

# The Use of Transcranial Magnetic Stimulation for the Treatment of Headaches in Women of Fertile Age

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**Abstract** Many works are devoted to the study of the relationship between tension headaches and mental disorders. At the same time, it is worth noting that episodic headache has a connection with mental disorders. In particular, chronic tension headache is a constituent symptom of mental disorders, such as depression. We cervicogenic headache as a possible variant of tension headache with involvement of pericranial muscles, as it is difficult to distinguish them clinically.

**Keywords** Headache, Migraine, Cephalgic syndrome, Psycho-vegetative disorders

## 1. Introduction

The most debatable issue, not only among neurologists, but also in medical issues, is headache (cervical) pain. This pathology affects most half of the patients at least once, but experienced headache (Tabeeva G.R. 2015). Despite the increased interest and diversity of research, headaches, predominantly primary and migranous, tension headaches, leave open for practitioners, diagnostic standards and difficulties, in some cases, not treatable (Lebedeva E.R., 2016). Abuse of drugs of analgesic action, transform rare headache attacks into chronic (abusive headaches) (Sanaeva M.J. 2021). In 75% of cases of headache, the prevalence of the type of tension headache (Hagen K 2020), where, according to different authors. patients with tension headache experience emotional direction, while it is believed that the stress factor, is a trigger option in the development of headaches. As for within 15% of the population, but is characterized by a bright manifestation of symptoms, mainly the treatment of this problem among the working-age population, the duration forces to depart from the usual type of activity, for a long time (Osipova V.V. 2018, Song T.S. 2020). Migraine attacks, in patients lead to depressive disorders (Ahmadiva L.R. 2016). Today there are, due to the development of technology, great opportunities in the range of diagnosis and treatment (Jurabekova A.T. 2017, Grender L.N. 2018, Kroll L.S. 2020). Therapy of migraine and headache is strenuous, requires long observation, in many cases drug treatment leads to complications, or has contraindications. In this regard, the use of non-medicated transcranial magnetic stimulation method is an alternative and promising addition to the treatment.

**Study Objective.** To study the use of rTMS for headache

treatment in women of fertile age.

## 2. Material and Methods

The study included 89 women who were treated, hospitalized in the City Hospital, Department of Neurology and private clinics of Karshi city for the period 2021-2023. The whole main group was divided into two subgroups - 50 of which had a diagnosis (according to the international classification of headache type 3 2013), migraine headache without aura. The age of the patients ranged from 25 to 45 years, mean age  $33 \pm 1$  years. Exclusion criteria were severe somatic, gynecological, and psycho-neurological diseases detected during initial examination and diagnosis. In addition, 26 healthy women without headache, selected during preventive examination in urban polyclinics, were included for purity of evidence study.

Study methods included, clinical and neurological examination in the dynamics before and after treatment. To assess the character of headache, the patients filled out a questionnaire, adolescent description of headache attacks (frequency, localization, intensity). Assessment of pain intensity was assessed by standard visual analogue scale (VAS), and by the McGill questionnaire. Electroencephalography was preferred among neurophysiological methods of investigation, before and after treatment. Statistical evaluation of the results of the study was performed on an individual computer, with a standard package of deviation and correlation criteria used Spearman, Mann-Whitney, where  $p < 0.05$ .

## 3. Results

According to the anamnesis and the filled

questionnaire-questionnaire, the duration of disease, headache in the examined women was distributed as follows: from 1-2 years in 10%; 2-3 years in 15%; 3-5 years in 26%; pain of 5 years in 49%. According to the character of clinical signs of headache, Table 1 is presented

**Table 1.** Character of clinical signs of headache in the examined patients

№	Indicators	Core group	
		Headache with strain n=50	migraine without aura n=39
1	Duration of headache (years)	8±1,0	6±1,0
2	Headache attack duration (hours)	7±0,5	72 hours
3	VAS	9±0,5	6,6±1,0
4	Pain medication use (per week)	3,0±0,5	5,5±0,5
5	Pain type		
	Pressing	43%	8%
	blunt	38%	9%
	debilitating	30%	29%
	Intense	9%	37%
	intermittent	15%	20%
	nauseating	1%	36%
6	Remaining	5%	39%
	presence of concomitant gynecological diseases is present	23%	33%

In patients with migraine without aura, the presented headache complaints were with characteristic throbbing pain, nausea and vomiting, in some cases accompanied by light or sound phobia. At the same time, patients with headache with strain were diagnosed (in accordance with the international classification) on the basis of headaches with episodic or chronic frequency; in addition to the basic complaints presented, the intensity of headache was determined using questionnaire scales, and patients were subjected to palpation to identify the direction and soreness of muscles. So the intensity of headache (HBS) on the average was 50 points. Assessment of clinical and neurological symptoms revealed pericranial muscle tension in patients with headache with strain. It should be noted that the number of GB attacks in patients with chronic character, the number of attacks varied up to 2 days a week (in patients with the period of disease more than 4 years). Duration of the course of headache with strain was significantly longer in female patients, compared to migraine without aura.

When comparing EEG changes between subgroups, it was found that 2-rhythm was reliably less frequent in comparison with the group of healthy people without headache: in patients with headache with strain in 78%, in patients with migraine without aura (MBA) in 70%; 2-rhythm was dominating, but compared to HC (healthy people), it had characteristic instability in patients with headache with strain 53%, in patients with MBA 80%. And women with headache with strain were detected on EEG, B-rhythm in 33%, and

Theta-rhythm was determined by anterior and posterior projection zones in 21%, with diffuse bioelectrical activity detected in 40% and sharpening in L and B-rhythmic bands in 56%. As for women with MBA, bioelectrical activity changed with loading, especially there was an increase in the synchronous bilateral slow wave position in 33%, at the same time in patients with headache with strain this increase was detected in 45%. It is important to note that the resting EEG in patients with MBA was virtually unchanged from the EEG of healthy controls. Thus, the result of the EEG study showed common and distinguishing features between the patients with headache with strain and MBA, and distinguishing features between the healthy controls.

A method of therapeutic exposure to electrical discharges, was used in ancient Rome. In the last century, the method of TMS in migraine therapy has not found wide application, but since 2017 there are many proven results of using TMS. Published in scientific journals, the clinical improvement was associated with increased levels of endorphins (B) in the blood; Kalita S. (2020), points to the improvement of somatosensory potentials, which changes the synchrony of the brain system and thus reduces pain. Shirshova E.V. (2021), after conducting a study, treatment of patients with headache with strain conclude about the marked effectiveness of the TMC technique, in the matter of analgesic action. The results obtained indicate an improvement in the clinical and neurological signs in patients with headache, which before the treatment reduced activity and performance. Headache intensity according to the VAS, revealed a decrease in pain to 2.5 points on average in the OG. In addition, the patients had improved sleep (time of falling asleep, normalization of sleep duration, and problem-free awakening, no daytime sleepiness). In the course of treatment (during the first sessions of TMS), when studying the EEG again, all OS patients had increased L-rhythm values (up to 66mc2/Hz), and L-rhythm index activity increased to 63%, which once again proves that TMS stabilizes cortical functions, with improved connections between the cortex and subcortical structures.

**Table 2.** Character of clinical signs of headache in examinees before and after TMS treatment

№	Indicators	Core group n=89			
		Headache with strain n=50		migraine without aura n=39	
		Before treatment	After treatment	Before treatment	After treatment
1	McGill test	16±1,0	8±0,5	15,9±1,0	9±0,5
2	HACS pain score	8±0,5	3,5±0,5	7±0,5	3,6±0,5

where  $p < 0.05$

The table shows a positive correlation between pain intensity in the subgroups according to the VAS scale and the McGill test.

## 4. Conclusions

1. Headache, the most common of all pain signs occurring in neurological practice is more than 80%, and characterized by gender identity among women.
2. Electroencephalographic indicators of the state of cortical brain structures, are most pronounced in patients with headache with strain than MbA, and characterized by a high value of the amplitude response, and a decrease in latency. The result of the study showed that EEG is an informative method for determining brain structures, which allows to objectify factors of chronic pain syndrome, so for patients with MBA and headache with strain the general changes on EEG, in comparison with healthy individuals, and changes differing from each other, where for MBA the alpha rhythm strength is typically reduced, while for headache with strain the theta rhythm strength is increased.
3. Modern principles of headache therapy (headache with strain and MBA), along with drug treatment, recommends the inclusion of non-drug measures aimed at increasing the active therapy strategy and at the same time eliminating the drug factor, the transition of episodic cephalgia into chronic.
4. TMS, based on the system of magnetic repetitive stimuli, an effective and safe method, able to influence different areas of the brain, allows to reduce the attacks of tension headache and migraine, without aura up to 40%, to reduce the disadaptation up to 35%, and the intensity of headache by 15%.

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