



Original article

IMPORTANCE OF POSTUROLOGY AS PREVENTION AND INTERVENTION FOR MUSCULOSKELETAL AND SPINAL DEFORMITIES

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ABSTRACT:

Posturology is a modern science of correct posture, which deals with the diagnosis, dynamic observation and disorder in body posture. The consequences of incorrect posture often lead to musculoskeletal and spinal deformities.

The purpose of the research is to understand the importance of post-typology for the prevention of spinal distortions and the preparation of a rehabilitation program for musculoskeletal deformities.

Material and methods: We used a documentary method and an empirical study. The functional study was conducted in the period 2022-2024 on the territory of Plovdiv and Haskovo regions. 488 individuals between the ages of 18 and 65 were studied, 49.8% (n = 248) females and 49.2% (n = 240) males. The diagnosis was made with special tests for spinal dysfunctions. A survey was conducted on physical activity, poor posture and overweight. Statistical methods were applied to process the results.

Results: A kinesiological analysis of musculoskeletal and spinal deformities was performed. Improper posture during functional stress of the musculoskeletal system is widespread among the respondents in 52.2%, and after excessive loading, they report previous phenomena such as pain in 45.1%, numbness, etc. The thesis of insufficient motor activity and the need for a kinesitherapy program consistent with the findings of the functional examination is confirmed.

Conclusion: Posturology provides an opportunity for diagnosis, treatment and prevention of common joint and musculoskeletal injuries due to the interrelationships with other body systems. Correct human posture is one of the signs of good physical development and health.

Keywords: posturology, musculoskeletal disorders, prevention, intervention

INTRODUCTION

The science that studies posture is called posturology. Prof. Dr. Silverio Di Rocca is considered to be the founder of monofunctional postural rehabilitation (MPP). It was formed as an independent direction in 1969 when the International Posturological Society was founded. In the last 50 years, it has been actively developing all over the world [1]. Posture refers to the strategy used by the neuromuscular and skeletal system to keep the body in balance by responding to gravity in the most economical way possible [2]. It helps and affects the fine multi-modal system of the organism, mostly related to the balance of muscle tone at different levels.

Posturology as a discipline is part of integrative medicine. Integrative clinical posturology is a complex, multidisciplinary science that unites a large number of medical specialists, dentists, orthopedic traumatologists, neurologists, ophthalmologists, otoneurologists, general practitioners, physical therapy specialists, rehabilitators, kinesitherapists, ergotherapists, etc. Posturology considers the human organism as a single complete system in which everything is interconnected. It emphasizes the individual characteristics of the person and, through the posturological examination, provides a new diagnostic and treatment method [3].

Posturology is a clinical methodology that helps in the diagnosis of skeletal-muscle dysfunctions by applying specific tests [4]. The biggest advantage of the method is that, by discovering the problem, concrete measures can be applied to quickly influence or prevent expectations.

Musculoskeletal and spinal deformities are correlated with movement and nutritional regime, with the constitution, with the early detection, prevention and treatment of acute and chronic diseases [5].

The modern way of life and reduced motor activ-

ity are factors that provoke the appearance of incorrect posture and various deformations on the part of the spine and chest [6].

Postural control is a fundamental motor skill that can be defined as “the act of maintaining, achieving or restoring a state of balance during any posture or activity” of daily life [7]. Maximum postural control is achieved between the ages of 20 and 60 years [8]. Postural control strategies depend on an individual’s physical activity and can be improved via training [9]. Early diagnosis, systematic monitoring, treatment and correct motor mode contribute to a favorable outcome of impaired posture [6].

In the case of kinesiology, the various types of physical deformities and the possibilities for technical corrections and treatment are actual and, therefore, the object of active research.

The purpose of the research is to understand the importance of posturology for the prevention of spinal distortions and the preparation of a rehabilitation program for musculoskeletal deformities.

MATERIAL AND METHODS

We used a documentary method and an empirical study. The functional study was conducted in the period 2022-2024 on the territory of Plovdiv, Haskovo and Kardzhali regions. 488 individuals between the ages of

18 and 65 were studied, 49.8% (n = 248) females and 49.2% (n = 240) males. The diagnosis was made with special tests for spinal dysfunctions. A survey was conducted on physical activity, poor posture and overweight. Potential candidates were informed of the voluntary nature of their participation, and if they agreed to participate, they were asked to sign the free and informed consent form. Before data collection, all subjects were instructed on the kinesitherapy procedures.

The collected primary information was processed and analyzed using the statistical programs SPSS 19. Microsoft Office Excel program was used for graphical processing and illustration.

RESULTS AND DISCUSSION

A kinesiological analysis of musculoskeletal and spinal deformities was performed. Improper posture during musculoskeletal exercises is widespread among respondents 52.2%.

During the examination, 56.8% of women (n=141) had a relaxed posture, and muscle imbalance in the back muscles was observed, mainly in males (42.5% (n=140). Females have the highest percentage of asymmetry in the shoulder complex area, at 40.7% (n=101).

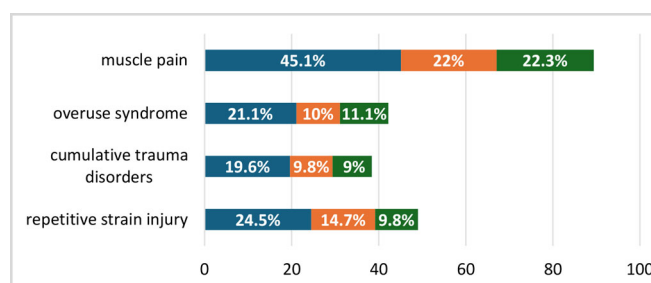
We mainly found increased thoracic kyphosis in 38.7% (n=96), scoliosis – in 26.6% (n=66) and lumbar lordosis – in 11.2% (n=28) in the studied women. (Table 1.)

Table 1. Results of somatoscopy and special tests

Segment	Relaxed posture/ muscle imbalance		Shoulder complex		Kyphosis		Scoliosis		Lumbar lordosis	
	females	males	females	males	females	males	females	males	females	males
gender	females	males	females	males	females	males	females	males	females	males
%	56	42.5	40.7	35.4	38.7	25.4	26.6	13.3	11.2	5.4
n	141	102	101	85	96	61	66	32	28	13

The prevalence of musculoskeletal injuries that increase the risk of recovery and low back pain is the main reason for temporary disability. Between 25% and 33% of the respondents suffer from various pathologies related to discomfort, reduced functional ability and persistent pain in the tendons, muscles, tendons and soft tissues, with or without objective findings. Various disorders of the muscle-skeletal system are observed: disorders accumulated as a result of performing repetitive movements (repetitive strain injury in 24.5%); injuries due to compression of soft tissues, ligaments and facial muscles (cumulative trauma disorders in 19.6%); disabilities from overuse (overuse syndrome in 21.1%). In case of excessive loading, pain (45.1%), numbness, etc., will appear, which is a signal of functional stress on the musculoskeletal system. (Fig 1.)

Fig. 1. Distribution of the type of damage to the musculoskeletal system



We recruited 65 young physically active individuals (mean age: 24.6 years, height: 1.69 m, body mass: 67 kg) and 28 physically active adults (mean age: 59.2 years, height: 1.58 m) as volunteers. , body weight: 72.3 kg).

Young people practiced physical activity (Pilates, yoga, fitness and other light aerobic activities) at least 2 times/week (average ~5/h week). Adults underwent kinesi-therapy treatments 3 to 5 times a week for 8 weeks.

Inclusion criteria for all participants included the absence of musculoskeletal disorders in the last 6 months and the active presence of neurological pathologies.

Two kinesi-therapeutic methods have been prepared according to the kinesi-ological analysis of the studied subjects. The difference between the two methodologies is determined by the conditions in which the analytical exercises are performed. The aim of the two kinesi-therapy programs is to strengthen the muscles that stabilize the posture, strengthening the new motor patterns. The functional condition of the muscles of the neck, back, shoulders, legs and lower extremities determines their ability to perform prolonged static loading.

No differences were observed in maintaining static and dynamic posture comparing the two groups. The main measures for the prevention of incorrect posture include, for both groups, habits in the area of ergonomics of the workplace, the introduction of regular sleep and rest periods, and the application of the kinesi-ology program.

Some studies report a number of postural problems. According to Mitova et al. (2020), the kinesi-therapeutic methodology and the performance of specially selected exercises leads to improvement of the condition of persons with lumbo-sacral pain syndrome, positive adaptation and adequate treatment of chronic pain [10]. Mihaylova et al. (2021) indicated that physical activity and rehabilitation, prevention, physioprophy-laxis, and the creation of health promotion programs are becoming more and more urgent. [11].

In a study, Sarto et al. (2022) showed that a physi-cally active lifestyle promotes static and dynamic balance in young and older adults and leads to positive adapta-tions for postural balance control [12].

According to Patti et al. (2023), postural health, to-day more than ever, is entering a part of everyday life and is associated with the biomechanical analysis of the hu-man body [13].

In 2023, Van Humbeeck et al. studied postural con-trol in both children and older adults. The authors showed a planar path length and an ellipse area with a U-shaped developmental trajectory [14].

In practical posturology, minimal deviations are of-ten observed, leading to general imbalance and pain in specific areas of the body [13]. Postural control is a com-plex process. Posture involves muscle activation that is controlled by the central nervous system (CNS), leading to postural corrections [15]. Postural corrections are the result of a complex system of mechanisms with multisensory inputs (visual, vestibular, and somatosensory) inte-grated into the CNS [16].

CONCLUSION

The thesis of insufficient motor activity and the need for a kinesi-therapy program consistent with the find-ings of the functional examination is confirmed.

In this study, we support the concept that a physi-cally active lifestyle can positively influence muscu-loskeletal disorders in young and elderly individuals. Correct human posture is one of the signs of good physi-cal development and health. It provides the necessary conditions for the normal functioning of the internal or-gans, maintains muscle balance and creates favorable me-chanical conditions for the development of the muscu-loskeletal system. Training in proper posture from a young age has a lasting impact throughout life. The prevention of poor posture and various postural disorders is directly related to the development of initiatives to promote healthy practices, practicing therapeutic physical exer-cises and various physical activities.

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