

Szpiech Kamil, Gierszon Patrycja, Łapiński Rafał, Majewski Artur, Kuś Adrian, Markiewicz-Mazur Oliwia. Logopedist role in childhood cerebral palsy – case report. *Journal of Education, Health and Sport*. 2019;9(9):599-613. eISSN 2391-8306. DOI <http://dx.doi.org/10.5281/zenodo.3455856>
<http://ojs.ukw.edu.pl/index.php/johs/article/view/7459>

The journal has had 5 points in Ministry of Science and Higher Education parametric evaluation. § 8. 2) and § 12. 1. 2) 22.02.2019.

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The authors declare that there is no conflict of interests regarding the publication of this paper.

Received: 10.09.2019. Revised: 19.09.2019. Accepted: 19.09.2019.

Logopedist role in childhood cerebral palsy – case report

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Key words: logopedist, childhood cerebral palsy, therapy, premature child

ABSTRACT:

This is a case study of a 5 years old girl, born as a premature child (27 weeks of pregnancy - extreme prematurity) with a very low birth weight and diagnosed with childhood cerebral palsy and drug-resistant epilepsy. In physical examination was shown: increased thoracic kyphosis, lopsidedness, contracted thoracic muscles, sciatica shin, hip-lumbar muscles, lower limbs in internal rotation. Girl should not be self-service and requires the help of a second person. She is circulatory efficient. She has also limb paresis, sensory disorders, perception, speech development disorders and eye damage. The girl has undergone logopedic therapy. Initially, the adaptation to the new environment and speech therapist was very hard.

The observations, help in various situations and various games have made the therapy successful. During the therapy, it was noticed that the girl was sitting incorrectly. The parents also reported problems with acceptance of louder sounds and music (confirmed by the therapist and psychologist), which, however, improves during the therapy. Body motor skills in the described patient is very weak. Since the beginning of the therapy, a full logopedic examination was conducted and specialist tests were performed, which were evaluated on the basis of established scales. The girl is also under physiotherapist's care. The evaluation of the course of therapy shows the progress, and on the basis of the results of examinations and observations, a plan of further therapy has been prepared.

MEDICAL HISTORY

The girl was born on 27.02.2014 from a single, fifth pregnancy (two pregnancies ended in miscarriages), she has an 18-year-old sister and 13-year-old brother. The baby was born at 27 weeks of gestation by caesarean section. Before and during pregnancy, the mother (33 years old at the time of the birth of the child) had an anaemia and during pregnancy she had diabetes mellitus. The father of the girl (then 35 years old) suffers from diabetes II, urate bottom, has a damaged spinal cord and therefore has a certificate of disability. The pregnancy was endangered from the beginning, the mother was under the constant gynaecologist care and performed all recommended periodical examinations. In the 26th week of pregnancy, the woman's foetal waters passed away. She was immediately admitted to hospital, where she was given an injection to develop the child's lungs and after about 2 hours she was transported by ambulance to a hospital in the provincial town. She stayed there for a week, the foetalwaters was still seeping. She was advised to drink a lot of water. She received a second injection to develop the child's lungs. After about a week's stay, the seepage water began to take on a green colour, and the dilatation started to grow. It was then that the decision was taken to have an immediate caesarean section. The mother received spinal anaesthesia, although initially she did not consent to this type of anaesthesia. The information obtained from the mother during the interview shows that the baby's head was already in the birth canal and the girl was extracted from it by force. After the birth, the newborn was completely bruised. The baby was born in the 27th week of pregnancy (extreme prematurity) with an extremely low birth weight of 780g. She received 3/3/4/6 points on the Apgar scale.

From birth, the girl was initially fed parenterally, then received her mother's milk from a bottle and then milk modified for premature babies. From birth to the present time she suffers from constipation and abdominal pain due to this reason.

DIAGNOSIS

The following diagnoses were made on the girl:

- extreme prematurity (P07.2),
- birth control asphyxia,
- respiratory failure,
- bronchopulmonary dysplasia,
- cerebral palsy in children (G80.9) in the form of tetraparesis spastica, i.e. four-sided paresis resulting from damage to the centres and brain tracts of the pyramid system in both hemispheres; and
- epilepsy (G40.9).

As coexisting diagnoses they occur:

- evident strabismus, concomitant, divergent alternating with predominance of the left eye (H50.1)
- other disorders of the optic nerve disc (neuropathy of the optic nerves in the course of prematurity, condition after regression of the ROP of both eyes) (H47.3).
- other neurodevelopmental disorders (R62.8)
- abnormal posture (R29.3).

Cerebral palsy in children is a group of permanent disorders of movement and postural development, resulting in a reduction in activity, which is attributed to non-progressive disorders in the development of the brain of the foetus or infant. Motor disturbances in cerebral palsy are often accompanied by sensory, perception, cognition, communication and behavioural disorders, epilepsy and secondary musculoskeletal problems [1]. The symptoms indicating damage to: central motor neuron (limb paresis), subcortical nuclei (involuntary movements), cerebellum (motion and balance disorders) are considered to be dominant in the clinical picture of the disease [2].

In this etiologically and clinically diversified syndrome of disease symptoms, apart from movement disorders, the most frequent are intellectual dysfunctions (about 75%), speech disorders (over 50%) and behavioural disorders (over 50%). Language communication disorders (oral and written) - related to motor disorders dominating in the clinical picture of this syndrome, as well as co-occurring cognitive dysfunctions, damage to sight and hearing, epilepsy - affect the majority of patients with cerebral palsy [1,2].

Cerebral palsy in children is not a disease, but a condition, a very heterogeneous clinical and causal disorder. Modern approaches define it as a syndrome of chronic and non-progressive disorders of the central nervous system, and first of all of the central motor neuron. Most of the available definitions place particular emphasis on impairment of motor functions, but more and more often they also pay attention to disorders of sensory organs as a result of damage to the central nervous system [1,2].

In the case of this girl, there is limb paresis, sensory disorders, perception, epilepsy, speech development disorders and eye damage.

OWN OBSERVATIONS

The girl has undergone logopedic therapy. The first meetings were devoted to mutual observation and adaptation to the new situation and new environment. Initially, the girl tolerated parting with her parent very badly during the therapy and all the time she cried or screamed. Gradually she got used to the voice and the person herself, who is the speech therapist. During this time, observations were made on what the patient likes, how she reacts to various situations, fears, activities and stereotypical movements. In addition, an attempt was made to answer some basic questions:

- How does the girl behave in everyday situations - during eating, hygiene procedures, dressing?
- What does she like to do and what does she do when she is alone?
- What does she clearly not like?
- Where is she most likely to stay?
- How does she communicate with carers and siblings?
- Does he distinguish between relatives and strangers?
- In what position does the child like to be in the most?
- Does it react to changes and how does it react to them (fear, curiosity)?
- Does it react to environmental sounds?
- Does he like to listen to music, and if so, what kind of music?
- Are there any activities your child prefers?

They tried not to impose anything on the child, but only to observe, possibly help in various situations when the intervention of the other person was necessary and to propose various forms of play.

On the basis of the answers to the above questions and own observations, it was noticed that during the classes the girl does not sit correctly in the chair. Very often she leans to the left or right. The parent who brings her to the class places a rolled blanket on one side in order to better place her in the chair (recommendation of a physiotherapist who conducts physical rehabilitation with the girl). The girl has considerable difficulties with keeping her head in the correct position, often she falls inertly on her chest. Then the baby's head should be lifted up again so that it can make and maintain eye contact during therapy and so that it can observe and imitate the proposed exercises. The girl is very salivating. You have to wipe her or put a tissue into her hand, then she will wipe herself and she likes to do it very much. With time, however, begins to put the tissue in the mouth and bite it. She doesn't like it when you take it away completely and then she gets angry. During classes, the girl must be busy with something all the time, be in the center of attention, you need to talk to her all the time, she likes to sing her. At the moment she reacts better and better to music, so she often demands to play her children's songs. During listening she laughs loudly, tries to vocalise. She turns her head towards the sound she hears, looking for the sound source. He still doesn't like sudden, especially loud sounds. The girl's parents signal that they cannot take her to church because she starts to cry and scream loudly during her singing. The girl distinguishes the voices of people known to her from those of strangers. She reacts much better to third parties entering the office during classes. New voices are listened to, but if the conversation drags on, the girl signals her dissatisfaction and forces the therapist to focus the therapist's attention exclusively on her. She also often reaches out and hits the table with her hand or tries to grasp the objects on the table. Located on a mat, she tries to get up to her sit down. She likes to be massaged very much, she likes both physiotherapeutic massages and speech organ therapies. Sometimes she tries to take the therapist from her hand a speech therapist masseur and wants to massage herself. She likes stuffed mascots and teaching aids. She manipulates them in her hands, turns them in order to get to know them. He tries to put the wheels on the rim himself. However, he often throws them on the ground or falls out of it. The girl wears pampers.

ANALYSIS OF PEDAGOGICAL DOCUMENTATION

In the opinion of the pedagogue - music therapist (in the first study carried out on 5.01.2016 and the second on 15.11.2017) to louder sounds, the girl reacts with fear, stretching the whole body and screaming. During the game she accepts, she laughs loudly. He understands the terms walk, nose, eye, belly. Most gestures are automatic and not precise. The girl's manual skills are very low. She does not hold objects on her own, she performs all

activities connected with moving instruments (rattle, knocker) under the therapist's dictation and control. It reacts with the withdrawal of the hand to rough and sharp textures, e.g. on a rehabilitation ball or sandpaper. It allows you to manipulate your hands. He communicates with the use of vowels, simple sound and trace expressions. It expresses emotions with a smile on the face. It differentiates between rooms and therapists.

ANALYSIS OF PSYCHOLOGICAL DOCUMENTATION

In the opinion of a psychologist (survey of 1.09.2015), poor performance of the visual and auditory analyzer. The girl does not follow the object shown, does not recognize the face. She is hypersensitive to loud sounds and touch. Does not react to reflection in a mirror. Distinguishes between the voice of people close to her and strangers. Has difficulty grasping. Does not sit on his own, does not plumb his body, does not turn from his tummy to his back and vice versa. He has very poorly developed small motor skills.

LOGOPEDIC EXAMINATION.

In order to obtain a complete picture of the disturbance and condition of the child's articulation apparatus, the structure of speech organs was taken into account:

- The shape of the hard palate:
Gothic palate, high vaulted, narrow palate;
- mobility of the soft palate:
excessive sensitivity of the back part of the throat (the child chokes, chokes while eating larger pieces of food);
- structure and mobility of the mandible:
The mandible moves only in the vertical plane, not in the horizontal plane;
- structure and mobility of the tongue:
Heart shaped tongue, short sublingual frenulum - type I in the 4-stage classification of Elisabeth V frenulums. Corrylos, low mobility of the tongue, mostly in a flat position, spastic tongue, excessive sensitivity of the tongue, makes only forward and backward movements, often protruding between teeth;
- Lip function:
low efficiency of lips, does not close lips firmly, does not close them;
- development and condition of teeth and coexisting malocclusion:
full condition of teeth, visible tooth decay, open bite.

The "Dysarthria Scale" was used for the study. Version for children made by Urszula Mirecka and Katarzyna Gustaw [3]. It is a diagnostic tool useful in determining the type and depth of respiratory, phonation, articulation and prodigious dysfunctions. This scale evaluates: comprehensibility of one-time, one-dimensional and free expressions of the patient; articulation, nasal resonance, prozodia of expression (intonation, accent, rhythm, pace of expression), phonation, breathing, alternating movements (lip and tongue movements), functional state of the muscles of the articulation apparatus. It has a qualitative character due to the age of the girl. This tool is designed to examine children from 6 years of age, and my patient is currently 5 years and 2 months old. In addition, some scale spheres of the study could not be studied due to poorly developed spontaneous speech.

I. **Self-esteem sphere**

The comprehensibility of one's own statements, is impossible to evaluate, because the girl is not able to evaluate her own statements (which are only single words and phrases), nor to determine whether she is tired while speaking, whether she has breathing difficulties and voice difficulties. Statements are rather a repetition of words. However, observing the reactions of the child in different situations may seem to understand many things, but motor difficulties make it impossible to provide feedback.

II. **Understanding sphere:**

1. intelligibility of one-word statements (only the girl speaks) - from among those words which the girl tries to repeat or speaks in spontaneous speech, some words are understandable, and some despite distortions within their structure, ellipsis, deformations, substitutions can be understood especially when considered in the context of the situation.
2. intelligibility of single-sentence statements - the girl does not say such things.
3. intelligibility of free statements of the patient - lack of such statements.

III. **Articulation sphere:**

The girl usually pronounces vowels correctly. She only has difficulty with correct articulation of vowels [y]. When articulating vowels, she sometimes arranges the organs of speech with her hands in the way I demonstrate them. In repeated expressions, the articulation of vowels is correct. However, these are simple

words, usually two-syllable, usually consisting of open syllables. These words do not contain consonant groups, but it can be assumed that the child is not able to express himself/herself with such groups at all. Articulation of polysyllabic words and sentences is not possible due to the lack of such statements.

IV. **Resonance**

Girls are usually hypernasal or have an unstable resonance.

V. **Prozodia**

1. Imitating intonation - does not imitate.
2. Intonation in free speech - lack of free speech.
3. Mimicking different accent patterns does not mimic.
4. Maintaining a proper rhythm in sentences - no possibility of examination.
5. Maintaining a proper rhythm in free statements - no possibility to examine.
6. Maintaining a proper pace of speaking in sentences - no possibility of examination.
7. Maintaining a proper pace of speaking in free statements - no possibility to examine.
8. Ability to accelerate the pace of speaking - no possibility to examine.
9. Ability to slow down the pace of speaking - no possibility to examine.
10. Length of phrases in sentences - no possibility to examine.
11. Length of phrases in free statements - no possibility to examine.
12. Synchronization of breathing, phonation and articulation in words - respiratory, phonation and articulation disorder can be observed, and during the spoken words the girl speaks with the remains of air.
13. Synchronization of breathing, phonation and articulation in sentences - no possibility to examine.
14. Synchronization of breathing, phonation and articulation in free statements - no possibility to examine.

VI. **Phonation**

1. Voice setting - start of emission [a] - beginning usually blocked by closing the vocal folds of the larynx.

2. Maximum phonation time [a] - approx. 4 seconds, but there are interruptions in the implementation of this vowel due to lack of air.
3. Voice intensity during speaking - there is a high instability of voice intensity, the voice is sometimes too high and sometimes too low.
4. Increasing the voice volume [a] - the child is not able to increase the voice volume or only slightly.
5. Decrease voice volume [a] - is not able to decrease voice volume.
6. Voice pitch - unstable, cannot keep the voice on one tone, sometimes the voice is weak.
7. Increasing the voice pitch [a] - cannot.
8. Lowering the voice pitch [a] - cannot.
9. Voice quality - voice significantly weakened, breaks in phonation, hoarseness appears.

VII. **Breathing**

1. Breathing at rest - usually with oral track, shallow breathing.
2. Breathing while speaking - short sounds, short expiratory phrase, tension, shorted larynx.
3. Exhalation length during emission [s] - no possibility to examine, because the girl does not pronounce the sound [s].
4. Exhaust length during emission of series [s] - no possibility to examine.

Lack of proper coordination in respiratory muscle function (breathing difficulties: lack of breath control, insufficiently deep inhalation and too short exhalation, which prevents prolonged phonation) causes interruptions during phonation, fluctuations in volume and intensity of voice, and difficulties in starting vocalisation. Difficulties in deep inhalation make it impossible to extend exhalation, resulting in more than 2 syllables in one exhalation. It also causes rapid fatigue and sudden and broken vocalisation. The child breathes most often with oral or verbal-nasal track.

VIII. **Alternating movements**

1. Quick opening and closing of the mouth in the full range of the jaw's mobility - the baby opens and closes the mouth, but very weakly, it is not in the full range of the jaw's mobility.

2. Rapid pulling and stretching of the lips - pulls and stretches, but these are very slow movements made with the child's hand.
3. Fast ejection and retraction of the tongue - extends the tongue slightly from the mouth and retracts, but these are very slow movements and not very precise.
4. Quick lifting and lowering of the tongue outside the mouth - does not perform.
5. Fast moving the tongue to the right and left lip corner - does not perform.
6. Fast repeating [u] - [i] - repeats, but slowly.
7. Fast repeating [a] - [y] - repeats, but slowly.
8. Fast repeating [pa] - [ta] - [ka] - repeats, but not precisely and very slowly.

IX. Functional state of the muscles of the articulating apparatus

1. Pulling down lips - pulls down, but with the help of his hand.
2. Lip stretching - stretches, but with the help of your hand.
3. Lip tension - lowered.
4. Tongue extension - extends, but horizontally only forwards and backwards.
5. Reversing the tongue - yes.
6. The appearance of the tongue - in the shape of a heart, usually covered with a white coating.
7. Pushing out with the right cheek - does not push out.
8. Pushing out with the left cheek with the tongue - does not push out.
9. Directing the tongue to the right corner of the lips - does not make such a move.
10. Directing the tongue to the left corner of the lips - does not make such a move.
11. Raising the tip of the tongue inside the oral cavity - to the upper gums - does not lift.
12. Raising the tip of the tongue outside the oral cavity - does not lift.
13. Tongue tension - increased tongue tension.
14. Soft palate lift during emission [a] - raises, but only to a very small extent.
15. Soft palate lift during series [a] emission - raises, but only to a very small extent.

16. Swallowing saliva at rest - moderate abnormalities - part of saliva leaks out, lips do not connect, tongue is not inserted between lips.
17. Swallowing saliva while speaking - the same as at rest.
18. Involuntary movements - occur.
19. Face symmetry at rest and during movement - one-sided asymmetry (right-sided descent) occurs at rest and intensifies during movement.

EVALUATION ACCORDING TO THE MUNICH FUNCTIONAL DEVELOPMENTAL DIAGNOSTICS.

The girl has a significant delay in psychomotor development according to the Munich Functional Developmental Diagnostics. Assessment of the development of active speech adequate to 18 months of age, assessment of the development of passive speech - 20 months. The girl pronounces sounds similar to the sounds of speech (longing), plays with the sounds she makes (longing), repeats the given sounds - single syllables, sometimes double syllables without meaning.

Cognitive processes and social maturity are at the level of a 12-month-old child. Some of the attempts are made but not performed precisely (attempts to insert a smaller cup into a larger one, pulls out the index finger in the indicated direction, pulls the toy by the string, if the string is put into the hand). While studying the social maturity of a girl, it can be noticed that some of the examined activities are not performed by the patient due to movement limitations. It can be assumed that if she had the opportunity, she would have tried to do it either by recommendation or by imitation.

In the Independence study, a girl functions at the level of an 8-9-month-old child. She is able to take a cap off her head, tries to help with dressing it with her own movements and rubs her hand against the handle under a stream of water, but these movements are not very precise.

DIAGNOSTIC HYPOTHESIS

In the case of the described patient, the cause of the symptoms should be considered a fundamental defect, i.e. cerebral palsy in the form of spastic tetraparesis, caused by prematurity, severe childbirth (perinatal trauma), perinatal asphyxia, respiratory failure.[4] As a result, the patient suffers from spastic dysarthria, manifested from a speech therapy point of view by lack of verbal expression, low efficiency of speech organs, reduced efficiency of the articulation apparatus, disturbed sensation of speech organs, hypersensitivity of the face and speech organs. In addition, there is a short expiratory phrase, problems with coordination of

breathing and sound. There are tensions in the larynx. On the basis of the analysis of the results of the trials carried out in the "Dysarthria Scale" study, I conclude that a girl has deep degree dysarthria. There are differences in tension, i.e. decreased lip tension and increased tongue tension. The overall picture is dominated by spasticity. Symptoms of dystonia can be observed.

THE COURSE OF THERAPY

The girl has been in therapy since August 2015, using physical rehabilitation (Vojta neurodevelopmental methods), speech therapy, occupational therapy, and before that also pedagogical and pedagogical therapy with elements of music therapy.

The first speech therapy study was conducted on 27.08.2015. In the diagnosis we read: spastic dysarthria. During this time the girl reacted to sudden, loud sounds with a wink of eyelids and a smile. She did not turn towards the source of sound, she did not react to the call. Formation and improvement of speech in a child with cerebral palsy should be started as early as possible. The therapy with the girl was started from learning the primitive activities, i.e.:

- Learning how to sit calmly, how to ensure correct sitting position, how to control the child's head while sitting (in cooperation with a physiotherapist I worked on the ability to hold the head correctly in the body's axis),
- exercises in directing and maintaining the child's attention, commonality of the field of attention,
- exercises improving visual perception (guiding one's eyes behind a presented object or toy; developing the ability to focus attention and look, recognizing people close to one another and foreign, familiar and foreign rooms with the eyes),
- exercises improving auditory perception (exercises in differentiating sounds of the environment, sounds produced by animals, human; sensitivity to sounds of speech, environment, own name),
- exercises in imitating movements - large and small motor
- skills of phonetic exercises.

Initially, the girl was taught (also in the presence of her parents) correct oral feeding patterns, and thus I stimulated the articulation apparatus at the same time, because abnormal tension in the speech organs and abnormal sensation of these areas made it difficult to swallow saliva and caused very large salivation.

In the course of the previous therapy, the following exercises were carried out to make the locomotor system work:

1. speech organ speech therapeutic massage according to Dr. Elżbieta Stecko method;
2. facial massage according to the Shantala concept;
3. vibrating point massage;
4. olfactory training (administration of fragrance containers, e.g. with vanilla, mint, lavender, lemon, vinegar).
5. exercises improving the motor skills of the articulation apparatus:
 - a) lip exercises,
 - b) language exercises,
 - c) soft palate exercises;
6. respiratory exercises;
7. phonetic exercises;
8. exercises developing passive and active vocabulary, exercises developing spontaneous speech;
9. auditory sensitivity exercises, exercises to improve auditory perception;
10. exercises to improve visual perception;
11. improving finger-pointing gestures;
12. practising hand precision and fingerprinting;
13. hand massage;
14. full body massage according to the Shantali concept;
15. learning how to read using the Glenn Doman method;
16. general developmental exercises: relaxing, logistic, logopedic computer programs.

Throughout the therapy I have been in close contact with the parents of the child. I kept them informed about the course of the therapy and its progress. I instructed and showed them exercises that they could continue at home. The stimulation included older siblings, with whom the child has a very good contact.

EVALUATION OF THE EFFECTS OF THE PREVIOUS THERAPY

The girl is sitting in a specially adapted chair during classes in the office. It is much better to stay in a sitting position. It happens, however, that the head still falls inertly on the chest, but less and less often. During classes in the office, the girl is calm, rather cheerful, although it requires constant attention. Her dissatisfaction is still alarmed by crying or

screaming. He is able to protest when he does not want to follow any instructions. Hypersensitivity to speech organs has decreased significantly. The girl likes all kinds of speech therapeutic massages, both external and internal organs of speech. There has been an improvement in chewing and swallowing food of different consistency (they are not only mixed slurries, but food chopped into pieces suitable for the girl to bite). It still does not bite off the food on its own. The exhalation phrase also increases and the coordination of the sounds with the exhalation is improved.

At present, the girl reaches out her hands, imitates the clapping gesture. She is able to give an object within her reach on request. She smiles, sees other people, sometimes tries to shake hands to say hello or farewell. Communicate with a few simple words (e.g. dad, mom) and sound and trace expressions. He likes to play with music.

Previously she reacted to sudden, loud sounds with screaming and crying, tensioning the whole body. Currently, she receives them much better. She likes songs for children. While listening to them she laughs loudly. She likes to play with her fingers. She understands simple instructions supported by a gesture. She is oriented in the scheme of her own body, points to parts of the body. She makes a goodbye gesture of waving her hand and sends a kiss. She follows moving objects and people with her eyes, lifts and grabs objects within her reach and sight, throws objects at them and tries to follow their movement. With a little help from the therapist, she can put wheels on the rim. She begins to associate the objects he learns with the heard sounds. He develops understanding of speech, reacts better and better to simple commands (such as: give, show) and asked questions (to which, if he is unable to answer with a word, he responds with a gesture, facial expressions, smile). Unfortunately, at the moment the weakest point of the girl is communication (spontaneous speech develops very poorly). Therefore, appropriate conclusions should be drawn for the programming of further speech therapy.

THE PROGRAM OF FURTHER THERAPY:

1. Further improvement of speech organs, speech therapy massage.
2. Development of passive speech (presentation of pictures, thematic set "From picture to word").
3. Continuation of learning how to read using the Glenn Doman method.
4. Introducing alternative methods of communication: pictograms, Makaton's dictionary.
5. Exercises of auditory perception, sensitizing to the sounds of the environment, mobilizing to produce sounds.

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