

Physical therapy of tension headache in high school children

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Abstract

The urgency of the problem of developing effective technologies of physical therapy of tension headache in children is caused by spread of the disease, and the influence of pain on the quality of life. It is also important, if possible, to minimize the use of drugs in pediatric practice. The purpose of this work was to determine the clinical effectiveness of physical therapy (relaxation techniques and massage or reflexotherapy) in senior school children with tension headache. 24 children of senior school age (15–18 years old) with tension headache were under observation. Follow-up examinations were performed: before the course of treatment and after the course of physical therapy in the outpatient setting. The complex No1 was given to 12 children, which included the use of relaxation and a course of neck massage with an emphasis on trigger points and zones. 12 children received the complex No2 – they performed the similar relaxation exercises, and in addition – a complex course of reflexotherapy. The complex consisted of acupuncture and reflexogenic massage with a multi-needle roller. Each of the courses consisted of 15 procedures. The study revealed that children with tension headache on the background of pain were characterized by asthenoneurotic complaints. Analysis of the clinical symptoms course in children with tension headache allowed to establish a reliable effectiveness of both applied approaches. Although the effect of the complex No2 showed better indicators (in particular, the absence of headache was noted after the course of No1 in 41.67% sick children, and after the use of the complex No2 in 66.67%). But the comparison did not show a significant difference between subgroups. In our opinion, this is due to the small size of the surveyed samples, which requires further research. A more pronounced effect of additional application of reflexotherapy on the state of emotional lability and other psychasthenic manifestations was noted. We believe that the achieved result is caused by the vegetotropic effect of the method (both at the central and peripheral levels of the vegetative nervous system). *Conclusion:* The use of physical therapy methods (relaxation exercises, techniques of psycho-emotional unloading and massage or reflexology) has significantly reduced the manifestations of pain and improved the physical and psycho-emotional state of senior school children with tension headache. Our pilot study showed the prospect of further research in the chosen direction.

Key words: tension headache, children of senior school age, physical therapy.

Introduction

The prevalence of headache (HA) among children and adolescents, according to various sources, is from 25% to 80% and increases sharply in adolescents (Caponnetto, 2021; Alidjanova et al., 2017; Vozniak, 2014; Tonkonozhenko et al., 2016). In particular, tension headache (THA) is the most common in school-age children (Alidjanova et al., 2017; Tonkonozhenko et al., 2016; Filipovich et al., 2019; Yudelson & Rachin, 2003; Shevtsova, 2017). According to the ICD, this disease is independent, has the code G44.2 “Headache of tension type” and refers to primary headaches. The International Classification of HA of the 2nd revision also classifies THA as primary and determines diagnostic criteria (Voznesenskaya, 2004; Headache Classification Committee of the International Headache Society, 2013).

The relevance of studying the problem of HA is also due to the diversity of etiology and pathogenesis of this problem (Caponnetto, 2021; Alidjanova et al., 2017; Filipovich et al., 2019; McDevitt et al, 2021; Hokenek et al, 2021; Roland et al, 2021, Walter et al, 2021). It is believed that the immaturity of the mechanisms of psychological protection is the key feature of the THA pathogenesis in children. So, the main factors that provoke pain attacks can be psychological and physical overfatigue, sleep deprivation, visual and emotional overload, problems of interpersonal communication, etc. (Shevtsova, 2017; Borisova & Abaturova, 2018; Korolenko & Gorsha, 2017). Besides, most researchers (Alidjanova et al., 2017 Polunina et al., 2017; Yesin et al., 2015; Golovacheva & Tabeeva, 2021; Kaytser et al, 2021) note a number of cerebroasthenic disorders in THA children, such as attention deficit, irritability, memory loss.

The psycho-emotional stress and vegetative dysfunction play a special role in the formation and maintenance of this type of cephalgia (Shevtsova, 2017; Kravtsova & Semenova, 2015; Borisova & Abaturova, 2018; Korolenko & Gorsha, 2017; Korolenko & Gorsha, 2018). That is why the urgent task is taking into account psycho-emotional and vegetative disorders in the formation of this multifactorial pathology correction

means (Shevtsova, 2017; Borisova & Abaturova, 2018; Korolenko & Gorsha, 2018; Polunina et al., 2017; Kulikova et al., 2018; Yesin et al., 2015; Gorsha & Korolenko, 2017).

Medico-social significance of the problem is extremely high, because THA leads to a decrease in the quality of life of children, their social activity, negatively affects academic performance, forms a tendency to depression and deterioration of communication skills (Caponnetto, 2021; Golovacheva & Tabeeva, 2021; Kaytser et al, 2021; Manandhar et al, 2021; Polunina et al., 2017).

Methods of physical therapy in pediatric practice prevail, because they do not cause adverse reactions and have mostly a complex patho- and sanogenetic effect (Korolenko & Gorsha, 2017; Korolenko & Gorsha, 2018; Polunina et al., 2017; Kulikova et al., 2018; Gorsha & Korolenko, 2016; Gorsha & Korolenko, 2017; Grygus et al, 2021; Dido et al, 2021). In particular, reflexotherapy (acupuncture) has a pronounced analgesic effect, and can be used to treat headache (Zalman, 2018; Sviridova et al, 2018; Usakova, 2019). However, too few of the studies of such effects mechanisms have been conducted and it is necessary to involve the effective non-drug methods for the chronic HA treatment, especially in children.

The *aim* of the study was to determine the clinical effectiveness of physical therapy methods (relaxation techniques and massage or reflexotherapy) in senior schoolchildren with THA.

Material and methods

24 children of senior school age (15–18 years old) with THA were under observation. The girls – 70.83%, the boys – 29.27%. The children suffered from THA for a long time (more than a year). THA was diagnosed after a preliminary somatic and neurological examination according to the recommendations of the International Association for the Study of Headache (Voznesenskaya, 2004; Headache Classification Committee of the International Headache Society, 2013). Follow-up examinations were performed: before the course of treatment and after the course of physical therapy of the sick children. After the primary examination, the effect of the applied complexes of physical therapy on the sick children condition course was studied. All sick children by the method of continuous sampling were divided (depending on the nature of the impact) into two subgroups: the treatment and rehabilitation complex No1 (TRC No1) was used in the 1st subgroup (12 children) and TRC No2 – in the 2nd subgroup (12 children). The population of subgroups was comparable according to the clinical condition, sex and age. Another criterion for involving children in the study was obtaining the informed consent of the children and their parents / guardians.

The sick children were evaluated for the intensity and frequency of headache, which determines the existing condition of the patient, as well as a criterion for the effectiveness of therapy. Assessment of the intensity of headache was performed by the visual analog scale (VAS): 0 – “no pain”, 10 points – “unbearable pain”. Assessment of the clinical symptoms rate was performed using R. Likert scale: 0 – no, 1 – rarely, 2 – often, 3 – constantly.

Methods of physical therapy. The sick children had physical therapy on an outpatient basis. The TRC No1 was given to 12 children (1st subgroup), which included the use at the rehabilitation center, under the supervision of a physical therapist, relaxation techniques (deep slow breathing, muscle relaxation, the relaxation light and the music therapy) and a neck and collar zone massage course with an emphasis on trigger points and zones. 12 children of the 2nd subgroup received TRC No2 – previously studied with the help of an instructor the similar relaxation exercises and techniques of psycho-emotional release, which were performed daily independently and received a comprehensive course of reflexotherapy (RT). The RT session consisted of acupuncture, heating of certain biologically active points and the reflexogenic massage with a multi-needle roller of the neck, nape and cervical area. Each of the courses consisted of 15 procedures, 10 of which were held daily by weekdays, and others every other day by weekdays. The duration of each course was 4 weeks.

Methods of descriptive statistics and testing of statistical hypotheses were used to characterize and analyze the results of the study (Trukhacheva, 2012). The study data was processed using the software product STATISTICA for WINDOWS 6.0. To compare the samples, Student's t-test was calculated to compare absolute and relative values. The organization of the methodology of the study complied with the provisions of the Consensus on Biomedical Ethics and was conducted according to the principles of evidence-based medicine.

Results

The examined children had the headache manifested by cephalic episodes lasting from several minutes to several days. The pain was usually bilateral, astringent or oppressive, different intensity, sometimes with the presence of photo- or phonophobia, not exacerbated by exercise. In 79.1% (17/24) of sick children, the intensity of pain by VAS corresponded to a gradation from 4.0 to 6.0 points. Besides HA, these children suffered from other complaints, such as fast fatigue, emotional lability, sleep disturbances, meteosensitivity, and a number of complaints simultaneously. Objective examination often revealed tension of the neck and occipital muscles, myogenic trigger points and areas of pericranial and cervical muscles and signs of dysplastic connective tissue: scoliotic posture or scoliosis, increased lumbar lordosis with recurrence in the joints, signs of joints hypermobility.

The table 1 presents data on the frequency and intensity of headache in the examined children depending on the applied complexes of physical therapy.

Table 1

Dynamics of headache intensity in sick children when using physical therapy, (abs, M ± m (%))

Clinical indicators		Before treatment (p ₁)		Subgroup 1 (TRC No1), (p ₂)		Subgroup 2 (TRC No2), (p ₃)		Significance of differences
		n = 24		n = 12		n = 12		
		Abs	M ± m (%)	Abs	M ± m (%)	Abs	M ± m (%)	
Headache (intensity according to VAS criteria)	0	0	0.00 ± 0.00	5	41.67 ± 14.86	8	66.67 ± 14.21	p ₁₋₂ < 0.05 p ₁₋₃ < 0.05 p ₂₋₃ > 0.05
	1–3 points	2	8.33 ± 5.76	2	16.67 ± 11.24	2	16.67 ± 11.24	p ₁₋₂ > 0.05 p ₁₋₃ > 0.05 p ₂₋₃ > 0.05
	4–6 points	17	70.83 ± 9.48	4	33.33 ± 14.21	2	16.67 ± 11.24	p ₁₋₂ < 0.05 p ₁₋₃ < 0.05 p ₂₋₃ > 0.05
	7–9 points	4	16.67 ± 7.77	1	8.33 ± 8.33	0	8.33 ± 8.33	p ₁₋₂ > 0.05 p ₁₋₃ > 0.05 p ₂₋₃ > 0.05
	10 points	1	4.17 ± 4.17	0	0.00 ± 0.00	0	0.00 ± 0.00	p ₁₋₂ > 0.05 p ₁₋₃ > 0.05 p ₂₋₃ > 0.05
Headache (frequency)	0 – no	0	0.00 ± 0.00	5	41.67 ± 14.86	8	66.67 ± 14.21	p ₁₋₂ < 0.05 p ₁₋₃ < 0.05 p ₂₋₃ > 0.05
	1 – rarely	2	8.33 ± 5.76	3	25.00 ± 13.06	3	25.00 ± 13.06	p ₁₋₂ < 0.05 p ₁₋₃ > 0.05 p ₂₋₃ > 0.05
	2 – often	20	83.33 ± 7.77	4	33.33 ± 14.21	1	8.33 ± 8.33	p ₁₋₂ < 0.05 p ₁₋₃ < 0.05 p ₂₋₃ > 0.05
	3 – constantly	2	8.33 ± 5.76	0	0.00 ± 0.00	0	0.00 ± 0.00	p ₁₋₂ > 0.05 p ₁₋₃ > 0.05 p ₂₋₃ > 0.05

After application of both complexes, which we defined, intensity of headache by VAS has essentially decreased. So, the intensity of 4–6 points before and after the course decreased significantly in both subgroups (p < 0.05). And, accordingly, the number of children in the category “0 points” increased significantly (p < 0.05). The frequency of headache in the category “often” decreased from 83.33 to 33.33% and 8.33% (respectively – in 1 and 2 subgroups), (p₁₋₂, p₁₋₃ < 0.05). However, the comparison of the influence of TRC No1 and TRC No2 did not show a significant difference between the intensity and frequency of HA (p₂₋₃ > 0.05). Although the effect of TRC No2 showed better indicators, in particular, the absence of HA was found after the TRC No1 course in 41.67% sick children, and after the use of TRC No2 – in 66.67%.

Also a significant reduction in asthenoneurotic complaints was noted, the characteristics of which in the course of time presented in table 2. A significant reduction in fatigue was recorded after the use of both complexes (p₁₋₂, p₁₋₃ < 0.05). The significant positive effect on emotional lability and sleep disorders was recorded after the use of TRC No2 (p₁₋₃ < 0.05). However, no significant effect on meteorosensitivity was recorded.

Table 2

Changes of the frequency of complaints in sick children when using physical therapy, (abs, M ± m (%))

Clinical indicators	Before treatment (p ₁)		Subgroup 1 (TRC No1), (p ₂)		Subgroup 2 (TRC No2), (p ₃)		Significance of differences
	n = 24		n = 12		n = 12		
	Abs	M ± m (%)	Abs	M ± m (%)	Abs	M ± m (%)	
Fatigue	21	87.50 ± 6.90	6	50.00 ± 15.08	5	41.67 ± 14.86	p ₁₋₂ < 0.05 p ₁₋₃ < 0.05 p ₂₋₃ > 0.05
Emotional lability	19	79.17 ± 8.47	9	75.00 ± 13.06	4	33.33 ± 14.21	p ₁₋₂ > 0.05 p ₁₋₃ < 0.05 p ₂₋₃ < 0.05

Clinical indicators	Before treatment (p ₁)		Subgroup 1 (PRC No1), (p ₂)		Subgroup 2 (TRC No2), (p ₃)		Significance of differences
	n = 24		n = 12		n = 12		
	Abs,	M ± m (%)	Abs	M ± m (%)	Abs,	M ± m (%)	
Sleep disorders	17	70.83 ± 9.48	6	50.00 ± 15.08	4	33.33 ± 14.21	p ₁₋₂ > 0.05 p ₁₋₃ < 0.05 p ₂₋₃ > 0.05
Meteosensitivity	14	58.33 ± 10.28	6	50.00 ± 15.08	4	33.33 ± 14.21	p ₁₋₂ > 0.05 p ₁₋₃ > 0.05 p ₂₋₃ > 0.05

Discussion

So, the study found that children of the senior school age with THA on the background of pain are characterized first of all by asthenoneurotic complaints. Rapid fatigue, emotional lability, sleep disturbances, meteorological dependence were found often. Our data on asthenoneurotic manifestations in children with THA generally agreed with literature data (Alidjanova et al., 2017; Golovacheva & Tabeeva, 2021; Tonkonozhenko et al., 2016; Filipovich et al., 2019; Yudelso & Rachin, 2003; Shevtsova, 2017).

The nature of the headache and its intensity (4–6 points by VAS) also corresponded to the data described by other researchers (Alidjanova et al., 2017; Tonkonozhenko et al., 2016; Filipovich et al., 2019; Yudelso & Rachin, 2003; Shevtsova, 2017). We performed restorative treatment of sick children using physical therapy methods in the form of relaxation techniques in combination with massage (subgroup 1) or reflexology (subgroup 2). The further analysis of the clinical course in children with THA allowed to establish a reliable effectiveness of both applied methodological approaches. Although the additional use of RT helped to achieve better results as for frequency and intensity of HA, the comparison did not show a significant difference between the indicators of the subgroups. In our opinion, this is due to the small size of the surveyed samples, which requires further research in this field. However, even at this stage, we see a more pronounced effect of additional use of RT on the state of emotional lability and other psychic asthenic manifestations.

We believe that the achieved result is caused by the vegetotropic effect of RT (both at the central and peripheral levels of the vegetative nervous system). This hypothesis about the mechanisms of the RT influence is supported by other researchers (Zalman, 2018; Sviridova et al, 2018; Usakova, 2019).

Conclusions

1. The study revealed that in the majority (79.1%) of examined children of the senior school age with tension headache, the intensity of pain by the visual analog scale corresponded to 4.0 to 6.0 points, and its gradation frequency “often” (2 points by R. Likert scale) was registered in 83.33% of patients. Except for the pain syndrome, asthenoneurotic complaints predominated in children with THA.

2. The use of physical therapy methods (relaxation exercises, techniques of psycho-emotional release and massage or reflexotherapy) has significantly reduced the manifestations of pain and improved the physical and psycho-emotional state of senior school children with THA.

3. Our pilot study showed the prospect of further research in the chosen direction.

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