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Sensory Integration as One of the Methods in Physical Therapy for Pre-School Age Children

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Key words: sensory integration, physical therapy, children therapy

Abstract

Sensory Integration (SI) is one of the therapeutic methods created and described by J. Ayres in 1972. In Poland, for a few years, more and more specialists, also rehabilitators, have followed this concept in their work. SI is a subconscious process, whereby the ordering and

assignment of meaning to information acquired by the senses takes place. The three principal senses, which Ayres described are: the sense of touch, proprioception, and the vestibular system.

Introduction

Sensory Integration (SI) is one of the therapeutic methods created and described by J. Ayres in 1972. In Poland, for a few years, more and more specialists, also rehabilitators, have followed this concept in their work. SI is a subconscious process, whereby the ordering and assignment of meaning to information acquired by the senses takes place. The diagnosis and the therapy consist in detecting and correcting defective neural organisation. Individuals with established sensory integration disorders do not usually have any neurological defects and their nervous systems are of normal development. Rather than that, processing or transmitting the stimuli collected by the patient's senses is disrupted [1]. Impulses, which, by way of various neurons, reach the central nervous system, commence their integration on different levels already during foetal life. The highest development of sensory integration is observed up to the age of 7. In the event of a disorder of processing the stimuli collected by the senses, it is the easiest to remedy that in the first seven years of life. The irregularities might also be mitigated at a later age; however, the therapy lasts longer then [2]. A plethora of stimuli, which have their origin in the senses, reaches the nervous system. The encephalon is responsible for processing, ordering, and tagging a huge number of images, sounds, tactile and kinaesthetic impressions. If, for some reasons, this integration is faulty, various manifest movement, emotional or social disorders are observable with children [3].

The Senses and the Stages of the Integration Thereof

The three principal senses, which Ayres described are: the sense of touch, proprioception, and the vestibular system. Normal visual and auditory perception depends on normal development and regular integration of the basic senses. All the senses cooperate, and their integration is attributable to the centres located, among others, in the brainstem. Ayres [2] defined four levels of sensory integration, which develop simultaneously during a child development. The last stage shall be reached by a child at the age of about 9 [4]. The first level of integration refers to the foetus, a long before delivery. Gravity stimuli provided by the mother, who makes various movements – from the calm up to the sudden. The organism of the baby at the embryo stage is also reached by the stimuli:

- tactile—having the origin in the pressure of amniotic fluid,
- gustatory – arising as a result of swallowing amniotic fluid,
- auditory – provided from the inside of the mother’s body, also some sounds reach the embryo from the outside,
- visual – the light of varying intensity reaches the eyes of the embryo.

The second stage of the development of sensory integration falls on early infancy. An infant develops the awareness of their own body by way of coordinating the left and the right side thereof. The movements become smooth, the postural reactions shape, and the functioning of the remaining senses is perfected. At the third stage, falling on the preschool period, visual and auditory stimuli integrate with the remaining basic senses. At the last, fourth stage of sensory integration, a child develops abstract thinking and reasoning skills. Complex motor skills, self-awareness and self-control render a child action more purposeful; a child can also contain their reflex responses. [2,4].

Application of sensory integration in physical therapy

The impressions are organised in a child’s nervous systems on account of activity displayed by children in the first years of their lives. Normal vestibular system operation conditions, among others, bilateral body coordination and the ability to cross the middle line. The

location of various body parts in relation to the environment is known from proprioceptive information [5]. Proprioception is directly connected with the vestibular system. Maintaining the intended body posture is possible owing to the proper muscle tone. Improper body posture during sitting or standing is observed with children with hypotonia. Parents or teachers observe that such children slip off chairs, often change the position, prop their heads on their hands or quickly complain that they are tired [6]. The children seek activities whereby they could experience the experience necessary to develop new motor functions. A human being who develops regularly, from the first moments of life has massive intrinsic drive to develop [8]. More and more often, exercise adopting the method of Sensory Integration is becoming included among the physiotherapeutic methods applied during physical therapy. The diagnostic test of Southern California might be applied to diagnose the disorders. It determines the disorders concerning movement and sensation. Based on the conducted tests, an interview with parents, the observation of the child in the consultation room and the test results, a customised action plan is developed for every child [9].

Where insufficient atrial sensitivity is diagnosed, during the therapy, the child is provided with stimuli that stimulate this very system. During the exercise, among others, suspensions, such as a hammock, a therapy platform, a cocoon, a mushroom swing, a tyre, a tube swing, a suspended flexible trampoline, a helicopter swing, a stork nest, a horse swing, a suspended bench, a T-swing, a suspended therapy pear are used. Owing to the application of steel suspension frame, which allows for hanging various equipment at different heights, it is possible to stimulate the child's vestibular system in multiple ways and using several types of equipment interesting to the child. The exercise using suspended equipment develop motor coordination, by way of practicing the sense of balance. On account of this, an improvement of the integration of proprioceptive stimuli takes place [8].

The children with diagnosed tactile hypersensitivity are administered atrial and epicutaneous stimuli in the therapy. No badly tolerated stimuli are to be enforced. The therapy begins by the exercise of tactile system, in the places most tolerated by the child. During the exercise, it is recommended to include the work on other senses, so that the application of tactile impressions is but one of the elements of physical therapy[10].

If we observe deficient vestibular sensitivity in a child – we provide them information using, e.g., a barrel, a pool with balls, a therapeutic ghost, a therapeutic hammock, a sensory wringer of various shapes and sizes. Also toys and pressure quilt are applied, rolling the child

in a mattress or a little blanket, playing the so-called pancake. In the therapy, also pressure owing to the application of a roller, an orthopaedic roll (smooth or with bumps), a ball and other therapeutic accessories available on the market. Also massage therapy and joint compression are applied – by means of the hands of therapist [5]. The method of sensory integration is also applied to treat disorders of abnormal muscle tone [11], as an element of treatment of children with speech disorders [12] and in therapy of children with mental disorders [13]. Sensory integration is more and more often, and to a greater extent, applied not only at the physiotherapist's consulting room. SI constitutes one of the essential elements of multi-faceted work with a child.

Bibliography

1. Kołat N. The sensory processing disorders of children – diagnostic an proceeding. *Nowa Pediatria* 2014, 3; 97-102.
2. Ayres A. Dziecko a Integracja sesoryczna. Harmonia Universalis, Gdańsk 2018.
3. Grzywiak C. Incorrect sensory integration as the constituent of mental disorders occurring both in the case of children and of young people and adult individuals Alice. *Psychiatria* 2016; 13, 3, 144 – 148.
4. Banaszek G. Rozwój niemowląt i jego zaburzenia a rehabilitacja metodą Wojty. *Alfamedica* 2002
5. Odowska – Szlachcic B. Terapia Integracji Sensorycznej. Ćwiczenia usprawniające bazowe układy zmysłowe i korygujące zaburzenia planowania motorycznego, zeszyt 1. Wyd Harmonia, Gdańsk 2018.
6. Jacków-Sowa K. Ruch — rozwój — nauka, czyli jak ruch wpływa na uczenie się. *Integracja Sensoryczna* 2016; 1: 37–39.
7. Cygan B. Sensory processing disorder (SPD) as a source of difficulties and school failure of a child in early school education. *Rocznik Komisji Nauk Pedagogicznych* 2018, LXXI,: 83–96.

8. Przyrowski Z. Integracja sensoryczna. Teoria, Diagnoza, Terapia. Wyd. Empis & Sensus Mobile sp.z o.o. 2019.
9. Kałużna A. Zasady diagnostyki i terapii zaburzeń rozwoju integracji sensorycznej u dzieci. Wydawnictwo AWF, Wrocław 2004.
10. Przyrowski Z. Podstawy diagnozy i terapii integracji sensorycznej. AWF, Kraków 2001.
11. Wasilewski T. Sensory integration and its significance for functioning and developing children speech. *Pediatr Med Rodz* 2018, 14 (1), 20–32.
12. Jodzis D. Dysfunkcje integracji sensorycznej a sprawność językowa dzieci w młodszym wieku szkolnym. *Harmonia Universalis*, Gdynia 2013: 13–88.
13. Grzywniak C. Nieprawidłowa integracja sensoryczna jako składowa zaburzeń psychicznych występujących zarówno u dzieci, jak i u młodzieży oraz dorosłych. *Psychiatria* 2016; 13: 143–148.