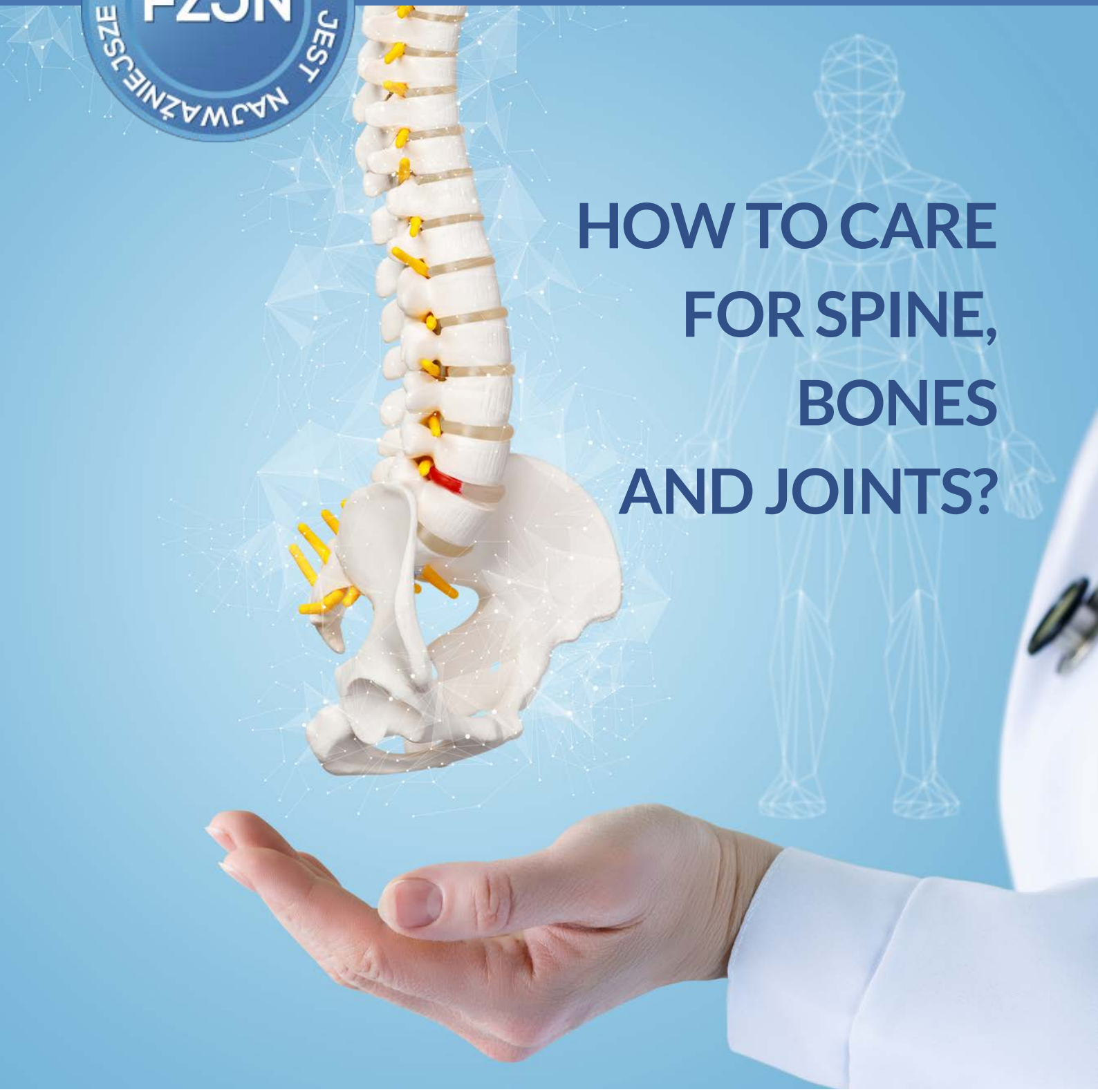
FUNDACJA ZDROWIE JEST NAJWAŻNIEJSZE

FZJN

ACTIVE SPINE
Educational campaign



HOW TO CARE FOR SPINE, BONES AND JOINTS?

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ACTIVE SPINE
Educational campaign

Agnieszka Dąbkowska, - the chairwoman of FZJN, the organizer of the Active Spine educational campaign. Due to a car accident she suffered an injury to her spinal cord which led to a severe spasticity (muscle tightness). She knows how important a healthy spine is, something one does not pay attention to until they encounter problems with it.

FZJN was established in January 2014 and aims to increase the awareness of and the access to the medical services that include physiotherapy and physiatry for as many people that seek help as possible. It is because in many cases early medical intervention or physiatry is essential for quick recovery and reduction of complications. To find out more information about FZJN visit **www.fzjn.pl**.

The online educational campaign ACTIVE SPINE is a social initiative which aims to promote the health of the spine, bones and joints, which have a direct influence on our everyday life. It is aimed at people with a sedentary lifestyle, people with motor disabilities and their caregivers, everyone interested in the spine and the osteoarticular system disease prevention. Spine, bones and joints diseases are the twenty-first century problems and during the pandemic they are visible even more than before, as people work and learn remotely.

The FZJN team mostly consists of people with motor disabilities. We know how important a healthy spine is, something people do not pay attention to until they encounter problems with it. Therefore, in order to help other people, we invited medical experts.

For further details go to **www.aktywnykregoslup.pl**

ACTIVE SPINE
Educational campaign

The organizer: FZJN, Editing Team and Patrons

Dietetics
Psychology
Lifestyle Medicine

Hanna Stolińska, MD, PhD
PhD in Health Sciences, dietitian

Author of the photo: How2

Malwina Umiastowska, MA
dietitian, psychologist

Alicja Baska, MD
Executive Director,
Polish Society of Lifestyle Medicine

Neurosurgery
Orthopaedics
Internal Medicine

Paulina Juszyńska, MD
Neurosurgeon

Jakub Wojciechowski, MD
Neurosurgeon

Paweł Walasek, MD, PhD
Orthopedics and traumatology expert

Anna Plucik-Mrożek, MD
Internal medicine specialist
President of Exercise Is Medicine Poland

Physiotherapy

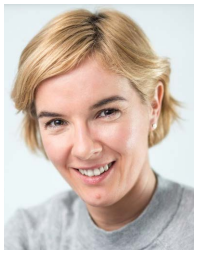
Iwona Skorupa, MA
Physiotherapist, Urogyneocology
President of the Mazowian Brand of the Polish Physiotherapy Association

Joanna Tokarska, MA
Physiotherapist, Neurorehabilitator,
Assistant of the PNF concept

Magdalena Łuczak, MA
Physiotherapist,
WATSU therapist

Katarzyna Janowska, MA
Physiotherapist,
Halliwick therapist

Kama Brzostowska, MA
Physiotherapist, Orthopodologist,
Orthopaedic inserts



Andrzej Grudniewski, MA
Physiotherapist, Orthopaedic
and Post-surgery Rehabilitator

Łukasz Frącz, MA
Physiotherapist, Orthopaedic
and Post-surgery Rehabilitator

Walenty Trandasir, MA
Physiotherapist, Orthopaedic
and Post-surgery Rehabilitator

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TAKE CARE OF YOUR SPINE – YOU HAVE ONE FOR YOUR LIFE

The spine protects your spinal cord and forms the axis of your skeletal system. Bone structure gives shape to the body and protects internal organs. The joints, on the other hand, support weight and connect bones. These locomotor organs work hard every day to help your body move. And how do you support them and protect them from pain, overload, injuries, contusions?

Diseases of the locomotor system, i.e. back pain syndromes and degenerative joints diseases are the main problem in the case of civilization diseases (according to GUS report from 2021 on the health of the Polish population in 2019 civilization diseases were recorded among 73.1% of adults). From a report published in 2019 by National Health Fund, estimated number of people suffering from osteoporosis (also called „silent epidemic" or „silent bone thief") was 2.1 million, of which 1.7 million were women (2018, Poland).

The leitmotif of the ACTIVE SPINE educational campaign is the spine and the osteoarticular system. What do we know about them?

- The spine is the scaffolding of the torso and consists of 33-34 vertebrae, divided into 7 cervical, 12 thoracic, 5 lumbar, 5 sacral and 4-5 coccyx (caudal).
- In an adult human there are approximately 206 bones (there are more of them in children and adolescents and there may be fewer of them in the elderly people's bodies).
- Bone joints are divided into continuous ones with no mobility or slight movements (bone adhesions: ligaments, cartilage hyperplasia) and free, that is, joints that are movable (spherical, spherical-acetabular, condylar, saddle, hinge, screw, swivel, flat).

Usually, we do not treat them well on a daily basis, which is why over time, there may accure problems with the locomotor system, i.e. pain, stiffness, restriction of mobility, injuries, contusions, fractures, diseases, degenerations, inflammations etc.

ACTIVE SPINE educational campaign is a response to urgent needs in the field of prophylaxis of back pain and diseases of the osteoarticular system. It can help with spine, bones and joints health, which is important for our life activity. COVID-19 pandemic and limited access to rehabilitation and physical activity, plus sedentary lifestyle, due to work and distance learning, bad lifestyle habits, including improper nutrition, increasing body weight leading to overload arthritis, neglect of sleep hygiene as well as chronic stress can cause many diseases and dysfunctions.

The solution for the risks associated with this is prevention in the field of spine, bone and joint system diseases. The campaign is aimed at physically disabled people and their caregivers (whose spine is exposed every day by various types of overload when lifting heavy weights while helping their charges on daily basis), people with sedentary lifestyle as well as anyone interested in comprehensive spine, bones and joints diseases prevention and life activity.

It covers several fields, i.e. clinical dietetics, psychology, lifestyle medicine, neurosurgery, orthopedics, internal diseases, physiotherapy, new technologies in diagnostics and physiotherapy (in the form of a debate), in which specialists in specific medical fields answered the question – HOW TO TAKE CARE OF THE SPINE, BONES AND JOINTS? The webinars took place: 29.04.–27.05.2021. Using this information, the editorial team of experts and patrons participating in the campaign, has prepared this e-book for you, which is free of charge. You can download it at www.aktywnykregoslup.pl. Movies from the webinars are available on YouTube of the FZJN, the organizer of the ACTIVE SPINE educational campaign.

BONE DESEASE PREVENTION

Scientific research confirms that a properly balanced diet plays an important role in the process of prevention and supporting the treatment of bone and joint diseases, i.e. osteoporosis (bone thinning), osteopenia (reducing bone mineral density, considered to be the early stage of osteoporosis), RA (rheumatoid arthritis) and other degenerative joint diseases.

„Taking care of yourself with a healthy diet and being active is frankly very nice. I recommend it to everyone."

Hanna Stolińska, MD, PhD

Therefore, it is worth introducing healthy eating habits into your life, before the first symptoms appear. A disease such as osteoporosis also called „the silent bone thief" does not hurt, so you do not think about it. You don't feel the loss of bone density until you trip over, break, and start dealing with this problem. People with eating disorders have osteoporosis very often and it does not apply only to the elderly people. Young people who want to run, jump and enjoy life get sick nowadays more often, and they are deprived of this due to their low body weight. To get on their feet it is necessary to take care of their health and recover from eating disorders.

The risk of developing osteoporosis not being in the age that affects the loss of bones density, genetic conditions (mother's, grandmother's and slim body structure) and hormonal disorders (resulting from malnutrition, estrogen deficiency or diseases such as hypothyroidism, Hashimoto's), in most cases depends on our lifestyle such as:

✓ **regular physical activity** (one that bounces us off the ground, e.g. jumping rope)
✓ **excess caffeine** (coffee, strong tea, carbonated drinks)
✓ **consuming high-calcium and high-magnesium water**
✓ **taking supplements** (mainly vitamin D, omega-3 fatty acids)
✓ **exposure to sunlight** (providing vitamin D)
✓ **developing healthy eating habits**
✓ **using hormone replacement therapy** (protects bone density)

x **smoking and alcohol abuse**
x **drinking plant-based drinks enriched and fortified with vit. D**

Many factors affect bone density and structure. Calcium is one of the most important (but not the only one!), but not the amount of calcium is important in our diet, but how it is absorbed into the body. The degree of bioavailability of calcium is influenced by various nutritional aspects.

Negative effect on calcium absorption have an excess and deficiency of protein, caffeine, salt, refined sugar, alcohol, antacids and containing aluminum medicine we take for heartburn, certain medications (antibiotics, steroids, thyroid hormones), vitamin A supplementation, sweet drinks containing caffeine and sugar, the use of very common diuretics, excess dietary fiber (found in people who are on plant-based diets). When it comes to vegetables rich in solanine, the so-called nightshades (tomatoes, potatoes, eggplant, pepper) and oxalic acid (spinach, rhubarb, sorrel, cranberry, plums, chard), the limitation of calcium absorption is only 5%, so you don't have to worry about it that much. Many of these products have additionally chlorophyll, which is beneficial for calcium absorption, and also they themselves contain a lot of calcium. Worth mentioning is also phytic acid, that is why it is recommended to soak grains and legumes. However, you shouldn't fall from one extreme to the other, also legumes contain a lot of calcium.

In order to increase the absorption of calcium, an adequate supplementation with vitamin D and magnesium is necessary, because in the absence of consumption of foods rich in magnesium, like whole grain cereal products, calcium will not be absorbed into the bones, only between the bones and will cause joint pains. Probably silicon, which can be found in green leafy vegetables, also works, and milk (in moderation) and fermented dairy products.

There is not a problem to well balance our vegetarian diet, as there is a whole range of foods rich in calcium, such as leafy green vegetables, Chinese cabbage, kale, pak choi, legumes, sesame, ground poppy seeds, amaranth, quinoa (pseudo-cereal with a very good composition and amino acids), dried apricots, dried figs. We don't have to eat a lot of calcium, because research shows that 700 - 800 ml of calcium plus all factors supporting its absorption, are good enough for our bones to be strong and healthy.

JOINT DISEASE PREVENTION

Depending on the severity of degenerative joint diseases a plant-based diet with an emphasis on an anti-inflammatory diet can help in treatment, including the removal or alleviation of symptoms. Women get sick three times more often than men, and with age, the risk of developing joint diseases increases.

It is estimated that from rheumatoid arthritis in Poland suffers half a million people and more than half of people suffering from joints desease also suffer from other diseases, i.e. diseases of the respiratory, digestive and circulatory systems, urinary tract, diabetes, amyloidosis. Among comorbidities are osteoporosis and cardiovascular disease (atherosclerosis). RA as well as steroids used in treatment significantly accelerate the development of osteoporosis. It is important to start early treatment to reduce the risk of bone fractures.

This does not mean that everything can be cured with a diet, but the correction of what we eat each day can bring you a significant improvement in well-being. For patients who eat meat regularly, the vegetable diet at the beginning seems quite restrictive, however, you get used to it over time. The color of vegetables and fruits is also important due to the nutritional value they contain. For joint health, green and purple vegetables are the best.

Proper nutrition primarily supports prevention, we cannot influence the genes, the time laps or gender, but there are many other factors dependent on us, i.e. a balanced diet, physical activity, posture, environment, infection (weakening the immune system and joints), injuries, smoking, stress etc. Vegan or vegetable diet with fish has a lower fat content and contains less toxins than food of animal origin, which causes damage to the tissues in the body and inflammation. Vegetables should be the basis (not an addition!) of every meal. **Supplementation with Vitamin B12 (which is only found in products of animal origin) in the amount of 2500 mcg per week**, is essential in a plant-based diet.

The most important **rule of healthy eating is to use a varied food**. The share of all groups of food products ensures a properly balanced diet and protects against dangerous deficiencies. You should eat whole grain cereal products primarily as a basis of healthy and nutritious breakfast and a full dinner. It is very important to choose mainly whole-grain cereal products such as: wholemeal, rye on sourdough bread, natural flakes, thick groats, natural rice and wholemeal pasta. It is better to prepare flour dishes like pies and pancakes with wholemeal or spelt flour.

Fruit, on the other hand, should not be eaten in unlimited amounts, as it is in the case of vegetables. In addition to valuable vitamins, they contain large amounts of sugar - fructose, which if consumed in excess and usually in the evening, transforms into fat tissue. It is very important to eat the fruits together with the peel, because there are vitamins and fiber that prevent sugar from being absorbed. Berries are the healthiest fruits with anti-inflammatory properties – strawberries, blueberries, blackberries, raspberries. Dried fruits, such as calcium-rich figs, and apricots that provide calcium and beta carotene, should also be on the menu.

Dry legume seeds (peas, beans, lentils, chickpeas, soybeans, broad beans) they are a source of wholesome protein, but most of all of iron. Because they are considered to be the main iron sources in a vegetarian diet. In a diet providing 2,000 kcal per day, you should consume at least one glass cooked legumes as well as three tablespoons of nuts and seeds and one tablespoon of freshly ground linseed (interchangeable with chia seeds and seeds hemp), providing omega-3 acids in the plant diet. Nuts, almonds and seeds should be added to salads, soups, yoghurt, shakes or eaten as a snack as this supports the absorption of the fat-soluble vitamins (A, D, E, K) contained in vegetables, fruits and dairy products.

Source: Dr. Hanna Stolińska's lecture entitled "Strong bones and joints – dietary support", webinar on 04/29/2021 as part of the ACTIVE SPINE educational campaign, www.aktywnykregoslup.pl and books by Dr. Hanna Stolińska entitled "Diet in the treatment of osteoporosis", Zwierciadło Publishing House NS. Z o.o., Warsaw 2019 and "Healthy joints. Diet treatment ", Dom Wydawniczy REBIS Sp. Z o.o., Poznań 2020.

SPINAL PAIN AND GUT HEALTH

When talking about "the gut" we usually mean its role in the removal of undigested food contents and waste products. However the gut plays a lot of extremely important functions in our body and are called our "second brain". Our wellbeing depends on its proper functioning and health. Although an interesting relationship has been proposed between the spinal pain and the gut, further research is needed in this area. As regards the gut itself, there is a growing number of publications available and we are gaining more and more knowledge of how we can maintain its proper functioning.

„The gut is an extremely important organ that affects the health of the whole body including our bone density."

Malwina Umiastowska, MA

THE GUT – AN ORGAN OF EXTREME IMPORTANCE TO THE BODY

The gut is called our second brain because of numerous neurons and nerve endings located in the gut wall. Their number is estimated to reach 100-500 million, which may correspond to the size of a cat's brain (comparing to the human brain having about 100 billion neurons). The gut communicates directly with the brain through the vagus nerve via the so called "gut-brain axis". As much as 90% of messages are sent toward the brain. These are signals from the gut bacteria that release various neurotransmitters as products of their metabolism.

Composition of the intestinal microbiota should be kept in balance as it has a profound effect on the body's health and wellbeing. The intestines are responsible for digestive processes . Most nutrients are absorbed in the intestines. It is also the site of production of vitamin K, which is involved in blood clotting and calcium metabolism, and biotin, which among its numerous functions prevents fatty tissue accumulation. Dysbiosis of the intestinal microbiota may promote inflammation, reduce absorption and production of nutrients, contribute to allergies and intolerances and even help develop obesity and depression.

More than 90% of serotonin, commonly known as the happiness hormone, is produced in the gut and deficiency of this hormone, caused by microbiota dysbiosis, may lead to depressed mood, anxiety and depression. Impairment of cognitive functions is also possible, which is commonly known as "brain fog" and manifests with attention disorders, memory problems and difficulties when recalling words. Unfortunately we do not know the complete list of bacteria involved in the production of positive and negative molecules but we do know which food products are good for the gut health and which are not. We will discuss this issue in the next sections.

SPINAL PAIN MAY BE RELATED TO THE GUT HEALTH

OImbalance of the normal gut microbiota and inflammation have been shown to cause discomfort and pain in the upper part of the cervical spine and the base of the skull. Unhealthy gut can affect sympathetic innervation of the thoracic vertebrae (Th9-Th11) and diaphragmatic muscle tone as well as - through the small bowel mesentery - cause pain in the upper part of the lumbar spine. The signals are transmitted via the vagus nerve. Furthermore the unhealthy gut can cause tightness in the abdomen, and with increased abdominal gases and pressure on the diaphragm it can cause difficulties with breathing. All of this may result in indigestion, food allergies and sensitivities as well as irritable bowel syndrome.

Studies of the impact of gut function on spinal pain, although scarce, indicate an important direction for further research of the causes of pain and open new opportunities to use osteopathic techniques as an adjunctive treatment modality in pain management. This therapy should be provided by qualified and experienced health experts. Moreover, based on our own observations, we may see how our posture, position of the body and muscle tone change when we feel abdominal pain. Chronic muscle strain results in more pain and malaise. These mutual interactions are like a vicious circle..

TAKING CARE OF YOUR GUT

How can you find out whether your gut works properly? Happily there is a number of studies that show us how we can keep our gut in good health. At first it is worth considering whether we pay enough attention to symptoms that may suggest a disease of the gut. We often erroneously explain our ill-being with aging. Our gut is unhealthy when we repeatedly suffer from digestive problems such as bloating, flatulence, abdominal distension, diarrhoea, constipation and other symptoms. Less obvious manifestations may include inflammatory conditions, chronic fatigue, inability to cope with stress, nervousness, poor sleep, hair, nails and skin problems, and spinal pain.

Factors that disrupt the normal intestinal microbiota are antibiotics and drugs including OTC products as well as unhealthy diet rich in sugar, highly processed food and alcohol. Nutrient deficiencies, stress, food allergies and intolerances are also among factors that can have a negative impact on the gut microbiota composition. To avoid such an unfavourable outcome, when taking antibiotics prescribed by your doctor you should always take probiotics of proven efficacy, preferably in the form of medicinal products. Moreover it is good to support our gut with probiotic foods including pickles and sauerkraut or fermented dairy products. Apart from probiotics, a healthy diet should contain prebiotics such as inulin, FOS and GOS, which promote the growth of good intestinal bacteria. Large amounts of them can be found in fibre provided with vegetables, oatmeal, chicory, unripe bananas or onion.

We should reduce sugar intake down to 5 tea-spoons of sugar at maximum, according to the WHO recommendations. We should control our intake of fast foods, sweets and salty snacks, ready meals and canned or jarred foods. Choose less processed or whole foods such as fruits and vegetables, groats, unprocessed fish, meat, eggs or products with as short as possible list of natural ingredients.

Eat products rich in fibre, that improve intestinal motility and promote normal intestinal microbiota as they feed healthy bacteria. Products rich in fibre include whole fruits and vegetables, pulses, nuts and seeds, whole-grain foods such as groats (buckwheat, pearl barley, millet), brown, wild and red rice, whole-grain bread and pasta. Large amounts of fibre are also found in vegetables rich in resistant starch, i.e. cooked and then cooled potatoes, rice, corn. We must not forget to drink enough water, at least 1.5-2 litres a day, and eat nutrient-dense, colourful, balanced diet while reducing alcohol consumption.

We must be aware that currently, when we are overloaded with information from the Internet, we can be easily tempted by trendy diets that actually do not work. It is not a good solution. Products commonly considered healthy may not be good for us. Every human being is different and that is why everyone of us needs a unique, individually tailored dietary plan. We may try to develop our own healthy dietary habits. However if our test results are outside the reference range and we suffer from various concomitant diseases, it is good to consult a physician and clinical dietician

Source:, Presentation of Malwina Umiastowska, MA, entitled Czy ból kręgosłupa może mieć związek ze zdrowiem jelit? Jak zadbać o jelita („Could spinal pain be related to gut health", " How to take care of the gut?") , webinar of April 29, 2021 as part of the ACTIVE SPINE educational campaign, www.aktywnykregoslup.pl; Malwina Umiastowska article entitled " Jak przyspieszyć metabolism?" („How to speed up metabolism?"), May 2020, www.mudiet.pl; Kossobudzka M., „Man against bacteria". Warsaw 2018; Liem T .; Dobler T.K .; M. Puylaert M., "Przewodnik po osteopatii wisceralnej" („Guide to visceral osteopathy"), Volume1, Wrocław 2017 pp. 161-202

LIFESTYLE MEDICINE
Adding years to life and life to years

„The basis of lifestyle medicine is to perceive the body and functioning as a whole, remembering that a healthy lifestyle can not only prolong life, but first of all improve the quality of life."

Alicja Baska, MD

HEALTH (according to the World Health Organization) is a state of perfect physical, mental and social well-being, and not only the complete absence of disease or disability. In recent years, this definition has been supplemented with the ability to „lead an effective social and economic life" as well as its „spiritual dimension".

WHAT IS A HEALTHY LIFESTYLE? Unfortunately, there is a very large discrepancy between what is beneficial to our health and what we actually do to ensure it. Poland does not differ much from other developed countries in terms of the level of physical activity of the society. The situation is also similar as regards eating habits and other lifestyle aspects. What do we have to face? What are the key modifiable risk factors and problems in this area?

LIFESTYLE MEDICINE is a branch of medicine that relies on scientific evidence to make use of complex changes in everyday behaviour to prevent disease, reverse its effects and support treatment and recovery. What was missing in clinical medicine was a holistic approach and physicians' care of patients' lifestyle. This is why lifestyle medicine was born. It consists of six pillars:

The Polish Society of Lifestyle Medicine, which has been operating in Poland since 2018 and is part of the Lifestyle Medicine Global Alliance, launched in 2015 by the American College of Lifestyle Medicine (ACLM) promotes lifestyle medicine through scientific, educational, didactic and organizational activities.

Unhealthy eating habits now pose a greater risk of morbidity and mortality than risky sexual behaviour, drinking alcohol, using drugs and smoking put together. In addition, SEDENTARY LIFESTYLE MAY BE CALLED NEW SMOKING, and although smoking tobacco products is still a huge health problem, unfortunately, a sedentary lifestyle becomes a similar threat..

According to Lalonde's health field concept our lifestyle is in 50% responsible for our life. Environmental factors play a much smaller role (20%), genetic (20%) and medical care (10%). A healthy lifestyle is:

12-14 years longer life	**93%** fewer cases of type 2 diabetes	**81%** fewer heart attacks	**50%** fewer strokes	**36%** fewer cancers

Data: „EPIC" study (2009) „Impact of healthy lifestyle factors on life expectancies in the US population (2018).

WHAT ARE BLUE ZONES? These are 5 regions in the world significantly distant from each other in terms of geographic location, with the highest percentage of centenarians. Scientists decided to identify common features characteristic of all these regions - factors that have such a positive effect on extending life expectancy of the inhabitants of the Blue Zones.

WHAT ARE THE RISK FACTORS IN POLAND? Every second adult Pole is overweight or obese (> 60%). The situation is similar in the case of dyslipidaemia, i.e. abnormal blood cholesterol (> 60%), every fourth adult Pole has arterial hypertension (> 25%) and nearly every tenth Pole suffers from type 2 diabetes (> 9%). The basic method of preventing and treating these diseases (and medical conditions) is to change our lifestyle.

9 LESSONS OF LONGEVITY

according to the Blue Zones Solution of Dan Buettner which are the pillars of longevity and healthy lifestyle

1. Engage in natural physical activity
2. Do not overeat
3. Eat plant-based meals
4. Reduce alcohol consumption
5. Set goals for yourself
6. Do not hurry up
7. Share a spiritual bond with someone
8. Put family and friends first
9. Keep in touch with people who think the same as you

70% OF ALL DEATHS IN THE WORLD ARE CAUSED BY DISEASES WHICH ARE IN 70% DEPENDENT ON LIFESTYLE

HOW HAS THE COVID-19 PANDEMIC AFFECTED LIFESTYLE IN POLAND?

Unfortunately, the lifestyle of Poles in lockdown has deteriorated even further. According to the NIZP-PZH report „The health situation of the Polish population and its determinants in 2020", approx. 24% of Polis men and 13% of Polish women declared to have increased alcohol consumption. As a result, already in 2020, 19% of Polish men and 9% of Polish women could be classified as "risky drinkers". The data concerning the young age group, namely people aged18-29, where an increase in alcohol consumption was declared by 29% of Polish men and 21% of Polish women, are also a cause for concern. Fortunately, as regards smoking and use of electronic cigarettes, from year to year, smoking as a risk factor seems to be losing its importance in the sense that fewer and fewer people worldwide smoke. Yet, popularity of e-cigarettes which are not indifferent to our health has increased. In 2020, approximately 31% of Polish men and 21% of Polish women were smokers. Compared to world statistics, this number is significant. In Poland, the percentage of smokers is decreasing, but at a much slower pace than in other countries. During the COVID-19 pandemic, body weight has also changed, unfortunately for the worse. 28% of Polish men and 29% of Polish women noticed an increase in body weight, which is related to changing lifestyle (more frequent snacking, reduced activity due to teleworking and distance learning). This has negative impact on our spine, causing various types of diseases and pain. The same applies to physical activity that has changed in Poland during the COVID-19 pandemic. In 2020, 70% of Polish men and 64% of Polish women were not physically active. Only 39% of Polish men and 30% of Polish women met the WHO standards in terms of minimum physical activity. The greatest decrease in physical activity was observed in the group of persons aged 20-24 (63% of Polish men and 60% of Polish women), i.e. the group that switched to the so-called "home office" model and actually stayed at home during the COVID-19 pandemic.

WHAT'S IN FOR A HEALTHY LIFESTYLE? It turns out that when we are refreshed and reinvigorated, it is easier for us to make healthy choices, namely exercise more or manage stress, which clearly benefits our health and ensures well-being. Such behaviour should be part of our everyday lifestyle. Our well-being, psyche and longevity are also positively influenced by outdoor activity (a few minutes' walk), contact with nature, adequate body exposure to the sun, regenerative sleep, healthy eating habits, a sense of meaning of life or good-quality interpersonal relationships, which may reduce the risk of diseases such as cardiovascular diseases , strokes etc.

Source: Presentation of Alicja Baska MD „Lifestyle medicine - adding years to life and life to years", webinar of 29 April 2021 as part of the campaign: ACTIVE SPINE, www.aktywnykregoslup.pl; description of Lifestyle Medicine in Poland and in the world, www.ptmsz.pl; Willet W., Rockstrom; J., Loken B. al. et. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet. 2019; 393-447-92; „Impact of Healthy Lifestyle Factors on Life Expectancies in the US Population", Yanping Li, An Pan et al., Circulation. 2018; „Findings from the European Prospectiv Investigation into Cancer and Nutrition-Potsdam Study ", Ford ES, Bergmann MM et al., Arch Intern Med. 2009; NIPH-PZH Report „The health situation of the Polish population and its determinants 2020"

SPINE SURGERY

„Degenerative spinal conditions are considered a civilization disease and will be the fate of about any of us."

Paulina Juszyńska, MD

„In the population below 45 years of age back pain is among the most frequent causes of sick leave. Nearly 90% of the population will experience back pain at least once in their lifetime."

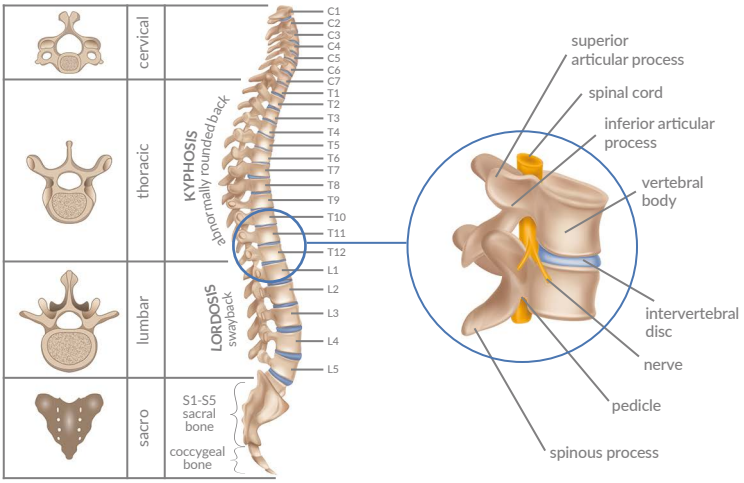
Jakub Wojciechowski, MD

Human spine is a dynamic organ. It has supportive function, but also absorbs mechanical shocks and protects spinal cord and nerve roots. It works all the time, regardless of our body position or strain. It's also subject to constant change.

SPINE ANATOMY

Spine anatomy is complex. It consists of bony elements – vertebrae, that stacked one on another form the column of 33-34 vertebrae. Although individual vertebrae differ in appearance, from delicate cervical to robust lumbar, majority of them has common characteristics: body, arch, paired articular processes (upper and lower), as well as transverse ans spinal processes. Between the vertebrae there are (usually 23) intervertebral discs. Each consists of an elastic gelatinous core, the nucleus pulposus (NP), surrounded by annulus fibrosus, a tough outer layer of fibrocartilage. They serve as shock-absorbers. Apart from that vertebrae are connected by numerous ligaments and muscles that move them.

The spine can be split in several segments. Starting from the top, i.e. from the base of the skull: cervical (with 7 vertebrae), thoracic (with 12), lumbar (5 vertebrae), sacral – consisting of 5 fused vertebrae, and coccygeal – with 4 or 5 vertebrae.



The space between vertebral bodies and arches is called spinal canal. It protects the spinal cord and the origins of nerve roots that leave it in pairs through intervertebral foramina. Altogether there's 31 pairs of those. In an average adult the spinal cord typically ends with the conus medullaris on the level of L1 body. Further down, up to the level of S2 the meningeal sac contains just nerve roots called cauda equina (Latin for "horse's tail").

SPINE DEVELOPMENT

The spine of a newborn doesn't resemble that of an adult. It is C-shaped, vertebrae are cartilaginous and the whole column has just one kyphotic curve – to the back. Intervertebral discs are also much more hydrated. During the first years of life the spine undergoes dramatic changes. Two lordoses, i.e. ventrally oriented curves (cervical and lumbar) form and between them there's a thoracic kyphosis. After achieving proper form and balance the spine should be able to keep straight, vertical position with no additional muscle strain.

Spine stability according to Panjabi

„It's the ability of the spine to transfer physiological loads within a limited range, causing neither irritation or damage to the spinal cord or nerve roots, nor deforming the spine itself."

SPINE DISEASES

With time, degenerative changes appear, encompassing all elements of the spine. Vertebrae, i.e. bony elements, experience bone remodelling with spurs (so-called osteophytes) on the edges of vertebral bodies, remodelling and thickening of the joint processes, and sometimes even their fractures.

Moreover with age ligaments of the vertebral column get more rigid. Also the chemical composition of nuclei pulposi changes, leading to lower hydration, and as a consequence to decreased elasticity, increased fibrosis and fragmentation.

These changes lead to disc herniation and pressure/irritation of e.g. nerve roots. Bulging itself, without rupture of annulus fibrosus (extrusion) usually has a tendency to self-limitation and self-healing. The impinged fragment gets dehydrated and constricts. Much less frequent is rupture of the annulus fibrosus and protrusion of the nucleus pulposus to the spinal canal, commonly referred to as **disc herniation**).

Bone and ligament remodelling lead to progressive narrowing of the spinal canal, the so-called **spinal stenosis**. In the end the degenerative process may lead to instability/ pathological mobility or misalignment between the vertebral bodies – so-called **spondylolisthesis**, or to degenerative, 3D spinal deformity – **scoliosis**. The degenerative process ultimately limits the loads that the spine can bear.

! THE DEGENERATIVE PROCESS, ONCE COMMENCED CANNOT BE REVERSED AND CAN ONLY BE SLOWED DOWN

Although symptoms of degenerative spine disease will be present in nearly 90% lof population in the form of at least one painful episode in a lifetime, the need for invasive procedures will not be nearly as high. At most 10% of the sufferers will require them..

Symptom usually start when people are in their thirties or forties (exceptionally rarely in children) and progress with different speed. Among risk factors there are heavy strains for the back, such as obesity, pregnancy, lifting weights, spending long hours in the sitting position or smoking.

Pain radiating to upper or lower extremities is present less often than back pain itself, but in most cases it is also self-limiting and the symptoms subside in 2-3 months. Very rarely do symptoms persist for over a year.

WHEN TO SEE A SPECIALIST

Indications:

- sudden, increasing back pain with accompanying muscle weakness
- urinary retention (inability to empty the bladder)
- sensory disturbances in the extremities and/or ano-genital region
- recurrent back pain radiating to the extremities

Indications for an operation

Usually the first line of treatment are drugs combined with physiotherapy/rehabilitation. When those are ineffective – surgery is considered.

When the pain radiating to extremities does not subside within 5 to 8 weeks, as well as with subsequent pain episodes or progressing deficits (muscle weakening in upper or lower extremities, i.e. paresis) the doctor may decide to proceed with an operation.

There are many surgical methods and the doctor decides which would be optimal, basing his/her judgement on specific signs and symptoms as well as on imaging tests. If the patient has doubts whether the operation is necessary or whether there are other options, he/she should discuss it with the specialist. The patient should not decide about his health all by himself, without consulting a specialist, as it might worsen his/her health status and exacerbate problems.

The consultation

The consultation usually starts with anamnesis which helps to pinpoint when did symptoms start and what exacerbates them. The doctor also evaluates the pain intensity on a scale, asks about its localization and radiation. Afterwards the doctor examines the patient evaluating his/her muscle strength (and possible paresis) and sensation. In case of any abnormalities he/she might have additional imaging studies performed, such as MRI, functional X-ray, neurophysiological studies etc.

Control, post-operative visit

If the patient is qualified for the operation, next step is post-operative rehabilitation. It's a very important part of the whole process of bringing the patient back to health. After the therapeutic process has been finished, the doctor at a post-operative visit evaluates whether what had been assumed at the start, has been achieved and if not, does it require additional treatment.

OPERATIVE PROCEDURE IS A LAST RESORT. To avoid it, we should attempt to function in a way, so we could avoid overexploitation of our spine. And that's where an advice from physiotherapists is so valuable. They can suggest how to sit, lift, carry heavy weights etc. Thanks to it our back shall work longer with no major ailments.

Source: Presentation of Paulina Juszyńska, MD and Jakub Wojciechowski, MD, entitled „Chirurgiczne metody leczenia choroby zwyrodnieniowej kręgosłupa" (Surgical methods of degenerative spine disease treatment), webinar from 6.05.2021, part of the educational campaign AKTYWNY KRĘGOSŁUP (ACTIVE SPINE), www.aktywnykregoslup.pl; Mark S. Greenber, Handbook of Neurosurgery 9th Edition, Thieme 2019

SPINE AND JOINTS AND RUNNING

Progress and civilization bring about negative consequences for our health. We spend more time sitting at the desk, we are less and less active, we have unhealthy eating habits. This increases the incidence of diseases which, due to the consequences of the described changes, are called civilization diseases.

„Most of the patients coming to my office expect a quick relief for their joint pains. They consider changing their lifestyle as a way of solving problems. A healthy lifestyle means a number of activities, including a regular physical activity"

Paweł Walasek, MD, PhD

WHICH ACTIVITY TO CHOOSE?

Running is the simplest and the most natural form of exercise, with a comprehensive „therapeutic" effect, which can be done by almost everyone and without limitations.

RUNNING IS NOT THE GOAL. IT IS PART OF A HEALTHY LIFESTYLE

Running improves the condition of soft tissues, their elasticity and muscular tension (it has a positive impact on the functioning of the joint) **and proprioception of joints, stabilization of the pelvis, hips and knees** (this protects against dispersion of contact forces in the kinetic chain).

IS RUNNING DANGEROUS FOR OUR JOINTS?

While running a distance of 1 km only (i.e. for about 5-8 minutes) we hit the ground with our foot approx. 1,000 times and the pressure on the lower limb can be three times the body weight.

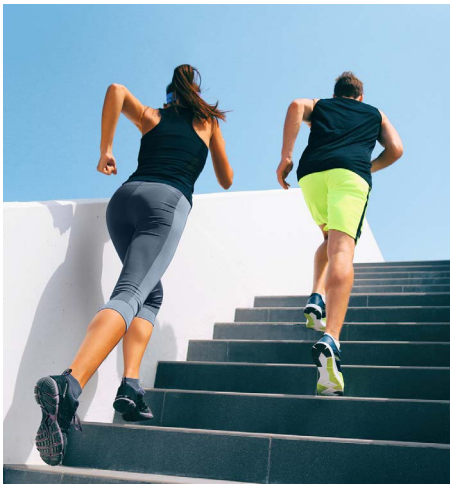
The load for a person weighing 70 kg = 70 x 3 x 1,000 = 210,000 kg!

This load is enormous, so it seems reasonable not to run. Nevertheless, there are now a number of publications that question this point of view, including research studies comparing moderate exercise in a group of people with osteoarthritis. It

turns out that the quality of life of patients engaged in moderate running who suffer from osteoarthritis is definitely higher than that of people who do not engage in any physical activity. What's more, there are potential benefits of straining of the articular cartilage, i.e. the one that occurs while running. This inhibits the production of pro-inflammatory cytokines and thus improves the structure of the cartilage and reduces the progression of degenerative changes (Source: HHS Public Access 2019 June, „Effects of Physical Activity in Knee and Hip Osteoarthritis: A Systematic Umbrella Review", Virginia B Kraus, Kyle Sprow , Kenneth E. Powell, David Buchner, Bonny Bloodgood, Katrina Piercy, Stephanie M. George and William E. Kraus, 2018 Physical Activity Guidelines Advisory Committee).

THE SPINE AND RUNNING

- The spine is one of the most strained structures of the musculoskeletal system while running, the situation is similar as regards straining the hip and knee joints. Persistent incorrect posture while running can exacerbate problems.
- Most problems with the spine are caused by the lack of movement and staying in a sedentary position. Every form of physical activity should be promoted, not discredited.
- Running training is not only about running, but also about ensuring the correct tension of postural muscles, abdominal muscles and pelvic muscles, which are crucial for the well-being of our spine.



HOW TO START RUNNING?

Each case is an individual story related to, among others, physical activity undertaken so far, age, accompanying diseases, etc. If you want to change your life, most often spent sitting at the desk or in an armchair, you should do it with caution and moderation, because it can easily cause an injury. **Before starting jogging, it is recommended to consult a doctor**, especially in the case of people with diseases that may be a barrier to physical activity (e.g. coronary heart disease, diabetes, lung diseases, arterial hypertension), but also in the case of healthy people over 35 years of age (it is necessary to perform an ECG).

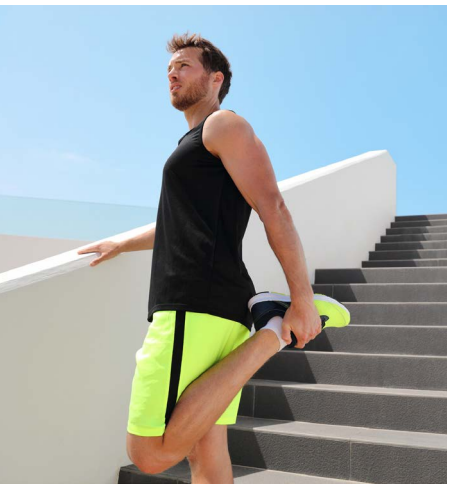
It's never too late to start running. At the beginning we should act with caution. It's a good idea to take a one-day break after each training session. If you feel tired, you should take a longer break, 2-3 days and plan a running schedule for 4-6 weeks. You should watch your body and react if necessary. In the case of pain and discomfort, take a break. Don't try to overcome the pain with another workout! With the time, your body will begin to adapt to physical activity. It will be easier for you to breath and you will not get tired so quickly. You can start to slowly increase the training load. But don't do it too fast. **Training load should be increased gradually and adequately to the level of training already done**. 10% per week is safe. Increasing training load too rapidly (which is often observed in the case of „ambitious" sports enthusiasts who want to make up for many years of the absence of training in a month) may lead to fatigue, overtraining and may even be dangerous to health. Most dangerous cardiac episodes result from ignoring the initial signals, overestimating one's own abilities, and engaging in unhealthy competition. However, limiting training to one constant load will not allow you to develop physical capacity, but only maintain the level of physical fitness.

People who start their adventure with physical effort, may experience problems with running, especially those who have not been involved in such activity before. They may have problems with hip and knee joints, which, most often do not result from joint damage itself, but from overstraining soft tissues around the joint, e.g. iliotibial band syndrome, goose foot inflammation, and greater trochanteric pain

syndrome. They are caused by excessive strain of musculoskeletal system, inability to adapt and too short recovery time; yet they can be cured.

Absolute contraindications to physical activity are rare. The key is to establish a safe training scheme. BMI is important for taking up a sport. Being overweight, especially obese, does not prevent from engaging in physical activity, but it undoubtedly creates barriers. In this situation you have to be cautious when participating in physical activities. You should start with walking, and as you lose weight and improve your physical fitness, you can start quick marching. People who are overweight are particularly vulnerable to injuries, they should increase physical strain very slowly and patiently.

The most important investment are running shoes. Not all popular „sports shoes" are good for running. It is recommended to seek professional advice and buy footwear dedicated to running. Individual features should be taken into account when choosing shoes suitable for a particular person. With a body weight exceeding 80 kg and running on hard surfaces (i.e. pavement or asphalt), shoes with greater shock absorption will be a good choice. People with overpronation of the foot, i.e. flat feet problems, should also wear shoes with the support of the medial arch of the foot.



There is no one effective training plan that is good for everyone. Every person is unique, presents a different level of physical fitness and different susceptibility (reactivity) of the body to training stimuli, so the pace of achieving training effects may be different for each of us. **Therefore, it is extremely important to watch carefully how the body reacts and properly interpret the signals it sends**. We should run when we can talk, speak in full sentences. This is such a safe level of effort for beginners.

When you start your adventure with running, you should know that the failures are due to the following factors: lack of general physical fitness, lack of elasticity of soft tissues, joint and muscle contractures. Many injuries result from excessive training load, too short regeneration, and inability to adapt. **If you want to take running seriously and increase the chance of success, you should remember about stretching and building general physical fitness by training postural abdominal and back muscles**.

Disturbing symptoms, such as fainting/loss of consciousness, chest pain, shortness of breath, arrhythmias, especially during or after exercise, and loss of physical fitness, should not be ignored. People who ignore these symptoms, do not perform tests or overestimate their real capabilities experience the most cardiological problems related to playing sports. What is more, sports also involve some kind of competition, i.e. rivalry. These are very unhealthy aspects that can just lead to such dangerous incidents.

WHO SEEKS ORTHOPEDIC DOCTOR'S ADVICE?

1. People who have been engaged in running for many years, often participating in mass running events or marathons, having a strong desire of achievement, come to the doctor because of persistent joint pain.
2. People who have not been running before but would like to change their lifestyle and start running due to the risk of civilization diseases, suffering from joint pain.
3. Overweight and obese people who have been advised to exercise regularly due to their weight problem.

Source: A lecture by Paweł Walasek, MD, PhD in medical sciences entitled „How to start running? Is running dangerous for our joints? What is the impact of running on the spine? webinar of 06 May 2021 as part of the ACTIVE SPINE (AKTYWNY KRĘGOSŁUP) educational campaign, www.aktywnykregoslup.pl and articles by Paweł Walasek, MD, PhD in medical sciences „MTSS, or Medial Tibial Stress Syndrome - a very common injury!" and „Runner's knee - almost every fourth runner struggles with it!" at www.biegajacyortopeda.pl. Kraus, Virginia B., et al. „Effects of physical activity in knee and hip osteoarthritis: a systematic umbrella review." Medicine and science in sports and exercise 51.6 (2019): 1324.

PHYSICAL EXERCISE AS A CURE FOR JOINT DISEASES

„Every minute of activity counts. Look for opportunities, not excuses"

Anna Plucik-Mrożek, MD

Physical activity will help you feel better, move better and sleep better. Experts say that any physical activity is important for improve your health condition - even a few minutes! If you are one of the millions of people who suffer from osteoarthritis, exercise is an important key to reducing the pain and stiffness in the joints that are characteristic of arthritis. If you live a sedentary lifestyle, you will become weaker and weaker, which will aggravate your joint pain, stiffness and disability.

Regular exercise has been shown to reduce pain, improve the ability to carry out daily activities and reduce the risk of developing other health problems. This is due to the immunomodulatory effect of exercise which reduces TNF-alpha, Interferon-gamma and CRP levels. During physical activity, the number of leukocytes increases, and after exercise, the number of leukocytes returns to pre- exercise level..

EFFECT OF MOVEMENT ON JOINT DISEASE:

- reduced pain intensity
- greater joint mobility
- reduced severity of the disease
- less fatigue
- improved quality of life

DEGENERATIVE JOINT DISEASE

Physical activity is an important key to reducing joint pain and stiffness. Regular exercise alleviates pain, improves the ability to carry out daily activities, and reduces the risk of developing other health problems.

RHEUMATOID ARTHRITIS

Increasing physical activity combats fatigue, alleviates joint pain, stiffness and inflammation. Regular exercise is not harmful to your joints and reduces the risk of developing other health problems such as heart disease, stroke and type 2 diabetes. Exercise is recommended and safe, even for people with active rheumatoid arthritis.

HINTS AND PRECAUTIONS

Start slowly. Try to be active during the time of day when pain and stiffness levels are at their lowest. Increase the time or pace of physical activity by no more than 10 percent each week.

We all make mistakes at times and the pain increases. If your medical condition gets worse, if you experience swelling or increased pain and stiffness, don't give up on all your physical activity. During recovery time make gentle movements in your joints. Then start over just below the level that caused aggravated your condition.

Reduce the strain on your joints by losing weight. Even 5% weight loss will boost positive effects of physical activity. With each kilogramme lost, the strain on the knee joints is reduced by approx. 4 kilogrammes. It's a very nice feeling!

AEROBIC-CARDIO TRAINING

Aerobic activity increases heart rate and breathing and improves endurance. The target is to exercise at least 150 minutes per week in the case of moderate-intensity activity or 75 minutes per week in the case of high-intensity activity. Start with low-intensity training such as walking, cycling, or exercising in a warm water pool.

Identify what you need to start exercising, such as equipment, expert advice or a good place to be active. If you are going to start a walking program, wear shoes that absorb shock well. What about trekking poles for hiking?

You may experience some discomfort when exercising, but that doesn't mean you are doing harm to your joints. If the pain remains more severe for 2 hours after exercising than it was before, do lower-intensity exercise or exercise for a shorter period the next time. If any particular exercise causes pain, find another exercise that won't cause discomfort.

AEROBIC TRAINING TIPS AND PRECAUTIONS

- Several short workouts can be better for your joints than one long workout. Do more varied exercises during the same workout or over the week. It is more fun!
- Remember to warm up and cool down at a gentle pace for 5 to 10 minutes to loosen your joints before and after exercising.
- If your knees hurt more, try less strenuous training such as cycling. Ask your doctor for advice.
- Do physical exercises in warm water (water exercises or swimming), which reduce the strain on your joints when you move.

Walking at a moderate to brisk pace in shallow water improves endurance, coordination, balance, and strength in the lower part of the body. Make sure you keep the correct posture while exercising.

STRENGHT TRAINING

Strength training is an important part of the training programme for people suffering from osteoarthritis. Strength training helps reduce muscle loss caused by arthritis, can reduce pain and improve your ability to perform recreational and daily activities. Increasing the strength of the muscles above and below the affected joint also helps.

STRENGHT TRAINING TIPS AND PRECAUTIONS

- If you experience pain while exercising, reduce the intensity of the exercises, change position or grip, do fewer exercises, or try different exercises.
- Some exercises may be more or less comfortable. As you begin, focus on more comfortable exercises. Gradually, you will be able to increase the range of exercises as the pain decreases and you get stronger.
- Dividing your aerobic activity into two shorter sessions before and after the strength training reduces the risk of your aggravating your medical condition

EXERCISING IN WATER

- If you have severe joint pain and swelling, try to exercise in the pool with water at 32 ° to 35.5 ° C.
- Walk keeping correct posture (standing upright) in warm shallow water to build endurance, coordination, balance, and strength in the lower part of the body.
- As the water depth increases, the strain on the joints decreases.
- Exercising in water is a great way to use the natural resistance of water to strengthen your muscles.

Source: Presentation of Anna Plucik-Mrożek MD entitled „Physical activity as a natural remedy, in both health prevention and in degenerative disease and joint inflammation", webinar dated 06 May 2021 part of the Active spine educational campaign [AKTYWNY KRĘGOSŁUP], www.aktywnykregoslup.pl entitled Exercise is Medicine Poland, www.exerciseismedicine.org/poland

PATIENT – CAREGIVER – PHYSIOTHERAPIST

Who is a caregiver? All of them: parents, husband/wife, partners, grown-up children, grandchildren, a person taking care of a patient 24/7, an employee in a social health facility, assistant of a handicapped person who visits his/her patient at home, etc. What does it mean? It means that being a patient and/or a caregiver may touch everybody.

„Everybody of us copes with various afflictions, disfunctions, illnesses and everybody has, in his/her close surroundings, a person that needs help, permanent or occasional. These roles may change depending on the needs, age, unexpected incidents (e.g. accidents), etc."

Iwona Skorupa, MA

Another very important question is the determination of one common aim for a patient-caregiver- physiotherapist. Why is it so important? Because this will make the whole therapeutic process smooth and effective. Sometimes the needs of a patient or caregiver may differ from those proposed by a physiotherapist at the moment. But it is worth remembering that the paramount aim of a physiotherapist, like of other healthcare specialists, is the patient's good. Speeding up of certain stages could affect negatively the final effect – patient's recovery to his/her proper functioning in the society. From the other side, taking into consideration patient's needs and natural predispositions or interests may have a positive influence on his/her motivations and engagement in health recovery.

„Common elaboration of the aim, achievable and acceptable for all participants of the therapeutic process, is of key importance"

Joanna Tokarska, MA

CAREGIVER'S WELFARE IS THE PATIENT'S WELFARE

While taking care for a patient and making everyday transfers of the persons with physical disability one should also remember about the health of his/her own spine. That is why the house, suite, healthcare facility or another place of healthcare should be adapted not only to the patient's but also to the caregiver's needs in order to facilitate his/her everyday work.

„Many practical guides how not to overcharge the spine unnecessarily during patient's care were described in the book "Rules of lifting and transferring patients. Nurses' guide" edited by Elżbieta Szwałkiewicz, including, among others, biomechanics of lumbosacral pain, biomechanics of body movement, rules of risk assessment at manual lifting and transferring of grown-up patients, babies and children, types and characteristics of the equipment for manual transferring and equipment for mechanical lifting (slings, lifts, suspenders, belts, carts, mats, slip sleeves, etc.), methods of transferring patients in beds, sitting down on and standing up from chairs, toilet and getting dressed or washing and bathing.

Long-term permanent care of a bedridden person or an elder person of low physical ability or dementia disorders is connected with a substantial physical and psychical burning-out. It is defined as the Caregiver Stress Syndrome (CSS). i.e. a state of emotional, psychical and physical burning-out.

It is observed at the persons taking long-term care of the persons that cannot function by themselves. That is why the REST CARE (REPRIEVE CARE) is so important and this is the physiotherapist role to activate the patient to the extent that the caregiver had less work or not at all."

Iwona Skorupa, MA

CARE FOR OTHERS NEEDS ALSO CARE FOR OURSELVES

We have to remember that the spine is a dynamic organ. It does not like stagnation. Strengthening, loosing and extending exercises may have a positive influence on physical condition and give new energy for routine activities in patients' care.

Source: Presentation of Ms Iwona Skorupa, MA, entitled: "Cooperation of physiotherapist with caregiver", webinar of 13.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl. "Rules of lifting and transferring patients. Nurses' guide" edited by Elżbieta Szwałkiewicz, medical publishing house Urban & partner, Wrocław 2000. Lecture of Joanna Tokarska, MA, entitled "Caregiver's welfare. How to care and be cared at the same time" webinar of 13.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

REHABILITATION METHODS IN WATER

In the hydrotherapy treatments various kinds of methods and concepts of work in water are applicable, like: Watsu®, Halliwick®, Bad Ragaz Ring Method (BRRM – method based on PNF concept assumptions and work with neurologic persons), Water Dance (Wasser Tanzen), Aquathernatives Underwater, swimming learning, Sensorial Integration, etc.

The work in warm water causes increase of sensorial feelings, extends blood vessels resulting in loosening of our muscles, the body relaxes and we gain an effect of deep release. It allows, especially spastic patients, to make wide movements in their full scope. Handicapped persons have possibility to perform activities impossible to achieve on the land. Through works in water we help patients in their activities on the land where they become more open and mobile, more eager to solve everyday problems. Additionally, presence of a therapist in water, who assists, cares for safety, makes massage, mobilizes joints, muscles, works on facias or trigger points (muscle knots) results in the feeling of safety and favours establishing social relations. Such therapy is much more pleasant for the patient than rehabilitation on the land.

Harold Dull is the creator of Watsu® - he adopted Shiatsu techniques to warm water and used it for better work with the body. The name Watsu® comes from the connection of two words: Water and Shiatsu. It is a passive (inactive) form of work with the body where the patient lies in water supported by his/her therapist who works with his/her body, at the same time not allowing for sinking his/her head. The patient's face is on the water surface all the time of the session. Everyone may use this kind of therapy providing there are no contraindications.

„In Watsu, like in any other water therapy, we should follow the body. The body sends signals and prompts us in a certain manner what to do and in what direction to follow. We only have to learn to receive these signals and cooperate with the patient"

Magdalena Łuczak, MA

In Watsu® we always begin with joining our patient in breathing. We pay special attention to work with breath since there are techniques to be done on indrawn breath and techniques to be done on exhaust. For the patient, this is a very pleasant form of therapy, effective and safe.

Water Dance derives directly from Watsu® and dance. The sequences have to be done slowly, in smooth and delicate movements. It resembles a dance in a decelerated pace. All is done under water. Thanks to that the client has the possibility to experience the feeling of freedom, impossible to be achieved on the land. It is the method of the work with the body under water, created by Arjana Brunschwiler and Peter Schröter as the method to be developed on having completed Watsu® courses. It is important because we have to feel the body well and to have good abilities of non-verbal communication, especially by touch.

One of Watsu® forms elaborated by Harold for the need of wider learning of positive aspects of this therapy is Watsu® Round in which persons that had not any contact with such therapy before may participate. The session should be leaded by an educated therapist authorised to perform it. The participants act in the so-called triads where one person receives the session, the other one is the leader and the third one plays the role of observer and supporter, then they change. Everyone is the receiver, giver and observer. All of them cooperate together during the session. Watsu® Round is an occasion to feel the essence of Watsu®.

What is Watsu® and what does it consist in? Harold said: "simply to be, here and now". We can feel the force of Watsu® only when we are with our client here and now, we are for him/her only and we form an entirety together.

Source: Presentation of Ms Magdalena Łuczak, MA, entitled: "A specific water therapy as a method of improvement of quality of life", webinar of 13.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

WATER AS AN ENVIRONMENT FOR PHYSICAL REHABILITATION

„Water accompanies us from the very beginning. For 3 months after being born, we even have the diving reflex."

Katarzyna Janowska, MA

Author of the photo: gierlinski.com

Water is the first environment we have contact with, we spend the first 9 months of our life in the amniotic waters. We feel safe there, we swim, we hear sound stimuli through the abdominal wall and the water bubble which reach the sensory organs of our developing body. After all, water is a chemical substance that has its own characteristics, parameters and properties.

I will present them briefly and show how they affect the human body. The first one, so well-known to all of us, is water TEMPERATURE. Let's start with the fact that we perceive water temperature in a completely different way than air temperature. This is due to the fact that water has 4 times greater heat capacity and 25 times greater thermal conductivity. Therefore, the loss of heat to water is 250 times greater and takes place 2-3 times faster than in the case of air. Therefore, the temperature at which we feel thermal comfort is different for water and air, 34-36° C and 20 ° C, respectively. One of the water temperature perception scales is presented in Figure 1.

-I	30°C	Cool	Warm	38°C	+I
-II	24°C	Cold	Very warm	40°C	+II
-III	18°C	Very cold	Hot	42°C	+III
-IV	12°C	Unpleasantly cold	Very hot	44°C	+IV
-V	6°C	Unbearably cold	Unpleasantly hot	46°C	+V
-VI	0°C	Freezing col	Unbearably hot	48°C	+VI
	-6°C	Cryotherapy	Limit of tolerance	50°C	

Figure 1. Perception of water temperature according to the Cordes scale

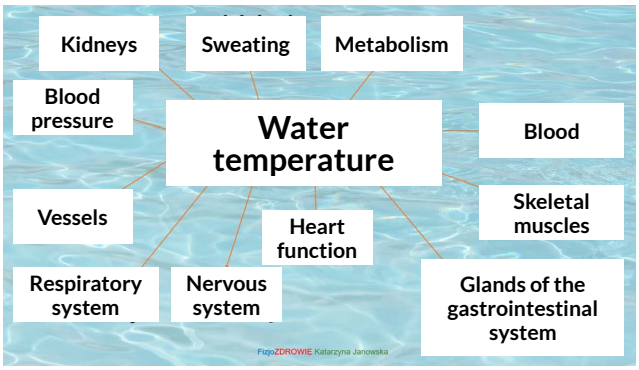


Figure 2

The multidirectional impact of water temperature on the body is presented in Figure 2. This impact is different depending on the time spent in cold, warm and hot water. For example - warm water dilates the superficial and narrows deep blood vessels and relaxes muscles, soothes the nervous system, and cold water works on the contrary - it narrows the superficial and dilates deep blood vessels, increases the muscle tone and stimulates the nervous system. A broader discussion of this the issue is beyond the scope of this publication.

The density of water is about 770 times greater than that of air. Therefore, it is more difficult to move in it. Thus, we feel the resistance of the water wall, and in fact disorder in water pressure arising as a result of body movement.

When we enter a swimming pool, lake or another water reservoir the water surrounding the body on all sides exerts pressure on it, pressure related to the weight of the liquid. This means that those parts of the body that are deeper immersed in water experience greater pressure than those which are closer to the surface. And so, in a standing position, when we are immersed in water up to the neck, the pressure in the foot area is greater than in the chest area.

Thanks to this, among others we support the functioning of the circulatory system and gain support from water – it helps us to stand. You probably remember from school that „a body immersed in a liquid apparently loses as much weight as the weight of the liquid displaced by this body", that is, the Archimedes principle. What does this mean for us in the context of water exercises?

The strain and pressure on the joints are eliminated. Thanks to this, we obtain an analgesic effect in the case of problems related to damage to the articular surfaces. This effect is also associated with muscle relaxation and decreased sensitivity of the nervous system. Most importantly, this effect is almost immediate - all you need to do is keep the right body posture in water to achieve it. This is evidenced by the following stories.

.

Example 1* – A man ages 80 with bone stabilization of the lumbar spine, which started to become destabilized, and major changes in the cervical spine felt pains in both these parts of the spinal column. Particularly acute was the pain in the cervical part of the spinal column. In one of the training sessions the pain became so agonizing that the man was no longer able to do the exercises in the supine position, even after changing this position. The shift to a vertical position brought immediate relief. Until the end of the workout session, the man did exercises in the position of a „chair" with his head resting on the water surface. He finished the exercises without pain, after getting out of water he still did not feel any pain and most importantly, he came to the next workout session after a few days with no pain.

Example 2* – A woman aged 40 with overload changes in the thoracic spine resulting from workload and severe pain in this part of the spine. Already during the first workout session, it turned out that lying down was a position beneficial for her which brought relief, reducing pain almost to zero. The woman performed exercises in this position, thanks to which the pain she felt decreased successively. The manual therapist found that 80% of the improvement was the result of water exercises.

* data have been changed for the purpose of this publication

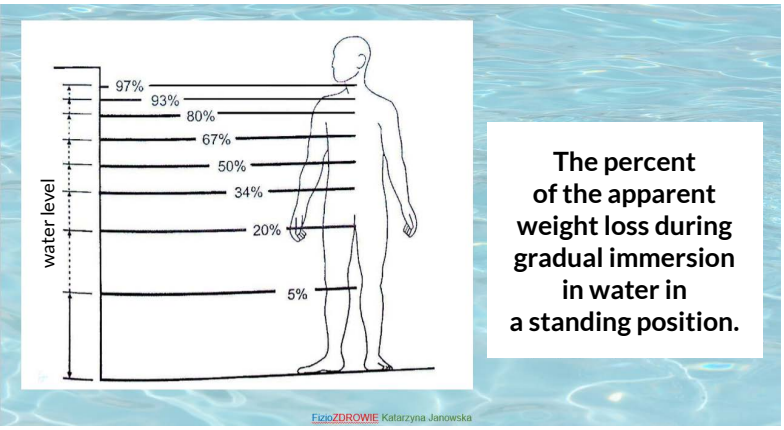


Figure 3

Figure No. 3 shows the approximate percent of weight loss depending on the depth of body immersion in water.

As you can see, the very fact of being immersed in water is a therapy and has a beneficial effect on the body, whereas physical activity in water is a pure pleasure that enhances these benefits.

Source: Presentation of Katarzyna Janowska, entitled „Water as an environment for physical rehabilitation and sports and medical training", webinar dated 13 May 2021 as part of the Active spine educational campaign [AKTYWNY KRĘGOSŁUP], www.aktywnykregoslup.pl

HOW FEET INFLUENCE POSTURE

„There are many interrelations in the anatomic details of feet and in their health, that influence the condition of other joints in our body, including those within the spine."

Kama Brzostowska, MA

Human foot is a complex anatomical structure, consisting of many bones, muscles, ligaments and joints. It's supplied with many blood vessels and nerves. Her evolutionary, static-dynamic role is complex and sophisticated. These small parts of our musculoskeletal system are responsible for a lot of functions: support (keeping the balance), weight bearing (helping with locomotion or walking), shock-absorption (dispersing abnormal stresses and preventing them from cumulating in the higher parts of the body), sensory and thermoregulatory.

Elements of feet anatomy determine proper functioning also on higher levels of the body, including our spine. Our bodies encompass myofascial meridians that are completely interdependent. That's why any deformation of the feet may cause strain in other parts of our body.

It's worth stressing that in permanently sedentary people, such as paraplegics on wheelchairs, feet are also of paramount importance. They are home for nerve endings and blood vessels that have to maintain good flow. That's why a foot has to be flexible, stable and free of deformities or sprains. It also should have full range of movement preserved, so as to enable muscle pump to work and facilitate blood flow to the heart. Feet are not only indispensable for standing or walking. They are also thermoregulators and their vessel endings are linked with the rest of our circulatory system. That's why they have to be taken care of even in persons who do not walk on a daily basis.

Part of health prophylaxis should be reporting for full evaluation under an experienced eye of a specialist. Full evaluation encompasses precise and modern computed diagnostics, tests on specialized instruments (footoscope, planturograph) and a thorough manual evaluation made by physiotherapist.

You should refer for such diagnostics if you:

- complain of pain in the feet, knees, hips or back,
- have noticed changes in the anatomy of your big toe (e.g. hallux valgus) or have heel pain,
- are receiving help from an orthodontist, phlebologist (vein doctor), neurologist,
- experience frequent injuries, ankle or knee sprains
- have problems with foot skin, such as calluses or corns,
- want to prophylactically check your musculoskeletal system's predispositions and your feet condition.

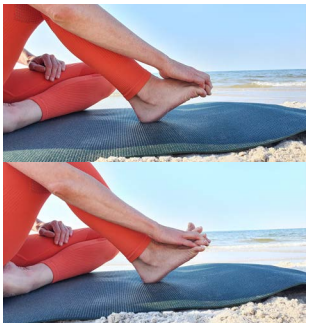
You can get an individually tailored physiotherapy after completing the full examination. Every patient examined receives recommendations regarding possible therapy, instructions for exercising or a suggestion of appropriate footwear or correcting insoles.

STRENGTHEN YOUR FEET AD MAKE THEM MORE FLEXIBLE

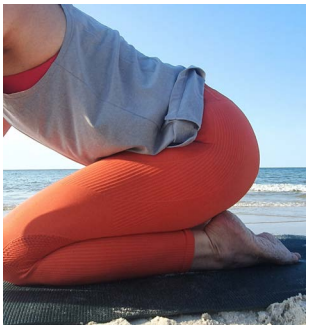
1. To roll feet you may use a tennis ball, a rubber ball or a ball from an orthopaedic shop. Massage bottom of your feet thoroughly, from front to back and from side to side; focus on slow movements and controlling the pressure.

2. Stand on your toes: standing by the wall stand on your toes, hold that position for a while, then roll to your heels and hold that position as well. Do 4 series of 8 repeats each.

3. Press your heel on the floor. Keeping it pressed fold a towel with your toes. Repeat 10 times with each foot.



4. **Mobilize your feet individually**: interlock your fingers with your toes and then alternately flex and extend the foot, then rotate it to the left/to the right. Make 10 repeats of each movement for every foot.



5. **Stretch your foot sole adopting the position shown on the picture** – hold it for 2 minutes.

6. **Stretch the back of your foot and the extensor compartment of leg as on the picture** – hold it for 2 minutes

Source: Presentation of Kama Brzostowska MSc, entitled: „Konsekwencje zaburzeń stóp na układ ruchu człowieka" (feet abnormalities and their impact on human locomotor system), webinar of 20.05.2021, part of educational campaign AKTYWNY KRĘGOSŁUP (ACTIVE SPINE), www.aktywnykregoslup.pl

SPINE PHYSIOPROPHYLAXIS

„Physioprophylaxis is of top importance because it concerns all of us."

Andrzej Grudniewski, MA

PHYSIOPROPHYLAXIS – STAGES

EARLY PHYSIOPROPHYLAXIS
Aim: Propagation of the physical activity – universal action level (addressed to the whole population)

PRIMARY PHYSIOPROPHYLAXIS
Aim: Prevention of diseases before they develop – selective action level (addressed to high risk groups)

SECONDARY PHYSIOPROPHYLAXIS
Aim: Completion of treatment by implementation of the physical activity tailored to the disfunction – selective action level

IIIRD PHASE PHYSIOPROPHYLAXIS
Aim: Prevention of effects of the past or current disease – third rank physioprophylaxis – selective action level

WHAT IS PHYSIOPROPHYLAXIS?

„Physioprophylaxis means physiotherapeutic activities aimed at preventing, slowing down or retreating effects of improper life style and/or disease processes. Physioprophylaxis activities are, among others, health education, promotion of physical activity, diagnostics and reduction of risk factors."

The National Physiotherapist Chamber

According to the holistic model of physiotherapy, treatment of disease processes and their effects is of the same importance as protecting them. The features of the modern society, i.e. ageing, low level of physical activity and unhealthy life style favour occurrence of chronic diseases. And the latter form a serious challenge for health care systems. Promotion of health and physioprophylaxis may contribute to prevention of civilisation diseases and lowering of costs of their treatment.

WHY IS PHYSIOPROPHYLAXIS IMPORTANT?

Pandemic, remote work and learning limited the physical activity of the population to a great extent, what affects motor system and spine. The National Physiotherapist Chamber (KIF), in cooperation with the World Health Organisation published, in Polish version, the latest guidelines of 2020 concerning physical activity, containing recommendations for public health for children, youth, grown up and elder people, taking into account volume of physical activity (frequency, intensity and time of duration), that may be free of charge downloaded from KIF website (www.kif.info.pl).

For the first time the guidelines have been presented in the context of relation between the sitting life style and its health effects as well as recommendations for pregnant and childbearing women and persons with chronic diseases or inability have been presented.

WHAT IS THE DIFFERENCE BETWEEN PHYSIOPROPHYLAXIS AND CLASSICAL PHYSIOTHERAPY?

As it was proved in research works nearly half of Polish people spend more than 5 hours in the sitting position and that is why the National Physiotherapist Chamber prepared a cycle of movies with exercises „07 rusz się" „07 move on" dedicated to office employees, teachers, officials, IT specialists, drivers and all persons leading the sitting style of work. On the KIF website (www.kif.info. pl) and Znajdź Fizjoterapeutę – Find a Physiotherapist website (www.znajdzfizjoterapeute.pl) one may also use publicly available prohylaxis programs prepared by the National Physiotherapist Chamber and Ministry of Health, i.e. „Active senior at home" or "Active break in work".

„Pandemic time is a very stressing period and that is why I encourage you to practise physical activity."

Łukasz Frącz, MA

WHY MOVING IS WORTHWHILE?

Apart from the advantages like good wellbeing, maintaining proper body mass, increased metabolism, strengthened motor system, improvement of capacity and circulatory system or increase of oxygen capacity of the organism, practising physical activity has a positive influence on one's immunology system and lowers the risk of cancer.

We practise physical activity for ourselves and any kind of it is better than nothing since it supports our spine (affecting it directly or indirectly). Irrespectively of moving upper extremities causing certain movements at its thoracic section or riding a bike, all the time we move our pelvis.
The selection of the kind of physical activity or adequate equipment for exercises should be adjusted both to our preference and state of health. That is while it is advisable to contact a physiotherapist and during exercises we should obverse our organism. During the training we should not feel pain raising with the next repeated series. If it occurs, the training should be stopped and we should consult a specialist.

HOW TO CHECK WHAT WAS THE INTENSITY OF THE TRAINING WE HAVE DONE?

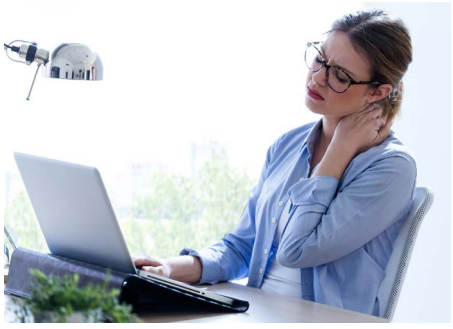
One of the parameters of the intensity of our training is the percentage HRmax value, i.e. maximum pulse. We can calculate it with the Sally Edwards formula:
HRmax for women: 210-0.5 x age – 0.022 x weight (kg)
HRmax for men: 210-0.5 x age – 0.022 x weight (kg) + 4

The table below could help us estimate the physical activity we have done on the basis of pulse:

Intensity	% of maximum HR
Very low	<30
Low	30 – 49
Moderate	50 – 69
High	70 – 89
Very high	≥90
Submaximum	100

„Sitting many hours at desk affects our body adversely."

Walenty Trandasir, MA



The ergonomics of everyday activities plays an important role in the care for our spine. In many cases the state and condition of our spine depends on ourselves, on the position we seat at the desk, how we lift heavy things, how we use our smartphone at work or during recreation, how we wear bags on our arm or with shopping or how we prepare our place for sleeping. Negative effects for spine can also be caused by habits, like sitting on a portfolio in the back pocket, putting one leg on the other or sitting with the leg bent under one's buttock.

If we feel pain during physical activities or everyday activities it worthwhile to visit a physiotherapist who will prepare physiotherapeutic plan tailored to the patient's needs.

WHEN OUR VISIT AT THE PHYSIOTHERAPIST IS ALSO ADVISABLE?

In the state of feeling overcharged and increased muscle tension, unproper posture, limitation of movement in joints, after orthopaedic injuries, in order to improve results in sport, to prevent injuries in sport, etc. Physiotherapist can not only make a physiotherapeutic procedure but also assist in selection of adequate exercises, tailored to the state of our health.

We should remember about the ergonomic charging of our body at each activity charging the motor system. One should change one's habits and try to implement ergonomics not only at his/her workplace but in all activities of everyday life. Below we present several postures at which specific rules should be followed in order to avoid pain in our motor system.

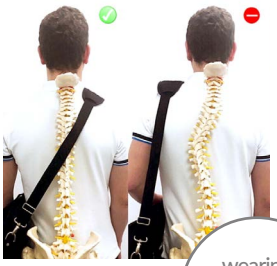
sitting with the leg founded on the leg

The correct way of lifting heavy pieces is essential. Not following basic rules we risk serious contusions of muscles, joints and intervertebral discs. We avoid bending in waist, squeezing pelvis and excessive extending arms. We never turn when lifting something. Bending and turning spine at the same time may lead to contusion of discs. We should stand as near the lifted piece as possible, if possible we should carry the piece together with other persons or divide it into smaller pieces. While lifting we keep straight back, knee joints bent, lower extremities widely set out.

pick up things from the floor

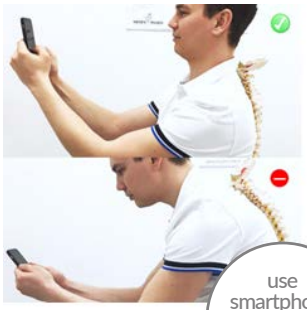
Sitting at the desk for long hours affects our body adversely. If we do not keep ergonomic rules, not change position, not make breaks for exercises we may get pains of head, neck and back, pull hip flexors and hamstrings and suffer from general stiffness. During long-lasting sitting at the computer we should remember about positioning the screen vis-à-vis our face and on the level of eyes, arms should supported on the desk or chair supports, under wrists we may use bags with sand/convex pads or side mouse, feet should have contact with the floor and the knees should be bent at the angle slightly over 90 degrees.

While carrying shopping or heavy bags we should divide the weight equally on both sides. Thus we shall avoid asymmetry that may lead to spine pains or its curvature (scoliosis).



wearing heavy bag on one shoulder

Ergonomic use of smartphone or phone is also important for our health. While writing SMS or e-mails the head (weighing about 5 kg) bent at the angle of 60 degrees presses cervical spine with the force of up to 30 kg, and that is why the head and silhouette should be straightened up and the scree at the level of eyes. Smartphone should be help in both hands and use both thumbs for writing. Let's remember about breaks and several-minute exercises of hands and wrists. When sleeping we do not have full control over our body so it may occur that we turn spine, bend pelvis or make harm to the posture not being conscious of that. Sleeping on abdomen is especially unfavorable since in this position it is not possible to set neck correctly. It is advisable to use hard mattress and orthopaedic pillow. While sleeping on a side or back we should have the spine set straight, if we sleep on a side it is advisable to put pillow or chock between the knees, if on the back – we should have a pillow under the knees.



use smartphone during work or recreation

If we get used to ergonomic habits we have a chance to avoid pains in motor system. If pain occurs it is advisable to call a doctor or physiotherapist. Please remember that we should prepare ourselves for such visit. One should have his/her medical documentation of the earlier treatments, history of contusions, accidents and chronic diseases and wear loose clothes since the specialist may often ask us to get undressed to underwear for diagnostic purposes.

Source: Presentation of Andrzej Grudniewski, MA, Łukasz Frącz, MA and Walenty Trandasir, MA, entitled: „Spine physiotherapy in everyday functioning of the contemporary society", webinar of 20.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl. Resolution of the National Physiotherapist Council No. 44/I/KRF of 28 March 2017. Resolution of the National Physiotherapist Council No. 384/I/KRF of 16 May 2019. Compendium of Physioprophylaxis, M. Grygorowicz, M. Podhorecka, UMP Scientific editorial office, Poznań 2020. WHO guidelines concerning physical activity and sitting lifestyle translated into Polish - www.kif.info.pl. Publicly available prophylaxis programs prepared by National Physiotherapist Chamber and Ministry of Health, i.e. „Active senior and home" or „Active break in work" – www.kif.info.pl and www.znajdzfizjoterapeute.pl. Articles of Łukasz Frącz, MA, entitled: „Physiotherapist – who is? (part 2 and 3) at www.grudniewscy.pl. L. Pavilack, N. Alstedter, Handbook of correct posture, Vital, 2021

BIBLIOGRAPHY

GUS (Main Statistical Office) Report of 2021 on the state of health of the population in Poland in 2019

NFZ (National Health Fund) Report of 2019 Osteoporosis - about health in Poland in 2018

ZUS (State Social Security) Report of 2021 on sickness absence in Poland in 2020

Lecture of Dr Hanna Stolińska entitled: „Strong bones and joints – dietetic support" webinar of 29.04.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

Books by Dr Hanna Stolińska entitled: „Diet in treatment of osteoporosis" Editorial Office Zwierciadło Sp. z o.o. Warszawa 2019 and „Healthy joints. Dietary treatment". Editorial house REBIS Sp. z o.o., Poznań 2020

Presentation of Malwina Umiastowska, MA, entitled: „Could spinal pain be related to gut health?"

"How to take care of the gut?" webinar of 29.04.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

Article of Malwina Umiastowska, MA, entitled: „How to speed up metabolism?" www.mudiet.pl

Kossobudzka M. "A man on bacteria." Warszawa 2018

Liem T.; Dobler T.K.; M. Puylaert M., „Guide to visceral osteopathy", Vol.1, Wrocław 2017 pages 161-202

Presentation of Alicja Baska, physician, entitled „Lifestyle medicine – to add years to the life and life to years", webinar of 29.04.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

Description of the medicine of life style in Poland and in the world, www.ptmsz.pl;

Willet W., Rockstrom J., Loken B. al. et. Food in the Anthropocene: the EAT-Lancet Commission on healthy diets from sustainable food systems. Lancet. 2019;393-447-92;

„Impact of Healthy Lifestyle Factors on Life Expectancies in the US Population", Yanping Li, An Pan et al., Circulation. 2018;

„Findings from the European Prospective Investigation into Cancer and Nutrition-Potsdam Study", Ford ES, Bergmann MM et al., Arch Intern Med. 2009;

NIZP-PZH (National Institute of Public Health - National Institute of Hygiene) Report „Health condition of Polish population and its conditioning 2020"

Presentation of physicians Paulina Juszyńska and Jakub Wojciechowski entitled: „Surgery methods of treatment of spine arthritis", webinar of 6.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

Mark S. Greenber, Handbook of Neurosurgery 9th Edition, Thieme 2019

Lecture of Paweł Walasek, Med.Sc.Dr., entitled: „How to begin running? Is running dangerous for our joints? What is the influence of running on the spine?, webinar of 6.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl. and articles of Dr. Paweł Walasek entitled. „MTSS or tibia pain – very often contusion!" and „Runner's knee – a problem of nearly every fourth runner!" at www.biegajacyortopeda.pl.

Kraus, Virginia B., et al. „Effects of physical activity in knee and hip osteoarthritis: a systematic umbrella review." Medicine and science in sports and exercise 51.6 (2019): 1324.

Presentation of Anna Plucik-Mrożek, physician, entitled: „Physical activity as a natural medicine, both in health prophylaxis and in joints arthritis and inflammation", webinar of 6.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.;

Exercise is Medicine Poland, www.exerciseismedicine.org/poland

Presentation of Iwona Skorupa, MA, entitled: „Cooperation of physiotherapist with the caregiver", webinar of 13.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

"Rules of lifting and transferring patients. Nurses' guide" edited by Elżbieta Szwałkiewicz, medical publishing house Urban & partner, Wrocław 2000

Lecture of Joanna Tokarska, MA, entitled: "Caregiver's welfare. How to care and be cared at the same time" webinar of 13.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

Presentation of Magdalena Łuczak, MA, entitled: "A specific water therapy as a method of improvement of quality of life", webinar of 13.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

Presentation of Kama Brzostowska, MA, entitled: „Consequences of feet disturbances on human motor system", webinar of 20.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl.

Presentation of Andrzej Grudniewski, MA, Łukasz Frącz, MA and Walenty Trandasir, MA, entitled: „Spine physiotherapy in everyday functioning of the contemporary society", webinar of 20.05.2021 within the educational campaign ACTIVE SPINE, www.aktywnykregoslup.pl..

Resolution of the National Physiotherapist Council No. 44/I/KRF of 28 March 2017. Resolution of the National Physiotherapist Council No. 384/I/KRF of 16 May 2019.

Compendium of Physioprophylaxis, M. Grygorowicz, M. Podhorecka, UMP Scientific editorial office, Poznań 2020.

WHO guidelines concerning physical activity and sitting life style translated into Polish - www.kif.info.pl.

Publicly available prophylaxis programs prepared by National Physiotherapist Chamber and Ministry of Health, i.e. „Active senior and home" or „Active break in work" – www.kif.info.pl and www.znajdzfizjoterapeute.pl;

Articles of Łukasz Frącz, MA, entitled: „Physiotherapist – who is? (part 2 and 3) www.grudniewscy.pl

L. Pavilack, N. Alstedter, Handbook of correct posture, Vital, 2021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