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CHANGES IN BODY POSTURE IN CHILDREN BETWEEN THE 10TH AND 13TH YEARS OF AGE

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ABSTRACT

Introduction. The possibility of detecting postural defects early, a significant development with respect to available therapeutic methods, and an awareness of the necessity for continuous and individually adjusted treatment, are regarded as an important progression in the modern conservative treatment of faulty postures.

Aim. This work aimed at determining changes in body postures in 10- and 13-year old children within a 3-year period.

Materials and methods. This research was conducted in Mława in two primary schools and involved 10-year old children, who were reexamined after a 3-year period, at the age of 13. The final group included in this research consisted of 76 subjects.

Results and Discussion. Changes in body posture observed in the study group over the 3-year period are as follows: 34.29% of children manifested excellent and good posture during examination I; whereas during examination II 45.71% of children had good posture.

The adopted methodology did not allow us to determine physiological changes concerning body silhouette. However, it allowed us to detect posture abnormalities, and to diagnose postural defects.

Conclusions. The results confirmed the occurrence of changes in body postures in children between the 10th and 13th years of age. These changes, defined as detected body posture abnormalities, showed both improving and worsening tendencies with respect to the analyzed elements of body posture. A general percentage analysis showed an improvement in the body posture of children within a 3-year period.

Key words: body posture, children, changes in body silhouette

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INTRODUCTION

Postural defects are defined as changes observed in an unrestrained, erect position, which significantly differ from postures typical of a particular age, sex, race, and constitution. They result from pathological changes, may occur in all planes and are manifested as changes in the spinal curvature and body sections directly connected to the spine [4, 14, 16, 17]. It is extremely important to conduct examinations in the period critical for postural development. The second growth spurt occurs between the 10th and 12th years of age. After the age of 10, developmental changes intensify. Maintaining a proper body posture often requires a more concentrated effort due to physiological weakness in the muscles. During this period, there may occur spontaneous corrections of postural defects, as well as their worsening [10]. The possibility of detecting postural defects early, a significant development with respect to available therapeutic methods, and an awareness of the necessity for continuous and individually adjusted treatment, are regarded as an important progression in the modern conservative treatment of faulty postures. Therapeutic procedures should be holistic and involve not only a psychic sphere, but also environmental factors [11]. Discontinuing corrective therapy during the period of physiological development, results in disturbances with respect to efficiency as well as the economy and esthetics of movement. This, in adult life, leads to an early overstraining of joints and to both degenerative and deformative diseases [15].

AIM

This work aimed at determining the changes in the body postures in children during the period of the second growth spurt – between the 10th and 13th years of age (health check) and an anthropometric analysis of the changes occurring within this developmental period.

MATERIALS AND METHODS

This research was conducted in Mława in two primary schools and involved a group of 10-year old children, who were reexamined after 3 years. The examination of 10-year old children (92 subjects) was termed as examination I, and that of 13-year olds – as examination II. Because the parents of 16 children did not consent to the examination II, the analysis of the results excluded these children. The final study group consisted of 76 subjects. The examination record form was adjusted for the purpose of this study. Examinations were conducted according to a visual assessment of selected elements of body build and posture on the basis of the modified point-based method [7], the New York posture test, and the detailed posture evaluation test [17, 18].

On the basis of an obtained number of points, during the final analysis, each child's posture was graded as being excellent, good, poor or bad.

STATISTICA 7.1 for Windows by Statsoft® was used for a statistical analysis of the obtained data. Statistical significance was defined as $p \leq 0.05$.

RESULTS

Changes in body posture observed in the study group over the 3-year period are as follows: 34.29% of children manifested excellent and good posture during examination I; whereas during examination II 45.71% of children had good posture (Fig. 1).

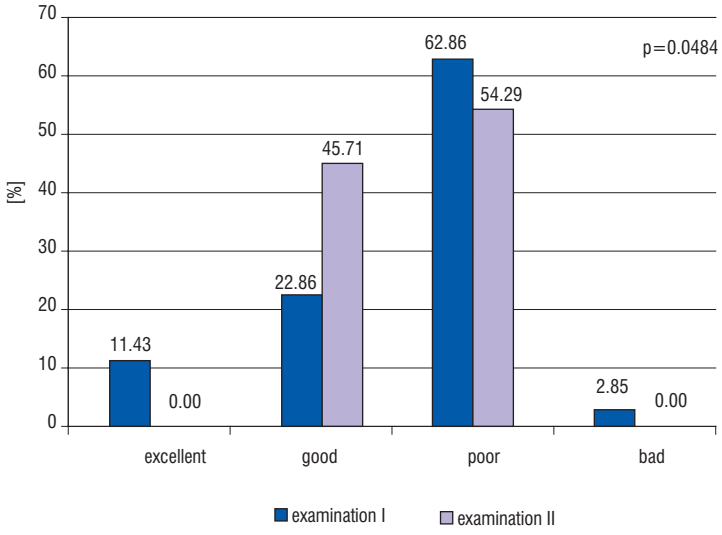

Fig. 1. Changes in body postures of children between the 10th and 13th years of age

13-year old children generally manifested improved postures, with an increased number of postures graded as good (by 14.58% in boys and by 23.1% in girls). A significant improvement was observed with respect to hollow back (by 37.5% in boys). A decrease in the incidence and intensity of changes also occurred in the case of: protuberant abdomen (by 10.53% in girls), protruding head – sagittal plane (by 5.27% in girls), asymmetric shoulders (by 6.25% in boys and by 5.27% in girls), asymmetric shoulder-blades – frontal plane (by 31.58% in girls), abnormal spinal curvatures (by 12.5% in girls and by 10.53% in boys), waist asymmetry (by 12.5% in boys), slanting pelvis (by 6.25% in boys), and improper calcaneus positions (by 6.25% in boys and by 5.27% in girls).

Within the age bracket of 10–13, the worsening with respect to the frequency of occurrence and intensity of changes was observed for the following defects: protruding head – sagittal plane (by 18.75% in boys and by 36.85% in girls), forward protrusion of the shoulders – sagittal plane (by 31.25% in boys and by 26.31% in girls),

winged scapula (by 6.25% in boys and by 16.13% in girls), abnormal chest shape (by 18.75% in boys and by 36.84% in girls), rounded back (by 21.05% in girls), hollow back (by 5.26% in girls), asymmetric shoulder-blades – frontal plane (by 6.25% in boys), asymmetry of the back in the forward bending position (by 10.53% in girls). Three 13-year old children manifested varus knee; this deformity was not observed when they were 10 years old.

Statistically significant differences were obtained concerning the following defects:

- hollow back in boys: $p = 0.0019$,
- abnormal chest shape – sagittal plane in girls: $p = 0.0443$,
- asymmetric shoulder-blades – frontal plane in girls: $p = 0.0422$.

DISCUSSION

The term "changes in body posture" appearing in the title of this paper refers, in its basic meaning, to physiological changes in the human body silhouette, which can be observed both during the overall development of a given individual and during a single day, e.g., due to physical fatigue or the psychological condition of a given individual [4, 7, 12, 13]. The methodology adopted in this work did not enable us to determine physiological changes in the body silhouette. It allowed us, however, to detect posture abnormalities and to diagnose postural defects. With an increase in age, posture generally improved. Examination II revealed an increase in the number of postures graded as good (by 14.58% in boys and by 23.1% in girls). Nevertheless, these results are not satisfactory, because 68.75% of boys and 42.11% of girls still manifested poor postures, and no child's posture could be graded as excellent. The frequency of occurence of abnormal lateral curvature of the spine is consistent with the findings of other authors [3, 5, 6, 8]. Research conducted by Górniak in 2003 concerning a group of rural children [5], revealed a progression of this defect in 31.2% of cases. In the town of Rzeszów [6], abnormal spinal curvatures were detected in 40.9% of examined children, whereas in Kłobuck County [8] in 57% of girls and 35% of boys. When comparing the obtained results with the results of children examined in Konstancin [3], in Rzeszów [6], and in Bydgoszcz [1], one may draw the same conclusion: abnormal spinal curvatures in older children (13–14 years old) are more frequent in girls than in boys (the research showed that this defect was twice as frequent in girls); varus knee occurs rarely, whereas valgity tends to increase with age (irrespective of sex). A slight decrease in the number of defects concerning the heels is observed with advancing age. In both age groups, varus deformities were not observed, whereas valgus heel wedges were detected in few cases, and the intensity of this deformity was low. Between the ages of 10 and 13, a general improvement of body posture was observed: 34.29% of 10-year old children manifested postures graded as excellent and good, whereas after a 3-year period, posture graded as good

was detected in 45.71% of children. Consequently, discordance appeared with respect to the findings of other authors, who detected an increasing tendency with regard to the frequency of occurrence of postural defects in children [1, 2, 9]. After a thorough analysis of the results, along with an accounting for particular types of defects, we are not able to conclude that the improvement involved all the postural defects examined in children within the age bracket of 10–13 years of age. The frequency of occurrence of protruding head – sagittal plane increased twice as much in 13-year old girls and boys. The difference in the frequency of occurrence and intensity of a defect occurred also for: forward protrusion of the shoulders – sagittal plane, winged scapula, abnormal chest shape, rounded back (increased number of girls), valgus knee (the same level of incidence, but increased intensity), and asymmetry of the back in the forward bending position. Three 13-year old children manifested varus knee which was not diagnosed earlier. A general percentage analysis of the remaining 9 elements of examined body elements, considered when assessing body postures, exceeded the percentage of the worsening of the enumerated defects, which accounts for the obtained discrepancy in our results with respect to the findings of other authors.

CONCLUSIONS

1. Our research results confirmed the occurrence of changes in body postures in children between the 10^{th} and 13^{th} years of age. These changes are understood as detected abnormalities showing both improving and worsening tendencies with respect to the analyzed elements of body posture.
2. A general percentage analysis showed an improvement of body posture in children examined after 3 years.

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