

THE ASSESSMENT OF BODY POSTURE PARAMETERS OF DEAF AND HEARING CHILDREN AGED 9 - 11 YEARS HODNOCENÍ PARAMETRŮ DRŽENÍ TĚLA U NESLYŠÍCÍCH A SLYŠÍCÍCH DĚTÍ VE VĚKU 9 – 11 LET

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SOUHRN

Držení těla je pohybová dispozice závisající na velkém počtu vnitřních a vnějších faktorů. Porucha slyšení je jedním z faktorů, který může mít vliv na držení těla. Cílem této studie bylo hodnocení držení těla u neslyšících dětí a zjistit zda existují rozdíly v tělesném držení mezi neslyšícími a slyšícími dětmi. Výzkumný soubor tvořilo 19 neslyšících a 33 slyšících náhodně vybraných dětí na základní škole v Poznani ve věku 9 – 11 let. Tělesné držení bylo hodnoceno neinvazivní metodou pomocí přístroje Posturometer-S (POSMED Wrocław, Śliwa, 1999). U slyšících bylo zaznamenáno největší procento špatného držení těla, u neslyšících tomu bylo naopak. Zároveň však u slyšících bylo zjištěno velmi dobré držení těla. Přes výše uvedené, měly neslyšící děti měly držení těla lepší. Slyšící děti vykazaly největší procento kytofického držení II. typu a neslyšící I. typu. Závěrem: tělesné držení u neslyšících a slyšících se v podstatě liší pouze v asymetrických ukazatelích tělesného držení. Mezi slyšícími a neslyšícími nebyly zjištěny významné rozdíly v držení těla.

Klíčová slova: držení těla, parametry, neslyšící děti, slyšící děti

ABSTRACT

Body posture is a motor habit depending on many endo- and exogenous factors. A hearing defect is a factor which may have an influence on body posture. The aim of the study was the assessment of body posture in deaf children and determining whether there are any significant differences in body posture between deaf and hearing children. The material consisted of a group of children from a primary school for 19 deaf children and 33 hearing children, randomly selected students of one of primary schools in Poznań, aged 9 to 11 years. Body posture was assessed using a non-invasive method with the use of Posturometer-S (POSMED Wrocław) (Śliwa, 1999). In hearing children the largest percentage of types of bad posture was noted and in deaf children the largest percentage of types of good body posture. At the same time, in the groups of hearing children very good posture types were noted. In spite of the above, in general, deaf children are characterised by better types of body posture. In hearing children there is the largest percentage of type II kyphotic posture and in deaf children type I kyphotic posture. To sum up, body postures of hearing and deaf children differ basically only in terms of asymmetry of body posture parameters. No significant differences were noted in terms of other examined parameters such as types of posture.

Key words: body posture, parameters, deaf children, hearing children

Introduction

Body posture is a motor habit depending on many endo - and exogenous factors. A hearing defect is a factor which may have an influence on body posture. However, appropriate prophylactic and corrective actions and providing a prosthesis

may to a large extent decrease the effect of hearing defect on posturogenesis (Zwierchowska, 2006)

Osteoarticular and ligamentous system, muscular and nervous systems take part in regulating body posture (Kasperczyk, 1997). The system works on the basis of information coming

from the periphery, functioning on the feedback principle. The time of information circulation from a receptor to effector that is to muscles responsible for maintaining a correct body posture is very short: 70-129 m/s (Wilczyński, 2001). The mechanism of controlling posture is complex (Horak, 1990). Structures responsible for the control of posture are located at the level of spinal cord and on superspinal levels (vestibulospinal tract, pyramidal tract, rubrospinal tract). Also receptors of balance organs, skin receptors, prioreceptors of muscles (muscular spindles), joint (Vater-Pacini and Ruffini corpuscles and free nerve endings) and sight receptors also take part in it. The main role in the process is played by the habit of body posture.

Methods and material

The material consisted of a group of children from a primary school for deaf children in J. Sikorski School and Childcare Centre for Deaf Children (Ośrodek Szkolno-Wychowawczy dla Dzieci Niestyszających im. J. Sikorskiego) and hearing children, randomly selected students of one of primary schools in Poznań. A group of 19 deaf children and 33 hearing children was examined, including 23 girls and 29 boys aged 9 to 11 years. The average age was 9.9 years.

Body posture was assessed using a non-invasive method with the use of Posturometer-S (POSMED Wrocław) (Śliwa, 1999). The examination of body posture took place in a free position backwards to the device, directly opposite. Before the examination the device was calibrated so that the readings of the parameters corresponded to the actual state. Specific points on the body were marked in relation to which the measurement was taken: the top of the head, acromions, lower angles of the scapula, spinous processes from C₇ to L₅, posterior superior iliac spines.

Characteristics of the measurements during the examination of body posture – changes were recorded in case of:

- asymmetry in body posture – if deviations are at least 15 mm
- asymmetry of shoulders and scapulas – if they are shifted in relation to each other by at least 25 mm.

The examinations were carried out in the morning after obtaining a written consent of the children's parents to take the measurements.

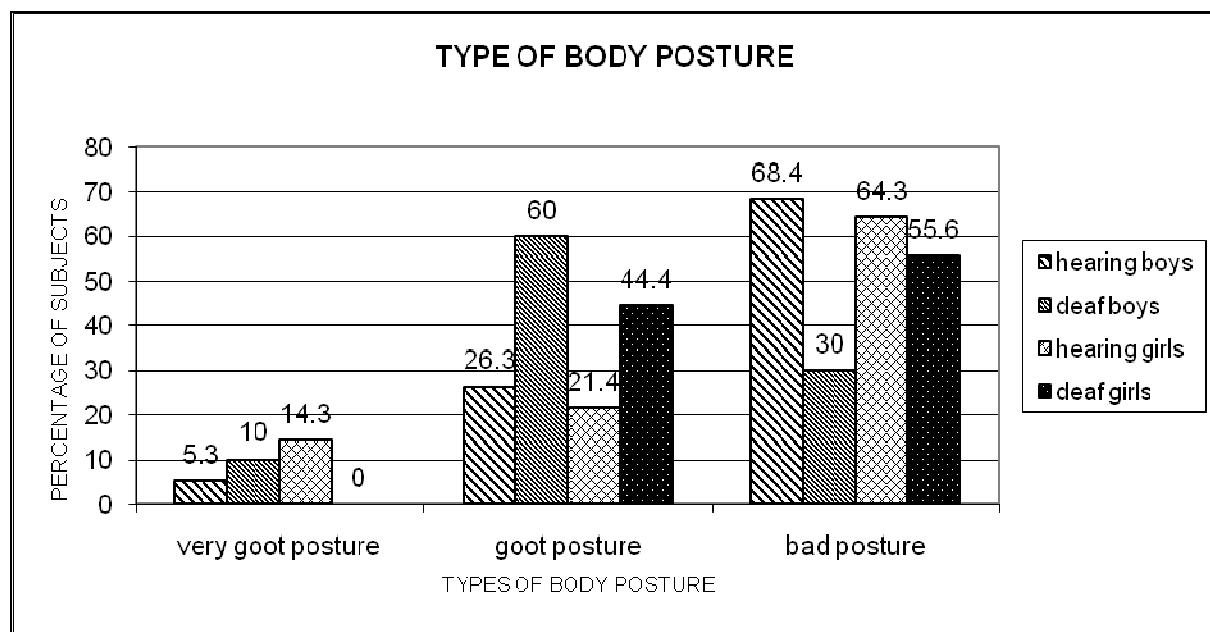
Results

- 68.4% of hearing boys had bad posture and 26.3% had good posture. Good posture was noted in 60% of deaf boys and bad posture in 30% of deaf boys.

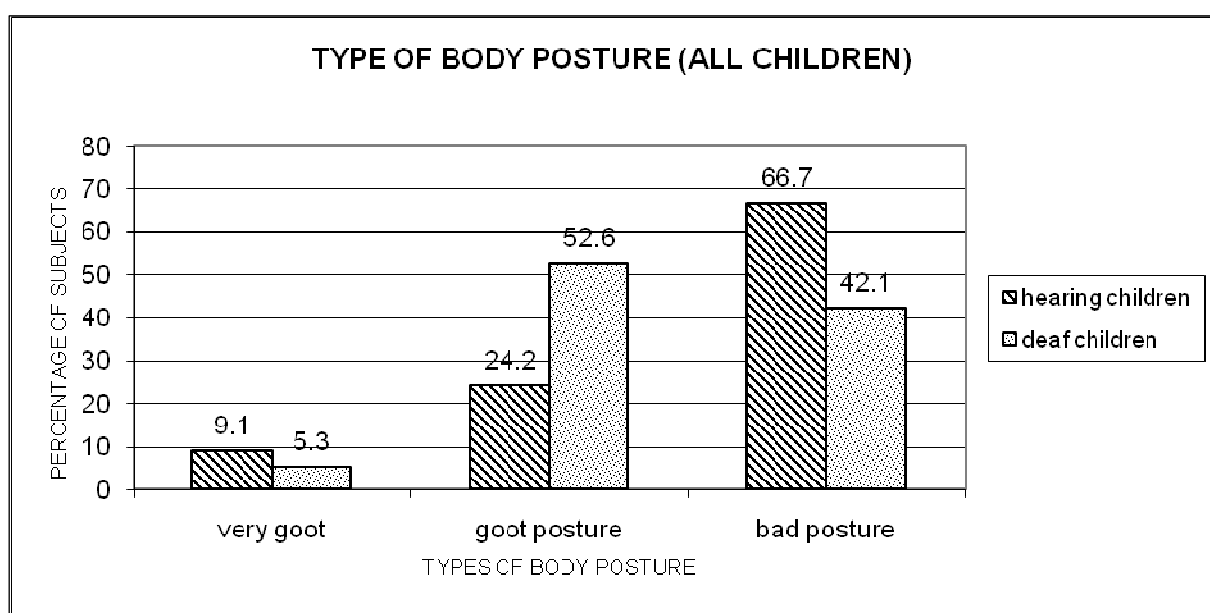
According to Nowotny and Saulicz controlling posture is a continuous process and involves constant adjusting of individual parts of body to current needs, both in the sense of adapting a posture in line with a specific model and maintaining it (Wilczyński, 2001). According to this statement dysfunctions of hearing organ or lack of hearing may contribute to disorders in body posture and affects the process of posturogenesis and the equilibrium of the body (Seltz, 1996; Suarez, 2007).

The aim of the study was the assessment of body posture in deaf children and determining whether there are any significant differences in body posture between deaf and hearing children.

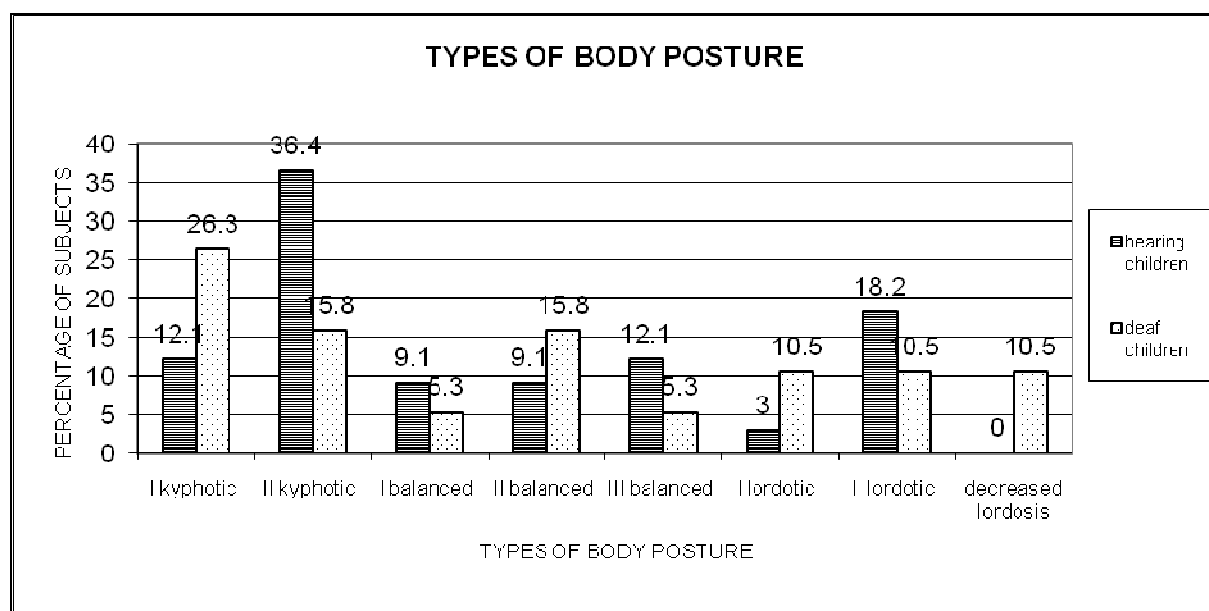
- Bad body posture in hearing girls (64.3%) and deaf girls (55.6%) was noted in more than half of the subjects.
- The results indicate a greater lability of body posture in girls, which is indicated by a variety of types of body posture (hearing girls: 21.4% good posture, 14.3% very good posture, deaf girls: 44.4% good posture, 0% very good posture).
- In the analysis of occurrence of various types of body posture in deaf boys 30% of type II balanced posture and type I kyphotic posture were found. Other types are at the level of approximately 10%. No type II lordotic posture was noted.
- In hearing boys the largest percentage of type II kyphotic posture was noted (42.1%) and approx. 16% of type III balanced posture, other types accounted for approx. 10%. No decreased lumbar lordosis was noted.
- In hearing girls most type II kyphotic postures and type II lordotic postures were noted (28.6%), 14.3% of both type I kyphotic and type I balanced postures each. Other types of posture occurred in approx. 7% of the subjects.
- Neither type I lordotic posture nor decreased lumbar lordosis were noted.
- In the group of deaf girls the largest percentage (33.3%) of type I kyphotic posture was noted, 22.2% of both type II kyphotic posture and type II lordotic posture and 11.1% of both type I lordotic posture and decreased lumbar lordosis. None of the balanced types were noted.
- Asymmetry of body posture is clear in deaf children in terms of all studied parameters: body asymmetry (hearing children 12.2%, deaf children 52.7%), shoulder asymmetry (the hearing children 42.4%, deaf children 57.9%) and scapula asymmetry (hearing children 6.1%, deaf children 15.8%).



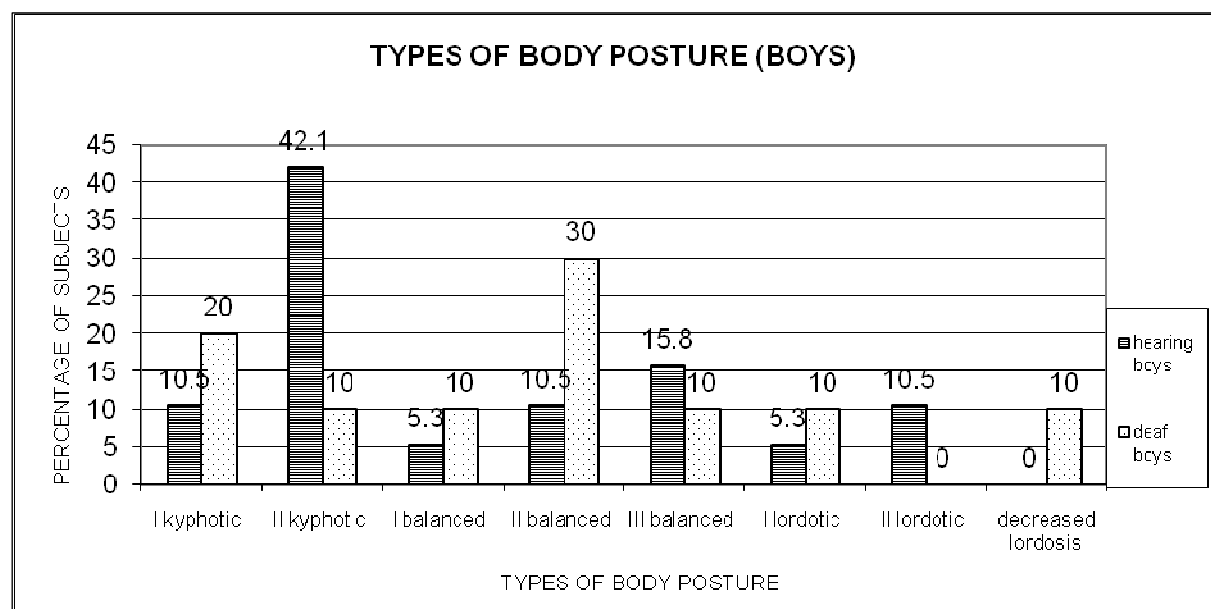
Obrázek 1. Typ držení těla slyšících a neslyšících chlapců a děvčat
Figure 2. Type of body posture



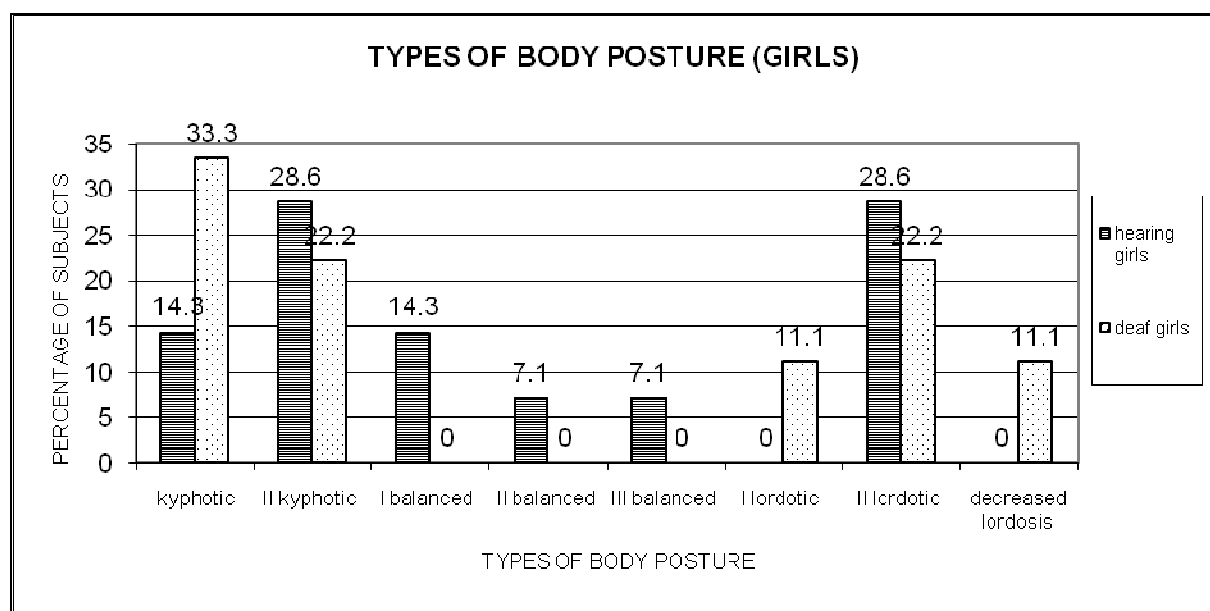
Obrázek 2. Typ držení těla všech dětí
Figure 2. Type of body posture (all children)



Obrázek 3. Typ držení těla slyšících a neslyšících
Figure 3. Types of body posture

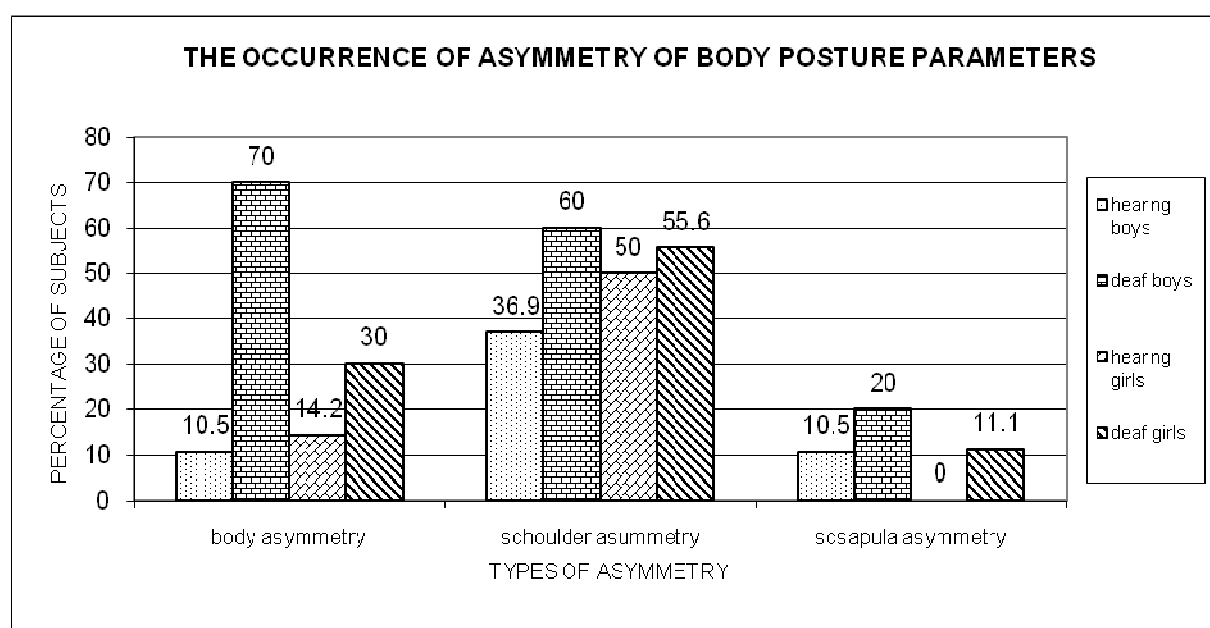


Obrázek 4. Držení těla slyšících a neslyšících chlapců
Figure 4. Types of body posture (boys)



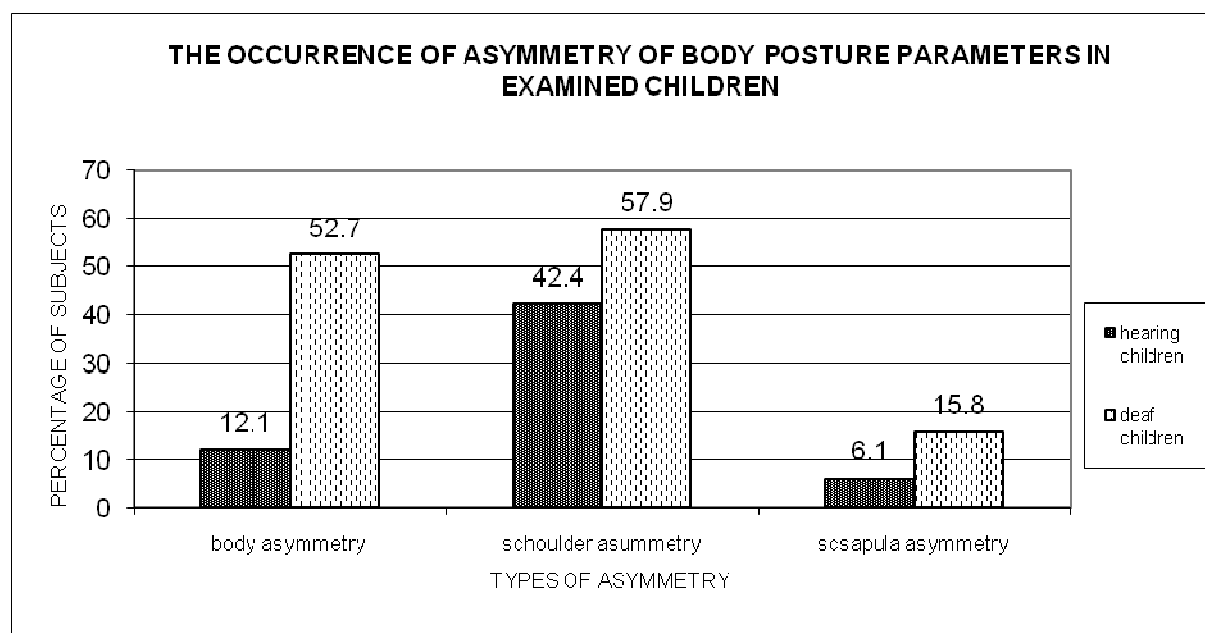
Obrázek 5. Držení těla slyšících a neslyšících děvčat

Figure 5. Types of body posture (girls)



Obrázek 6. Výskyt asymetrických parametrů tělesného držení u neslyšících a slyšících chlapců a děvčat

Figure 6. The occurrence of asymmetry of body posture parameters



Obrázek 7. Výskyt asymetrických parametrů držení těla u zkoumaného souboru slyšících a neslyšících
Figure 7. The occurrence of asymmetry of body posture parameters in examined children

Discussion

In Poland few investigators studied body posture of deaf children, moreover their results are difficult to compare as in majority the studies were carried out using various methods. Szczygieł assessed body posture of children using the Metresom System method. He noted a large percentage (80%) of children with one-arch scoliosis with the curvature angle of up to 10°. (Szczygieł, 1999). In the work of Grabara, the percentage of these children was lower, but probably, as the author explains it, this was caused by the possibility of measuring the angle of curvature which the method of Mora (Grabara, 2006) does not have. These studies (the photogrammetry method – CQ Elektronik System Wrocław) showed moreover that in deaf children body asymmetry and defect of the chest appear more often than in the group of hearing children. The author noted also in majority of subjects deviations of the trunk in the sagittal plane, usually it was a forward bend which may suggest a disorder of body balance in the subjects. However, the study of Wierzbicka-Damska et al. did not confirm the thesis that a hearing defect adversely affects the ability of maintaining a stable standing position (Wierzbicka-Damska, 2005). Wilińska and Kasperczyk assessing posture using a visual method noted approximately 40% of incorrect postures, however they did not compare them to healthy children (Wilińska, 1990). The results of this study can be compared to the assessment of children's posture carried out by Śliwa with the use of Posturometer-S which he devised. 116 deaf children aged 7-15 were examined. Trace

curvatures, scoliosis and coastal prominences and lumbar torus were more frequent in deaf children (35%) than in the control group (29%) (Śliwa, 1999). In the presented studies it was noted that body postures of hearing and deaf children differ basically only in terms of asymmetry of body posture parameters. Taking into consideration other assessed parameters such as types of posture, no significant differences were noted. In hearing children there was the largest percentage of type II kyphotic postures and in deaf children type I kyphotic postures. In general deaf children, in spite of their defects, were characterised by better types of body posture than hearing children.

Few studies of other authors confirm however that in deaf children the hearing deficit may be significant for body posture. Grabara sees the causes for this in a relatively frequent morphological and functional asymmetry, more prominent in case of a hearing defect, which may be related to a one-sided hearing loss and which is confirmed by our research and results of the study of Grabara (Grabara, 2006). Many confirm the fact that the physical development of these children may have a different course compared to healthy children (Śliwa, 1999; Grabara, 2006; Wierzbicka-Damska 2005; Wilińska 1990; Nowotny, 1993).

In deaf children or hard of hearing compulsory reflex positioning of the head is sometimes noted, making hearing easier. An incorrect position of the head may be the reason for disorders in the position of the neck part of the spine and shoulder girdle. The whole body posture changes. In corrective exercises the steering functions of the head are probably not used to the full, as it is known that

correct position of the head in various positions causes automatically straightening of the trunk, pulling the shoulders together and correction of the position of shoulder girdle (Nowotny, 1993). This further influences thoracic curvature. In the group of deaf children the largest percentage of type I kyphotic postures was found. During corrective exercises in deaf children attention should be paid to correct positioning of the head; among many types of action this is considered by the system according to U. Hoppe in which through three-plane, isometric, asymmetric work of muscles using feedback symmetry is built in the motor system ensured by a correct muscular balance (Hoppe, 1992). For this also techniques according to PNF methods may be used, with an approximation on the top of the head (Adler, 1993). During the therapy Thera-band tapes with various resistance may also be used (Wiernicka, 2007)

Conclusions

1. In hearing children the largest percentage of types of bad posture was noted and in deaf children the largest percentage of types of good body posture. At the same time, in the groups of hearing children very good posture types were noted. In spite of the above, in general, deaf children are characterised by better types of body posture.
2. In hearing children there is the largest percentage of type II kyphotic posture and in deaf children type I kyphotic posture.
3. To sum up, body postures of hearing and deaf children differ basically only in terms of asymmetry of body posture parameters. No significant differences were noted in terms of other examined parameters such as types of posture.

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