

SAUNA COMBINED WITH EXERCISES FOR THE PREVENTION AND TREATMENT OF INCORRECT POSTURE

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INTRODUCTION

Caring for human health is a huge engagement of utmost importance for the future of our nation and country. It is not necessary to mention the connection between the health of a nation and its successes in all fields of material and spiritual life. Concerning this we say that human health is a priceless asset, in the protection of which each of us must participate most responsibly and competently, depending on our professional and social situation. During the last decades sedentary lifestyle turns into an epidemic. Country's health systems, policymakers, stakeholders and society become aware that it is necessary to be taken an actions immediately.(ex. Djobova et al., 2019)

The human, as a biological individual, has to adapt to the always-changing environment of modern culture, the quickest changing environmental factors affecting directly to the motor mode. Moreover, the active regime in the technically advanced countries has an unfavourable effect not only because of the lack of the movements but also, above all, it causes static overload. (ex. Ignatova D., 2019)

The balance between the predominantly static postural and phase muscles was disturbed to the detriment of the latter, with typical disturbances of muscle regulation occurring. Characteristic of modern lifestyles is that we load the motor system and spine more and more static. Consequently, on the one hand, static disorders are becoming increasingly important for productivity, and on the other hand, the static overload of certain muscle groups is often a cause of motor stereotypes. Terms such as "posture disorder" and "scoliosis" are of increasing interest (ex. Prokopov I., 2018). Deviation from the "balance" between the individual muscles, from the optimal model for movement due to our lifestyle, are too frequent and for that have great pathogenetic significance.

Improper muscular regulation and exercise are the most common causes of functional disorders in the motor system. Getting out of poor motor mode is a regular exercise that compensates for lack of movement, regular walks, hiking and swimming. Equally important is the fight against obesity, especially since the two factors are often closely linked: lack of movement supports obesity, and obesity obstructs movement. In order to prevent the negative effects of bad posture and spinal distortions on the human body, permanent preventive measures are needed.

Prevention (from προφύλαξις - I protect, care) must be taken care of not only by healthcare but also by the whole society. Electromyographic and tonometric studies of the spinal muscles in various postures (sitting, standing and lateral lying), made by Golovinskaya (1950), have found interesting facts. In a calm, correct posture (back seat), the back muscles showed bioelectric activity of symmetrical character, ie. In maintaining the corpse, the muscles of both halves are equally involved. In an incorrect posture (sitting, standing, or carrying a bag in one hand), the dorsal musculature showed uneven bioelectric activity, more pronounced on the convex side of the back, that is, where the tension of one-half of the dorsal muscle increases, and seeks to return the corpse to its proper position. Frequently repeated incorrect posture when sitting in a chair, at work, when lying sideways, when walking, etc., creates prerequisites for incorrect posture, which in turn leads to a violation of muscle balance and later to spinal distortions (Chernogorova, 1955).

Natural physical factors represent an important role in the complex prophylactic and therapeutic program in case of bad posture. Balneotherapy is widely used in Bulgaria.

Mineral waters have a therapeutic effect through their thermal, chemical and mechanical effects. Common baths, medicinal baths, underwater massage, etc. are applied. Weakly mineralized, sulphide, radon and other mineral waters are used. The slightly mineralized waters are those in Ovcha Kupel, the village of Banya (Pazardzhik), the village of Banya (Karlovsko), the Stara Zagora mineral baths and others. Sulphides are the waters of Sapareva Banya, Kyustendil, Vonesh water and others. Waters rich of radon is of Narechen, Pavel Banya, Momin Pass Velingrad and others.

Water treatment recommends a bath with t 37.5 ° C for 10-15 minutes, underwater brush massage, underwater shower massage with t 36-37 ° C and

spray pressure 0.5-1.5 atmospheres, mineral baths with radon, sulphide and hydrogen sulphide waters (Gatev, 1992).

Major use in prevention and treatment is the mud. It is indicated for muscle spasm and contractures, persistent pain syndrome, trophic disorders of the skin and muscles. It should be given with a stabilized status and no inflammatory activity. It is applied by a mitigated procedure (t of mud no more than 39-40 ° C, 15-20 min). The influence of therapeutic mud applications, make the peripheral blood vessels widen, microcirculation improves, muscle spasms resolve, muscle contractures recede, trophic processes in the affected joints and muscles are activated. The temperature of the applied mud must be adapted to the stage of the disease.

Some authors recommend the sauna toward the prevention and treatment of the musculoskeletal system. The sauna reduces the pain and spasms of the muscles, the painful stiffness of the joints and release the movements (Krauss, 1973; Matthew et al., 1983; Koenig, 1983; Matthew et al., 1986, etc.). The therapeutic effectiveness is higher when its use is balanced and combined with some physical factors (ex. Ryazkova, 2000; Petkov, 2008 Kostov, 2018; Albert, 2017, etc.).

The therapeutic effect of the sauna is complemented by the positive stress for the body, the activity of the adrenal gland is activated and it releases cortisol in small quantities, which acts beneficial to the body (ex. Dimitrova, 2012; Albert 2014).

The common thing about sauna and hot-air baths in the past was that the heat source is hot stones. In the Middle Ages, the "sweating stone" was spread during almost Europe, losing its popularity only in the seventeenth century. The stream of the sauna during the Middle Ages and later became Scandinavia and the Karelo-Finnish regions, northern Russia, Siberia and Alaska. For most of the people, the sauna was a regular source of health, physical and spiritual regeneration and joy. Over the centuries, observations have been gained about the positive impact of the sauna on both the healthy and the sick people. Due to its characteristics, the sauna has become excellent for prevention and treatment.

In its nature, the sauna is a dry hot-air bath / with an air temperature of 60 to 100-110 C and relative humidity of 5 to 15% /, which produces heavy sweating and is combined with cold water or an air procedure (St. Gatev, 1992). Based on the main characteristic feature of the sauna - the high

temperature / 60-110 C / and the low relative humidity / 5-15% /, it is necessary to emphasize its advantages in comparison with other popular types of baths / Russian steam bath, Turkish bath and etc. /, particularly - the softness of the thermal effect followed by its good tolerance on the part of the patient - the procedure: a gentle form of training of the circulation and the respiratory system: optimal and pleasant sweating: no irritating and adverse effects on the skin: suitable for people who ill often.

The physiological impact of temperature is closely related to the humidity in the sauna. The microclimatic conditions with increased humidity in the sauna have a definite burdensome thermal impact on the various systems of the human body and especially on the musculoskeletal system, cardiovascular system, respiratory and endocrine systems, as well as the thermoregulatory processes and metabolism. Particularly emphasized is its beneficial effect on muscle rigidity and joint contractures. The sauna eliminates the hypoxia of the tissue structures and improves blood flow, reducing the morphological changes of pathological nature in the tendon-fascial apparatus. It could be considered as a pathogenetic method of treatment and renewal of morphological structures (ex. St. Gatev, 1992; M.Lumba,1993) monitored the effect of alternating a sauna (three times a week) with kinesitherapy (two procedures a week) in 15 men hospitalized at Military Hospital with spondylosis. The results compared with the control group that performed daily computer tomography showed better management of pain syndrome in the acute and subacute period of spondylosis and statistically significantly higher increase in the indicators of functionality in the group conducted sauna and kinesitherapy.

The sauna registers the beneficial effects of the connective tissue's physical characteristics - elasticity and softening ability, especially in chronic muscle and joint processes. Under the influence of the hot environment of the sauna, respectively under its microclimatic conditions, the volume of movement in the joints of the limbs and spine increases. These and its effects define it as an appropriate and quite important treatment and prophylactic procedure for the musculoskeletal system, with an obvious beneficial effect on the spine as a whole. It can be performed as a separate procedure, as well as in combination with other means, to influence the human body. The sauna can be a previous procedure for more efficient carrying out of other physical methods

of influence on the human body - physical exercises, therapeutic massage, physiotherapy and more.

METHODS

Tasks

- The purpose of the study was to investigate the effect of the sauna on some functional parameters of the spine.
- Place of study - Center for kinesitherapy at Sofia University "St. Kliment Ohridski" Sofia

Material and methods:

- 14 subjects (9 females and 5 males), randomly divided into two groups (trial and control), with an average age of 38.25 ± 12.71 years;
- The subject of study: through centimetres and the Schober test, we examined the mobility of the spine in the three dimensions, frontal, sagittal and transversal, for flexion, extension and lateroflexion, from sitting and standing.

Methodology

The methodology includes sauna and complex of exercises.

With all the participants in the study, we conducted a set of physical exercises of a restorative nature, with an emphasis on exercises for rotation of the spine. Classes were held twice a week for one hour for two months.

The difference in methodology in the two groups consisted of the additional inclusion of a sauna in the experimental group. For them, the additional remedy - sauna, was applied as a preparatory procedure before the exercises for the spine. The stay in the sauna was twice for 10 to 15 minutes at an air temperature of 60-80 degrees. We did not use a sauna in the control group.

RESULTS

The results of the initial study of vertebral mobility from standing position indicate a limitation in both groups. The flexion deficit in the patients in the experimental group is smaller compared to the extension, and the lateral flexion is the same in both directions.

The result of the final study of mobility in the experimental group shows that the improvement is evident in all four indicators, and the differences are statistically significant.

From the analysis of the results received for the mobility of the spine from sitting position in the experimental group, we found that in all three

planes the motions improved statistically. The most significant change was lateroflexion left - by 4.12 cm ($p < 0.02$), and least flexion - by 2.14 cm ($p < 0.05$).

The control group showed positive changes, but only the difference in flexion was statistically significant. The lateroflexion improved most on the right - an average of 3.85 cm, but the difference is not significant.

DISCUSSION

Changes in the mobility of the spine from sitting and standing in the experimental group may be related to the use of a sauna in this group before training with exercises for the spine. The control group also noted improvement in the studied indicators, but the improvement was less than in the experimental group.

From the results of the Schober test, a limitation of flexion and extension movements was found in both groups. The latter study showed a significant increase in mobility, but only for flexion was statistically significant. In the control group, the improvement was much less pronounced.

The increase in mobility in the experimental group during the flexion movement in the Schober test may be related to the sauna effect in this group of persons previous to the exercises for the spine.

From the studied indicators, no statistically significant differences were found in the first study of the two groups. At the end of the study, statistically significant differences were noticed between the two groups for the studied indicators. The test group is in better condition in the last study. Indicators informing the functional state of the spine were positively influenced by the sauna used in the experimental group preceding the physical exercises for the spine.

CONCLUSIONS

From the comparison of first and final results, the following conclusions can be determined:

1. In the experimental group, the use of a sauna combined with exercise led to a positive effect on the functional state of the spine. The improvement of the studied parameters in this group is from the mixed application of a sauna and a complex of physical exercises for the spinal column of corrective character.

2. In the control group, without the use of a sauna, we also observe an improvement in the indicators, but slightly less pronounced. The improvement of the studied indicators in this group is from the application of a complex of

physical exercises for the prevention and correction of incorrect posture and spinal distortions.

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