

BARBARA GÓRNIK
Regional Hospital in Hrubieszów
Neurological Department with Division of Stroke Medicine

Influence of emotional disorders on process of recovery disordered language skills at neurological patients

SUMMARY

The main purpose of this publication is to show how emotional disorders influence the process of recovery of disordered language skills after the undergone stroke. The article is divided into two parts: the theoretical and the research one. The first part deals with the problems faced by neurological patients while gaining back lost language skills. The pattern how to behave in case of aphasia and various backgrounds of emotional disorders have been analysed. What is more, the work of Andrzej Kokoszka entitled "Krótka skala samooceny depresji i lęku" ("A short scale of self-evaluation of depression and fear") has been presented. The research part uses clinical data of two patients treated on Neurological Department of Regional Hospital in Hrubieszów. The initial information (collected by medical interview, clinical observation, the results of specialist research) were contrasted with final results (received on the basis of the research conducted once again: after nine-week of intensive process aimed at improving disordered functions). Having analysed the received research material thoroughly, the conclusions were drawn: psychological help is needed in case of deep depressive disorders. Different ways of trying to improve language disorders, without taking into account emotional ones, do not give desired effects.

Keywords: emotional disorders, aphasia, language skills, brain plasticity, rehabilitation.

THE MECHANISM OF REGAINING LANGUAGE FUNCTIONS AT PATIENTS WITH NEUROLOGICAL DYSFUNCTIONS

The neurological rehabilitation is a process of making people with various brain damages able to function in the society and improving their lives to a great extent. The main element of neurological rehabilitation is the therapy of language and communications disorders. The above mentioned disorders are so varied and complicated that a therapist must be really careful when choosing the best me-

thod for a therapy session. The most important therapist's task is to choose such a method which will make a patient overcome communication problems as soon as possible. The therapy should be based on analytical diagnosis and dysfunctions while producing speech and should concentrate on the predominant fault in the process of speech making (Seniów, Nowakowska 1978). At the beginning of patient's recovery it is crucial to prevent disadvantageous psychogenic changes. In the first part of the therapy it is important to stop functions which were disordered by dynamic changes in the central nervous system (by direct stimulating and psychotherapy actions). The next stages of therapist's work should focus mainly on the attempt to improve disordered speech function system, which means replacing it by system functioning properly but whose role has been different so far (it is done by replacing or rebuilding).¹ It is ought to be known that the process of regaining language functions is possible to happen when various compensation mechanisms cooperate, that is why the therapist should use different methods at the same time.

NEUROLOGICAL BEHAVIOUR IN CASE OF MOTOR-KINESTHETIC LANGUAGE DISORDERS

In case of motor aphasia the predominant dysfunction is a visible impairment of verbal expression. Speech functions, such as: repeating, naming and spontaneous speaking are significantly limited. This problem is usually connected with the damage of the cerebral cortex – the bottom part of postcentral gyrus (parietal operculum) and lower part of premotor area (central operculum) of the dominant side of the brain (Łuria 1967).

The main form of disturbances of the aphasic type is motor-kinesthetic aphasia (also called afferent aphasia).² It is characterized by disturbances of analysis and synthesis feeling sensations coming from speech organs. The main reason of these difficulties is inability of finding a proper way of articulation organs arrangement while phonic realization. The produced text is phonetically distorted. The

¹ Contemporary scientific research show six different biochemical and psychological mechanisms of brain plasticity: 1) proper recovery – when axon of damaged neuron sends new fibres, making so called working synapses close to damaged place; 2) side recovery – when neurons surrounding damaged neuron send dendrites, completing the missing links; 3) cerebral reserve – the use of inactive synapses as alternative workout to provide information; 4) reconstruction of the neuron network – when the cells surrounding neurotic area send dendrites to other not damaged cells, making new pathways at the same time; 5) denervation hypersensitivity – when saved afferent fibers make stronger reactions in a postsynaptic cell, replacing faulty fibers; 6) long term activation of potentials – quick and more effective transmission of neurons (Pačalska 2007, 218–219).

² The classification of disorders by A. Łuria covers three forms of motor aphasia: (1 – kinesthetic // afferent, 2 – kinetic // efferent, 3 – dynamic), two types of sensory aphasia (1 – acousto-agnostic, 2 – acousto-mnestic) and semantic aphasia (Łuria 1967).

same difficulties occur in patient's writing production. Although the understanding process is often intact, deficits in phonematic hearing may appear occasionally.

Speech rehabilitation in case of motor-kinesthetic aphasia consists of series specific therapeutic actions (Pačalska 2003; Maruszewski 1974; Strachalska 2002):

a) the initial stimulation for oral expression - using of series therapeutic actions making a patient use these forms of communication which are automatic and involuntary;

b) wordless exercises of articulation system - the exercises should be done in two ways (I - tests to imitate specific articulatory motor patterns, II - tests to make some oral movements but only following therapist's orders and clues – without imitation);

c) exercises making possible to regain the ability of articulating sounds in isolation - using the visual analyzer; speech sounds which differ in terms of articulation are introduced first in times; later the main emphasis is put on sounds with similar articulation pattern;

d) attempts to integrate speech sounds into concrete words - the main aim of these exercises is to remember a proper hearing pattern by process repeating and naming - gradually eliminating words disruptions and deformations (sounds paraphasias, words covering, loss of concrete speech sounds at produced words, loss of steady motor and hearing words pattern...);

e) making developed statements - attempts to make sentences while describing pictures and create dialogs based on previously learnt language skills;

f) attempts to rebuilt lost abilities to write and read - exercises which are based on the restoration and consolidation of a visual image of the letter, tests of analysis and synthesis of sound and spelling of the word.

The rehabilitation exercises of language functions take place a few times a day, but their length depends on the patient state and condition - his fatigue, activity level, the depth of language dysfunctions, his motivation and other disorders. In the first part of therapy the most important thing is to make a proper emotional contact with a patient; automatic and involuntary verbal sequences are used to create closer relationship with him. More difficult and complicated communication and language exercises are introduced after some weeks of speech rehabilitation (Szumska 1980).

EMOTIONAL DISORDERS AFTER BRAIN DAMAGE

Emotional system can be defined as automatic emergency system based on processes needed for a quick assessment of things in the outside world and for immediate activation of a limited number of inborn behavior pattern (Pačalska

2007, 387). In clinical practice emotional disorders are considered with two ways:

a) physical / neurological aspect: emotional layer may be disturbed because of the damage of limbic system or other brain parts connected with this system in a dynamic way (lower and medial part of frontal lobe); in a clinical practice there are three characteristic behavioral groups of specific symptoms and different intensity³;

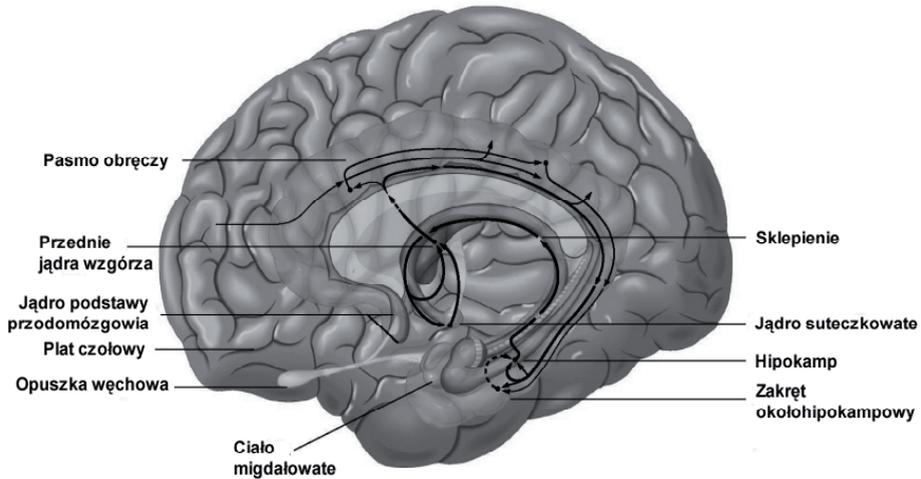


Fig. 1. The Limbic system (Herzyk, Borkowska 2002)

Translation: *pasmo obręczy* (*tract of girdle*), *przednie jądra wzgórza* (*front nuclei of thalamus*), *jądro podstawy przodomózgowia* (*basal nucleus of prosencephalon*), *płat czołowy* (*frontal lobe*), *opuszka węchowa* (*olfactory bulb*), *ciało migdałowe* (*amygdaloid body*), *sklepienie* (*fornix*), *jądro suteczkowate* (*nucleus of mamillary body*), *hipokamp* (*hippocampus*), *zakręt okołohipokampowy* (*hippocampal gyrus*).

b) psychological / psychical aspect: neurological problem happening quite often becomes a really difficult experience for a patient; it may have negative influence on patient's psychical functioning – the inability of dealing with a difficult situation leads to a various emotional reactions.⁴

³ Behavioral groups based on neurological aspect: 1) syndrome of right hemisphere deep apathy – characterized by lack of any emotional reaction to stimulus; 2) emotional lability – characterized by inability to control unaccepted emotional reactions; 3) anxiety or depression symptoms – deep sadness or fear without any concrete reason (Pachalska 2007).

⁴ Characteristic emotional reactions based on clinical observation: 1) apathy – the state of lower sensitivity of emotional and psychical impulses; 2) catastrophic reaction – fear or anxiety difficult to control or stop; 3) anxiety or fear reactions (Herzyk, Borkowska 2002).

The deep analysis of emotional and personality disorders is a crucial element needed to create the special therapeutic program of improvement disordered functions. The introduction of various psychotherapy methods allows to achieve quick results in the process of neurological rehabilitation.

A SHORT SCALE OF SELF-EVALUATION OF FEAR AND DEPRESSION

In 2008 Andrzej Kokoszka analysed an easy method to diagnose depression and anxiety states in case diabetes.⁵ The specific construction of this scale makes it possible to use it in clinical researches, taking into account not only diabetes. It takes less time to use this method than any other one available on a medical market.⁶

The pattern of “A short scale of self-evaluation of fear and depression” is not very complicated. It consists of ten steps using the scale of 11 points, with answers from 0 to 10 points. The total results may be 100 points maximum (max. 50 points in a single subscale) – a patient’s questionnaire is placed in Enclosure 1.

Factors taken into account in Depression Scale:

- 1) mood,
- 2) feeling of energy,
- 3) power of interests,
- 4) ability to experience pleasure,
- 5) pace of thinking and action.

Factors taken into account in Anxiety Scale:

- 1) anxiety, nervousness, psychical pressure,
- 2) restlessness (feeling of danger without any reason) or fear of specific danger,
- 3) apprehension, being afraid of what might happen,
- 4) feeling of physical pressure (muscles tension, shivering hands, sharp pain...),

⁵ This text was published in medical journal *Medic Guide* (Kokoszka 2008, 74–81).

⁶ The most frequently used psychometric tests for evaluating emotional disorders: 1) Hospital Scale of Anxiety and Depression – used in order to find people treated in hospital and suffering from anxiety and depression; 2) Hamilton Scale of Depression – made for psychiatric use; 3) Beck’s Depression Scale; 4) Wimbledon Scale of Self-Evaluation – scale for patients after cerebral strokes; 5) Neuropsychiatric Inventory – neuropsychiatric evaluation for patients with dementia (Pąchalska 2007, 402).

5) Avoiding situations which cause anxiety (situations of hiding and withdrawing).

Patients quite often suffer from anxiety and depression disorders, that is why, while analyzing the above described method, we should consider results taken from both subscales. The results are divided into three categories:

- I results from 0 to 8 points: lower level of anxiety and depression disorders,
- II results from 9 to 27 points: average level of anxiety and depression disorders,
- III results from 28 to 100 points: high level of anxiety and depression disorders.

THE MAIN ASSUMPTIONS AND THE METHOD OF DESCRIPTION

The main purpose of this publication is to show how emotional disorders influence the process of recovery of disordered language skills after the undergone stroke. For achieve this purpose it took advantage of this clinical informations of two patients treated on Neurological Department of Regional Hospital in Hrubieszów. The initial information (collected by medical interview, clinical observation, the results of specialist research) were contrasted with final results (received on the basis of the research conducted once again: after nine-week of intensive process aimed at improving disordered functions). Having analysed the received research material thoroughly, the conclusions were drawn.

SHORT CHARACTERISTICS OF TWO PATIENTS

Hospital informations

a) patient 1

Personal informations: name - Teresa // date of birth: 11.06.1948 // married // technical secondary school education // currently pensioner // date of admitted to hospital: 19.05.2013.

Clinical diagnosis: left hemisphere cerebral stroke // disseminated angiogenic focal points of both cerebral hemispheres // cerebral atherosclerosis // arterial hypertension // diabetes // heart disturbances // hypercholesterolemia // habitual luxation of right junction shoulder.

CT: leukoarajosis periventricular // hypodense focal points at the left cerebral hemisphere and widen perivascular spaces.

b) patient 2

Personal informations: name – Zofia // date of birth: 08.03.1931 // widow // technical secondary school education // currently pensioner // date of admitted to hospital: 31.07.2013.

Clinical diagnosis: cerebrovascular disease // right hemiparesis // atherosclerosis of carotid artery // chronic circulatory insufficiency // ischemic heart disease // arterial hypertension // valvular incompetence // arthrosis.

CT: small focus of contrast intensification at basal part of right frontal lobe without edema // small hypodense changes in both cerebral hemispheres – probably angiogenic focal points and widen perivascular spaces.

The initial research of language functions

In the first period of neurological rehabilitation both patients had similar language dysfunctions (type of motor–kinesthetic aphasia). The detailed description of irregularities is presented in the Table 1 and Figure 2.

Table 1. Specification of abnormalities in two female patients⁷

Language functions		Patient 1	Patient 2
I Realization of automatism		1	1
II Process of repeating	a) sounds in isolation	2	1
	b) syllables	2	2
	c) words	3	2
	d) sequence of words	3	2
	e) separate sentences	3	2
III Process of naming		3	2
IV Spontaneous speech	a) phrase length	3	2
	b) grammatical forms	2	2
	c) paraphasia	3	2
	d) speech intonation	2	1
	e) speech understanding	3	2
V Phonematic hearing		1	0

⁷ The analyses of the most important language functions was done on the bases on notes by Włodzimierz Łucki (Łucki 1995).

Tab. 1.

VI Understanding processes	a) understanding of orders and single names	1	0
	b) understanding of syntactic constructions	1	1
	c) understanding of inflexion structures	1	1
	d) understanding of opposities	0	0
	e) understanding of metaphors	2	1
VII Writing process		3	2
VIII Reading process		3	2
IX Awareness of deficiencies		0	0
	Total	42	28

Arabic numbers stand for degree of intensification of the abnormality, which means: 0 – lack of abnormalities; 1 – slight abnormalities; 2 – average abnormalities; 3 – severe abnormalities.

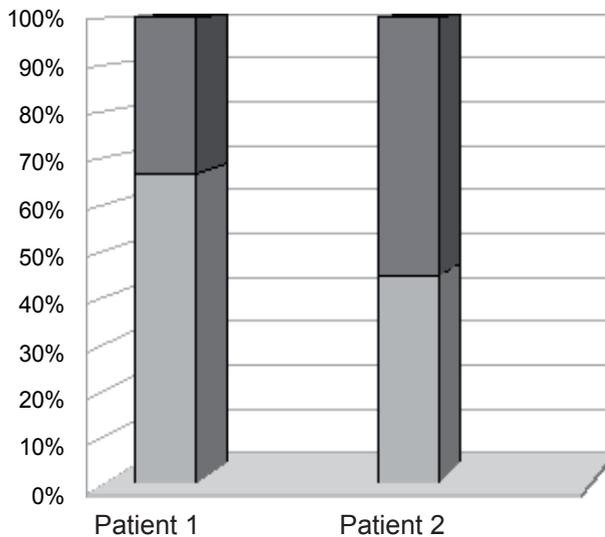


Fig. 2. Percentage of language disorders

According to the above results, a patient suffering from all language dysfunctions is able to get 63 points totally. All received results are:

Patient 1: got 42 points together (66,6% of language disorders – lighter field on the Fig.; 33,33% accounts for not disordered functions – darker field on the Fig.);

Patient 2: got 28 points together (44,44% of language disorders - lighter field on the Fig.; 55,56% accounts for not disordered functions - darker field on the Fig.).

The preliminary assessment of anxiety and depression disorders

In the first period of neurological rehabilitation the patients undergone the assessment of anxiety and depression disorders (according to “A short scale of self-evaluation of anxiety and depression” by Andrzej Kokoszka). Because of serious writing and reading difficulties, all the scale’s steps were done orally. One family member of each patient, who was able to compare patient’s condition after and before the neurological problems and who was a kind of help for the therapists, took part in the examination. The lack of deep disorders of understanding processes allows to carry out the assessment. The received results are presented in the table 2.

Table 2. Results of self-assessment test for unimpaired understanding of verbal messages in both female patients

Examined people:	I	II	III	IV	V	VI	VII	VIII	IX	X
Patient 1	0	0	3	1	2	0	0	0	0	0
Patient 2	7	6	6	6	8	7	5	5	5	5

Patient 1 - got 06 points together (lower level of anxiety and depression disorders);

Patient 2 - got 60 points together (high level of anxiety and depression disorders).

Complex improvement of disordered functions

Both patients received the same tasks from the physiotherapists on the first days of hospitalization. Kinesitherapy (exercises of body movement – big motor activity)⁸, manual therapy (exercises of palm - small motor activity) and speech therapy (regaining disordered language skills) were introduced. The activities la-

⁸ Proper choice of exercises is a fundamental basis of neurological rehabilitation. Their aim is to bring back proper movement patterns, being able to assuming of erect position, improve walking and self-service processes (Laidler 2004).

sted for nine weeks – Sunday was free for resting. In both cases the speech therapy was conducted in a similar way (because of the similar language disorders)⁹.

The first patient was willing to cooperate with medical staff during the rehabilitation. Her ambition, perseverance and willfulness quickly contributed to first therapeutic successes. Whereas the second patient was not so willing to cooperate; because of anxiety and depression disorders at first, she hardly participated in the exercises. She did not believe, that she was able to succeed; she was not motivated enough. She also suffered from attack of hysteria, emotional disorders or sudden crying. That is why, in her case, individual psychotherapy were introduced. After a week she finally started cooperating and took part in all activities. The first small achievements were visible after several days. This patient had an individual psychotherapy till the end.

Additional examination of language functions

Another assessment of language functions was carried out in the ninth week of intensive reeducation work. The received results are presented in the table 3 and enclosed Figure 3.

Table 3. Assessment results of language capabilities in the 9th week of rehabilitation of both female patients

Language functions		Patient 1	Patient 2
I Realization of automatism		0	0
II Process of repeating	a) sounds in isolation	0	0
	b) syllables	0	1
	c) words	1	2
	d) sequence of words	2	2
	e) separate sentences	2	2
III Process of naming		2	2
IV Spontaneous speech	a) phrase length	2	2
	b) grammatical forms	1	2
	c) paraphasia	2	2
	d) speech intonation	1	1
	e) speech understanding	2	2

⁹Neurological speech therapy concentrated on the limitation of language dysfunctions connected with motor-kinesthetic aphasia: the used exercises were described in the theoretical part of this publication (chapter 2).

Tab. 3.

V Phonematic hearing		0	0
VI Understanding processes	a) understanding of orders and single names	0	0
	b) understanding of syntactic constructions	0	0
	c) understanding of inflexion structures	0	0
	d) understanding of opposities	0	0
	e) understanding of metaphors	1	1
VII Writing process		2	2
VIII Reading process		2	2
IX Awareness of deficiencies		0	0
	Total	20	23

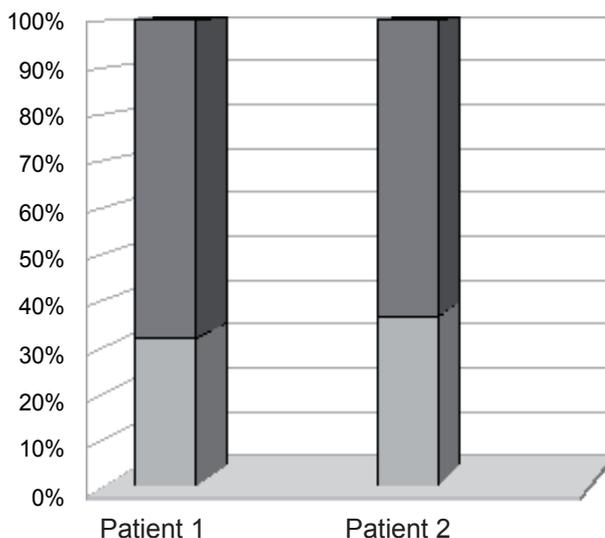


Fig. 3. Percentage of language disorders

Patient 1: got 20 points together (31,74% of language disorders – lighter field on the Fig.; 68,26% accounts for not disordered functions – darker field on the Fig.);

Patient 2: got 23 points together (36,51% of language disorders – lighter field on the graph; 63,49% accounts for not disordered functions – darker field on the Fig.).

The initial and additional results were compared and it was stated that language abilities of both patients really improved :

Patient 1: language abilities increased by 34,93%;

Patient 2: language abilities increased by 07,93%.

Additional assessment of anxiety and depression disorders

In the final period of patient's rehabilitation anxiety and depression disorders were analyzed once again. Because of great improvement of language and communication abilities (also reading and writing processes), every steps of self-evaluation scale were presented in both versions (orally and on the paper). The received results are compared below:

Table 4. Results of the self-assessment scale of depressive and anxiety disorders in both patients

Examined people:	I	II	III	IV	V	VI	VII	VIII	IX	X
Patient 1	0	0	1	1	1	0	0	0	0	0
Patient 2	1	1	2	2	2	1	1	1	1	1

Patient 1: got 03 points together (lower level of anxiety and depression disorders);

Patient 2: got 13 points together (average level of anxiety and depression disorders).

The initial and repeated results were compared and it was stated that emotional condition of both patients got better:

Patient 1: anxiety and depression disorders decreased by 3%;

Patient 2: anxiety and depression disorders decreased by 47%.

CONCLUSIONS

The first patient, who suffered from more severe language disorders, got better results. She was more concentrated on work with the speech therapist and quickly learnt specific language skills. Whereas the second patient was working differently. She was unable to participate in activities until her negative emotions were calmed down. That is why her therapy was slower and less effective.

Deep anxiety and depression disorders always require psychological intervention. Any attempts to improve language disorders, without taking into account emotional and personality disorders, do not give desired effects.

Enclosure 1.

„A short scale of self-evaluation of fear and depression” – Andrzej Kokoszka

Personal informations about patient:

Examination date:

Please, try to judge your present emotional condition by writing X at the proper place.

Current emotional condition you should compare with the earlier stage of your life.

Number 10 means the most intensification of the concrete feature, that you can imagine.

I. Mood

0	1	2	3	4	5	6	7	8	9	10
<i>good</i>		<i>moderately smf</i>			<i>smf</i>		<i>very smf</i>			<i>extremely smf</i>

II. Feeling of energy

0	1	2	3	4	5	6	7	8	9	10
<i>good</i>		<i>moderately lmt</i>			<i>big lmt</i>		<i>very big lmt</i>			<i>complete lmt</i>

III. Power of interests

0	1	2	3	4	5	6	7	8	9	10
<i>normal</i>		<i>moderately weakened</i>		<i>considerably weakened</i>			<i>very weakened</i>			<i>complete lmt</i>

IV. Ability to experience pleasure

0	1	2	3	4	5	6	7	8	9	10
<i>normal</i>		<i>moderately weakened</i>		<i>considerably weakened</i>			<i>very weakened</i>			<i>complete lmt</i>

V. Pace of thinking and action

0	1	2	3	4	5	6	7	8	9	10
<i>normal</i>		<i>moderately weakened</i>		<i>considerably weakened</i>			<i>very weakened</i>			<i>extremely weakened</i>

VI. Anxiety, nervousness, psychical painness

0	1	2	3	4	5	6	7	8	9	10
<i>lmt</i>		<i>moderate</i>			<i>big</i>		<i>very big</i>			<i>extreme</i>

VII. Recklessness (feeling of danger without any reason) or fear of specific danger

0	1	2	3	4	5	6	7	8	9	10
leci		moderate			big		very big			extreme

VIII. Apprehension, being afraid of what might happen

0	1	2	3	4	5	6	7	8	9	10
leci		moderate			big		very big			extreme

IX. Feeling of physical tension (muscle tension, shivering hands, sharp pain...)

0	1	2	3	4	5	6	7	8	9	10
leci		moderate			big		very big			extreme

X. Avoiding situations, which cause anxiety (situations of hiding and withdrawing)

0	1	2	3	4	5	6	7	8	9	10
leci		moderate			big		very big			extreme

BIBLIOGRAPHY

- Herzyk A., Borkowska A., 2002, *Neuropsychologia emocji – poglądy, badania, klinika*, Wyd. UMCS, Lublin.
- Kokozska A., 2008, *Krótką Skala Samooceny Depresji i Lęku. Opis konstrukcji oraz właściwości psychometryczne dla osób z cukrzycą*, „Przewodnik Lekarza”, s. 74–81.
- Laidler P., 2004, *Rehabilitacja po udarze mózgu. Zasady i strategia*, Wyd. Lek. PZWL, Warszawa.
- Łucki W., 1995, *Zestaw prób do badania procesów poznawczych u pacjentów z uszkodzeniami mózgu*, z. A–C, Warszawa.
- Łuria A. R., 1967, *Zaburzenia wyższych czynności korowych wskutek ogniskowych uszkodzeń mózgu. Wprowadzenie do neuropsychologii*, Warszawa.
- Maruszewski M., 1974, *Chory z afazją i jego usprawnianie*, Warszawa.
- Pąchalska M., 2003, *Diagnoza chorego z afazją. Terapia chorego z afazją*, [w:] *Logopedia – pytania i odpowiedzi. Podręcznik akademicki*, t. 2, *Zaburzenia komunikacji językowej u dzieci i osób dorosłych*, red. T. Gałkowski i G. Jastrzębowska, Opole, s. 611–771.
- Seniów J., Nowakowska M. T., 1978, *Metody rehabilitacji chorych z zaburzeniami ekspresji słownej*, [w:] *Rehabilitacja chorych z afazją*, red. M. T. Nowakowska, Wrocław–Warszawa–Kra-ków–Gdańsk, s. 31–66.
- Strachalska B., 2002, *Ćwiczenia usprawniające aktualizację wyrazów w mowie osób z afazją*, Wyd. APS, Warszawa.
- Szumska J., 1980, *Metody rehabilitacji afazji*, PAN, Warszawa.