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# Basic Development Limitations in Children with Down Syndrome *

SUMMARY

The present paper discusses the key deficits present in the development of children with Down syndrome, which determine the course of speech therapy. The reduction of intellectual capacity, the impairment of perception development, irregularities in the anatomy of speech organs and incorrect socio-emotional development, all of them constitute the limitations which result in the delays in language acquisition by children especially in their early years. Nevertheless, the retarded language acquisition does not mean that the child would not master the language at all, but rather it means that this process is much slower than the pace of life.

**Key words**: development deficits, mental retardation, sensory integration, interpersonal relationships.

## INTRODUCTION

"In every faculty of human nature there is the urge to raise itself out of its state of lifelessness and clumsiness to the developed power. […] The eye wants to see, the ear wants to hear, the foot wants to walk and the hand wants to grasp, the heart wants to believe and to love, the mind wants to think. (J. H. Pestalozzi, 1973: 8)". This statement formulated by J.H. Pestalozzi – the pedagogue and thinker of the first half of the 19th century, the forerunner of the contemporary knowledge about spontaneous inclination of small children to self-development and their "elementary"[1] learning can be reliably applied to children with Down

[1] Pestalozzi called his educational system "elementary", as every educational system starts at child's birth. At this stage a child cannot do anything and its parents or therapist rely on the "seeds" of its skills (after: H. Olechnowicz, (1999), *O elementarnym kształceniu najmłodszych dzieci* [in:] *U źródeł rozwoju dziecka. O wspomaganiu rozwoju prawidłowego i zakłóconego*, ed. H. Olechnowicz, Warszawa: 51– 69

syndrome, who in their first months of life are on the level which can be referred to as "elementary" (see H. Olechnowicz 1999: 51). Despite the fact that their development is assisted[2] and stimulated at an early stage, the success of all of them is not guaranteed. The deficits in their achievements are intrinsically related to: reduced intellectual capacity, disturbed physical, perceptive, social and emotional development, and also to incorrect development of language skills, which is more often delayed than in a correctly developing child. Extensive research shows that children suffering from this syndrome produce their first words when they are three years old, or even older. The most frequent phenomena include: the gap between the receptive and expressive language functions; the so-called development spurts (a child does not speak for a long time, and then there is an explosion of words which s/he uses, and then again s/he definitely does not speak so much), and the development of speech competence in stages. The language skills do not develop in a child with Down syndrome parallel to his/her aging and they fall behind it (J. Kostrzewski 1966, E. Minczakiewicz 2001, B. B. Kaczmarek 2008). Nevertheless, the need to communicate with others is the supreme mental need of any human (see T. Kaczan 2008: 353). It is an indispensable condition for the performance of any other needs and it plays a huge role in the intellectual development of the child (see K. Krakowiak, M. Panasiuk 1992). The slowdown in language acquisition does not mean that the child does not learn the language at all, but rather that the process of this language acquisition is definitely slower than the pace of life. The child's development and progress should be very important both for parents and speech therapists and they should consider that "the consecutive development stages occur and that the child is moving forward – as child' consistent development is the key issue […]. The sequence of stages is more important rather than their timing." (B. B. Kaczmarek 2008: 105).

Man's development is conditioned by many factors which may be defined as his potentials. The most important ones include inter alia: innate development potentials inherent in the organism structure (genes); the environment in which the child is raised; the child's own activeness; his/her potentials to acquire new skills and experiences; the methods applied in order to facilitate the development of a small child, and expectations formulated in respect to the child – the higher such expectations are, the better results are achieved, (see R. J. Piotrowicz, www.rozwój –dziecka –z- zespołem- downa).

[2] According to one definition – man's development consists in his growing and acquiring experiences, trying to achieve certain life skills […]. Such development is determined by genetics and the environment – i.e. by the brain with inherent genetically determined unsurpassable barriers, and by the living conditions of a child, its own activeness, and upbringing methods. Therefore, genetically determined development potentials play a crucial role, but at the same time the environment as well as active and focused upbringing process is also important (K. Rożnowska, (2007), *Dziecko z zespołem Downa. Jaka to musi być miłość,* Warszawa: 76

Children with Down syndrome have their own strengths and weaknesses (the so-called retardations, disharmonies and disorders) pertaining to their development both in physical, cognitive, personality and emotional-motivational spheres of their life, which influence their development and determine therapeutical approach. Since the development of children with Down syndrome is retarded, it must be facilitated and quickened. Parents and therapists should remember that intervention in the development should be as early as possible: it is best to start it right after the child's birth and it should not be launched later than by the end of the third year of child's life. The fact is that "the development rate of the human brain is the highest up to the seventh year of life, and at that time the brain may record the greatest volume of information coming from the environment. By the sixth month of life, the child's brain doubles its birth weight. By the third year of life the brain performs 70% of the anatomic functions of the grown up brain, whereas the brain of a 7-8 year-old child is almost anatomically mature, and later on it only refines its functions. The intellectual development is most dynamic up the third year of life (…) An infant with Down syndrome sleeps a lot and s/he is not very active (…). If we do not induce his/her activeness (…) we will lose a great chance to facilitate his/her development. This is the time which we will never make up for" (Rożnowska, 2007: 85). According, to inter alia, C. Cunningham (1993), E. Minczakiewicz and J. Błeszyński (2012) it is necessary to promptly commence speech therapy only due to the fact that some children with this syndrome already in the first months of their lives "demonstrate unusual activeness, good apprehension, a well visible tendency to imitate, good procedural memory, and ease in establishing new relations, which allows them to create liaisons with their environment, including their family and especially their mothers" (Ibid 2012: 69).

## THE PURPOSE OF THE PAPER

This paper will demonstrate such barriers in the child's development which determine the quality of the work performed by a speech therapist, and which contribute to the development of the child's communication skills:

Mental Disability and Retarded Psychomotor Development.

This is the so called cardinal feature of persons with Down syndrome. Many researchers have tried to determine the intellectual development level, i.e. the intelligence quotient – IQ, the basic thinking skills of children with Down syndrome (inter alia in: J. Carr 1985; J. Kostrzewski 1963, 1965, 1970; J. Smoleńska 1962; E. Zasępa 2003, and others). According to them, the level of intellectual disability is most often mild or severe. An average intelligence quotient of 100 patients

tested by Quaytman (after: J. Kostrzewski 1963), equalled 44, whereas the highest IQ obtained in this group equalled 52. In J. Kostrzewski's own research (1963) on the group of 122 persons: 5.7% had a severe disability level, 89.4% had a considerable and moderate disability, with 4.9% having a mild disability level. Today, children with Down syndrome are different than several or dozens of years ago. Most of them have a higher IQ. According to L. Sadowska, M. Mysłek-Prucnal and A. Gruna-Ożarowska (2008: 51) the majority of children with Down syndrome demonstrate mild, or moderate intellectual disability. The disability of some children might be deeper, but the IQ of others may be almost on a standard level. Nevertheless, the reduction in IQ has been recorded with the progressing age. According to researchers, the social maturing age of children with Down syndrome is usually 3 years higher than their intelligence age. Therefore, the social development profile of e.g. the five-year-olds with Down syndrome is similar to such a profile of healthy three-year-olds.

The intellectual development of children with Down syndrome was investigated by such Polish researchers as J. Kostrzewski (1963, 1965, 1970), J. Smoleńska (1967) and E. Zasępa (2003), who applied the following techniques in their studies: interview, the Stanford–Binet Intelligence Scale, Doll's Social Maturity Scale, Cattell's Infant Intelligence Scale, Kostrzewski's Basic School Skills Scale, Niepokójczycka's Logical Reasoning Scale, and Kostrzewski's Word Auditory Perception Scale. On the basis of the research results of the aforementioned authors it may be concluded that perceptiveness is the best developed intellectual process (e.g. children pointed to the missing parts of a picture, they drew a presented figure, etc.); the attention of the tested children was very short-term and only involuntary; they demonstrated perceptual thinking. At the same time, such intellectual operations as concluding, synthesizing, creating judgements and notions, identifying similarities and differences between objects, creative imaging, were practically inaccessible to them; their low capacity memory operated on a very low level.

According to E. Zasępa (2003), 10 to 13-year-old children with Down syndrome in the three tested groups (with simple trisomy, translocation and mosaic trisomy) demonstrate an average general level of basic school skills development. This proves that their mental disability level is considerable. Only children with mosaic Down syndrome achieved significantly higher results than their peers with simple trisomy and translocation in terms of verbal and non-verbal skills. All three groups obtained low results in the case of word perception skills. The results of other psychological tests also indicate that the auditory association and memory of children with Down syndrome is particularly defective (visual perception and memory are definitely more developed). Such defects may be caused by the irregularities in the operation of the auditory receptor, e.g. a higher hear-

ing level in both, or in one ear, which proves the existence of the peripheral auditory system disorder, unusual development and maturing of the auditory tract (inter alia W. Pilecki et. al. 1996 after: E. Zasępa 2003: 160). Different levels of hearing impairment are caused by otitis media and irregularities in the development of this organ (including among others narrow ear canals which become wider with age).

## IRREGULARITIES IN THE ANATOMY OF PERIPHERAL ARTICULATORY ORGANS

Small jaws, and therefore also small lips (as compared with the size of tongue, which is of normal size against some cbeliefs[3]), a downturned lower lip, the mandible moved forward and down, are typical of children with Down syndrome. The underdevelopment or even lack of nasal sinuses is observed along with increased palatine tonsils and enlarged adenoids influencing the breathing manner. A child breathes through the mouth. Such breathing results in recurrent respiratory infections, pharyngitis, laryngitis, bronchitis with cough, hoarseness and reduced respiratory capacity (after: B. B. Kaczmarek 2008: 107- 108). The palate is higher and narrower, and jaw-bone is smaller, which makes it difficult for the child to keep its tongue inside the mouth. Flabby tongue muscles result in the protruding tongue which reduces air flow through the oral and nasal cavities. The child tries to compensate for this by pushing its tongue into the direction of his hard palate (A. Regner, 2008: 83). All of these irregularities in the anatomy of the oral cavity contribute to problems with chewing and swallowing (dysphagia). The anatomy differences are also present in the larynx which is too high with swelled vocal cords and occlusal abnormalities (open bite occlusion and overbite, distances between teeth, and delayed or irregular teething).

The different hearing impairment level caused by otitis media and the irregularities in the development of this organ (including among others narrow auditory canals which grow together with the child) constitute another material cause hindering speech development.

Nevertheless, the low muscle tone (the so called hypotonia) of the tongue, lips, soft palate and respiratory muscles constitutes the most important factor hampering speech development. The tenuousness of the respiratory and phonation muscles makes it difficult to control them, and thus in consequence it prevents early production of sounds, adequate suction and swallowing.

[3] According to some Polish researchers (referring to the most recent papers, e.g. of E. Minczakiewicz, J. Błeszyński, 2012: 68) the tongue is too big, heavy and inflexible, sometimes craggy – a geographic tongue; to a considerable extent it hampers, or even totally thwarts correct articulation.

According to M. Sustrova (1999, after: T. Kaczan 2008: 351) children with Down syndrome have limited maximum inspiration and expiration capacity, whereby the total lung capacity (sum of inspiration and expiration) is reduced. The reduction of lungs capacity is caused by the instability of abdominal muscles, humerus muscles and pathological tongue protrusion limiting the air flow through oral and nasal cavity.

As speech therapists note, phonation of children with Down syndrome is weak and interrupted with short breaths, whereas the duration of a sound is shortened.

## SENSORY INTEGRATION DEFICITS

Children with Down syndrome demonstrate sensory integration deficits. J. Ayres defined sensory integration (SI) as the "the process that organizes sensation from one's own body and from the environment and makes it possible to use the body effectively within the environment" (after: V. Maas, 1998, 18). In other words, this is a correct organization of stimuli coming through the receptors. The brain of a developing child receives information from all the senses (visual, auditory, vestibular, tactile, proprioceptive), then it recognizes, segregates, interprets and integrates them with earlier experiences. This is the basis for the development of the so called adaptive reaction (adequate to the circumstances). Children with Down syndrome have irregularities in sensory integration. This means that their nervous system incorrectly organises sensory stimuli coming from the environment. Such dysfunctions influence both motor system development and perception processes and are caused by incorrect operation of brain structures and insufficient sensory experiences resulting from retarded motor development at the beginning of the child's life (see B. Odowska-Szlachcic, 2008: 133–153; 2010, M. Wiśniewska, 2012:16–170). The symptoms of sensory dysfunctions in children with Down syndrome may be inter alia demonstrated by reduced muscle tone, disordered protective reactions, hypersensitivity to touch, sound, and smell, by motor clumsiness, weak perception of own body, reduced sensitivity to stimuli, increased fatigue, low dexterity of hands (graphomotoric skills, self-services tasks), bad visual-motor coordination, and hyperactivity (see www.wspomaganie – rozwoju- dziecka- z – zespołem – downa). All intellectual operations are conditioned by the correct intellectual development and any dysfunctions in sensory processes which are not subjected to therapy inhibit the child's development. Therefore, therapeutical action preceding and accompanying speech therapy aims at the stimulation of senses, sensory-motor integration and development of somatognosia[4]. Such efforts undertaken as early as possible will enable "taking

[4] Any efforts undertaken by mothers of not only children with Down syndrome, but also of healthy children, allow the youngest infants who have not yet acquired the identity of their own body, own physical autonomy, to learn and feel themselves, and "mother's hands, often unaware,

advantage" of the extraordinary ability of the brain to change and modify, the so-called compensatory brain flexibility (pursuant to the assumptions of the sensory integration method) which creates new neural networks. This mechanism allows a partial or total elimination of many development disorders.

## SOCIO-EMOTIONAL FUNCTIONING

Reference literature shows that different aspects of socio-emotional functioning of children and adults with Down syndrome constitute one of their strengths, and that their behaviour meets social expectations (see Żyta, 20011: 39). Nevertheless, they quite often demonstrate the so called problem behaviours which may negatively influence their functioning in the environment. Such behaviours include obstinacy, withdrawal, self-talking, hyperactivity, stereotype mannerism, increased anxiety and a depression level demonstrated among others by inertia and autoagression; improper social behaviours (e.g. refusals to carry out instructions, non-compliance with social rules, jactitation on the floor, persistent crying, damaging of things); compulsive behaviours (e.g. arranging objects, obsessive repeating of actions, obsessive attachment to certain objects)[5].

Problem behaviours occur more frequently in children with Down syndrome than in the case of persons with proper intellectual development, but less frequently than in the case of mentally handicapped persons without Down syndrome (E. Zasępa 2008: 15).

The difficulties in language acquisition are related to the deficits in socio-emotional development. According to some researchers, "cordiality, emotionality are demonstrated by Down syndrome patients in different situations in, as it were, a routine, maladaptive manner, without true understanding of others, their intentions, or emotions. In many instances this may result in different problems with interpersonal relations" (after: E. Zasępa, 2008: 100–101).

It is commonly known that the development of language and communication skills and abilities may take place at home, in the kindergarten and at school. Parents, and especially mothers, play a crucial role in this process. The early and sometimes very simple stimulation methods applied by them determine whether and how the child would be able to communicate with the environment. The child needs a regular emotional contact with the persons to whom s/he feels that s/he belongs (A. Rakowska, 2003: 130–131).

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are the wisest teacher. The contact with the child's hand – touching child's hands – is especially important, as hands are an educational tool" (*U źródeł rozwoju dziecka. O wspomaganiu rozwoju prawidłowego i zakłóconego*, (ed.) H. Olechnowicz, 1999: 127).

[5] The issue is elaborated by A. Żyta, 2011: 39. Problem behaviors were also analyzed by E. Zasępa, *Psychospołeczne funkcjonowanie osób z zespołem Downa,* Kraków 2008

The education of children with Down syndrome at regular schools and not special schools constitutes an important factor stimulating the development of their speech and language acquisition. The researchers focusing on this aspect of child's development conclude that education among healthy peers contributes to better school achievements and verbal communication for two reasons: firstly, because the peers with good spoken language competence stimulate the development of language competence in children with the subject syndrome, and secondly, children participate in all the classes having at the same time access to individual assistance. Despite its multiple advantages, the education of such children among correctly developing peers does not improve social integration, and does not "result in new friendships"; however, it contributes to the achievement of better school results and development of general knowledge about the world. Nevertheless, special schools' advantage consists in a definitely better contact with the peer group with the same level of cognition, which has a great influence on the good disposition of children with Down syndrome (see A. Żyta, 2011: 48–49).

Family plays a crucial role in the emotional development process. Parents are children's first teachers on how to master their emotions, they spur their curiosity and interest in the world (see the studies by H. Olechnowicz 1999, E. Minczakiewicz 2001). As J. Cieszyńska wrote, "a child gets to know the world in the environment shaped by parents and therapists. This idea of the *extended mind* also covering man's closest environment seems to be useful in developing the most effective therapy strategies for children with development disorders. (…) In other words, the more the child's extensive vocabulary resources and language skills are, the greater are his/her chances for the development of his/her cognitive functions. (…) The development therapy which shapes and stimulates auditory, visual, motor, tactile, gustatory, and olfactory functions creates the language system indispensable for communication, play and performance of social roles" (J. Cieszyńska, 2011: 129).

## CONCLUSIONS

This paper presents only basic issues influencing the development of speech and communication skills in children with Down syndrome. I hope that the majority of parents and speech therapists are aware of the fact that assisting the child's development is central to every child. "Development is not a race" - logopedic, psychological, or pedagogical therapy must be focused on the "understanding of the child", uncovering his/her strengths and weaknesses, potentials and threats and "monitoring the child's development". Development will be successful if we try to remember about a few instructions, namely: let's try not to limit the child's activeness, let's help him/her with satisfying his/her curiosity and the need to

move; let's not replace the child in doing things she/her can do him/herself; let's define clear limits and let's be consistent in our decisions. We should grade difficulties, but we should create potential situations for the child to be successful, and we should verbally describe the performed actions. Every child works at different pace, his/her fatigue level and reaction to comments and instructions may differ, and that is why every therapy programme for the child with Down syndrome should be individually tailored (see also: C. Rose, G. Dryden, Gdańsk 2009: 11; J. Pilecki, P. Olszewski, T. Żurek, 1998: 17–18).

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