DRUG-FREE TREATMENTS OF TENSION HEADACHES IN SCHOOL-AGE CHILDREN

Polunina VV[1] ✉, Sergeenko EYu[1], Yarustovskaya OV[2], Polunin VS[1]

[1] Pirogov Russian National Research Medical University, Moscow, Russia

[2] Russian Medical Academy of Continuous Professional Education, Moscow, Russia

Nowadays headaches are common among teenagers and children. This study aimed to assess effectiveness of reflexology, kinesiology taping and myofascial trigger point therapy in children with tension headaches and to compare these treatments with traditional drug-based modalities. The study recruited 37 children (19 boys and 18 girls) aged 9 to 14 years. The main group (n = 25) received 2 series of reflexology treatments separated by a month interval, kinesiology taping and trigger point massage, which was also taught to the patients and their parents. The control group (n = 12) received Ibuprofen and Mydocalm (the daily doses did not exceed 30 mg/kg and 2–4 mg/kg, respectively). Treatment duration in both groups was 4 months. Treatment effectiveness was assessed based on the evolution of patients' complaints and the impact of headache on children's daily activities, using the visual analog pain scale and the HIT-6 method, respectively. Within a month, headaches became 1.2 times less frequent and the attacks became 1.2 times shorter in the control group, while in the main group headaches became 2.5 times less frequent and the attacks became twice as short as they had been before Headache intensity did not change significantly in the control group, while in the main group it decreased 1.5 times ($p < 0.05$). The number of controls who experienced a severe impact of headache on their daily activities decreased 1.2 times after the treatment, while the main group reported no such impact at all. In the main group the number of patients who experienced only a slight impact of headaches on their daily activities increased 4.7 times, from 12 % to 56 %. Our findings demonstrate that drug-free treatments for tension headaches are more effective than drug-based regimens. Moreover, children benefit from drug-free regimens as they are not exposed to the negative effects of analgesics and muscle relaxants.

Keywords: children, tension headache, kinesiology taping, reflexology, drug-free treatment

✉ **Correspondence should be addressed:** Viktoria Polunina
ul. Ostrovityanova, d. 1, Moscow, Russia, 117997; vikt025@gmail.com

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НЕМЕДИКАМЕНТОЗНЫЕ СПОСОБЫ ЛЕЧЕНИЯ ГОЛОВНЫХ БОЛЕЙ НАПРЯЖЕНИЯ У ДЕТЕЙ ШКОЛЬНОГО ВОЗРАСТА

В. В. Полунина[1] ✉, Е. Ю. Сергеенко[1], О. В. Ярустовская[2], В. С. Полунин[1]

[1] Российский национальный исследовательский медицинский университет имени Н. И. Пирогова, Москва

[2] Российская медицинская академия непрерывного профессионального образования, Москва

Головная боль очень распространена среди современных детей и подростков. Целью исследования являлось изучение эффективности рефлексотерапии, кинезиотейпирования и точечного массажа миофасциальных триггерных точек в лечении головных болей напряжения у детей в сравнении с медикаментозной терапией. В исследовании приняли участие 37 детей (19 мальчиков и 18 девочек) в возрасте 9–14 лет. В основной группе (n = 25) лечение включало 2 курса рефлексотерапии с перерывом между ними в 1 мес., кинезиотейпирование и точечный массаж, которому в том числе были обучены пациенты и их родители; в контрольной (n = 12) — получение ибупрофена (суточная доза — не более 30 мг/кг) и мидокалма (суточная доза — 2–4 мг/кг). Общая продолжительность лечения в обеих группах составила 4 мес. Эффективность лечения оценивали по динамике жалоб на головную боль с использованием визуальной аналоговой шкалы боли и степени влияния головной боли на повседневную активность детей с помощью методики HIT-6. В контрольной группе частота эпизодов головной боли за месяц и средняя продолжительность приступа в среднем уменьшились после лечения в 1,2 раза, а в основной группе частота эпизодов головной боли за месяц уменьшилась в 2,5 раза и средняя продолжительность приступа — в 2 раза. При этом обычная интенсивность головной боли в контрольной группе практически не изменилась, а в основной — уменьшилась в 1,5 раза ($p < 0,05$). В контрольной группе количество пациентов с сильным влиянием головной боли на повседневную активность уменьшилось после лечения в 1,2 раза, в основной же группе таких пациентов вообще не осталось, а количество пациентов с незначительным влиянием головной боли на повседневную активность увеличилось в 4,7 раза — с 12 до 56 %. Полученные результаты показывают, что немедикаментозное лечение головных болей напряжения у детей эффективнее медикаментозного, при этом важно, что дети не подвергаются негативным эффектам от употребления анальгетиков и миорелаксантов.

Ключевые слова: дети, головная боль напряжения, рефлексотерапия, кинезиотейпирование, немедикаментозное лечение

✉ **Для корреспонденции:** Полунина Виктория Валерьевна
ул. Островитянова, д. 1, г. Москва, 117997; vikt025@gmail.com

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According to various researchers, from 25 to 80 % of schoolchildren suffer from headaches [1–4]. Often, they are accompanied by attention deficit and hyperactivity. Eighteen to twenty-five percent of children and teenagers have tension headaches, i.e. repeated bilateral headaches of compressing, pressing and dull types [5–8]. They make 2/3 of all headaches suffered by this group [9].

The specific feature of tension headache pathogenesis in children and adolescents is the immaturity of their psychological defense mechanisms. They can develop tension headaches as a result of physical and mental fatigue, sleep deprivation, visual overstrain, problems with their group or classmates [1]. In addition, some researchers [10–12] point out that children suffering from tension headaches often have cerebrovascular disorders, including attention deficit, memory loss, increased irritability, affective outbreaks. These disorders may be caused by birth injuries to the CNS, somatic diseases, craniocerebral trauma, neuroinfections.

In some cases, headache is accompanied by the symptoms of autonomic dysfunction [13–15]. Timely detection of vegetative disorders allows effective correction of the clinical manifestations of the pathology, which translates into improved quality of life for patients [15]. It is especially important to diagnose vegetative imbalance in children and adolescents, because their age is the time when segmental and supra-segmental structures of their brain mature, and those structures influence appearance of pain syndromes, including cephalothia.

Trigger points, mainly those found around upper shoulder girdle and neck, play an important role in tension headache development. A trigger point is a cluster of electrically active sections of muscle fibers that are connected to the contracted ending of the motor nerve in the skeletal muscle. Constant tension of the trigger point fibers disrupts blood circulation in the corresponding parts of the muscle; metabolic products accumulate there and prolong the existence of those points, which can contribute to the reflected headaches of different locations. Massaging (and self-massaging, most importantly) the trigger points helps to somewhat remedy the headache. The alleviation is the result of disruption of chemical and neurological feedback loop that keeps the muscle contracted. Also, massaging improves the local blood flow and straightens the muscle fiber [16, 17].

Reflexology has been used to treat headaches for a long time [18, 19]. There are acupuncture points that help remedy the condition. Acupuncture combined with the trigger points massage may yield a long-term relief from a headache.

Kinesio taping is one of the pain management methods suggested by Kenzo Kase (Japan) in 1973. The method is effective as part of rehabilitation programs; it has been applied all over the world for more than 30 years now. Kinesio tapes are elastic bands of high quality cotton covered with acrylic hypoallergenic adhesive gel that activates at the body temperature. The elastic properties of tapes are close to those shown by skin. And since they are cotton, the skin is breathing and evaporation remains unhindered. Thus, the tapes can be left on the skin for 5–7 days and there is no need to skip showers. Clinical studies have shown that kinesio tapes normalize microcirculation in the skin's connective tissue and subcutaneous fatty tissue, alleviate pain, restore functional activity of the muscles and optimize afferent pulses at the segmental level [20]. Depending on the application method, a tape can relax or contract the muscle, reduce fascia tension, minimize swelling, help with the resorption of hematomas. Kinesio tapes at trigger points and zones reinforce the effect of reflexology and point massage.

The purpose of our study was to research the effectiveness of non-drug treatment of headaches in children, including reflexology and kinesio taping.

METHODS

The study was conducted at the premises of the Rehabilitation Department of Children's City Polyclinic no. 39 (Moscow). Thirty-seven children participated in the study: ages 9 through 14, 19 boys and 17 girls, suffering from tension headaches for 6 to 18 months. The average age of the children was 11.2 ± 1.6 years. Inclusion required the child to suffer from episodic tension headaches (at least once a month, but not more than 15 episodes a month) and have myofascial trigger points. Children with other types of headaches and of other ages were not included into the study.

Outpatient, all participants were examined by a neurologist, an oculist, a psychologist, a reflexotherapist; underwent ultrasound dopplerography of cerebral vessels, a general blood test, blood pressure checkup; had their neck and shoulder muscles assessed, as well as those of the back and upper limbs; filled questionnaires (their parents, too) and health diaries. Then the children were randomly divided into two groups, each receiving a different treatment.

The treatment group included 25 children (13 boys and 12 girls). A neurologist monitored them for 4 months; they had 2 reflexology courses with kinesio tapes and learned to massage myofascial trigger points. The control group included 12 children (7 boys and 5 girls); their state was monitored by a neurologist for 4 months from the day they applied for medical help; they received medication, analgesics and muscle relaxants: ibuprofen (daily dose — no more than 30 mg/kg) and midocalm (daily dose — 2–4 mg/kg).

Prior to the therapy, the patients kept health diaries for 1–2 months (aided by their parents). There, children registered days when they had headache, its intensity, duration and impact on general health and daily activities. Subsequently, based on those records we determined the pain intensity using the visual analogue scale (VAS): 0 points — "no pain", 10 points — "the pain is unbearable". HIT-6 was used to assess the impact headaches had on daily activities [21].

Treatment group received 2 two-week reflexology courses: 10–12 sessions per a course, on weekdays, each lasting

Characteristics of headache in the groups, before and after treatment

Headache characteristics	Treatment group		Control group	
	before treatment	after treatment	before treatment	after treatment
Frequency, average number of episodes per month.	12.9 ± 2.6	5.1 ± 1.2*,#	12.3 ± 2.1	10.1 ± 1.9#
Average duration per month, h	4.9 ± 1.4	2.4 ± 0.6*	5.2 ± 1.3	4.3 ± 0.9
Typical intensity per month, VAS score	6.2 ± 1.1	4.1 ± 0.9*	6.1 ± 1.1	5.6 ± 1.4
Impact of headache on daily activities, HIT-6 score.	53.5 ± 3.1	45.3 ± 2.7*	52.3 ± 4.9	49.5 ± 6.1

Note. * — p <0.05 when comparing results before and after treatment within a group, # — p <0.05 when comparing results after treatment between groups.

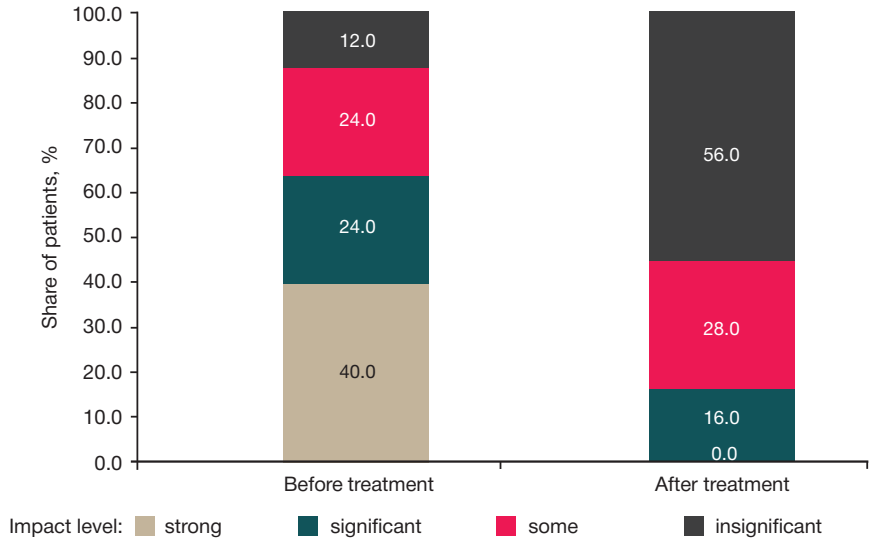

Fig. 1. Treatment group patients by impact of headache on their daily activities, before and after treatment (p <0.05)

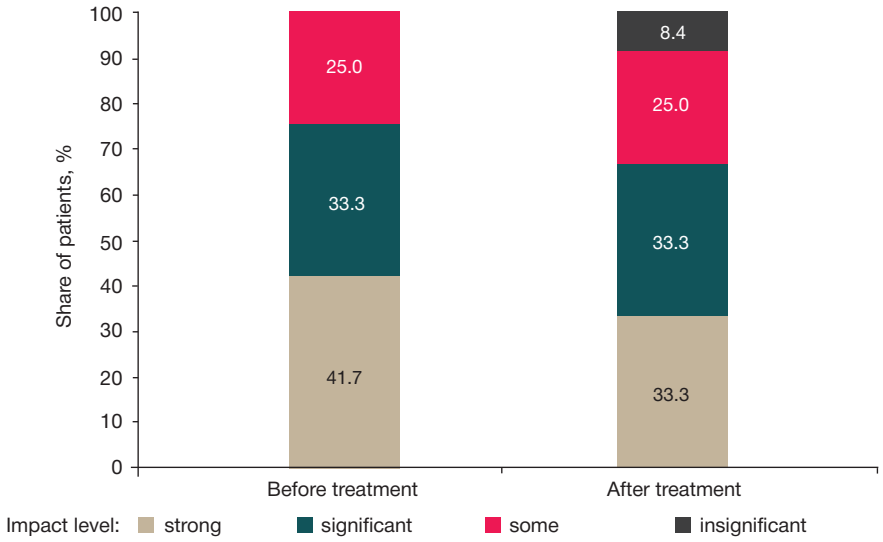

Fig. 2. Control group patients by impact of headache on their daily activities, before and after treatment (p <0.05)

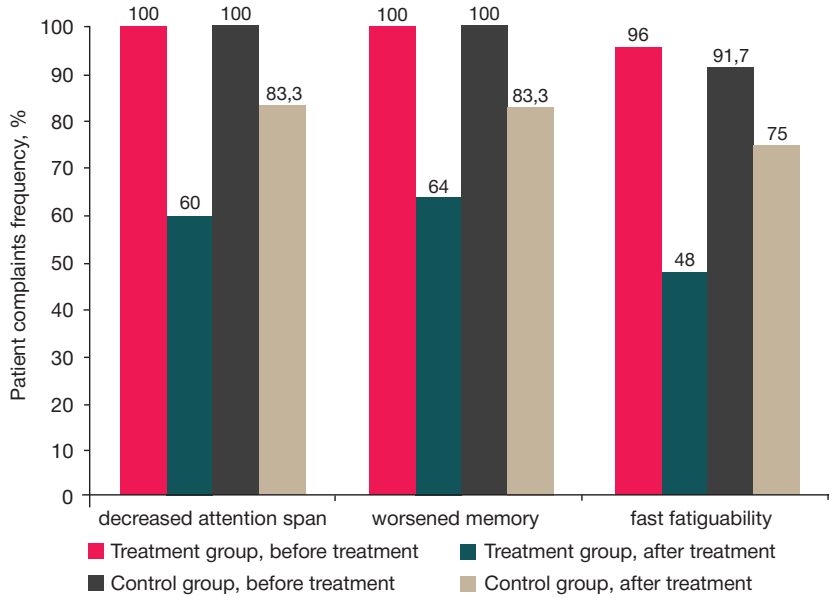

Fig. 3. Frequency of complaints of shorter attention span, poorer memory and rapid fatiguability among patients with tension headache, before and after treatment, calculated for 100 subjects (p <0.05)

10–15 minutes depending on the child's age. The second course was a month later. Reflexological treatment included acupuncture with a massage roller, corporeal and auricular acupuncture, acupressure. Five to seven corporal and two to three auricular points were affected in a session. The points were chosen following patient's complaints and results of examination.

After the reflexological treatment, children received kinesio tapes applied to their trapezius and hind neck muscles with the aim to relax them. Trapezius muscles received "Chinese lantern" applications, hind neck muscles — Y-shaped applications. No strain was put on the tapes.

In addition, therapists massaged trigger points found in the area of trapezoid, sternoclavicular-mastoid, belt, supraspinatus and pericranial muscles. Patients and their parents were trained to deliver point massage. They were recommended to massage at least twice a day, in the morning and in the evening, 1 minute to each point, and also every time after a long stay in uncomfortable poses.

MS Excel-2007 was used for statistical processing of the data. We calculated the mean value and the mean squared deviation of each parameter studied; Student's t-test was used to assess the confidence of differences revealed.

The study was approved by the ethics committee of the Children's City Polyclinic #39 (Minutes No. 1 of 21.03.2016). Parents of the patients signed voluntary informed consent forms and thus approved participation of their children in the study.

RESULTS

The effectiveness of treatment was assessed through analysis of the dynamics of patients' complaints, intensity of headache as reported at examination, during surveying and testing. The data considered were those obtained before treatment and 4 months after treatment.

The table shows characteristics of headache in the groups. In the control group, which received medications only, the frequency of headache episodes per month and their mean duration decreased on average 1.2 times, but the differences were insignificant. In the treatment group, which received non-drug treatment, the frequency of headache episodes per month decreased 2.5 times and they grew twice as short ($p < 0.05$). That said, the intensity of headache in the control group remained practically the same, while in the treatment group it decreased 1.5 times ($p < 0.05$). The same pattern applied to the impact headache had on the daily activity of patients. Thus, reflexology and kinesio taping alleviate headache better than drugs, with the difference being statistically significant.

The impact of headache on the daily life of patients is of great importance. This factor was assessed using HIT-6; Figures 1 and 2 show the results. In the control group, the number of patients whose daily life suffered greatly from their headaches decreased after treatment 1.2 times, and there were patients (8.4 %) whose activities were almost unhindered by the pain. But the differences were insignificant. In the treatment group, no patient reported any considerable impact of headache on the daily life after treatment, and the number of those who did feel a small-scale negative effect of headache in their daily lives increased 4.7 times ($p < 0.05$).

Patients suffering tension headaches also reported poor attention span, worsened memory and rapid fatiguability. Figure 3 shows that after treatment, participants from the treatment group complained of those symptoms significantly less often than children from the control group.

DISCUSSION

Tension headaches are primary headaches; children and adolescents develop this type of headache most often [1, 9]. The results we obtained through this research effort prove that reflexology and kinesio taping are effective methods of treatment of tension headaches with myofascial syndrome in children. It should be noted that they typically have no complaints about reflexology routines and its methods have no side effects. Treating children, it is very important to use guides when introducing acupuncture needles, since they help to keep associated pain to a minimum. It is also important to psychologically prepare children patients to acupuncture sessions and have calm music playing in the background. Teaching parents and children to massage myofascial trigger points and recommendations to do that regularly helped to successfully to stop headache and prevent the episodes.

Papers [22–24] had adults as participants, and they also show that reflexology is a valid headache treatment method, in part due to its capacity to decrease the consumption of analgesics and muscle relaxants. Compared to the drug treatment, reflexology had a more pronounced effect.

It is also important to note that successful treatment of tension headaches in children and adolescents largely depends on positive psychological atmosphere in family and school, adequate sleep, rest, daily schedule and nutrition regimens, appropriate physical and mental workload, limited computer and social networks time. In other words, the success of treatment largely depends on how strictly the patient follows the prescribed regimen.

CONCLUSIONS

In paediatrics, various reflexology techniques in combination with kinesio taping allow decreasing the frequency of headache episodes, their duration and intensity. Moreover, these non-drug methods also eliminate the associated symptoms such as attention and memory deficits and fatigue. Reflexology and kinesio taping offer a better therapeutic effect than drugs, with difference in results being statistically significant.

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