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DIAGNOSTICS AND PROGRAM OF PSYCHO-PEDAGOGICAL TREATMENT FOR SPEECH AND NON-SPEECH STUTTERING MANIFESTATIONS IN ADULTS VIA SMARTPHONE APPLICATIONS

Abstract. One of the priority goals of special education is to support people with disabilities, including stuttering adults, and assist them in successful adaptation and socialization in society. Therefore, training such persons to achieve speech fluency and communication skills under the natural conditions of daily communication is a matter of prime importance. The article contains the author's definition of the "actual speech communication conditions" as a current moment of interpersonal speech interaction significant for at least one of the interlocutors.

The author presents a brief overview of contemporary techniques of treatment of stuttering, as well as the basic stages and educational conditions required for realization of the authored program for rehabilitation of stuttering in adults via smartphone applications. He describes its purpose, objectives, content and lines of development aimed to train and automate verbal communicative skills in the process of functional training. The reliability of efficiency indicators of the suggested program is ensured by the author's method of psycho-pedagogical diagnostics, which makes it possible to obtain quantitatively comparable data on the frequency of stuttering moments (core behaviors), their duration and the nature of accompanying movements (secondary behaviors) before and after rehabilitation, which improves the reliability of statistical calculations. It has been proved that the realization of the program guarantees a significant improvement in speech fluency and communicative skills and their reinforcement in the course of functional training. The shaping of fluent speech in peculiar and typically significant situations is facilitated by the creation of pedagogical conditions including individual selection of the method of acoustic stimulation (rhythm, frequency-altered auditory feedback, masking noise, etc.), modeling verbal communicative situations providing gradual preparation for real communication, and variability of learning conditions. The actualization of

the created conditions and the effectiveness of the rehabilitation process are achieved through interrelation and continuity of its stages.

Keywords: diagnostics of stuttering; stuttering; logopedics; adults; rehabilitation of stuttering; speech disorders; persons with speech disorders; methods of treatment of stuttering; speech communication; psycho-pedagogical intervention.

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Stuttering is one of the most severe forms of speech pathology. If we take the recommendations of Avicenna (980—1037) for the treatment for this disorder related in *The Canon of Medicine* as the starting point, we will see that the methods and techniques of its treatment are almost a thousand years old. In spite of this fact, according to the modern scientific literature, the effectiveness of rehabilitation work, especially with adult patients, does not exceed 60% and only 20% taking into account the catamnestic 2-3 year long period [as cited in: 12].

To a great degree, this situation may be explained by the fact that non-speech disorders of situational-phobic character in adults suffering from stuttering (sharp limitation of the range of social interaction, reduction of communication with the peers of the opposite sex, telephone communication, etc.) are manifested in a most salient manner. Thus, the skills of communicative-verbal behavior of the stutterers in society

represent a pathological “architecture” of communicative activity which is characterized by hypersensitivity to socially significant speech situations directly provoking emergence of stuttering (speech convulsiveness proper). This “situation-bound phenomenon” of instability of stuttering manifestation depending on the change of communication conditions allows introducing the term “actual speech communication conditions” as a current moment of interpersonal speech interaction significant for at least one of the interlocutors [5].

The presence of frustrating component in the situation-bound communication of the stutterer which determines the variability of manifestation of stuttering in one and the same person makes it possible to speak about stuttering in adults as a combined disorder that needs creation of complex psycho-pedagogical programs aimed at restructuring the pathological stereotype of the communicative-verbal behavior under

actual speech communication conditions.

Today, we can single out the following methods of treatment for stuttering.

The method of complex medico-pedagogical rehabilitation of stuttering adults by N. M. Asatiani and N. A. Vlasova which is applied in hospital and is based on the approach by N. A. Vlasova [7].

The system of rehabilitation of adult stuttering people by V. M. Shklovskiy which closely combines logopedic, psychological, psycho-therapeutic and neurological intervention [13].

The system of complex logopedic and psycho-therapeutic intervention to treat stuttering in adults by Yu. B. Nekrasova, further considerably developed by *E. Yu. Rau*. The essence of the method consists in stimulation, amplification and reinforcement of sanogenetic states leading to speech readiness in training freedom of changing psychological states, which facilitates real communication [10; 11].

The method of L. Z. Arutyunyan. The given method is defined by the author as a method of stable normalization of speech in stuttering. The method is characterized by significant slowing down speech tempo, called "feat tempo", and its consecutive synchronization with the fingers of the leading hand which determine the rhythmic-intonational contour of the phrase [1].

The new method of treatment for stuttering by Yu. A. Fesenko and M. I. Lokhov. This method is based on the supposition that all speech disorders are consequences of the primary lesions of brain structures and impairment of interaction between the structures responsible for speech production. Rehabilitation is held on the background of psychopharmacological medication accompanied by logopedic exercises [12].

The program for rehabilitation of stuttering in adults via smartphone applications with rhythmic effect [5] worked out by *S. V. Gussarov* and *E. Yu. Rau* and approbated on more than 70 patients by now. The program showed high efficiency corroborated by statistical data. The suggested program is based on the results of studying the use of acoustic stimuli to overcome speech convulsiveness in adult stutterers [2]. On the basis of preliminary investigation results, we have chosen the rhythmization of 80 metronome beats per minute as the leading technique in the suggested program. In addition, we also used acoustic feedback with the -0.5 octave frequency offset and a white noise muffler (50dB). The above mentioned methods of intervention were technically produced with the help of the patients' personal smartphones. Free applications like *Metronome beats*, *Voicesmith*, *White Noise Generator*, etc. were used as

software means of acoustic signals playback.

The realization of the program was preceded by a complex psychopedagogical diagnostics one of the main components of which was the “*Assessment of Degree of Speech and Non-speech Stuttering Manifestations in Adults*” (S. V. Gusarov, E. Yu Rau) [4] during public speech of the experiment participants. The suggested method allows obtaining the following precise quantitative data:

- frequency of stuttering moments,
- average duration of the longest stuttering moments,
- manifestation of accompanying movements during speech —

and to compare them before rehabilitation and after it, which improves the reliability of statistical calculations in the assessment of effectiveness of the psycho-pedagogical intervention. The authored variant is based on the standardized method of assessment of the degree of stuttering manifestations SSI-4 (Stuttering Severity Instrument, G. D. Riley) [14; 15].

In accordance with the suggested method, five degrees of disorder manifestation are singled out: super mild, mild, moderate, severe and super severe. The diagnostic procedure presupposes obtaining video recordings of the patients’ spontaneous speech, their preliminary procession and analysis with the

help of free software, as well as methods of data assessment.

The indicators obtained – the number of syllables with stuttering moments, their duration and manifestation of accompanying movements – may be used for their comparison in different patients or may be compared with the indicators discovered in the same patient at different stages of rehabilitation. And the total scores of all three indicators make it possible to classify stuttering according to the degree of its manifestation.

The diagnostics results allow comparing the degree of the manifestation in various speech situations provoking stuttering and in natural communication. If necessary, the experimenter can undertake comparison in only one or two parameters.

Secondary observation at various stages of rehabilitation course allowed us to reveal the dynamics of speech and non-speech manifestations of stuttering in patients and to assess the effectiveness of the psycho-pedagogical intervention performed.

Signs of stuttering were absent in 85.9% of the patients immediately after the course of special training and in 77.2% at the end of the two-year catamnestic period. Immediately after training, no stuttering was observed in 69.4% of the control group members who had taken a traditional rehabilitation course.

The suggested “*Program for rehabilitation of stuttering in adults via smartphone applications ...*” allows changing pathological skills of communicative-verbal behavior on the whole (convulsive and accompanying motor manifestations), as well as automating the skill of fluent speech under natural conditions.

The aim of the Program consists in helping stuttering adults acquire communicative-verbal skills and facilitating their automation in the course of functional training.

The Program tasks include formation of fluent speech and communicative skills in stuttering adults, reinforcement of the communicative-verbal skills in classroom situations and their automation under the conditions of real speech communication.

The effectiveness of the Program is achieved via realization of four interconnected stages the content of which is made up of the complex of logopedic and psycho-rehabilitation techniques worked out taking into account:

- the modern tendencies of special equipment application in rehabilitation of stuttering people;
- individual for each, and typical for the majority of patients specificity of speech and non-speech stereotypes in the structure of stuttering of adults during communication;

- individual and typical nature of communicative-verbal situations provoking stuttering;
- individual-typological character of impact of acoustic stimuli on convulsive manifestations in the structure of stuttering.

The beginning of logopedic work presupposes intervention in the basic speech components – sound, syllable, word, as well as further development of the skills of fluent speech in monologue and dialogue utterances under classroom conditions of communication in a group of patients. The psycho-rehabilitation techniques are realized in functional training under artificially created (modeled) conditions in the process of role playing, holding discussions, etc. in different variants of role-play situation-bound communication. They are targeted at gradual transition of group functional training from the logopedic classroom to the real conditions of speech communication (situations of problem-based speech communication). Thus, the learners simultaneously acquire the skills of fluent speech and adequate emotional response to an interlocutor (or a group of people) in emotionally significant situations working out the strategies of interaction with strangers in the situation of a public speech, telephone conversation, etc. Then, the acquired knowledge is automated in all individually and typologically signifi-

cant speech situations. This makes it possible to generalize and single out the main *pedagogical conditions* of formation of fluent speech in stuttering adults via mobile technical means under the conditions of real speech communication:

- individual choice of acoustic stimuli with relation to the degree of manifestation of the disorder, individual psychological problems and the specificity of the communicative situations;
- modeling individual and typical speech situations ensuring step-by-step training for the real communicative conditions;
- variation of the training conditions the aim of which is to ensure the optimal amount of psychopedagogical measures and differentiated application of rehabilitation technologies in evaluating the individual properties of the participants.

The actualization of the pedagogical conditions and removal of disorganizing factors in the process of training are facilitated by the interrelationship and continuity between the stages of the program. Let us enumerate them:

- Information-analytical stage, devoted to collection of anamnestic data and complex psycho-pedagogical diagnostics.
- Organizational or planning stage. It results in the structural program of the rehabilitation process prepared for realization with regard to the patients' individual properties.

- Active rehabilitation stage. Its main aim is to achieve speech fluency in all participants without technical support and in all individually and typically significant situations.

- Correcting and regulating stage. It is a stage of secondary diagnostics, assessment of results, correction of the methods and techniques of special training.

The program of psycho-pedagogical intervention includes interrelated *areas* of rehabilitation work which reflect its basic *content*:

- diagnostic work – it ensures identification of the degree of manifestation of disorder and personal qualities of the patients, as well as the specificity of response to the acoustic stimuli;
- preparatory training – it ensures organization of the rehabilitation process and allows creating the conditions guaranteeing its maximum effectiveness;
- rehabilitation – it provides specialized support by a logopedist for development of the skills of fluent speech and formation of the communicative skills in the situations provoking stuttering;
- information-counseling work – it is aimed at explanatory activity connected with further independent work and the disorder relapse prevention.

Program content characteristics

Diagnostic work includes:

– complex collection of anamnestic data and analysis of the patients' diaries according to Yu. B. Nekrasova [10];

– identification of stuttering manifestation with the help of the modified method of G. D. Riley, SSI-4 (S. V. Gusarov, E. Yu Rau) [4];

– study of the effect of the acoustic stimuli on stuttering convulsive moments (SSI-4) and the patients' well-being according to A. B. Leonova [8; 9];

– study of the typical and individual speech situations presenting difficulties for the patients with the help of the authored questionnaire “*Study of Stuttering Manifestations under Various Conditions of Communication*” (S. V. Gusarov, E. Yu. Rau) [6] and the patients' diaries (Yu. B. Nekrasova).

Preparatory work includes:

– choice of main and auxiliary acoustic stimuli on the basis of preliminary diagnostics data;

– selection of optimal conditions for conducting functional speech trainings on the basis of diagnostic data about the complexity of typological and specific communicative situations.

Rehabilitation work includes:

– organization and conduct of group sessions and individual consultations in the amount necessary for overcoming stuttering;

– systemic intervention in speech and non-speech manifestations in the structure of stuttering using a

complex of psycho-pedagogical technologies aimed at acquisition of elements of non-verbal communication, sensory-motor acquisition of rhythm, teaching “speech behavior”, etc.

Information-counseling work includes:

– publishing a methods guide with well-grounded recommendations for the patients' individual work on the basis of rehabilitation activity experiment;

– counseling support for the relatives of the patients in questions of the strategies for further communication with the member of the family predisposed to stuttering.

The suggested program covers a 1.5 months course with daily sessions at the stage of active rehabilitation (for two weeks, 5-7 hours a day) and further training at the rehabilitation-regulatory stage during the next month (twice a week, 5-7 hours a day). The number of patients may vary within the range of 6-10 people, which makes it possible to ensure optimal pedagogical conditions of the rehabilitation-communicative micro-medium and interaction between the members of the group and the specialist to establish efficient feedback [5].

The advantages of the suggested program include high effectiveness, orientation towards work under the most complicated conditions of real communication, implementation of objective diagnostic methods into

the system of complex psychopedagogical intervention, and the potential to integrate the given program in the systems and methods of rehabilitation of stuttering in adults described in this paper or in other programs and rehabilitation systems.

Conclusions. It has been proved that the realization of the program guarantees a significant improvement of speech fluency and communicative skills and their reinforcement in the course of functional training.

The formation of fluent speech in peculiar and typically significant situations is facilitated by the creation of pedagogical conditions including individual selection of acoustic stimulus or a combination of such stimuli, modeling verbal communicative situations providing gradual preparation for real communication, and variability of learning conditions.

Salient stage-by-stage organization of the pedagogical process facilitates disintegration of pathological speech (convulsive) and non-speech (accompanying motor) stereotypes in stuttering adults emerging as a response to socially significant stimuli in their communication with people, as well as formation and automation of the skills of “sanogenetic” conditioned-reflex realization of speech fluency, bodily, facial expression, gesture and visual contact with people

under the conditions of real speech communication.

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