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COGNITIVE REHABILITATION OF A PATIENT WITH ANOREXIA

A – Study Design
B – Data Collection
C – Statistical Analysis
D – Data Interpretation
E – Manuscript Preparation
F – Literature Search
G – Funds Collection

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SUMMARY

Background

The aim of our research was to assess the efficiency of cognitive rehabilitation aimed at training selective memory with the help of mnemonic techniques.

Material/ Methods:

The patient, aged 26, had been treated for anorexia for two years (BMI-9.7, almost critical condition). He complained of anxiety, difficulties in coping, hyperorality and attention disorders, compulsiveness and auto-aggressive behavior. He also had sleep disorders; from time to time he verbalized suicidal thoughts. The family also noticed numerous negative personality changes. The MRI examination revealed minor, generalized cortical and sub-cortical degenerative lesions. The patient had been attending neuropsychological therapy for 6 months, which included training selectivity of memory, working and prospective memory, and executive functions, using mnemonic devices to improve his cognitive functioning. Also, due to a relationship crisis and the patient's separation from his fiancée, crisis intervention was needed, with special care taken to provide emotional support. Neuropsychological rehabilitation was directed at reducing cognitive disorders. Drawing therapy was also applied.

Results:

After cognitive rehabilitation the patient has gained 8 kg and reports feeling much better. His personality resources have improved significantly. He prepares meals on his own and eats more regularly. He also takes medicines on his own. He is planning to return to college. What is more, he has begun to think of himself as a person.

Conclusions:

Cognitive rehabilitation resulted in achieving significant improvement in terms of the cognitive and emotional processes of this anorectic patient. Special attention should be drawn to the improvement in the sphere of executive functions, especially in terms of everyday activities and organizing his own life. The results are interpreted with reference to microgenetic theory.

Key words: crisis intervention, drawing therapy, hermeneutic analysis

INTRODUCTION

Anorexia seems at first glance not to belong to the domain of neuropsychology. Although it is known that in the course of the disease the caloric deficiency may lead to neuron death (Duchesne, et al. 2004), anorexia is most often considered to be a serious neurosis, which occurs primarily in young girls in their puberty or just after it (Truglia et al., 2006). Nevertheless, the nature of anorexia has been re-explored over and over again, and its multifactorial and complex character is often emphasized in the literature (Claudino, et al. 2006). The new neuropsychological literature (reviewed by Duchesne et al., 2004) refers first of all to the cognitive symptoms (in particular memory disorders, especially of working and prospective memory, selectivity of attention, and executive dysfunction) observed in the later phases of the disease, when progressive degeneration of cortical and subcortical tissue leads to symptoms similar to dementia. It is generally stated that the main cause of anorexia is a pathological, even obsessive pursuit of a slim figure in accordance with the dictates of fashion, the basis of which might be a persistent and intractable dissatisfaction with the shape of one's own body, or even a delusion that one is still obese even after all excess weight is long gone.

However, the authors' own experience, together with a review of neuropsychological research conducted by other authors (Duchesne et al., 2004), indicates first of all that the disease is typical of both men and women, and secondly that the age interval is a bit broader than is most frequently stated in the literature. What is more, none of the patients with anorexia we have seen has ever exhibited symptoms of a delusion of obesity, at least not in the further stages of the disease, and only a very few of them have actually demonstrated an unwillingness to eat because of the rigors of a self-imposed diet. These patients usually know very well that they are terribly thin, that they are likely to die from hunger, and they are afraid for their lives. Clinical observations indicate that a patient with anorexia may stand in front of the refrigerator and not be able to decide what kind of meal to prepare; and if it is finally prepared, it may well remain untouched on the plate, since he is convinced that he has already eaten it.

If a young man starves himself to death, all the while insisting that he is obese and needs to lose more weight, ignoring the protests of the people around him and what he sees in the mirror, then he may be compared to a deluded person who jumps out of the window on the tenth floor, convinced he has wings and can fly. Starving oneself to death may also be a specific kind of suicide, an expression of extreme self-loathing and a desire for punishment to atone for some deep sense of guilt or sin. Nevertheless, how can we explain a patient who knows he is very ill, is terrified by the prospect of his own death, has a plate with a meal in front of him, but the food never arrives to his mouth? Do we talk then about a serious neurosis, a psychosis – or perhaps a severe executive dysfunction? What is more, why does the

patient often claim that he ate the meal, and then show genuine surprise that the food is still there on the plate? Can a neurosis be so strong that a patient with a major caloric deficiency, who has not eaten anything at all for several days, or has eaten only so called “his” meals (e.g. cucumbers and yogurt), is not hungry at all? Hunger is one of the basic biological drives, which are by their very nature difficult to extinguish; if someone with an empty stomach does not experience hunger, it is worth asking: why? And in our opinion the answer to this question should be sought nowhere else but in the brain, and precisely speaking, at its deepest, oldest level, where basic biological drives are formed.

The aim of our research was to assess the efficiency of cognitive rehabilitation aimed at training selective memory with the help of mnemonic aids, which remind the patient about the time when medicines should be taken, to improve the functioning of a patient with anorexia.

CASE STUDY

Patient K.A., aged 26, had been treated for anorexia for two years. During this time he had been hospitalized twice in a psychiatric ward. During the second hospitalization he was discharged from the hospital at his own request, and underwent therapy (having been persuaded by his mother to do so) in a private psychological counseling office. He achieved a high score on the intelligence test (IQ of 131). Because he began to have more and more problems with his memory, he was referred for a neuropsychological consultation. During the first neuropsychological examination the patient weighed 36.3 kg, and was 193 cm tall, which gives a body mass index (BMI) of 9.7 – which is almost critically low. During a standard neuropsychological examination, working and prospective memory disorders were diagnosed, together with problems in the selectivity of memory and executive dysfunction. It should be mentioned here that patients with anorexia suffer from a variety of diverse cognitive dysfunctions (Duchesne et al., 2004).

The patient was referred for MRI examination, which revealed small, generalized cortical and subcortical degenerative lesions.

In addition, the patient complained of anxiety, difficulties in coping and numerous autoaggressive behaviors. For instance, he reported that he was hitting himself with a belt (showing his hands and legs covered with bruises) or hitting his head against the wall, or even tearing out his hair (showing the place where he had torn out a large amount of hair). He could not control these behaviors. He could not sleep at night and complained about sadness and suicidal thoughts appearing from time to time. The patient’s mother complained that she had recently observed substantial, unmotivated personality changes in him. Moreover, the patient did not want to eat at all, but drank large amounts of fluids (about 5 liters a day), distributing mugs with residues of the fluids all around the flat (hyperorality and attention disorders), and put

Table 1. Results of the IPIP-QPV questionnaire for anorexia patient K. A. (according to his mother)

Personality traits	Before falling ill	After two years of being ill	Δ
Extroversion	20	0	-20
Agreeability	19	0	-19
Conscientiousness	16	2	-14
Neuroticism	-4	6	+10
Openness	17	2	-15

various objects into his mouth (also a sign of hyperorality, suggesting frontal degeneration).

Detailed personality research was conducted using the IPIP-QPV Inventory¹ which includes a set of 50 questions selected from the International Base of Personality Inventories, designed by Goldberg (Paçhalska, 2008). The inventory was completed twice by the patient's mother: on the first run she was asked to describe the patient as he used to be before he fell ill; during the second run, as he is now (Table 1).

When we compare the premorbid personality traits of the patient to those recorded two years later, striking differences appear (see Fig. 1). The patient's mother recorded only positive personality traits before anorexia, with the highest scores in Extroversion and Agreeability, a bit lower (but still relatively high) in Openness and Conscientiousness, and the lowest score in Neuroticism.

The negative changes which occurred after the patient fell ill made his personality "shrink," which is graphically represented in Fig. 1. The greatest changes occurred in Extroversion and Agreeability, a bit less in Openness and

¹ This questionnaire in its Polish version was designed on the basis of the International Personality Inventory Pool, IPIP), established and run by one of the authors of the Big Five personality test, Goldberg. It is a database containing an entire set of over 2000 questions used to examine personality according to the Big Five theory. The base is available to everyone without any restrictions, and the whole set of questions in English may be downloaded from the Internet. Goldberg (2005) presents two sample tests, one consisting of 50 questions (10 in each category), and one consisting of 100 questions. No significant differences among the results of these two tests have been observed so far. Because of this and due to the fact that the caretakers of our patients with brain damage, who are to fill in the questionnaire, become tired and upset very quickly, the 50-question version was chosen for the purpose of the introductory research. When the test was translated into Polish, it was called IPIP-QPV (QPV = Questionnaire, Polish Version), which name remains in accordance with the common rules of naming national versions of tests built on the basis of the IPIP database.

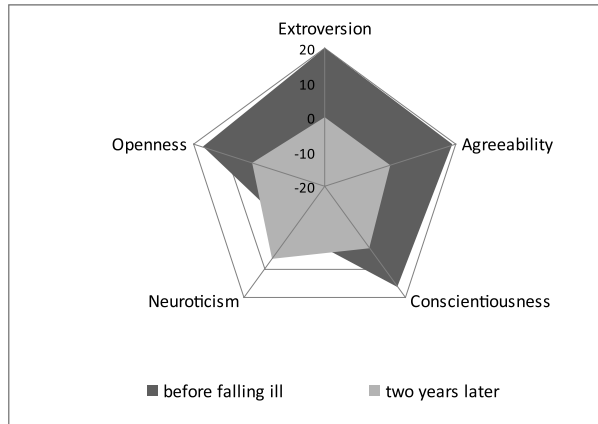


Fig. 1. Changes in the personality of patient K. A. according to the IPIP-QPV Personality Inventory

Conscientiousness. There was also a significant increase in the number of points in Neuroticism. The mother now perceives the patient as very stubborn, withdrawn, not conscientious but highly irresponsible (does not complete his duties at all). What is more, he is much more irascible and nervous than he used to be before his illness, although he usually directs his aggression at himself.

During one of the therapeutic sessions K.P. received a text message from his former fiancée, which evoked a strong emotional crisis. Having read the message he got up, screamed very loudly, then sat down, started swinging on the chair and loudly, rhythmically hitting his head at the table. Crisis intervention was immediately initiated, with special care taken for emotional support, and neuropsychological rehabilitation was continued, aimed at reducing cognitive disorders. Drawing therapy was also used. The patient was asked during subsequent sessions to draw himself as he sees himself here and now. The result from the first session may be seen in Fig. 2.

The pictures were interpreted according to the hermeneutic method (Kwiatkowska, 1996). At the phenomenological level a detailed description of the picture was done together with the patient. The patient presented himself as if he were hanging in the air, or as though flying one meter above the road (?) drawn below. He did not draw his right hand, and drew a hook instead of his left hand. There are also no facial features. When drawing the head he first drew a large U (not a circle, as in a stereotypical picture of a person), then hair (a bit longer than his own). He is wearing a wide shirt without trousers. His neck and legs are very thin. On the right and left hand side there are wavy lines drawn with the label, "a gust of wind." On the right-hand side of the person the patient wrote a list of his problems, including deadlock, unreality, loneliness and hopelessness. Then he wrote three question marks. The last statement, as a kind of a summation, was located below the line, and read, "These emotions block me from changing".

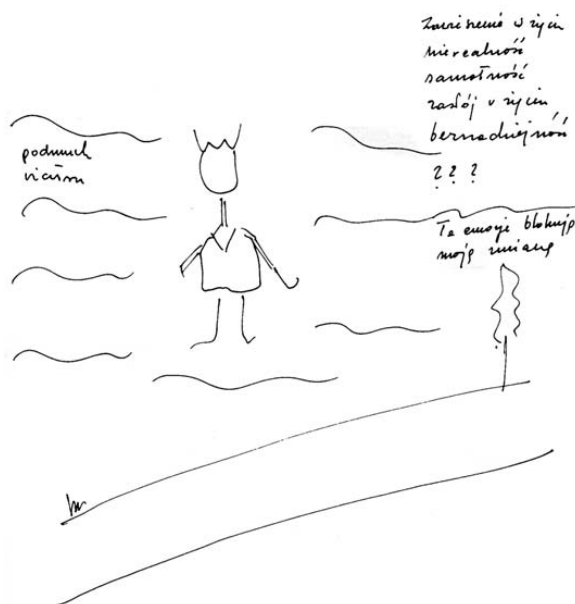


Fig. 2. Drawing by anorexia patient K. A., mid-March 2006. [Text on the left: podmuch wiatru – gust of wind; text on the right: zawieszenie w życiu, nierealność... – Deadlock, unreality, loneliness, stagnation in life, hopelessness; text under the wavy line: Te emocje blokują moją zmianę – These emotions block me from changing]

At the hermeneutic level we attempted to analyze the meaning of the picture. The patient emphasized that illness had changed his life to a great extent. He claimed that he had had to add the statements to the picture, because he had been worried that the message was unclear. He immediately added that he would like to explain the metaphor he used. At that moment of his life he really felt as if in a deadlock, for various reasons. First of all, he was on medical leave from his studies due to his illness, and he would really like to graduate finally. Secondly, two years before he had his life as he wanted it to be: a prosperous professional career awaiting him, a marvelous fiancée, all in all a bright future, full of the sense of having an aim in life. Then first the patient's biological father died; he was an alcoholic, refused treatment and died because of overdrinking. A year later all of a sudden he lost his fiancée, who fell in love at first sight with another man. He could not stop her from leaving him. He could not ask for anything. All his world – as he describes it – was destroyed and only debris remained. More or less at the same time his sister met a wonderful man and forgot she had a brother, and his mother got re-married. The patient's new stepfather, a professional pilot, was rarely at home, preferred solitude and disliked children. The patient, who had stopped eating since his fiancée had left him, began to lose weight dramatically, and within a month developed anorexia. His deadlock means, as he states, first of all the loss of any purpose in life. He describes it the following way:

„...I no longer move either forwards, or backwards, I am just hanging in one place... in the air... as if I were unreal, and my body – is disappearing. I am a toy of the wind, have no body mass. I can be pushed here and there, because nothing matters any more. Is it still me, or not me? I wish I could change, eat normally, but I cannot, since I am hanging like a toy... a puppet... in the air! Everybody can mistreat me... abandon me! And I have nothing to say. Others can make decisions, and I am always hesitating. It is like that even in the case of food. I am always standing and standing in front of the fridge and do not know what to eat. The worst thing is that my opinion never matters. My sister hates me, and my mother has no time for me. She is always condescending to me, finding little time to talk. The two of them manage my time. I am passive and have to give in. This is why I revolt. My contacts with my family... with other people... are a tragedy. I cannot change anything in my life. Nobody understands me, or knows what I feel! It is this painful helplessness... passiveness of some kind... as if I possessed no will of my own. Hopelessness and emptiness. Nobody loves me. Nothing awaits me.... I have nothing to live for”.

In the phase of criticism the patient realized that all is not exactly as he presented it in the picture. It could be said that refusing to eat is actually an act of will, or even a specific tool of some power. A little child begins to shape its “self” by replying with “No!” to everything, and can terrorize its environment with this one word. At the same time there is also toilet training, which means that he also says “No!” to his own body and therefore becomes the master of his own physiology. Eventually the patient began to understand that the reason for his problems is this feeling of passiveness when confronted with the decisions of other people (former girlfriend, mother and sister); three women having a direct influence on his life, while his own opinion does not matter at all. Refusing to eat is a revolt, especially against his mother (who is a nurse, by the way), whom (due to strategies used by the previous psychotherapist during an 18-month course therapy, which was completely ineffective) the patient charged with guilt for every misfortune in his life.

It should be remarked at this point that K.P. is almost an ideal patient. He is never late for meetings. He does his exercises correctly, although he is not systematic. He agreed to do the necessary medical examinations, did them and bought the medicines which were prescribed, but does not take them regularly. He has made slight progress in terms of working and prospective memory, selectivity of attention and executive functions. He is still not convinced that he should take part in intense group work. After three months of neuropsychological therapy, he was asked to draw another picture of himself. The result can be seen in Fig. 3.

In the phenomenological phase, it can be observed that this time the patient drew himself as he was walking along a road. The figure is wearing a shirt and short trousers: the outfit is similar to a suit. He marked mouth and eyes on his face and said that the figure is smiling. The neck is excessively



Fig. 3. Drawing by anorexia patient K. A. with anorexia in mid-June 2006. [text on the left: moja droga = my road]

thick, but the legs visible under the trousers are very thin, and the right hand is similar to a stick. The left hand is similar to a hook again (the patient cannot explain why).

It can be seen that the road leads downwards. On the right there are two trees. Above the person the sun is shining (although the rays are not straight, as in case of a stereotypical sun), and close to it there are clouds. There are no longer lines marking gusts of wind. The patient called the picture “My way” when he completed it.

In the hermeneutic phase, at first the patient claimed persistently that he was happy, because he had regained his way in life and will definitely be cured from his disease soon. Nevertheless, when asked whether the sun had emerged from behind the clouds, or would disappear behind them in a second, he chose the latter option after some consideration. He said that it was a sign that darkness still prevailed in his life, although it was maybe slightly weaker. He also admitted that the “new way of life” does not look attractive and it remains unknown where it would lead him.

In the criticism phase, the chosen “smiling face” strategy is a mask worn in order to give the impression that everything is all right, we are in control of the situation. Under this fake smile there is an attitude: “Leave me alone!” The patient is not so sure he chose the appropriate way, and confirms that his ambivalence appeared in the picture. He also started quite a long discussion with the therapist on the symbols in the picture and his own experience. It turned out that he made a decision, together with his mother, to join

a strict program of individual and group psychotherapy in the mental hospital in Warsaw, but at the moment he was unsure the program was appropriate for him. He claims that the neuropsychological therapy will help him in itself and cure him, because so far it has been going well. He does not want to join any psychotherapeutic group, because after such meetings he is extremely tired and cannot sleep. He does not want to join an inpatient health service, because in such case leaving the ward on a pass is possible only as a reward for eating a meal. He feels relief that he can talk about this, because he is afraid to disclose his worries in front of his mother, who, in his opinion, would interpret terminating this treatment as running away from the healing process.

A week later a serious quarrel took place with the patient's sister, 5 years his junior, about a trip to the seaside. It ended with the patient having another attack of autoaggression, barricading himself in his room and hitting himself with a belt on his hands and face. The sister, who saw the blood streaming from his nose, was greatly frightened and asked her mother to call an ambulance, because "my brother has had a psychotic attack and should be sent to Kobierzyn!" (i.e. the regional mental hospital). The following day the patient called the first author asking to meet, since he had a lot of things to discuss. He was in a severe existential crisis. He asked the therapist to tell his sister and mother not to send him to the mental hospital. During an interview with the patient's sister it was revealed that the patient's father had systematically beaten his wife and children. The patient had been beaten for much longer than his younger sister. This abuse had lasted till he was 15 years old. His father was beating him frequently, in some cases till he was almost unconscious. The sister claimed that K.P. expressed bitter regret about his mother not being able or willing to defend him from his father, and waiting with the divorce for too long. Paradoxically K.P. was the only family member to maintain relations with his father till his death, whereas his younger sister hated her father and wanted to have nothing to do with him.

During a therapeutic session, which included providing emotional support, the patient suddenly began to draw himself (Fig. 4).

In the phenomenological phase, the patient drew himself first and signed the picture: Me. Then he decided his family should be there, too, which is why he drew a married couple and labeled them "Mother" and "Jurek" (the patient's step-father). Then he claimed:

"This is of course my mother and her husband, Jurek. I mean, my step-father. They are always holding hands and smiling, because they are happy, which is why I drew them that way. My mother often grins, because she is more honest than my step-father is.... however, her smile sometimes makes me furious, because I am not happy".

Then the patient drew his sister and wrote her name: Patrycja, and at the very end, after some consideration, he added the figure of the father, distant at the right hand edge of the paper.

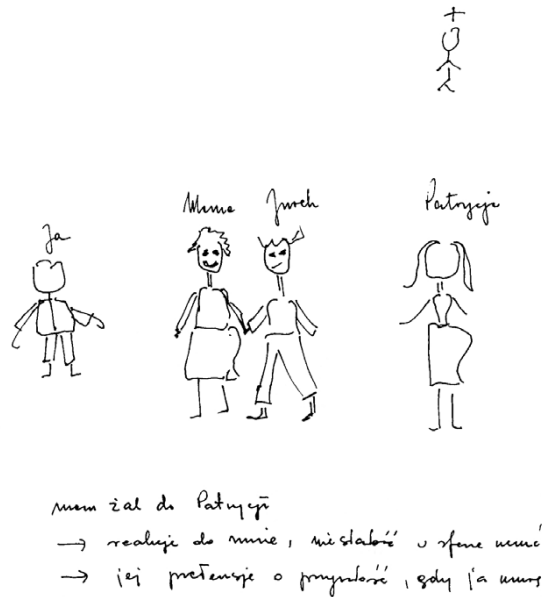


Fig. 4. Drawing by anorexia patient K. P. in early July 2006 [Text above each person: Ja – Me, Mama – Mom, Jurek – George, Patrycja – Patricia; text under the picture: Mam żal do Patrycji – I am angry at Patricia, reakcje do mnie, niestabilność w sferze uczuć – her reacting to me, lack of emotional stability; jej pretensje o przyszłość, gdy ja umrę – her complaints about the future, when I die]

It can be seen that the patient again drew himself with hardly any facial features. He is wearing a suit and short trousers. The figure is much smaller than the others, although the patient is in fact the tallest person in his whole family. The mother is wearing a loose blouse and a skirt, although in fact she always wears trousers. The step-father looks nice, although he lacks feet; it is worth noticing that he is a bit shorter than the mother, although in reality he is much taller. The sister is wearing a blouse and a skirt of a rather sexy kind; nevertheless she lacks her right hand and facial features. The father is a stereotyped stick figure lacking any kind of face, with a cross above his head to suggest that he is dead.

A stereotypical distribution of family members is maintained: parents in the middle, children to the side. The distance between the patient and the rest of his family is a subject of some concern, but he stands on the mother's side. The parents occupy a slightly lower platform compared to the patient, and his sister is even lower. The father, on the other hand, seems to be hanging in the air.

On the left hand side of the paper the patient wrote his current problem: "I feel angry at Patrycja" (his sister), and below he wrote down the reasons for his negative attitude to her: "negative attitude to me, lack of emotional stability" and "her complaints about the future, when I die".

On the hermeneutic level, the patient definitely wanted to underline his sensation of being isolated from the family, which is united against him. His attention was drawn to the fact that he located himself the closest to his mother in the picture. After some consideration he agreed that he loved his mother, and he realized it is he who rather isolates himself from the family. When the smiling faces of his mother and step-father were pointed out, he said that although some time ago he was angry at them for getting married, currently he wished them well. Nevertheless, he was most sorry about his sister, since she was emotionally unstable and at one moment had a positive attitude towards him, and at another moment, negative. It is a typical “emotional swing” which makes building normal relationships difficult. The sister is always complaining she cannot rely on him in any circumstances and is greatly worried he will die, because one cannot live without food, and he has already become a terrifying, fearsome “skeleton”. Such complaints are, according to the patient, “silly and annoying”, they upset him and block him from recovering. Apart from that he is still disturbed by the fact that his biological father, despite being dead, is still alive in his memories, which is rather unpleasant to him, because these are sinister recollections from his childhood he would rather not talk about. He adds that it is rather obvious that a person who was beaten by his own father could be insane. He also complains about feeling great anxiety when he has to talk about “domestic violence” - as he calls it – or when someone touches him.

In the criticism phase, the statements in the picture indicate that the patient has relocated his complaints and regrets from his father (and possibly from his mother as well) onto his sister. During therapy the phenomenon of displacement was discussed, and after some time the patient decided that the genuine source of all evil in his family was his late father. The unresolved conflicts before his death remained buried deeply within the psyche of all other members of the family, disturbing their mutual relations. The patient also realized that he had displaced his justified anger, first onto his mother and then onto his sister. He also admitted having been jealous of his mother’s new relationship and love, when his fiancée left him, as well as being jealous of his sister’s beauty and the admiration she receives from men. He perceives himself as he drew: badly dressed, dull, without a face, not being any kind of object of someone’s desire or even interest. He would like to have a girlfriend, but he immediately adds, “Who would want me now?”. The emotional support he received consisting in explaining that things are not as bad as the patient perceives them. It seems clear that he is aware, at least partially, of the sexual basis of his disorders.

Currently, after the last crisis intervention, the patient prepares his own meals and has started to eat more regularly. Although the so called refeeding effect occurred and the vital parameters dropped dramatically at first, he did not give in. He started intense cardiology treatment. He continues general and psychiatric treatment. He also takes his medicines systematically,

because his memory is much better now. What is more, in order to remind himself about the time a drug should be taken, he has introduced mnemonic techniques (various ring tones on his mobile phone). He is continuing neuropsychological therapy, art therapy, and attending a psychotherapeutic group, as well as (recently) participating in family therapy sessions.

CONCLUSIONS AND DISCUSSION

Summing up it should be stated that during a half year of treatment as described above the patient achieved a significant improvement in terms of his cognitive and emotional processes, and gained 8 kg of weight. He is planning to re-enter college studies. What is more, he has begun to think about himself as a person, who should stop complaining and start dating girls again. He understood that the fact his fiancée left him does not mean that he is worthless and will be rejected by everyone. He repeatedly emphasizes that he no longer feels “deadlocked” or “hanging in the air”, because he has hope for the future.

The case described here reveals the influence of numerous stereotypes, which after some time start existing autonomously, destroying the patient's will to live, or even his survival instinct. This instinct belongs (in microgenetic terms) to the very foundation of the central nervous system, which is the brain stem with mesencephalon. This is why, in our opinion, it is so difficult to treat persons with anorexia. In the light of our results, studies conducted by other authors and our own observations, it seems that anorexia should not be considered only as a neurosis. However, it remains unknown why in the case of anorexic people the basic reflex of putting food into the mouth in order to satisfy hunger is diminished or impaired. In the case described here a series of events made the patient lose the aim of his life completely and in one moment, since all his stereotypes began to fall apart. What happened later could be classified a catastrophic reaction, as described by Goldstein (1995). The patient was clinging to the remaining stereotypes, which, as he himself wrote on Fig. 2, “blocks changes.”

Drawing therapy played an immense role in the healing process, which was supported by talking and psychological help. The patient received significant insight into the basis of his problems. Nevertheless, insight alone is not sufficient in the case of people with anorexia. The disorder lies deeper, therefore the therapeutic techniques must include strategies that would explore the structure of the patient's identity even deeper. We are certain that sooner or later the existential anger directed towards the father (anger is one of the most fundamental, therefore most primitive emotions), which is now directed by the patient towards his mother, sister, and first of all towards himself, must find a different means of expression. However, one should remember that at this lowest floor both problems and solutions are usually equally simple and drastic, which is why they are sometimes so dangerous.

It is worth posing a question here, beyond just why the patient fell ill: why is he now recovering? Why did he start to eat? The neuropsychological rehabilitation played an immense role, since it was oriented at reducing cognitive functioning disorders, especially selectivity of attention, working and prospective memory and executive functions. The mnemonic aids proved very helpful, because they reminded him to do certain things (by means of an alarm clock, phone ringing etc.). Stimulation of the reward system was also used (e.g. a pleasant atmosphere during a meal, acceptance of choices being made, enriching meals with dishes the patient likes). In anorexia, as in acute depression, the reward system (see Fig. 5), which provides the feeling of pleasure, is weakened, or even paralyzed. Of course a crucial role here is played by neurotransmitters (especially dopamine deficiency and excessive serotonin).

Life becomes senseless, which may end with suicide in deep depression, and starving to death in anorexia. As in the situation when the lack of stimulation of a single neuron leads to activating the genetically programmed self-destruction of the cell (apoptosis), the lack of stimulation from the reward sys-

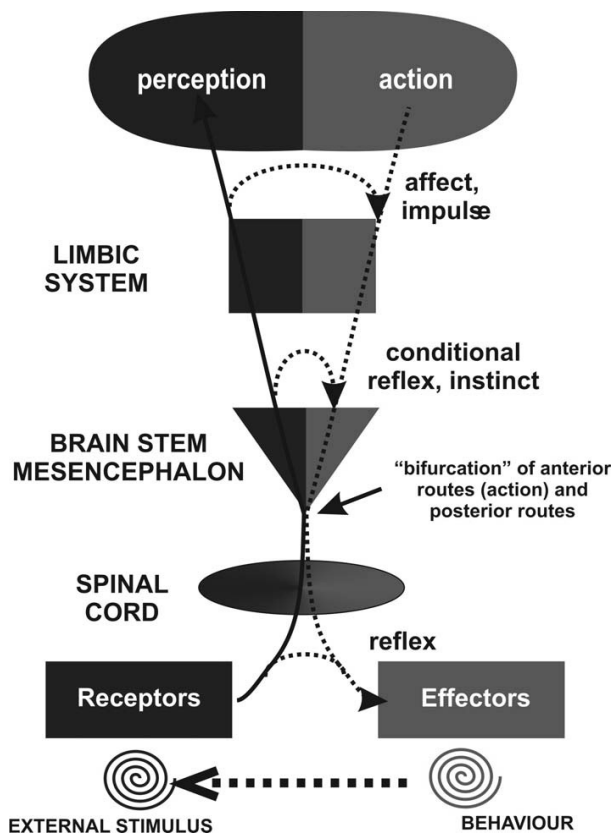


Fig. 5. Reward system [From: Paçalska, 2008]

tem may trigger a reaction in the organism, which would be of a catastrophic nature, resulting in self-destruction (Laatsch et al., 1997). In some cases this may be the reason for suicidal thoughts, or even suicide attempts; nevertheless, this act requires some strength of body and will from the person, so as to jump from the window, tie a rope around one's own neck and jump from a chair, or put a gun against one's head and pull the trigger, etc. In some cases anorexia may be a reaction to a complete loss of hope (Robins & John, 1996).

We know too little about what is going on in the brain of a person who has lost all motivation to live. Is it enough that the reward system fails to make a person feel that she has something to live for? Can the lack of appetite signal a will to self-destruction, which is stronger than the basic biological drives? If this is so, it would suggest that the very will to commit suicide or facilitate one's own death are basic instincts. Perhaps this is the neuropsychological basis for the death drive described by Freud in the last years of his productivity; he located it in the unconsciousness and called it Thanatos, parallel to but separate from Eros. So far these and other terms derived from psychoanalysis have not been treated too seriously by neuropsychologists, but we recommend considering what the cerebral mechanisms of an organism's self-destruction could be.

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