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The role of biological and environmental factors in the emotional development of children with Costello Syndrome. Case study

The authors of the article analyses biological, environmental and individual factors affecting the emotional development of a child with Costello Syndrome (CS) based on a case study of a 9-year-old girl named Zuzanna. Costello Syndrome, which is a rare genetic disorder, is associated with communication difficulties, psychomotor delay and emotional challenges. The study included an analysis of medical records, an interview with the mother and expert opinions. The results indicate that the specific difficulties associated with Costello Syndrome significantly impede speech development and consequently the expression of emotions, leading to frustration and secondary emotional difficulties. The mother's support in the therapeutic process and the integration with peers, which fostered the improvement of Zuzanna's social and emotional competences, proved to be crucial. The importance of early diagnosis, multi-specialist therapy and family involvement in the support process was highlighted. The results indicate the need for a holistic therapeutic approach and further research into the specificity of rare diseases. The analysis shows that well-tailored support allows children with CS to function better in society and progress in their emotional development.

Key words: Costello syndrome, speech development, emotional development

Rola czynników biologicznych i środowiskowych w rozwoju emocjonalnym dzieci z zespołem Costello. Studium przypadku

Autorki artykułu analizują biologiczne, środowiskowe i indywidualne czynniki wpływające na rozwój emocjonalny dziecka z zespołem Costello (CS) na podstawie studium przypadku 9-letniej dziewczynki o imieniu Zuzanna. Zespół Costello, będący rzadkim zaburzeniem genetycznym, wiąże się z trudnościami w komunikacji, opóźnieniem psychoruchowym oraz problemami emocjonalnymi. Badanie obejmowało analizę dokumentacji medycznej, wywiad z matką oraz opinie

specjalistów. Wyniki wskazują, że specyficzne trudności związane z zespołem Costello w znacznym stopniu utrudniają rozwój mowy, a tym samym ekspresję emocji, prowadząc do frustracji i wtórnych trudności emocjonalnych. Kluczowe okazało się wsparcie matki w procesie terapeutycznym oraz integracja z rówieśnikami, które sprzyjały poprawie kompetencji społecznych i emocjonalnych Zuzanny. Podkreślono znaczenie wczesnej diagnozy, terapii wielospecjalistycznej oraz zaangażowania rodziny w proces wsparcia. Wyniki wskazują na potrzebę holistycznego podejścia terapeutycznego i dalszych badań nad specyfiką chorób rzadkich. Analiza pokazuje, że odpowiednio dostosowane wsparcie umożliwia dzieciom z CS lepsze funkcjonowanie w społeczeństwie i postępy w rozwoju emocjonalnym.

Słowa kluczowe: zespół Costello, rozwój mowy, rozwój emocjonalny

Introduction

Understanding emotional development in children with rare genetic syndromes requires an integrated perspective combining biological, environmental and individual factors. The case of a child with Costello Syndrome offers a unique opportunity to analyze these interactions in depth. The present study reflects on a broad set of experiences, documented by specialists and caregivers.

Costello Syndrome (CS), also known as Noonan Syndrome (NS), is an ultra-rare genetic disorder with an incidence of 1:24,000,000 cases, according to available statistics. The pathogenesis of this syndrome is related to a mutation in the HRAS proto-oncogene, that leads to increased activity of the mitogen-activated protein kinase (Ras-MAPK) pathway (Pelc et al. 2012). The changes result in symptoms that manifest themselves in various aspects of functioning in those affected by CS. In the ICD-11 classification, Costello Syndrome is classified as LD2F.1Y, referring to other specific syndromes with multiple structural abnormalities, not originating from the environment. Characteristic clinical manifestations include facial dysmorphism, characterised by peculiar features and an excess of fine skin. The disease may also include nutritional disorders that result in growth retardation and low body weight (Philip, Sabine 1998). In addition, patients often experience cardiovascular problems, intellectual disability, disturbances in emotional development, as well as delayed psychomotor development. The complexity of the symptoms requires a multidisciplinary diagnostic and therapeutic approach that involves different specialists, as well as support from the patient's family (Ono et al. 2023).

Due to the extreme rarity of this condition, access to current research and literature can be limited, which is a challenge for professionals and families in the process of diagnosis and treatment, as well as the wider support of the child, including emotional support (Blachowska et al. 2016).

The purpose of this study was to analyse the emotional and psychosocial factors, affecting the development of a person with Costello Syndrome, based on the

case study of a 9-year-old patient named Zuzanna. The text also addresses important issues related to the lack of available sources to be used by professionals from different disciplines, as well as the impact of these factors on the patients' quality of development and life. The authors hope, that the research presented here may contribute to increasing knowledge among professionals, which, in turn, may speed up the diagnosis process and enable individual therapy to be better tailored to the needs of people with Costello Syndrome.

Characteristics of the research material

The methodological approach adopted in this study aimed to capture the multi-dimensional nature of the child's development. The following section presents the research design, the data collection process, and the analytical framework chosen to examine biological, environmental and individual factors affecting emotional development. In order to understand the complexity of emotional functioning in a child with Costello Syndrome, it was necessary to examine the available medical and therapeutic evidence in detail. The following section summarizes the material, on which the analysis was based, and outlines the sources that informed the interpretation of the child's development.

The subject of this study was a 9-year-old girl Zuzanna, diagnosed with Costello Syndrome. A detailed analysis was made of Zuzanna's medical and therapeutic records, collected during psychological, speech and language therapy, neurological therapy and other rehabilitation interventions in which she participated. A key element proved to be the analysis of interviews with the child's mother, who described in detail the diagnostic process, the daily challenges and progress associated with the therapy, and the collaboration with the multi-specialist team (speech therapist, neurologist, rehabilitation therapists, psychologists).

The main sources of information included:

- Medical records: the history of diagnoses and surgeries the child has had (including gastrostomy) and description of co-morbidities (including epilepsy, hearing and visual impairment).
- Interviews: in-depth interview with Zuzanna's mother regarding the girl's emotional development, particularly in the context of communication difficulties and the neurological therapy undertaken.
- Opinions of specialists: psychologists and speech therapists who have worked to improve the child's speech through exercises and techniques adapted to the specificities of Costello Syndrome.

Thus, the study involved an analysis of the therapeutic process from the early months of the child's life, with a focus on the years when Zuzanna was subject to intensive specialist interventions. It was conducted from January to April 2024. This period included an analysis of documentation from earlier years and interviews to assess the effectiveness of the therapies provided in the long term.

Qualitative research methods were used for the analysis, including interviews and analysis of medical records. The research tools also included an assessment of the progress of therapy based on regular reports from a psychologist, a speech therapist and a neurologist, who monitored Zuzanna's speech development in the context of complex communication difficulties, combining neurobiological constraints (macroglossia, hypotonia) with delayed expressive language development and resulting emotional problems. The study also used specialised scales to assess communicative abilities, taking into account the specificity of the disorders associated with Costello Syndrome, such as difficulties with articulation resulting from anatomical abnormalities of the speech apparatus and psychomotor delay.

The authors of the study paid particular attention to the impact of the support of the family environment on the child's broader development. The mother's cooperation with specialists and the systematic continuation of therapeutic recommendations at home were important in this respect. The material collected allowed for a full understanding of the specific features of Costello Syndrome, and the challenges related to the development of a child affected by this rare genetic disease.

Characteristics of research methods

In the article presented here, research methods were used, that allowed for a sound analysis of the issue addressed and the achievement of the objectives set. A case study method was used in this paper, which allowed for an in-depth understanding of the specific factors, that affected the broad emotional development of the girl described. An analysis of medical and speech therapy documentation was also undertaken, which allowed a thorough grasp of the specific features of the therapeutic process and the factors supporting it. The subject of the presented research is the factors influencing the emotional development of the child with Costello Syndrome. The main objective focused on in this study was to discern the factors reflected in the emotional development of the described girl.

Research questions

The main research question guiding this study was:

1. What specific biological, environmental and individual factors shape the quality of emotional development in a child with Costello Syndrome over time?

Based on this overarching question, the following analytical sub-questions were formulated:

1. Which forms of family engagement (such as implementing therapeutic recommendations at home, modifying the daily communication environment, or coordinating interventions with specialists) most effectively reduce emotional frustration and support emotional regulation in a child with Costello Syndrome?
2. How do communication-related difficulties, resulting directly from the biological characteristics of Costello Syndrome (e.g., macroglossia, reduced facial muscle tone, delayed psychomotor development) influence the child's ability to express and regulate emotions?
3. How do differing levels of parental involvement and the emotional dynamics within the parental relationship affect the child's sense of security, stability and emotional well-being?
4. In what ways do sibling interactions – including shared play, imitation behaviours and conflict resolution – contribute to the development of social-emotional skills in a child with Costello Syndrome?

These questions were formulated to capture the multi-factorial nature of the child's functioning and to provide an analytical framework for interpreting the collected qualitative material. A qualitative document analysis was carried out to examine the collected material. This approach made it possible to identify recurring themes and relational patterns present in the medical documentation, specialist reports and interview data. The analysis followed the principles of qualitative content analysis and consisted of several stages:

1. **Initial familiarisation** – all documents (opinions of specialists, early intervention records, medical reports, therapy notes) were read in full in order to identify general developmental trends and emotional-behavioural characteristics.
2. **Coding of relevant segments** – segments relating to communication behaviour, emotional regulation, therapeutic progress, parent-child interactions and environmental factors were coded and categorised. Each code represented an observable behaviour, documented pattern or therapeutic recommendation.
3. **Grouping of categories** – the codes were then grouped into broader categories reflecting biological, environmental and individual factors influencing emotional development. Examples of the resulting categories included: *com-*

munication limitations, emotional regulation difficulties, family engagement, therapeutic consistency, sensory sensitivities.

4. **Triangulation** – data from multiple sources were compared (specialist reports, medical documentation and the mother's interview) to validate the stability of observed patterns and avoid over-reliance on a single perspective.
5. **Analytical synthesis** – the categories identified during the coding process were summarized into a narrative description, which informed the interpretation presented in the Results and Discussion sections.

This analytical procedure ensured methodological transparency and supported a comprehensive understanding of development of the child's emotions and communication.

The independent variable in this study was the factors affecting the emotional development of the child described. On the other hand, the course of emotional development of the girl with Costello Syndrome was considered the dependent variable. In the context of this study, several key terms required operationalisation due to their multidimensional nature and their importance for understanding the emotional functioning of a child with Costello Syndrome.

Family engagement was defined as active and consistent parental involvement in the therapeutic process, including: participation in specialist sessions, implementing therapeutic recommendations at home on a daily basis, ensuring continuity of communication routines, modifying the environment (e.g., use of visual aids, adjusted communication strategies), maintaining cooperation with therapists and monitoring observed changes. These elements were identified through interview data and therapist reports.

Communication difficulties referred to a set of challenges observed in the child, including: biological limitations directly linked to Costello Syndrome (macroglossia, reduced facial muscle tone, hypotonia), delayed acquisition of expressive and receptive language skills, reduced tolerance for sensory stimuli affecting vocal expression, difficulties in articulation documented in speech therapy reports. The presence and nature of these difficulties were determined based on medical documentation and specialist assessments.

Emotional tension (often described in the documentation as "nervousness") was understood as heightened emotional arousal manifested through crying, physical restlessness, withdrawal, or frustration in response to communication barriers or stressful medical situations. These behaviours were consistently reported by caregivers and specialists.

Appropriate or inappropriate therapeutic attitude referred to the observed consistency, responsiveness and emotional availability of caregivers during interactions with the child, including their capacity to interpret and respond to com-

municative signals, maintain predictable routines and support the child in emotionally demanding situations.

The following indicators were adopted to examine the above variables:

- Involvement or lack of involvement of the child's immediate environment in the therapeutic process,
- The presence or absence of communication difficulties in the child with Costello Syndrome,
- Appropriate or inappropriate dynamics of the relationship between the parents of the child described,
- Appropriate or inappropriate attitude and involvement of siblings of the girl with Costello Syndrome.

The collection of information took place over a period of three months. The data collection methods used allowed detailed information to be obtained about environmental, family and therapeutic factors that influenced the girl's emotional development.

Results of studies carried out

The following case description outlines the medical history, therapeutic interventions and emotional development of a girl diagnosed with Costello Syndrome. This narrative is based on specialist documentation and caregiver interviews, illustrating the interplay of biological and psychosocial factors.

Case report of a girl with Costello Syndrome

The analysis of the collected material made it possible to reconstruct the developmental trajectory of the child and the circumstances shaping her emotional functioning. The results are presented in a chronological and thematic structure to highlight the key biological and environmental influences observed throughout the case.

Zuzanna, a baby girl born at 37 weeks of twin pregnancy, received a definitive diagnosis of Costello Syndrome at nine months of age. This diagnosis prompted the family and the specialist team to undertake intensive diagnostic activities to identify additional health issues. In order to provide comprehensive care, oncological consultations and stimulation of the child's development were ordered, including speech, pedagogical and psychological therapy. The mother's involvement in the therapeutic process significantly influenced the adaptation of activities to Zuzanna's needs, which enabled her to participate in stationary rehabilitation sessions, during which her overall development was worked on, including

through neurological speech therapy. At the age of ten months, a disability certificate and a psychologist's opinion were obtained, which made it possible to start early development support.

At the age of three, Zuzanna began her education in an inclusive public nursery school, which enabled her to have better contact with her peers and prevent social isolation. At about five years of age, the girl presented the characteristics of those with Costello Syndrome, such as dysmorphic facial features and feeding problems, but she often nonetheless demanded her own portion, wanting to be treated identically to the rest of the household. Although her speech development was delayed, verbal-logical contact was easy to establish. She was also able to communicate her needs through non-verbal signals, which indicated that she understood her basic emotions, the world around her and the phenomena in it. Over time, the girl began to notice differences between herself and her peers, which led to questions about her being different than other children. Zuzanna showed great emotional stability, but information about her illness caused her strong emotions and the need to confirm that she was not ill. Currently, Zuzanna maintains the characteristic appearance of those with Costello Syndrome. Thanks to her disability statement, she has been assigned a personal assistant at school to support her academic progress and facilitate her daily adaptation to new challenges.

From the moment of diagnosis, Zuzanna participated in an intensive and multi-specialist therapeutic programme. According to the medical and therapeutic documentation, early developmental support was initiated when the girl was nine months old. The intervention included:

- weekly sessions of neurological speech therapy (45 minutes each), focused on improving oral motor function, articulation and stimulation of facial muscles weakened by hypotonia;
- weekly sessions with an occupational therapist, aimed at sensory integration, regulation of muscle tone and development of motor coordination;
- bi-weekly psychological consultations (30 minutes), during which the therapist monitored emotional reactions, adaptive behaviours and communication attempts, and supported the parents in interpreting these signals;
- periodic rehabilitation stays (several days at a time, three times a year), during which an extended programme of physiotherapy, sensory integration activities and structured communication exercises was implemented.

Specialist reports indicate that the therapy was consistent and coordinated: the same therapeutic objectives were pursued across sessions, and the mother carried out recommended exercises at home (daily short neuromotor and articulation exercises lasting approx. 10–15 minutes). This continuity between profes-

sional sessions and home practice contributed to observable progress in expressive communication and emotional regulation.

Importantly, between the ages of two and four, Zuzanna was additionally included in a structured early intervention programme provided by a speech therapist and an occupational therapist in a home setting. These sessions were documented as occurring once a week, and they involved individualised work on communication routines, imitation skills and the development of alternative non-verbal communication strategies (e.g., pointing, gestures, simplified signs). According to both specialist opinions and the mother's reports, this period marked a gradual reduction in frustration caused behaviours and an increase in the child's willingness to initiate interactions.

Communication problems and interactions within the family

Communication difficulties in Costello Syndrome cannot be interpreted without considering the child's immediate family context. This section examines how daily interactions, emotional tension and family dynamics influenced Zuzanna's communication attempts and emotional regulation.

An interview with Zuzanna's mother reveals that communication problems were not only a consequence of anatomical predispositions related to the disease (e.g. large tongue, flaccid facial muscles) but they also resulted from stressful situations related to diagnosis and treatment. The family has noticed that it is easier for Zuzanna to communicate in the presence of loved ones, but she tended to display avoidant communication behaviours, reducing eye contact and limiting interaction when verbal demands exceeded her capacity. During the period up to the age of three she spent most of her time lying down and expressed her needs primarily through prolonged crying and vocal protests, which functioned as her main form of communication due to limited expressive abilities. During this period, Zuzanna exhibited frequent signs of elevated emotional arousal, manifested through prolonged crying, increased motor restlessness, vocal protests and withdrawal from interaction. These behaviours represented observable indicators of frustration resulting from limited expressive communication abilities and reduced capacity to regulate emotional tension. With time, thanks to therapies, she started to establish more complex forms of communication, which, according to her parents, definitely had a calming effect and increased her sense of security. The presence of siblings (older sister, twin brother and younger sister) influenced Zuzanna's willingness to communicate in play. Despite good family relationships, at one stage there was jealousy on the part of the twin brother, caused by the mother devoting a lot of time to Zuzanna. The mother, in collaboration with a psy-

chologist, decided to have the children attend therapy together, which helped to minimise tensions in the family.

In daily routines, the mother assumed an active and structured role that ensured continuity of therapeutic processes beyond formal sessions. According to specialist reports and the interview data, she incorporated therapeutic elements into nearly every part of Zuzanna's day. A typical day involved:

- morning articulation and oral–motor exercises (5–10 minutes) performed before school, focused on strengthening facial muscles weakened by hypotonia;
- supported communication routines during dressing and hygiene tasks, using simplified verbal instructions and visual cues (pictograms and gesture-based prompts introduced on the therapist's recommendation);
- structured sensory–motor warm-ups (brief balance activities, tactile stimulation, simple proprioceptive tasks) to reduce Zuzanna's anxiety and help her regulate arousal before leaving home;
- consistent monitoring of emotional triggers, with the mother noting situations in which frustration appeared and reporting patterns to the psychologist and speech therapist during regular consultations;
- daily homework sessions adapted to Zuzanna's cognitive pace, where the mother used step-by-step verbal scaffolding, modelling emotional vocabulary ("I see you're tired / frustrated / confused"), which supported the girl's development of emotional awareness;
- guided peer interactions after school, during which the mother facilitated joint play with siblings to encourage imitation, turn-taking and verbal attempts;
- evening calming routines, including reading out loud, joint drawing and simplified dialogues, which helped reduce emotional tension and supported expressive language.

She also maintained written notes documenting changes in Zuzanna's mood, reactions during therapy and communication attempts throughout the week. These notes were shared with specialists and contributed to adjustments in therapeutic goals. The consistency of these daily activities provided a stable emotional and organisational framework, which specialists identified as a significant factor in reducing anxiety and increasing Zuzanna's engagement in therapeutic tasks.

The mother's proactive and emotionally attuned approach contrasted with the father's limited involvement, which intensified her responsibilities but simultaneously strengthened her role as the primary regulatory figure in Zuzanna's emotional development. According to specialist evaluations, this continuity of home-based activities was essential for consolidating gains achieved during formal therapy sessions. The contact with the psychologist, which was undertaken by the parents, has, in their opinion, had a positive impact on the girl's emotional

reactions, which is now paying off in her further emotional and social development.

The role of therapy in the development of communication in a child with Costello Syndrome

Therapeutic intervention played a crucial role in shaping Zuzanna's communication skills. The following analysis highlights the impact of early developmental support, neurological speech therapy and structured sensory-motor work on the reduction of frustration and the development of expressive abilities.

The difficulties specific to Costello Syndrome and Zuzanna's delayed intellectual development have had a significant impact on her communication skills. From an early age, the girl was stimulated with a variety of therapies to support her overall development and speech skills. As a result, the child gradually began to accept her disability and the associated communication difficulties.

During the first stage of life, Zuzanna signalled her needs mainly through crying and involuntary body movements. Limited facial expressions, due to weakened muscle tone, contributed to the child's sense of anxiety. In the ninth month of her life, early developmental support was started. It was provided in a safe home environment by a speech therapist and an occupational therapist, and it had a good influence on Zuzanna's emotionality. Her communication skills improved and she was very keen to use them to make contact with her immediate surroundings. The girl did this often and willingly and the effective contact with those closest to her had a soothing effect on her and helped to calm her difficult emotions.

In the following stages of her life, especially when interacting with her peers in the inclusive kindergarten, the child had the opportunity to participate in an educational and therapeutic programme that developed her communicative abilities. As a result, there was a significant improvement in Zuzanna's intellectual, emotional and social development. By engaging in play with her peers and attempting to imitate them, Zuzanna established good relationships with other children, which resulted in more progress in speech and positive mental and emotional development. In the parents' opinion, this situation proved to be a breakthrough. By watching the behaviour of her peers, the girl was acquiring further simple skills related to play, reinforcing contacts and stabilising her own emotional reactions. It was relatively common for her to imitate her peers in simple behaviours and reactions to various events occurring, e.g. in play or conflict situations. The expansion of both her active and passive vocabulary was a major

factor here, which helped the girl to make very clear progress in many areas of her development.

Discussion of the results

The findings presented above reveal several interconnected factors shaping the emotional development of the child. The discussion below synthesises these observations, placing them within the broader theoretical framework and identifying the implications for therapeutic practice.

From the analysis of the research findings, key conclusions emerge about the factors influencing the emotional development of a girl with Costello Syndrome named Zuzanna:

1. The influence of biological traits on communication and emotions:

Weakened muscle tone and specific anatomical difficulties (e. g. an enlarged tongue) significantly impede communication and speech development. These factors can lead to frustration, which affects the child's emotional functioning. Early recognition of the condition allowed therapy to begin relatively quickly, reducing the negative effects of the communication difficulties.

2. The influence of the family environment:

The mother's active attitude in the therapy process was crucial for Zuzanna's progress, in contrast to the father's more withdrawn attitude, which introduced additional periods of increased family stress, resulting from inconsistent parental involvement. Interactions with siblings had a positive impact on the development of the girl's social and emotional skills. Playing together supported natural imitation of communication patterns. Conflicts between parents and the withdrawal of one parent can affect a child's sense of security, hindering their emotional development.

3. Educational environment and individual support:

The presence of an educational assistant and integration in a peer environment definitely helped Zuzanna to build relationships and develop communication skills. The benefits of peer contact and natural interactions with other children supported her emotional development and strengthened her sense of belonging to a group.

4. Individual therapeutic approach in line with the girl's needs:

The use of teaching aids that were interesting for Zuzanna increased her involvement and had a positive effect on the therapy. The involvement of a number of specialists (speech therapists, neurologists, psychologists) has allowed for comprehensive support of her development and the reduction of her difficulties. The

individual approach of each specialist increased the girl's sense of security, influenced her well-being and the frequency of verbal contacts.

5. Discussion of challenges and future directions of support:

The analysis of the documents collected indicates the limited availability of professionals and literature on Costello Syndrome, which makes it difficult for families and therapists to provide optimum care. It also highlights the need to educate the child's environment to increase understanding and acceptance by those closest to the child. The findings confirm that a holistic approach to supporting a child with Costello Syndrome, taking into account biological, environmental and individual factors, is crucial for the child's normal emotional and social development. This suggests the need for further research and work to increase the availability of holistic support for both the children themselves and their families.

Conclusions

Based on the collected evidence and its analysis, several conclusions can be drawn, regarding the emotional development of children with Costello Syndrome. These insights may inform both clinical practice and further research in the field of rare developmental disorders.

Based on the analysis of the information obtained from the interview with the mother and the analysis of the documentation including: a genetic opinion from 2015; an opinion on the need for early development support from 2015; a psychological opinion from 2015; a statement on the need for special education from 2017; a psychological-pedagogical-speech therapy opinion from 2021; a statement on the need for special education from 2023; a speech therapy opinion from 2023; as well as theoretical knowledge of Costello Syndrome, the research questions posed were answered and conclusions were formulated.

What factors influence the emotional development of the described child with Costello Syndrome?

Biological factors affecting the speech development of children with Costello Syndrome, such as weakened muscle tone, anatomical difficulties and intellectual disability, are important for their emotional development. This is because they affect communication disorders due to anatomical limitations (e.g. macroglossia) and articulation difficulties, and make it difficult for the child to express their needs and emotions. The inability to communicate effectively often leads to frustration and feelings of powerlessness. Prolonged experience of such emotions can contribute to the development of negative emotional behaviour patterns, such as

impulsiveness, social withdrawal or increased irritability. General muscular weakness limits the child's ability to explore the environment, which reduces the number of stimuli for cognitive-emotional development. Limited experiences contribute to difficulties in learning to regulate emotions and delay the ability to recognise and express emotions appropriately to the situation. The intellectual disability characteristic of Costello Syndrome makes it difficult to process social information, including understanding one's own and others' emotions. As a result, these children may have difficulty establishing and maintaining social relationships, fostering the development of a sense of isolation and reduced self-esteem.

The environmental factors, supporting the emotional development of a child with Costello Syndrome, include the attitude of the immediate environment in which the child grows up. In the analysed case, one of the most important elements supporting this process was the presence and appropriate attitude of the siblings. The relationships between the siblings, including playing together and elements of healthy competition, fostered the formation of positive relationships among the children and appropriate patterns of emotional regulation. Siblings, as natural interaction partners, support the development of social skills such as empathy, mutual understanding of each other's emotions and cooperation. The school environment proved to be equally important. The belonging of the child with Costello Syndrome to an inclusive class and the access to a support assistant for learning and daily tasks helped the child to build a sense of security and belonging to a group. It should be added at this point that the other members of the school class showed a great deal of understanding and support towards Zuzanna in everyday situations. Thanks to the integration into the peer group, the girl focused on developing her social and emotional competences. Interaction with peers helped her learn to express emotions, build relationships and deal with conflict situations, which is crucial for healthy emotional development. Thus, there is a reason to assume that the lack of access to qualified professionals and prompt diagnosis and therapy may negatively affect the child's emotional development, which is directly linked to increased stress, confusion and a sense of helplessness on the part of the parents. Difficult access to specialist support increases the level of stress in the family and affects the dynamics of the relationship between the spouses, while the child may experience frustration related to unmet emotional and educational needs. This situation initially occurred in the family of the girl described. As a result, the child may develop a sense of isolation and lowered self-esteem, which can affect the regress of her emotional functioning.

Individual factors, such as school learning preferences, the speed of information processing and the need to adapt therapeutic materials to the child's character, also have a significant impact on the emotional development of a child with

Costello Syndrome. These children are often slower to process information compared to their peers, which can potentially lead to frustration and lower self-esteem. In such cases, it is important to have the support of an assistant to explain the material or tasks. As a result of such measures, the child is likely to feel confident and secure in the learning process. Similarly, adapting therapy to the individual needs of the child proves to be an important factor. Although much is said about this need in the learning process of children with disabilities, it turns out that these assumptions are not always successful. As Zuzanna's example shows, the key to success is to get to know the child thoroughly. By becoming familiar with her unique behaviour, character traits, temperament and interests, the teacher can significantly increase the child's motivation to act and continue working. Thus, the therapeutic process becomes more engaging, resulting in greater satisfaction and the child's sense of success. Stress and frustration levels are reduced, which promotes better emotional development of the child with a disability.

Does the involvement of the immediate environment make a difference in the emotional development of a child with Costello Syndrome?

The research has indicated that the environment, in which a child with Costello Syndrome develops, plays a key role in shaping their emotional, social and cognitive functioning. Of particular importance is the attachment style formed in the relationship with caregivers, and their attitude towards the child. Secure attachment promotes a reduction in stress levels, indirectly influences the regulation of muscle tone and increases the child's willingness to participate in various forms of therapy. Parents who are absent, unaccepting or repulsive towards a child with a disability can contribute to increasing feelings of loneliness, anxiety and even frustration or aggression in the child.

The school environment can and should support the emotional and social development of children with CS. Access to an educational assistant who supports them in understanding educational content and adapting in a peer group plays a key role in building a sense of security. This ensures that the child does not experience social exclusion, and the support received includes both cognitive and emotional aspects. Interaction with peers, made possible through participation in school life, is particularly beneficial in terms of the development of communication skills. The improvement in language skills resulting from natural social contact directly supports the child's emotional development. Consequently, the support of the educational and peer environment can be considered an integral element in supporting the child's holistic development, including emotional, social and cognitive functioning.

Do communication difficulties matter in the emotional development of a child with Costello Syndrome?

The speech development of a child with CS can be significantly shaped by biological factors such as genetic conditions, including mutations in the HRAS proto-oncogene. In addition, significant weakness of muscle tone in the face and neck, and anatomical difficulties, such as macroglossia (enlarged tongue), can lead to problems with primary activities such as swallowing saliva or eating. These limitations can significantly affect the child's ability to achieve secondary skills such as speech and communication. Whole-body muscular weakness not only limits motor skills, but also leads to difficulties in exploring the environment, which is not conducive to cognitive and emotional development. The inability to communicate effectively often generates frustration, which increases the risk of emotional difficulties, especially in stressful situations.

Children who are unable to express their needs may show intense emotional reactions or, conversely, give up trying to express their emotions and fall into apathy. As a result, the lack of effective communication and difficulties in dealing with emotions can significantly affect their psychosocial functioning. As Zuzanna's example indicates, early diagnosis and multifaceted therapeutic support are key to minimising the negative effects of these biological conditions.

Do parental relationship dynamics matter in the emotional development of a child with Costello Syndrome?

The support and involvement of both parents in the therapeutic process of a child with Costello Syndrome (CS) plays one of the most important roles in the child's emotional development and in the effectiveness of therapy. The birth of a child with a disability can elicit a variety of emotional reactions in carers, leading to different attitudes towards care and therapy. In some cases, one parent may withdraw from active participation in the therapeutic process, which has a significant impact on the functioning of the whole family. The lack of involvement of one parent can lead to conflicts in the partnership, reduced satisfaction with family life and difficulties in maintaining consistency in the parenting approach. A child with CS is sensitive to the dynamics of relationships within the family and, noticing the withdrawal of one carer, may experience feelings of rejection and guilt. Such emotions can affect the child's development, leading to emotional difficulties that further impede therapeutic goals.

Parents working together in the parenting and therapeutic process make it possible for a child with Costello Syndrome to feel accepted and supported. Such an emotional foundation promotes the child's social and emotional development

and a more effective achievement of therapeutic goals, which emphasises the importance of building a partnership and harmonised approach within the family.

Does the attitude and involvement of siblings make a difference in the emotional development of a child with Costello Syndrome?

The attitude and involvement of siblings is an important factor in supporting the emotional development of a child with Costello Syndrome. The presence of siblings in the family of a child with a disability promotes positive developmental changes by providing the child with appropriate emotional and language role models. Playing together and competition naturally stimulates social interaction, which supports the child's development of communication and emotional skills.

In addition, the involvement of siblings and their kind approach develop a sense of attachment and belonging in the child with a disability. The voluntary support of siblings in caring for the child improves communication within the family supporting its harmonious functioning. As a result, this approach leads to satisfactory results both in terms of the child's development and the formation of family relationships. Involving siblings in the therapeutic process of a child with Costello Syndrome not only supports the child's emotional and social development, but also strengthens family bonds, contributing to building a more integrated and supportive family environment.

The aim of the presented research was to analyse the biological and environmental factors, influencing the development of a person with Costello Syndrome. On the basis of the analysis of the results it is concluded that the supportive attitude of the immediate environment and the efforts of close people to establish contact (verbal or non-verbal) clearly influenced the emotional and psychosocial development of the analysed child with Costello Syndrome. The results of the study may contribute to developing the knowledge of the characteristics of Costello Syndrome and the education of parents of children with disabilities in the context of interacting with each other and maximising their potential.

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