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SPECIFIC LEARNING DISORDERS – DYSGRAPHIA, DYSORTHOGRAPHY – CASE STUDY

Introduction. Specific learning disorders (SLD) are among the most common developmental disorders in childhood and significantly affect children's academic performance as well as their psychological well-being. These disorders manifest in various forms, most commonly as difficulties in reading, writing, and mathematics, despite average or above-average intelligence. Early identification and appropriate educational interventions are crucial for minimizing their negative impact.

Methods. The study is based on a theoretical analysis of professional literature combined with a qualitative case study of a primary school student with special educational needs. The case study includes pedagogical and psychological diagnostics conducted in a counseling center, observation in the classroom, and analysis of recommended intervention strategies and teaching practices.

Results. Findings indicate that SLD arise from a combination of biological, cognitive, and environmental factors, often linked to central nervous system dysfunction. The analyzed case demonstrates typical manifestations such as deficits in attention, fine motor skills, auditory processing, and writing abilities. Effective support includes individualized teaching approaches, re-education methods targeting perceptual and motor functions, use of multisensory techniques, and close cooperation between school and counseling services. The implementation of targeted strategies led to improved student engagement, motivation, and partial compensation of difficulties.

Discussion. Early diagnosis and systematic re-education play a key role in reducing the long-term impact of SLD. Individualized instruction, supportive classroom environments, and appropriate assessment methods contribute to better academic outcomes and improved self-esteem in affected children. Advances in neuroscience, particularly the concept of neuroplasticity, offer new possibilities for intervention. The study highlights the importance of a holistic approach involving teachers, parents, and specialists to support the overall development and success of students with SLD.

Key words: common practice, diagnosis, dysgraphia, dysorthography, case study, specific learning disabilities.

Introduction. Learning disorders are among the most frequently diagnosed developmental disorders in childhood. For several years now, we have been encountering the term specific learning disorder not only in school, but also in everyday life. Specific learning disorders make it difficult for children to acquire knowledge and skills not only in primary school, but also at other levels of education. Learning disorders look very different from one child to another. One child may have problems with reading and spelling, while another loves books but does not understand mathematics. The problems are very different, but they are all learning disorders. Findings indicate that children who have a deficit in one area of learning often show deficits in other domains as well [15].

Learning disorders negatively affect school success and thus also negatively affect the psyche of children. Children tend to have reduced self-esteem, do not want to go to school, suffer from anxiety, often draw attention to themselves with inappropriate behavior, and want to get attention.

It is up to the teacher to recognize the problem in time and start solving it. Thanks to the cooperation of the school and, for example, a pedagogical-psychological counseling center, it is possible to choose appropriate re-education methods and thus make the school years easier

for the child and experience success. Learning disorders are umbrella terms for a wide range of learning problems. The existence of learning disorders has been discussed perhaps since the existence of education itself. John Amos Comenius advocated that students be approached individually. Therefore, he placed great emphasis on the clarity of the material explained and on the use of correct teaching techniques in learning.

Specific Learning Disabilities (SLD). SLD is an umbrella term that can describe many different types of learning problems. "Learning disabilities are a term that refers to a heterogeneous group of difficulties that manifest themselves in the acquisition and use of language, reading, writing, listening and mathematics. These difficulties are individual in nature and arise from dysfunctions of the central nervous system." [22, p. 10].

Specific learning disabilities are often defined as the inability to learn to write, read and count using conventional teaching methods with average intelligence and adequate sociocultural opportunities. Currently, children with this disorder are often referred to as students with special educational needs. This designation probably describes their problem best, because in addition to re-education of their disorders, it is also necessary to use other teaching

methods, special aids and assessment methods. (Jucovičová, Žáčková, 2014, p. 9)

Causes and manifestations of specific learning disorders. Specific learning disorders are specific both in terms of their causes (etiology) and in terms of their manifestations.

Specific learning disorders are congenital or acquired in early childhood. They arise from damage in the prenatal (e.g. maternal infections, bleeding during pregnancy, alcohol or drug use during pregnancy, smoking, etc.), perinatal (head injury during childbirth, lack of oxygen, inhalation of amniotic fluid, etc.) or postnatal period (infectious disease, CNS damage, etc.). The cause of learning disorders can also be heredity, or a combination of heredity and certain damage before birth, during childbirth or soon after the birth of the child.

«These disorders are inherent to the affected individual and presuppose a dysfunction of the central nervous system. Although a learning disability may occur concurrently with other forms of disability (such as sensory impairments, mental retardation, social and emotional disorders) or concurrently with other environmental influences (such as cultural peculiarities, insufficient or inappropriate teaching, psychogenic factors), it is not a direct consequence of such disabilities or adverse influences.» This definition emphasizes that a specific learning disability may occur with non-specific disorders and primarily draws attention to the fact that it is a dysfunction of the central nervous system [2, p. 9]. Several studies [6] show that the main causes of learning disabilities are hereditary causes, genetic causes, neurophysiological and neurobiological causes or brain injury, comorbid disorders, environmental factors.

Autism spectrum disorder (ASD) and attention deficit hyperactivity disorder (ADHD) are recognized as related disorders that affect learning, although not specific learning disorders [21].

Learning difficulties do not always stem from a learning disorder. Anxiety, depression, stressful events, emotional trauma, and other conditions that affect concentration make learning

more challenging. ADHD (Attention deficit hyperactivity disorder) and autism sometimes occur simultaneously or are confused with learning disorders [18].

The intellectual abilities of children with these disorders tend to be average to above average. Their disorder is not caused by reduced intelligence, but results from other causes. These children tend to have impaired cognitive functions that are necessary for learning to write, read, and count. For example, the ability to concentrate, think, remember, speak, and the process of automatization and mathematical imagination is impaired. Sensory perception (visual, auditory) is impaired. And motor functions, when fine and gross motor skills of the hand are impaired, but also, for example, of the mouth [Jucovičová, Žáčková, 2014; Šimek, 20].

Memory can be impaired in both long-term and short-term. With a short-term memory deficit, it appears that the child is listening, but information is not stored in short-term memory. With a short-term memory deficit, a child can only calculate a mathematical example if he writes down subtotals or calculates in writing. In the case of impaired long-term memory, the child does not recall learned knowledge that is not constantly repeated. If the concentration of attention is impaired, the child concentrates only for a short time and does not complete tasks or it takes him a long time to start concentrating. When perceptual functions are weakened, sensory perception is mainly impaired (auditory and visual). With a deficit in visual perception, slow reading occurs, double reading occurs, and problems arise in geometry (distinguishing shapes, lines, etc.). The child confuses numbers (e.g. 6-9, 24-42) or letters (b-d-p). There may also be problems with orientation on a map. The child is unable, or has difficulty, to orient themselves in space. The child is unable to distinguish visually, cannot distinguish size and shape, figure and background. With a deficit in auditory perception, the child is not capable of auditory analysis, synthesis and auditory differentiation. He cannot distinguish sound and tone, rhythm, sounds, syllables, words and sentences. The deficit in motor (movement) functions causes disruption of fine

Table 1

Factors influencing the development of SLD

Biological-medical level	focused on the genetic makeup of a person, the heredity of the main traits and the neurological concept (the structure and functions of the brain).
Cognitive level	deals with deficits in various areas of cognitive processes (phonological, visual, speech and language deficits, in the process of automation, in the field of memory, in time organization).
Social approach	its content is the external conditions (family and school) in which the child grows up.

Source: own processing after Bartoňová, 2013

and gross motor skills, eye movements, rhythm and coordination (interplay) of movements. The weakening of these functions can be manifested by slow writing, difficulties in imitating the shape of letters, problems in geometry, but also problems in physical education. Here, children are in most cases considered clumsy. [Jucovičová, Žáčková, 2014; 8]

In these cases, children have a neurodevelopmental disorder known as a learning disorder, the first part of the name of the disorder „DYS“ (dysfunction) regroups many types of learning and development problems [7], such as:

- a) dyslexia – reading disorder
- b) dysgraphia – writing disorder, graphic expression
- c) dysorthography – spelling disorder
- d) dyscalculia – counting disorder, mathematical functions
- e) dyspraxia – motor disorder, disorder of the ability to perform manual, complex tasks
- f) dysmusia – musical ability disorder
- g) dyspinxia – artistic ability disorder

Of these disorders, dyslexia, dysgraphia, dysorthography and dyscalculia are most common. Dyspraxia, dysmusia and dyspinxia occur less frequently.

Diagnosis of specific learning disabilities.

Learning disabilities are often grouped according to the set of skills in the school area. They are associated with psychological comorbidities. Most children have behavioral and emotional problems. Children with learning disabilities are at increased risk of hyperactivity [19].

Diagnosis of learning disabilities takes place mainly in pedagogical-psychological counseling (PPP), where psychological and special pedagogical examinations are performed. The initiative for examination in PPP can be given by a teacher, another specialist and of course parents can request the examination themselves without any recommendation. The examination in PPP uses intelligence tests, school knowledge tests and tests of other special abilities. Intelligence tests contain items that assess general intelligence. These tests not only assess the child's level of intelligence, but also provide information about his strengths and weaknesses. School knowledge tests are also used. These include reading, spelling, writing and mathematics tests. Special ability tests include language tests, auditory discrimination tests, visual discrimination tests, etc. In the event of confirmation of a specific learning disability, the pedagogical-psychological counseling center makes a recommendation to the school to create an individual educational plan.

When suspecting SPU, teachers, as well as parents, should focus on the following areas:

- writing – handwriting, holding writing utensils, editing, legibility, letter shapes, spelling,
- reading – fluency, speed, reading errors, comprehension of the read text,
- counting – confusing numerical operations, confusing numbers, misunderstanding the concept of number,
- concentration – fluctuations in concentration, lack of concentration,
- auditory and visual perception – distinguishing background and figures, dividing words into syllables,
- speech – small vocabulary, speech disorder,
- determining right and left sides,
- reproduction of rhythm.

Learning disorders can appear at different stages of a child's development. They do not manifest themselves until the child starts attending school. Many children do not show any signs until they engage in tasks that require some kind of cognitive processing [13; 5]. It is most often possible to detect SPU at a younger school age, after starting primary school, when a child begins to read, write and count. The issue of SPU does not develop only during the younger school age, but also at the second level of primary school. The problem occurs especially during the transition from the first level of primary school to the second level of primary school, when pupils with SPU have problems with mastering a large number of academic subjects. A major problem is significant problems in reading, when they are unable to read with understanding. This means that they are unable to learn through reading. The development of secondary problems is typical for the second level of primary school. These are difficulties that do not directly arise from the learning disorder, but are closely related to it. Primary problems include difficulties that are typical for individual types of disorders. In the case of secondary problems, these are learning difficulties, deficiencies in teaching. Primary diagnosis can occur only in the second grade of primary school, in the event that the child has a milder form of learning disability or has compensated for their disability for a long time with high intellectual abilities. Exceptionally, primary diagnosis of SPU can occur in adolescence or adulthood. Most often, these are people who use very good compensation mechanisms. For this reason, learning disabilities did not cause them problems until a certain time (reading speed in written exams for obtaining a driver's license, studying certain subjects at secondary school or university, etc.). For this reason, it cannot be said that there is a certain developmental period when learning disabilities no longer manifest themselves. „However, it always depends on

the type and form of the disorder, on timely and correct diagnosis, completion of special pedagogical reeducation and an appropriate approach by the school and family, whether the disorder is quickly and fully compensated so that it is no longer visible in later age periods and does not affect the child's performance in studies and in life [9, p. 80].“

General principles of re-education of specific learning disorders. Re-education can be called re-education, renewed education. These are work methods and procedures aimed at the development of impaired or undeveloped functions. The re-education process means the gradual improvement of impaired functions necessary for reading, writing and counting. It is also aimed at full or partial compensation of problems arising from learning disorders.

1) It is always an individual matter – each child is different, it is based on the current state and specific manifestations of the disorder.

2) Re-education is not just tutoring. It is a set of methods that aim to eliminate specific difficulties in writing, reading and counting. Here we build the ability to learn.

3) We start at a level that the child can confidently handle, motivate and gradually increase the difficulty.

4) When teaching and assessing, the teacher should respect the current level achieved during the reeducation of the disorder.

5) We always start reeducation by practicing perceptual motor functions. These are playful exercises that are attractive to children.

6) During reeducation, we try to involve as many senses as possible at the same time (sight, hearing, touch) in combination with words, movement, rhythm.

Dysgraphia

Is a writing disorder that affects the graphic aspect of written expression, its readability and editing. Symptoms of a learning disability in written language are associated with the act of writing. They include problems with:

- Clarity and consistency of writing.
- Accurate copying of letters and words.
- Consistency of spelling.
- Organization and coherence of writing [16].

They manifest themselves in various ways:

- the child does not remember the shapes of letters, has difficulty imitating them,
- the font is too small, large, difficult to read,
- the student often rewrites, crosses out,
- unedited written expression,
- slow writing pace,
- inconsistent and illegible writing,
- mixing upper and lower case letters,
- writing on the line and inside margins,

– difficulties with remembering and imitating letters persist even in higher grades.

The underlying cause of this disorder is often a fine motor disorder, but sometimes in combination with gross motor disorders. Motor difficulties refer to problems with movement and coordination, whether they are fine motor skills (cutting, writing) or gross motor skills (running, jumping). Motor impairments are sometimes referred to as “output” activities, meaning they are related to the output of information from the brain. In order for children to run, jump, write, or cut something, the brain must be able to communicate with the limbs needed to complete the action. Signs that a child may have a motor coordination disorder include problems with physical skills that require hand-eye coordination, such as holding a pencil, buttoning a shirt, or coloring a line[17; 14].

This is a disorder of movement automation, motor, and sensory-motor coordination. Dysgraphia may also involve deficiencies in spatial orientation, visual perception, memory, attention, or a sense of rhythm. The process of converting auditory or visual sensations into graphic form may be impaired. Problems with graphic expression also arise in cases of problems with lateralization (crossed or non-crossed laterality, practiced right-handedness or left-handedness). Crossed laterality is often a major problem. Crossed laterality has a negative impact on the perception of information, information processing in the CNS, and also on the conversion of information into performance. This leads to a slower work pace, and the quality of writing and its editing is reduced. The child has problems with connecting letters, the child cannot keep the letter on the line when writing, and does not observe the size of the letters. Problems occur in the direction of writing and in the correct inclination of the letter. Errors can also occur in illogical division or joining of words. The grip is not relaxed, spasmodic, or incorrect (e.g., poor finger position, low grip, etc.). In this case, the writing quality decreases, the writing pace is slower, and the hand tires more quickly when writing. Dysgraphia does not only occur in the writing process. It can also affect other forms of graphic expression. The child may then have problems, e.g. in mathematics, geometry. The drawing of dysgraphic children is inaccurate, children do not tighten or extend the line, do not follow the correct shapes, etc. Problems can also occur when writing numbers incorrectly. Children confuse numbers that are similar in shape or the order of numbers. Dysgraphic children need more time for word problems or geometric notation [22].

Reeducation and compensation for dysgraphia

1) development of gross motor skills – arm movements, waving, circling (bird flight, scythe mowing, crawl swimming), palm movements (waving, swinging, closing and opening the palm)

2) development of fine motor skills – modeling, cutting out, stringing beads, coloring books, finger movements

3) holding writing utensils – pinch grip

4) relaxation exercises – fluidity and rhythm of movements, tracing shapes (single strokes), various graphomotor exercises.

Dysorthography. This disorder affects spelling. It is manifested by an increased number of dysorthographic errors and spelling errors.

Dysorthographic errors: distinguishing long and short vowels, distinguishing hard and soft syllables, distinguishing sibilants, added, omitted, transposed letters or syllables, word boundaries in writing.

Spelling errors are classified as specific if the child knows the grammatical rules and can justify and apply them orally, but still makes errors in written expression. Specific errors can appear not only in dictation, but also when copying or transcribing text. The cause of this disorder may be reduced visual perception. Problems can also occur if the child has a slow working pace. With a combination of dysgraphia and dysorthography, writing is slow because the child concentrates on writing and does not have time to justify the spelling. They have problems wherever the subject matter is dictated to them. The child only hears the text, but does not see it. Problems can start as early as the first grade of elementary school, when a child has problems with writing and composing words. The child omits letters, has problems with diacritics, writes several words together. However, these difficulties may not be a manifestation of dysorthography. It may just be immaturity of perceptual functions. Problems also occur during the period when the child learns to distinguish between voiced and voiceless consonants. He writes words as he hears them, usually incorrectly (e.g. ice-years, snow-snow). Other difficulties occur with listed words. The child knows the listed words, but as soon as these words appear in a dictation in a different form or as derived words, the child usually makes mistakes [22].

Reeducation and compensation of dysorthography

1) distinguishing short and long vowels – e.g. using rhythmic exercises, clapping words, graphic representation, underlining long vowels in the text

2) distinguishing syllables dy-di, ty-ti, ny-ni – learning using a hard cube for hard syllables, soft

cubes or sponges for soft syllables, searching for words with a given syllable, distinguishing words that differ in the hardness of syllables

3) distinguishing sibilants – cards with letters, pictures with words related to sibilants, searching for words with sibilants

4) omitting, adding, rearranging letters – breaking a word into letters, forming words from rearranged letters, underlining correctly spelled words, determining the first and last letter

5) word boundaries in writing – building blocks, various elements depicting a word, pictures, cards with prepositions, determining the number of words in a sentence

6) mastering grammar rules – overviews of grammar curriculum, alphabet table, additional exercises, correction and justification of errors [9].

Case study from practice – Student with special educational needs

Student: Dominik D.

Born: 2014

School: Elementary School Mladá Boleslav

Grade: 2nd (total of 24 students in the class)

Personal history:

Prenatal and perinatal period: born in the 7th month of pregnancy

Motor development: normal

Speech development: normal, incorrectly pronounces the sound r

Health status: common childhood diseases

School history:

Preschool age: regular kindergarten, adaptation without major difficulties, restless, inattentive, hasty, cannot stay in one activity for long

Initial experiences at elementary school: without delay, positive attitude towards school, looked forward to school

First difficulties: 1st grade – distracts him, everything distracts him, cannot sit at a desk, plays with crayons, cannot remember letters, poor pencil grip, writes incorrect shapes and strokes of letters, omits letters, does not distinguish between hard and soft syllables, often crosses out, slow pace.

It is recommended to visit the Pedagogical Psychological Counseling Center (PPP).

Pedagogical diagnostics in PPP:

The examination took place in August 2021.

Conclusion of the examination: Level of support measures: 2

Organizational form of education: without IEP

Subject of special pedagogical care: 1 hour per week

Conclusion of the examination: Lower work-free maturity (variation of attention in the load, fluctuating pace). Weakening of some

partial functions (auditory analysis and synthesis, fine motor skills), unsharpened type of laterality, unfixed letter shapes, does not distinguish between short and long vowels, does not recognize word boundaries in writing, all with a negative impact on the teaching process, especially writing.

The PPP examination shows:

- psychomotor restlessness, impetuosity
- quickly loses motivation to complete work
- pace and attention fluctuate in workload
- below average focused attention, ability to recognize common aspects and differences
- laterality is not sharp (right hand dominant, but eye is not sharp – alternates)
- significant articulatory clumsiness of speakers (writes as they pronounce)
- auditory analysis (word decomposition – they only decompose shorter words) and auditory synthesis (they only put short words together again) are weakened
- fine motor skills are weakened (finger coordination is impaired – affects neatness and pace of writing)
- spasmodic grip with thumb overlap
- writes incorrect shapes and strokes of letters
- some letters are not fixed, they do not remember them
- it is difficult for him to write a sentence

- reads fluently syllable by syllable, he has managed to understand the text
- achieves the best performance in the area of visual perception, auditory memory (retelling a story heard)

Recommended teaching methods:

- individual approach – control and guidance
 - activate attention
 - provide assurance and correctness of the procedure
 - distinguish errors from ignorance and from deconcentration of attention
 - warn the child about the incorrectness of the solution
 - repeat instructions several times and calmly
 - provide brief information
 - alternate the child's activities and positions
 - allow enough time for processing tasks and self-control
 - possibility of reducing tasks
 - do not assign long transcripts and copies
 - provide support tools
 - teach parents how to practice
- Student assessment
- evaluate individual progress
 - evaluate only the material that has been practiced
 - greater tolerance when assessing performance



Fig. 1. Overview of aids suitable for dysgraphia and dysorthography reeducation

Common practice in the classroom:

- Dominik sits in the first desk, next to a girl who occasionally gives him advice, supervises
- I often encourage him with words, a smile, eye contact contact, light touch
- he has a small relaxation ball at hand, he plays with it when he is restless
- he has the opportunity to walk down the hallway
- I shorten his tasks
- he has enough time to work
- when writing, I give him extras rather than copying
- I allow a table with letter shapes
- we relax his hand before writing
- for Dominik, praise is the biggest motivator, a number one
- I include activities in his lessons where he can excel – detective game, word football, math games – he is a good calculator

Dominik has one hour a week of special pedagogical care from a school assistant and he goes to tutoring once a week.

Conclusions. Paying attention to normal developmental milestones in children is very important. Early detection of developmental differences can be an early sign of a learning disability, and problems that are discovered early are easier to correct. Science has made great strides in understanding the inner workings of the brain, and one important dis-

covery that brings new hope for learning disabilities and disorders is called neuroplasticity. It refers to the brain's natural, lifelong ability to change. Throughout life, the brain is able to form new connections and create new brain cells in response to experience and learning. This knowledge has led to groundbreaking new treatments for learning disabilities that take advantage of the brain's ability to change. Innovative programs, such as the Arrowsmith program (Arrowsmith-Young, 2013), use strategic brain exercises to identify and strengthen weak cognitive areas. For example, for children who have difficulty distinguishing different sounds in a word, there are new computer learning programs that slow down the sounds so that children understand them and gradually increase the speed of understanding.

Specific learning disabilities usually have a negative impact on children's school performance and their psyche. We can help children as educators and parents to look forward to school and not be afraid of failure. Let's allow children to apply their knowledge in other ways, such as reading and writing. Let's provide them with increased time reserves for writing down and checking assigned work. Let's respect their slow pace. Let's use the necessary re-educational aids. Let's appreciate effort, small progress. Let's use verbal assessment. We don't teach children for optimal performance, but for life.

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