreme workloads, overwork and stress diseases, and the environment.

In Table 2b are schematic recommendations for how to prevent long-term sustained sitting in a static right-angle position, how to reduce the pressure on inner organs created by prevalent incorrect body postures (spine in a C-shape), and how to prevent a lack of physical activity and a disproportion between activity and passivity. Through these measures, we can prevent the diseases displayed in the diagrams in Figures 1 and 2 (*Petelen et al., 2013*).

This also creates the basic informational databases to be used in creating an interactive internet application that will serve to inform the public about the issues surrounding the creation of their residential and working environments.

3. Conclusion

This analysis shows that, for example, circulatory system diseases, metabolic disorders and musculoskeletal system disorders are related to each other and the recommended preventative measures and therapies may be similar in many cases.

The case of interior dynamisation as a suggestion for improving the balance between active and passive lifestyles is common to many researched diseases of the modern world. It is evident that regular and well-balanced physical exercise helps ensure good blood flow and tissue perfusion and helps to prevent many diseases. On the other hand, long-term unilateral stress causes many musculoskeletal disorders and occupational diseases. In many cases these are a consequence of contemporary lifestyles influenced by the digital era and computer age.

Therefore it is essential to dynamise living and working environments by designing elements in the interior that will support a more active lifestyle. This means that the elements which constitute the environment should allow for and support the variance of body postures and activities. This works as both a preventative measure as well as a therapy in the case of cardiovascular and metabolic disorders. For the dynamisation of environment, we can formulate the following strategies:

- Create the possibility to change body positions within spaces used for long-term stays.
- Stimulate users to move in a natural way by employing spatial concepts like the strategic placement of staircases and ramps and the positive manipulation of the size of spaces and the relations between them.
- Dynamise the interior through the use of physiotherapeutic and fitness principles in the conception of furnishings and built-in elements in working and residential environments.

It is very hard to make people to move more in a natural way and to implement these principles without creating a feeling of discomfort.

Also, physical laziness can be a sort of behavioural dependence. MUDr. Okrúhlica, the director of the Centre for Drug Addiction in Bratislava, has set out a hypothesis that nowadays lower levels physical activity – laziness – is one of the most prevalent mental disorders and shows the typical characteristics of dependence. Chronic physical hypoactivity can be a mental disorder and laziness can be primarily a behavioural dependence. First of all, it is important that prevention begin in early childhood through the influence of parents, schools and the whole society.

It is not optimal to take the time spent in physical activity as the criterion for its contribution to health. This would be a significant simplification. The most important

indicators of the sufficiency of physical activity are the results of clinical measurements of physiological parameters, e.g., VO₂ and pulse/heart rate (*Okruhlica, 2011, p. 65*).

Here the environmental setting – both built-in elements and furnishings – play an important role in terms of the prevention or elimination of the negative impacts of sedentary lifestyles. It influences the volume of physical activity by setting the distances between the places we spend time during the day as well as the sort and volume of movement entailed by the everyday activities we perform in the particular places in which we spend time during the day, including the possibilities for changing positions/body postures during these activities.

Eliminating environmental stress is another means of prevention and therapy when talking about diseases of modern lifestyles. Environmental stressors are not only related to air pollution, increased noise levels, inappropriate interior lighting, temperature or humidity; substantial stressors are dimensions of the built environment as well. It is desirable to create environments that are consistent with the nervous system and its responses. The ability to create, control and protect a personal space is vital for a human's health. Research has proved the importance of contact, both haptic and visual, with the natural environment.

The choice of materials for interior designs and elements is also crucial for personal well-being. The proper material choice can reduce stress, contribute to a healthier microclimate indoors and increase the haptic comfort of individuals, which may help to relieve many symptoms related to modern lifestyle diseases.

The findings mentioned above indicate the next steps for this research. Further research will provide a detailed analysis of specific environmental stressors and the principles for built environments. The selected hypotheses will be examined during the experimental stage of the project. The selected hypothesis regarding the relation of modern lifestyle diseases to the built environment and the suggested means of prevention and elimination/therapy will be tested at one of the following levels:

- Virtual simulation;
- Qualitative and quantitative research in the field or in a sample box unit that will be built as a model room for conducting environmental simulations at the BCD lab to gain data to evaluate the reaction of respondents to particular environmental settings;
- Development, prototyping and mock-ups of the proposed practical solution.

Specific issues related to environmental stress and the possibilities for its prevention and elimination in relation to modern lifestyle diseases will be analysed and published on the internet website <http://www.bcclab.eu> and in scientific publications.

Acknowledgement:

This work was supported by the Slovak Research and Development Agency under the contract No. APW-0469-11 Interior design and its relation to diseases of civilization.

References:

- [1] Babisch, W., Beule, B., Schust, M., Kersten, N., & Ising, H. (2005). Traffic Noise and Risk of Myocardial Infarction. *Epidemiology*, 16(1), 33–40.
- [2] Baggot, R. (2000). *Public Health Policy and Politics*. Palgrave Macmillan.
- [3] Brunekreef, B. & Holgate, S. T. (2002). *Air Pollution and Health*. Lancet.
- [4] Cranz, G. (2000). *The Chair, Rethinking Culture, Body and Design*. New York. 288 p. ISBN 0-393-04655-9.
- [5] Cranz, G. (2006). *Reader Architecture 212 – Body Conscious Design*. Berkeley: University of California. 338 p.
- [6] Dethlefsen, T. & Dahlke, R. (2011). *Choroba ako cesta*. Praha: Triton.

- [7] Diener, E. (2009). Subjective Well-being. *The Science of Well-Being, 2009*, 11–58.
- [8] Gifford, R. (1997). *Environmental Psychology*. Allyn and Bacon. ISBN 0-205-181-5.
- [9] Hall, E. (1990). *Hidden Dimension*. New York: Anchor Books. ISBN-10: 0385084765.
- [10] Hall, E. (1989). *Beyond Culture*. New York: Anchor Books. ISBN 0-385-12474-0.
- [11] Hildenbandt, G. (1999). *Origins of Architectural Pleasure*. University of California Press. 174 p. ISBN 0-520-21505-2.
- [12] Jokl, M. (2002). *Zdravé obytné a pracovné prostredí*. Praha: Academia. 261 p. ISBN 80-200-0928-0.
- [13] Kotradyová, V. & Teischinger, A. (2014). *Komfort v mikroprostredí*. Bratislava: STU Bratislava (in publishing process).
- [14] Kotradyová, V. (2010). *Dizajn s ohľadom na človeka*. Bratislava: Fakulta architektúry STU Bratislava. 122 p.
- [15] Lars Jarup, J., Dudley, M.; Babisch, W., Houthuijs, D., Swart, W., Pershagen, G., Bluhm, G., Katsouyanni, K., Velonakis, M., Cadum, E. & Vigna-Taglianti, F. (2005). Hypertension and Exposure to Noise near Airports (HYENA): Study Design and Noise Exposure Assessment. *Environmental Health Perspectives, 113(11)*, 1473–1478.
- [16] McAllister, F. (2005). 'Wellbeing Concepts and Challenges'. Discussion paper prepared by Fiona McAllister for the Sustainable Development Research Network. Online. Available on: http://www.sd-research.org.uk/wp-content/uploads/sdrnwellbeingpaper-final_000.pdf.
- [17] Okruhlica, E. (2011). Telesná lenivosť ako závislosť. *Alkohol a drogové závislosti (protialkoholický obzor), 46(2)*, 65–78. ISSN 0862-0350.
- [18] Ott, J. O. (1973). *Health and Light. The Effects of Natural and Artificial Light on Man and Other Living Things*. New York.
- [19] Pallasmaa, J. (2005). *Encounters – Architectural Esseys*. Rakennustieto Publishing.
- [20] Pallasmaa, J. (2005). *The Eyes of the Skin – Architecture and Sences*. Wiley.
- [21] Petelen, I. a kol. (2013). *Interiérový dizajn ako prostriedok prevencie a liečenia civilizačných chorôb*. Výskumná správa etapa E01 – Interiér a jeho súvislosť s civilizačnými chorobami. Bratislava: Vydavateľstvo STU Bratislava. ISBN 978-80-227-3852-1.
- [22] Syme, S. L. (1992). Social Determinants of Disease. *Public Health and Preventive Medicine, ed. JM Last, RB Wallace*, 953-70. Norwalk: Appleton & Lange.
- [23] Skar, M. (2002). *Public Health*. The World Health Report 2002 – Reducing Risks, Promoting Healthy Life. World Health Organization.
- [24] Tolja, J. & Speciani, F. (2003). *Pensare con corpo (Bodythinking)*. Milan: Zelig (Italian Edition). ISBN 8887291977.
- [25] Tolja, J. (2010). *Lectures and Workshops within the course Body Conscious Design*. Bratislava: Faculty of Architecture STU Bratislava.
- [26] Trendbuero. (2010). *Vital-Studie*. Hamburg. Online. Available on: www.trendbuero.de.
- [27] Wojtczak-Jaroszowa, J. & Kubow, S. (1989). Carbon Monoxide, Carbon Disulfide, Lead and Cadmium – Four Examples of Occupational Toxic Agents Linked to Cardiovascular Disease. *Medical Hypotheses, 30(2)*, 141–150.

Addresses of authors:

Assoc. Prof. Veronika KOTRADYOVÁ, PhD.
Institute of Interior and Exhibition Design
Faculty of Architecture
Slovak university of Technology
Námestie Slobody 19
812 45 Bratislava
Slovak Republic
e-mail: kotradyova@fa.stuba.sk

Prof. Ing. akad.arch.Ivan PETELEN, PhD.
Institute of Interior and Exhibition Design
Faculty of Architecture
Slovak University of Technology
Námestie Slobody 19
81245 Bratislava
Slovak Republic
e-mail: petelen@fa.stuba.sk

Mgr. Art. Zuzana ŽÚŽIOVÁ, PhD.
Institute of Interior and Exhibition Design
Faculty of Architecture
Slovak university of Technology
Námestie Slobody 19
812 45 Bratislava
Slovak Republic
e-mail: zuzana.zuziova@gmail.com