



World Scientific News

An International Scientific Journal

WSN 135 (2019) 14-31

EISSN 2392-2192

Tension-type headache – most prevalent, still unknown

Mateusz Sobieski^{1,*}, Aleksandra Korzeniewska²

¹ Faculty of Medicine, Wrocław Medical University,
J. Mikulicza-Radeckiego 5, 50-345 Wrocław, Poland

² Faculty of Clinical Psychology, SWPS University of Social Sciences and Humanities,
A. Ostrowskiego 30b, 53-238 Wrocław, Poland

*E-mail address: mateuszsobieski@op.pl

ABSTRACT

Tension-type headaches are the most common type of primary headache disorders. They concern up even to 80% of the population. Despite their usually mild course, they are still a major health problem resulting from the multidimensional etiology of the disease, prevalence, demanding treatment and disregarding the symptoms of patients by doctors. The therapy of tension-type headache, due to its character, sometimes requires cooperation with a psychologist or psychotherapist. The article presents current diagnostic methods as well as methods of treatment - immediate, prophylactic and psychological.

Keywords: Tension-type headache, headache, pain, cognitive-behavior therapy, primary care

1. INTRODUCTION

Headache is the most common neurological symptom experienced by practically every person throughout life. Among them, the most common is tension-type headache, characterized by a predisposition to mild attacks of headache, usually not associated with the presence of additional symptoms or with a small number of them. The incidence of this disease, its elusiveness and frequent downplaying of symptoms, both by doctors and patients, make it a major medical, scientific, social and even economic problem.

Tension-type headache was previously known under the names "tension headache", "muscle contraction headache", "psychomyogenic headache", "stress headache", "ordinary headache", "essential headache" and finally "psychogenic headache". The multitude of names that have lost their meaning has resulted in many gaps in knowledge about this disease. With the development of science, many false beliefs about tension-type headaches have fallen, however, there is still a lack of a full explanation of the pathophysiological processes occurring in this disease and convincing evidence of the effectiveness of current treatments.

2. EPIDEMIOLOGY OF TENSION-TYPE HEADACHE

Tension-type headache (TTH) is the most common neurological disease in the world and the most common form of primary headaches (i.e. headaches that are not the result of another medical condition) [1, 2]. The occurrence of episodic tension-type headaches in the total population is almost 80%, and of chronic form - from 0.5 to 4.8%. Tension-type headaches most often occurs in people between 35 and 40 years of age, however, patients in all age groups suffer from it. They also occur in children, reaching a peak in middle age, and then decreasing slightly with age. TTH occurs more often in woman than men. The incidence of tension-type headache increases - the annual incidence of frequent episodic TTH is 14.2 per 1000 person [1, 3-7].

The prevalence, lack of information on the pathogenesis of the disease and low severity of symptoms cause that the problem is often neglected by both patients and doctors. However, tension-type headaches are associated with a significant decrease in patients' quality of life and are a common cause of incapacity for work [8]. What's more, the cost of medical visits for the entire population of people with TTH compared to the costs for migraine sufferers is 54% higher [9, 10].

3. ETIOLOGY AND PATHOMECHANISM OF TENSION-TYPE HEADACHE

Despite their prevalence, tension-type headaches are the least known primary headaches. It has been proved that the cause of the disease is to some extent neurobiological stimuli but the involvement of psychological, environmental, genetic factors and central nervous system's nociceptive abnormalities is also suggested.

Current hypotheses say that the cause of the disease is persistent activation of peripheral nociceptors and the increased sensitivity to the pain of muscle and fascia. It is caused by the release of inflammatory mediators, which results in a disturbance of pain stimulus conduction. One of the activators of nociceptors is nitric oxide (NO), which stimulates N-methyl-D-aspartate (NMDA) receptors [11, 12].

The second reason is that intact body tissues generate a pain stimulus - some patients may find painful areas during oppression in the physical examination, despite no active damage. These are groups of muscle fibers with disturbed activity [11,13].

These two elements explain the occurrence of episodic NBG. The explanation for the transformation of frequent episodic NBG into chronic NBG is a disorder in the processing of pain information on the upper levels of the nervous system [14].

Other possible causes of NBG are [15-20]:

- Changes in endogenous opioid peptide levels in cerebrospinal fluid
- Lowering the overall threshold of pain excitability in patients
- Local ischemia in the muscles associated with microcirculation disorders
- Disorders of metabolism and mitochondrial function
- Disorders of nervous regulation in the endothelium of brains and muscles vessels
- Increased levels of calcitonin gene-related peptide (CGRP) in central nervous system.

The only abnormality in the psychical examination in patients suffering from tension-type headaches is increased muscle tension in pericranial muscles. This is the reason for the frequent use of muscle relaxants (i.e. as baclofen) on NMG. However, using them does not bring any benefit to the patient, as the relationship between increased muscle tenderness and tension-type headaches symptoms has not been proven. Increased tension of the pericranial muscles also persists during the pain-free period and is not specific to this disease. Moreover, electromyography (EMG) does not confirm the state of increased muscle tension, despite being palpated by the examiner during a pain attack. These reasons suggest that the cause of the increased muscle tension is secondary to or independent of pain [21–23].

4. PSYCHOLOGICAL CHARACTERISTIC OF PATIENTS WITH TENSION-TYPE HEADACHE

Years ago, it was thought that tension-type headaches were associated only with psychological factors, which was expressed in the very old name of the disease "psychogenic headache". It is currently known that these factors are important in the course, prognosis and therapeutic process of the disease, but they are secondary to neurobiological factors.

Some of that factors are known, because a lot of researches were focused on finding a specific psychological features associated with the incidence of TTH. Those researches concern various psychological aspects of human being. Examination of 120 children in 6-16 years of age has shown temperamental differences in children with episodic TTH (ETTH) in comparison to children without episodic TTH [24]. Children with ETTH had higher emotionality, instability and level of anxiety but lower level of vigour. Moreover, researchers indicates the role of personality traits in migraine and tension-type headaches. E.g., some of them reports that women with tension-type headache have a higher level of neuroticism [25,26]. Ozdemir's and coworkers' research show up that women with TTH have lower level of active coping strategies. Furthermore, previous researches have shown that maladaptive coping strategies associate with more frequent episodes of headache [27]. Some studies also suggest that the increased level of anger experienced by an individual can also be a factor in people suffering from TTH [28].

Stress is one of the most important psychological factor in the matter of TTH. Nash and Theborge suggest that incidence and intensity of headaches are dependent on the onset of a stress episode [29]. They conclude, that psychological stress can be a predisposing, preceding, intensifying or aggravating factor. Moreover, stress can be not only a reason but the effect of a headache condition. That can lead to the conclusion, that psychological stress can take many roles for tension-type headaches episodes. As it was just mentioned, psychological stress and negative mood states can intensify the headache, although some researches indicates that only momentary psychological stress, not average stress level is associated with headache exacerbation [30].

TTH has its own comorbidities [3]. The strong association between TTH, especially its chronic form and Generalized Anxiety Disorder (GAD) was found. Approximately 38,5% - 52,5% patients with TTH suffer from GAD [31,32]. Also MDD (major depressive disorder) is one of the most frequent disorder concurrent with TTH. The same researches has shown, that about 32,7% to 36.4% patients with TTH suffer from MDD [31,32]. However, another researches suggest there are no differences in the incidence of headache symptoms consistent with TTH for children with or without anxiety disorders [33].

5. CLINICAL PRESENCE OF TENSION-TYPE HEADACHES

Tension-type headaches have several characteristics that distinguish them from other primary headaches, i.e. migraines or cluster headaches [34, 35]:

- pain is mild to moderate
- described by the patient as dull, non-pulsating, oppressive, creasing "like a band around the head"
- in 90% of cases pain is bilateral
- it may be associated with muscle tightness
- it is not accompanied by neurological symptoms
- it is not accompanied by nausea or vomiting.

Often, patients wake up with pain that increases during the day to subside in the evening. It usually covers the entire head or temporal region, as presented in the Figure 1. Tenderness of the cranial muscles may co-occur, however, in physical examination and additional (i.e. biochemical, electrophysiological) tests there are usually no deviations from the norm [36]. There are also no deviations from the norm in routine imaging tests.

Pericranial tenderness may be recorded by palpation with second and third finger on trapezius, splenius, sternocleidomastoid, pterygoid, masseter, temporal and frontal muscles [37, 38]. It is recommended to use a palpometer to capture objective results, but because the equipment is often unavailable - this is not necessary. Tension-type headache can co-exist with migraine (TTH episodes occur between migraine attacks). TTH may also become chronic daily headache, which is associated with the abuse of analgesics [39]. Pregnancy, menopause or menstruation do not affect the severity of tension-type headache [40].

Symptoms that may accompany tension headaches include:

- photophobia
- sleep disorders
- hypersensitivity to noise
- feeling of chronic fatigue
- decreased appetite.

International Headache Society experts have identified four different types of TTH, including [2]:

- Episodic tension-type headache - pain persists for less than 15 days a month or less than 180 days a year.

- Infrequent episodic tension-type headache
- Frequent episodic tension-type headache - at least 10 episodes of headache occurring for at least 1 day a month, but less than 15 days a month for at least three months.

They were distinguished from infrequent because of their negative impact on the patient's quality of life.

- Chronic tension-type headache - pain persists for more than 15 days a month for more than 3 months or more than 180 days a year; the pain lasts many hours and is continuous.
- Probable tension-type headache - the clinical picture is inconclusive and no other cause for headache was found.

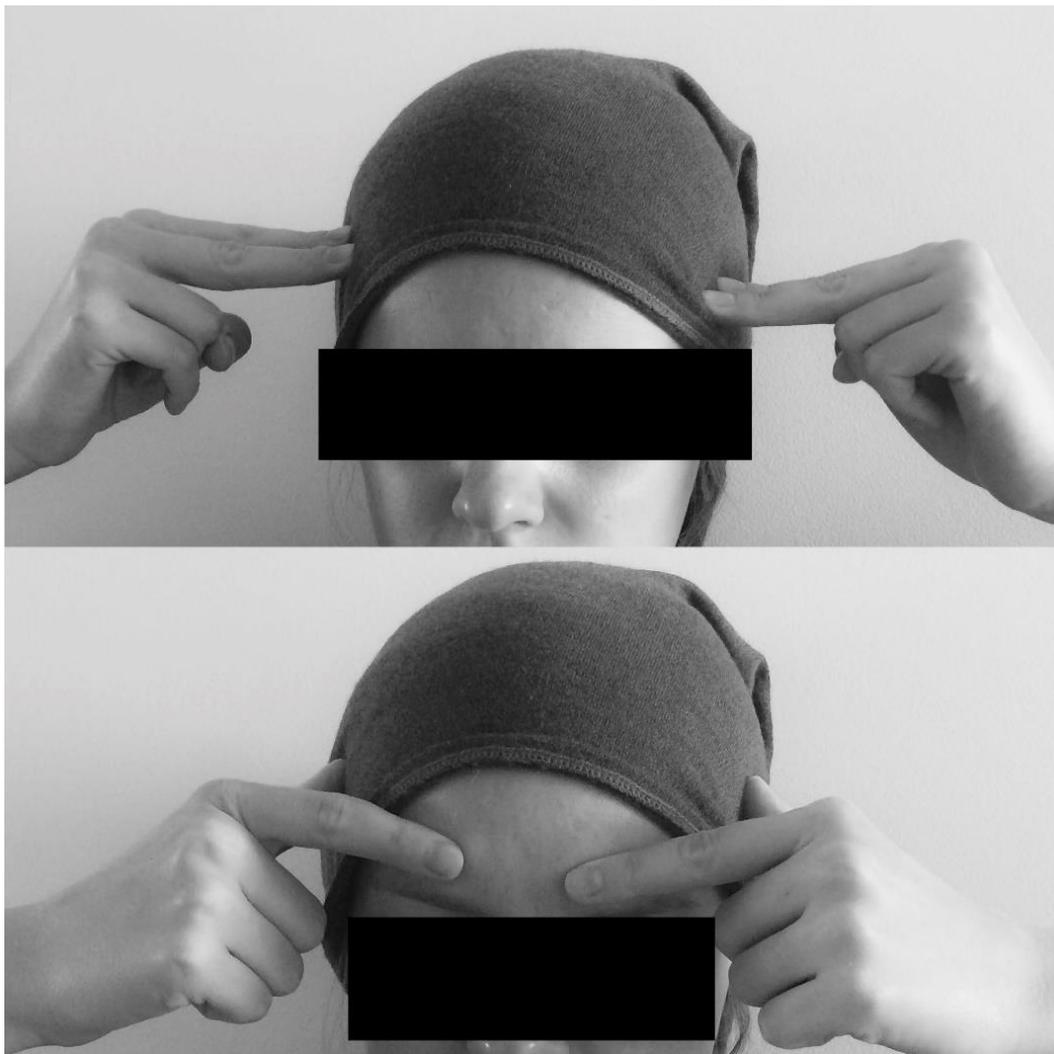


Figure 1. A patient suffering from tension-type headaches indicating location of pain.

The criteria for the diagnosis of tension-type headaches according to International Classification of Headache Disorders, 3rd edition (ICHD-3) are presented in Tables 1-3.

Table 1. The diagnostic criteria for the diagnosis of infrequent episodic tension-type headache [2].

A. At least 10 episodes of headache occurring on <1 day/month on average (<12 days/year) and fulfilling criteria B-D
B. Lasting from 30 minutes to seven days
C. At least two of the following four characteristics: 1. bilateral location 2. pressing or tightening (non-pulsating) quality of pain 3. mild or moderate intensity 4. not aggravated by routine psychical activity, such as walking or climbing stairs
D. Both of following: 1. no nausea or vomiting 2. no more than one of photophobia or phonophobia
E. Not better accounted for by another ICHD-3 diagnosis.
Note: Infrequent episodic TTH can be divided into infrequent episodic TTH associated- and not associated with pericranial tenderness due to fact of this symptom in patients. When headache fullfils criteria for both <i>Probable migraine</i> and <i>Infrequent episodic tension-type headache</i> , it's preferred to use <i>Infrequent episodic tension-type headache</i> , due to rule that definite diagnoses always trump probable diagnoses.

Table 2. The diagnostic criteria for the diagnosis of frequent episodic tension-type headache [2].

A. At least 10 episodes of headache occurring on 1-14 days/month on average for >3 months (≥ 12 and <180 days/year) and fulfilling criteria B-D
B. Lasting from 30 minutes to seven days
C. At least two of the following four characteristics: 1. bilateral location 2. pressing or tightening (non-pulsating) quality of pain 3. mild or moderate intensity 4. not aggravated by routine psychical activity, such as walking or climbing stairs
D. Both of following: 1. no nausea or vomiting 2. no more than one of photophobia or phonophobia
E. Not better accounted for by another ICHD-3 diagnosis.
Note: Frequent episodic TTH can be divided into frequent episodic TTH associated- and not associated with pericranial tenderness due to fact of this symptom in patients.

When headache fulfills criteria for both *Probable migraine* and *Frequent episodic tension-type headache*, it's preferred to use *Frequent episodic tension-type headache*, due to rule that definite diagnoses always trump probable diagnoses.
 Frequent episodic TTH often coexist with migraine without aura – it's necessary to identify both of disorders due to different treatments.

Table 3. The diagnostic criteria for the diagnosis of chronic tension-type headache [2].

A. Headache occurring on ≥ 15 days/month on average for >3 months (≥ 180 days/year) and fulfilling criteria B-D
B. Lasting hours to days, or unremitting
C. At least two of the following four characteristics: 1. bilateral location 2. pressing or tightening (non-pulsating) quality of pain 3. mild or moderate intensity 4. not aggravated by routine psychical activity, such as walking or climbing stairs
D. Both of following: 1. no nausea or vomiting 2. no more than one of photophobia or phonophobia
E. Not better accounted for by another ICHD-3 diagnosis.
Note: Chronic TTH can be divided into chronic TTH associated- and not associated with pericranial tenderness due to fact of this symptom in patients. Patient's headache can fulfill both all criteria for <i>Chronic TTH</i> and <i>Chronic migraine</i> . In these cases, only the diagnosis <i>Chronic migraine</i> should be given.

The exclusion of causes that may be responsible for secondary headaches reminiscent of tension-type headache is important not only because of possible wrong therapeutic decisions regarding the headache itself, but also overlooking the first symptoms of serious illness. There are several features of pain that are “red-flags” and require urgent specialist medical care (i.e. performing imaging tests and referring patient to a neurological ward) [35]:

- 1) sudden and very strong pain (the first so strong in life)
- 2) pain with increasing intensity
- 3) pain with accompanying meningeal symptoms and fever
- 4) pain in a person over 50 who appeared only at this age and whose intensity is increasing
- 5) extremely one-sided pain
- 6) pain not responding to any immediate treatment at all
- 7) suddenly changing the nature of pain in a person with a long-suffering headache
- 8) pain with accompanying neurological focal symptoms
- 9) pain with accompanying epileptic seizures
- 10) pain temporarily and causally associated with head injury

- 11) pain with the congestive optic disc
- 12) pain in people with hypercoagulability, in pregnancy, with (any) thrombosis in a personal or family history
- 13) pain in people with a history of cancer or positive anti-HIV antibody test.

Differential diagnosis of TTH includes:

- drug-induced headache
- sinusitis
- diseases of the eye (e.g. glaucoma)
- idiopathic intracranial hypertension (IIH)
- dysfunction of temporomandibular joint
- headache attributed to head and/or neck trauma
- brain tumors
- bruxism.

6. TREATMENT OF TENSION-TYPE HEADACHE

Treatment of patients with TTH is difficult for many reasons. Patients suffering from episodic TTH usually do not look for a medical advice from their doctor, but instead take *over-the-counter* analgesics. On the contrary, patients with chronic TTH, due to its resistance to treatment, often abuse analgesics and have a specific psychological profile, which also affects the therapeutic process.

Depending on the type of tension-type headache, different methods of pharmacological treatment are used, so it becomes necessary to determine the exact subtype of the disorder. Many patients may also benefit from additional psychological treatment.

People with infrequent tension-type headache and positive results of self-treatment with *over-the-counter* medications do not need constant medical care, but some of them may expect substantive support from a doctor if their treatment is appropriate for the disease. The use of medicines for acute headache should be no more than 2-3 days a week to minimize the risk of overuse of drugs or the occurrence of drug-induced headaches. Patients whose headache significantly reduces their daily lives, significantly affect the quality of life or cause additional health complications must be under constant medical care. People who abuse over-the-counter analgesics due their disorder should also receive specialist care.

Treatment for TTH includes the symptomatic therapy of acute attacks and, if necessary, the addition of preventive treatment to reduce the number of attacks.

6. 1. Symptomatic therapy of tension-type headache acute attacks

Over-the-counter medications such as acetylsalicylic acid (ASA) and paracetamol are effective in treatment of TTH attacks. Their general availability causes difficulties for the doctors to control the treatment. Of the above-mentioned drugs, acetylsalicylic acid at the 1000 mg dose is the most effective (however, the 500 mg dose is also effective). 1000 mg paracetamol was also effective in treating TTH seizures, but 500 mg was not more effective than placebo [41]. One study suggests that metamizole at 500 and 1000 mg doses is more effective than 1000 mg ASA [42]. Some non-steroidal anti-inflammatory drugs (NSAIDs), i.e.

nimesulide, naproxen, diclofenac, ibuprofen, and ketoprofen are also used to treat TTH attacks. Few studies suggest that they have slightly better efficacy than aspirin or paracetamol. Nimesulide and ketoprofen were the most preferred by patients [43]. A study on the comparable effectiveness of 10% peppermint oil compared to 1000 mg paracetamol was found to be statistically poorly constructed and so far the effectiveness of peppermint oil in the treatment of TTH has not been proven [44].

Drugs containing two or more active substances that contain an analgesic and caffeine, codeine, sedatives or tranquilizers are often used to increase the effectiveness of the analgesic itself. Their increased effectiveness is confirmed, however, caution should be used in their use due to the increased risk of addiction and the possible transition of TTH into a drug-related headache [35, 36]. Triptans, often used in the treatment of migraine headache and muscle relaxants are not effective.

In summary, paracetamol at a dose of 1000 mg is a first-line drug according to the guidelines of the European Federation of Neurological Societies (EFNS) in the treatment of TTH attacks due to better gastric side effect profile. The second-line drug is ibuprofen at a dose of 400 mg (not more often than 3 days a week), although these recommendations may change due to the equally high effectiveness of nimesulide and ketoprofen, and their better reception by patients [47].

When patient takes more than 8-10 tablets of analgesics per month, emergency treatment should be replaced with preventive treatment to prevent side effects of therapy.

6. 2. Preventive therapy of chronic tension-type headache

Antidepressant drugs are primarily used in the preventive treatment of chronic TTH. The best effects were observed after the use of tricyclic antidepressants (TCA), especially amitriptyline at a dose of 50-75 mg per night, which is considered the first choice drug in this type of disorder [41, 47, 48]. Due to the fact that it acts on many receptors in the central nervous system (both on the serotonergic system and as an NDMA receptor agonist) and weakens central sensitization, its analgesic effect is independent of the antidepressant effect, which may be useful in patients with TTH coexists with depression [49]. Other TCAs that have been shown to be effective in treating TTH in studies are opipramol and clomipramine [50]. Mianserin, atypical tetracyclic antidepressant (TeCA) is also effective [51]. Other tricyclic antidepressants are less effective.

The limitations in the use of TCAs are the numerous adverse reactions listed in Table 4. Because they are frequent and dose-dependent, it is recommended to start therapy at low doses and gradually increase them slowly. The effect appears after 4-6 weeks of therapy, and the minimum treatment time is 3-6 months [47]. The time to complete therapy depends on the patient's condition, results obtained and coexistence of depression or other diseases. Withdrawal should also be gradual and based on the clinical picture of the patient's condition and the frequency of headaches. The treatment effect lasts longer than the duration of drug use [47].

Other drugs used in prophylactic treatment are selective serotonin reuptake inhibitors (SSRIs), i.e. paroxetine or sertraline. These medications work primarily as coanalgesics, because they have a small analgesic effect - hence their use in TTH therapy is debatable [53]. Some studies show the effectiveness of SSRIs, while others show efficacy similar to placebo (SSRIs only reduce the total number analgesics pills taken by the patient) [53, 54]. Venlafaxine, which is an selective serotonin and noradrenaline inhibitor (SNRI) is more effective [55]. Side effects of SSRI and SNRI are rare, usually mild and include nausea, diarrhea and other

gastrointestinal disorders, decreased libido, insomnia or excessive sleepiness and, paradoxically, worsening of headache [52, 56].

Table 4. Adverse reactions that may occur during chronic tension-type headache therapy with tricyclic antidepressants [52].

Type of receptor	Adverse reaction
Muscarinic acetylcholine receptor	Urinary disturbance
	Constipation
	Dry skin and mouth
	Sweating
Histamine receptor	Sedation
	Confusion
	Appetite disorders
Serotonin receptor	Nausea
α_1 -adrenergic receptor	Tachycardia
	Hypotension
Dopamine receptor	Palpitation and tremor

If the above treatment does not bring the desired results, mirtazapine may be effective. It acts on alpha-2-adrenergic receptors, thus becoming an inhibitor of the reuptake of noradrenaline and serotonin. A dose of 15-30 mg per day reduced the strength of pain, its duration, and the incidence of accidents [47,57]. Adverse drug therapy effects are also rare and usually quite mild – i.e. increased appetite, drowsiness, sedation, headache, dry mouth, weight gain. Mental disorders such as confusion and anxiety may also appear [58].

Benzodiazepines, which have a sedative effect, can be used only periodically or temporarily due to the high risk of developing addiction. Diazepam, clonazepam or oxazepam are effective primarily in people with concomitant neurotic disorders, but rather are not effective in people without mental disorders [47,59]. As mentioned above, medications used to treat muscle spasticity are ineffective and are not recommended for tension-type headache therapy. The use of antiepileptic drugs is still a topic of research and does not give obvious results. Valproic acid is not effective in the treatment of TTH, although there are studies showing the effectiveness of topiramate at low doses [60,61]. Similarly divergent results relate to the use of botulinum toxin in the form of injections into muscles of the skull [62-64].

The use of melatonin and nutraceuticals in TTH therapy in children and adolescents has brought good results both in the effectiveness of headache treatment and in terms of treatment tolerance [65].

6. 3. Psychological treatment of tension-type headache

Such frequent co-occurrence of TTH and other mental disorders indicates the need for psychological or often psychotherapeutic care of patients with TTH, especially when patients experience high level of stress. Research results indicate that people with TTH have a reduced level of quality of life, hence psychological interactions may provide them with adequate support [66].

There are many psychological methods to help patients observe and reduce their level of pain. Lot of them can be used not only to control frequency of headaches but also other types of pain. Moreover, not only psychologists and therapists, but also other specialists who care for patients with TTH can use the methods listed below. The simplest of them involve, for example, a subjective assessment of pain on a scale. An example of such a scale is the *Visual Analog Scale (VAS)*, which is used to assess the intensity of pain at a particular time.

There are several brief psychological, behavioral-type interventions that can be successfully used during the tension-type headache episode. Positive Emotion Induction (PEI) is one of those effective and brief methods [67]. This simple intervention is used primarily in the context of acute pain felt or just before its anticipated arrival. In a nutshell, PEI's intervention is to bring back a positive memory. The use of PEI by respondents in the authors' research was associated with a lower subjective assessment of the level of pain, fear and anxiety relative to the control group [67].

The psychological behavioral effective treatment of TTH is also based on biofeedback. The meta-analysis of research on biofeedback indicates the effectiveness of this method [68]. Biofeedback involves reducing muscle tone by recording the patient's physiological responses and learning how to control these responses [69]. This method has been empirically confirmed also for the reduction of number of headaches episodes [70].

The cognitive-behavioral approach assumes that the cause of various disorders is a faulty belief regarding various aspects of reality. And so convictions about the inability to control pain can inhibit the individual from undertaking behaviors reducing him, thus the pain will be still at the same high level. Cognitive-behavioral therapy (CBT) is also effective when TTH takes a chronic form.

The important psychological model of chronic pain being the base for CBT interventions is the Common Sense Model (CSM) by Leventhal and his co-workers [71]. They assume that beliefs about pain are a cognitive factor that is important for giving significance to distress associated with chronic disease, which may be the chronic form of TTH. These beliefs trigger human emotional and motivational aspects that determine how to deal with the situation. Man in the situation of illness and the associated chronic pain creates this cognitive representation which researchers describe on several dimension:

- reason – “Why I experience pain?”
- consequence - perceived effects of pain
- identification, or simply naming the pain symptoms
- duration - perception of how much pain lasts and perceiving it as persistent
- controllability – “How can I affect my disease?”

These dimensions determine how patient copes with pain and the emotions experienced by a person with chronic pain. Research confirms that these beliefs also have an impact on triggering pro-health behavior or seeking medical help [71].

In many researches, the efficiency of CBT was proved. For example, the significant difference between the decrease of headache incidence and depression symptoms for interventions based on CBT programme vs RPC (routine primary care) for people with comorbid migraine and/or tension-type headache and major depressive disorder was found [72]. The reduction of pain achieved by CBT was higher than RPC. The same research indicates that different measures, e.g. lower level of anxiety or higher level of quality of life were more positive for patients after CBT interventions [72].

As mentioned, numerous studies support the thesis about the high effectiveness of behavioral and cognitive-behavioral therapy, although there are studies presenting different data. Malone and Strube compared the effectiveness of cognitive-behavioral therapy, behavioral training, autogenic training, biological feedback and relaxation with control conditions for various types of pain, including tension-type headache [73]. The effectiveness of each method in relation to the control group was proved. The most effective method was Schultz's autogenic training. Furthermore, researchers have shown that those methods have only short-term efficacy and suggested that the essence of that efficiency is because of the reduction of the level of fear or depression, not pain as such [73].

The above review indicates that there are numerous psychological correlates of tension type headaches. Many of these associate not only to TTH but to pain as such - in acute or chronic form. However, research indicates that these results may also be applied for tension-type headaches. Studies have also confirmed the effectiveness of numerous, non-pharmacological therapies that help reduce tension-type headaches. However, some studies, indicate that their effectiveness may not consist in reducing pain as such, but in reducing the level of anxiety and depression.

6. 4. Other non-pharmacological treatment of tension-type headache

Although there is a lack of convincing results on the effectiveness of other non-pharmacological methods besides psychological and acupuncture, there are individual reports on the benefits obtained by patients due to their use [74, 75].

Among them, physiotherapeutic methods are most commonly used, which aim to improve posture, achieve muscle relaxation and general relaxation of the patient through various exercises and stimulation with light, ultrasound and electricity [8,76]. Unfortunately, their effectiveness is rather low, although there have been reports that manual therapy effectively improves the quality of life of patients with TTH [8,76]. There is no evidence of the effectiveness of spinal manipulation in TTH [77].

Current research suggests that lifestyle changes can be helpful in TTH therapy. Dietary mistakes, caffeine abuse, insufficient or excessive sleep duration and its disorders are associated with worse results of tension-type headache treatment [65, 78].

7. CONCLUSIONS

Tension-type headaches are common and important health problem. It is important to treat this disorder properly and effectively, as its presence is associated with a reduction in the quality of life of patients experiencing it. Although the exact pathomechanism of tension-type headaches is unknown, the current state of knowledge allows for effective treatment of tension type headache. Despite high incidence of the disease, not enough research is being conducted

into the pathophysiology and treatment of tension-type headache. Unfortunately, due this fact, an effective and long-term treatment for the chronic TTH variant is still unknown.

References

- [1] Jensen R, Stovner LJ. Epidemiology and comorbidity of headache. *The Lancet Neurology* 7(4) (2008) 354–61.
- [2] IHS (Headache Classification Committee of the International Headache Society). The International Classification of Headache Disorders, 3rd edition. *Cephalalgia: an international journal of headache* 38(1) (2018) 1–211.
- [3] Chai NC, Rosenberg JD, Lee Peterlin B. The epidemiology and comorbidities of migraine and tension-type headache. *Techniques in Regional Anesthesia and Pain Management* 16(1) (2012) 4–13.
- [4] Stovner LJ, Andree C. Prevalence of headache in Europe: A review for the Eurolight project. *Journal of Headache and Pain* 11 (2010) 289–99.
- [5] Lyngberg AC, Rasmussen BK, Jørgensen T, Jensen R. Has the prevalence of migraine and tension-type headache changed over a 12-year period? A Danish population survey. *European Journal of Epidemiology*. 20(3) (2005) 243–9.
- [6] Lyngberg AC, Rasmussen BK, Jørgensen T, Jensen R. Incidence of primary headache: A Danish epidemiologic follow-up study. *American Journal of Epidemiology* 161(11) (2005) 1066–73.
- [7] Yu S, Han X. Update of Chronic Tension-Type Headache. *Current Pain and Headache Reports* 19 (2015) 469.
- [8] Falsiroli Maistrello L, Rafanelli M, Turolla A. Manual therapy and quality of life in people with headache . Systematic review and meta-analysis of randomized controlled trials. *Current Pain and Headache Reports* 23 (2019) 78.
- [9] Vos T, Allen C, Arora M, Barber RM, Brown A, Carter A, et al. Global, regional, and national incidence, prevalence, and years lived with disability for 310 diseases and injuries, 1990–2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet* 388(10053) (2016) 1545–602.
- [10] Gustavsson A, Svensson M, Jacobi F, Allgulander C, Alonso J, Beghi E, et al. Cost of disorders of the brain in Europe 2010. *European Neuropsychopharmacology* 21(10) (2011) 718–79.
- [11] Ashina M, Stallknecht B, Bendtsen L, Pedersen JF, Galbo H, Dalgaard P, et al. In vivo evidence of altered skeletal muscle blood flow in chronic tension-type headache. *Brain* 125(2) (2002) 320–6.
- [12] Andersen S, Petersen MW, Svendsen AS, Gazerani P. Pressure pain thresholds assessed over temporalis, masseter, and frontalis muscles in healthy individuals, patients with tension-type headache, and those with migraine-a systematic review. *Pain* 156(8) (2015) 1409–23.

- [13] Fernández-De-Las-Peñas C, Bueno A, Ferrando J, Elliott JM, Cuadrado ML, Pareja JA. Magnetic resonance imaging study of the morphometry of cervical extensor muscles in chronic tension-type headache. *Cephalalgia* 27(4) (2007) 355–62.
- [14] Palacios Ceña M, Castaldo M, Kelun W, Torelli P, Pillastrini P, Fernández-de-las-Peñas C, et al. Widespread Pressure Pain Hypersensitivity Is Similar in Women With Frequent Episodic and Chronic Tension-Type Headache: A Blinded Case–Control Study. *Headache* 57(2) (2017) 217–25.
- [15] Moskowitz MA, Macfarlane R. Neurovascular and molecular mechanisms in migraine headaches. *Cerebrovascular and Brain Metabolism Reviews* 5(3) (1993) 159–77.
- [16] Williamson DJ, Hargreaves RJ. Neurogenic inflammation in the context of migraine. *Microscopy Research and Technique* 53(3) (2001) 167–78.
- [17] Benemei S, Nicoletti P, Capone JG, Geppetti P. CGRP receptors in the control of pain and inflammation. *Current Opinion in Pharmacology* 9(1) (2009) 9–14.
- [18] Perini F, D’Andrea G, Galloni E, Pignatelli F, Billo G, Alba S, et al. Plasma cytokine levels in migraineurs and controls. *Headache* 45(7) (2005) 926–31.
- [19] Schou WS, Ashina S, Amin FM, Goadsby PJ, Ashina M. Calcitonin gene-related peptide and pain: a systematic review. *Journal of Headache and Pain*. 18(1) (2017) 34.
- [20] Bach FW, Langemark M, Ekman R, Rehfeld JF, Schifter S, Olesen J. Effect of sulpiride or paroxetine on cerebrospinal fluid neuropeptide concentrations in patients with chronic tension-type headache. *Neuropeptides* 27(2) (1994) 129–36.
- [21] Jensen R. Pathophysiological mechanisms of tension-type headache: A review of epidemiological and experimental studies. *Cephalalgia* 19 (1999) 602–21.
- [22] Jensen R, Rasmussen BK. Muscular disorders in tension-type headache. *Cephalalgia* 16(2) (1996) 97–103.
- [23] Schoenen J, Gerard P, De Pasqua V, Juprelle M. EMG Activity in Pericranial Muscles During Postural Variation and Mental Activity in Healthy Volunteers and Patients With Chronic Tension Type Headache. *Headache: The Journal of Head and Face Pain* 31(4) (1991) 321–4.
- [24] Pilarska E, Olszewska A. Temperament traits of children with episodic tension-type headaches. *European Journal of Paediatric Neurology* 13(4) (2009) 327–31.
- [25] Ozdemir O, Aykan F, Ozdemir P. Coping Strategies and personality traits in women patients with migraine and tension type headache. *Journal of Mood Disorders* 4(2) (2014) 59.
- [26] Aaseth K, Grande RB, Leiknes KA, Benth JŠ, Lundqvist C, Russell MB. Personality traits and psychological distress in persons with chronic tension-type headache. The Akershus study of chronic headache. *Acta Neurologica Scandinavica* 124(6) (2011) 375–82.
- [27] Siniatchkin M, Riabus M, Hasenbring M. Coping styles of headache sufferers. *Cephalalgia* 19(3) (1999) 165–73.

- [28] Perozzo P, Savi L, Castelli L, Valfrè W, Giudice R Lo, Gentile S, et al. Anger and emotional distress in patients with migraine and tension-type headache. *Journal of Headache and Pain* 6(5) (2005) 392–9.
- [29] Nash JM, Thebarg RW. Understanding psychological stress, its biological processes, and impact on primary headache. *Headache* 46(9) (2006) 1337–86.
- [30] Kikuchi H, Yoshiuchi K, Ando T, Yamamoto Y. Influence of psychological factors on acute exacerbation of tension-type headache: Investigation by ecological momentary assessment. *Journal of Psychosomatic Research* 79(3) (2015) 239–42.
- [31] Puca F, Genco S, Prudenzano MP, Savarese M, Bussone G, Amico D, et al. Psychiatric comorbidity and psychosocial stress in patients with tension-type headache from headache centers in Italy. *Cephalalgia* 19(3) (1999) 159–64.
- [32] Da Silva A, Costa EC, Gomes JB, Leite FM, Gomez RS, Vasconcelos LP, et al. Chronic headache and comorbidities: A two-phase, population-based, cross-sectional study. *Headache* 50(8) (2010) 1306–12.
- [33] Fielding J, Young S, Martin PR, Waters AM. Headache symptoms consistent with migraine and tension-type headaches in children with anxiety disorders. *Journal of Anxiety Disorders* 40 (2016) 67–74.
- [34] Gaul C, Van Doorn C, Webering N, Dlugaj M, Katsarava Z, Diener HC, et al. Clinical outcome of a headache-specific multidisciplinary treatment program and adherence to treatment recommendations in a tertiary headache center: An observational study. *Journal of Headache and Pain* 12(4) (2011) 475–83.
- [35] Jensen RH. Tension-Type Headache – The Normal and Most Prevalent Headache. *Headache* 58(2) (2018) 339–45.
- [36] Ashina M, Bendtsen L, Jensen R, Sakai F, Olesen J. Muscle hardness in patients with chronic tension-type headache: Relation to actual headache state. *Pain* 79(2–3) (1999) 201–5.
- [37] Headache Classification Subcommittee of the International Headache Society. The International Classification of Headache Disorders: 2nd edition. *Cephalalgia* 24(Suppl 1) (2004) 9–160.
- [38] Loder E, Rizzoli P. Tension-type headache. *The BMJ* 336(7635) (2008) 88–92.
- [39] Stovner LJ, Hagen K, Jensen R, Katsarava Z, Lipton RB, Scher AI, et al. The global burden of headache: A documentation of headache prevalence and disability worldwide. *Cephalalgia* 27 (2007) 193–210.
- [40] Rasmussen BK. Migraine and tension-type headache in a general population: precipitating factors, female hormones, sleep pattern and relation to lifestyle. *Pain* 53(1) (1993) 65–72.
- [41] Steiner T, Lange R, Voelker M. Aspirin in episodic tension-type headache: placebo-controlled dose-ranging comparison with paracetamol. *Cephalalgia* 23(1) (2003) 59–66.
- [42] Martínez-Martín P, Raffaelli E, Titus F, Despuig J, Fragoso YD, Díez-Tejedor E, et al. Efficacy and safety of metamizol vs. acetylsalicylic acid in patients with moderate

- episodic tension-type headache: A randomized, double-blind, placebo- and active-controlled, multicentre study. *Cephalalgia* 21(5) (2001) 604–10.
- [43] Affaitati G, Martelletti P, Lopopolo M, Tana C, Massimini F, Cipollone F, et al. Use of Nonsteroidal Anti-Inflammatory Drugs for Symptomatic Treatment of Episodic Headache. *Pain Practice* 17(3) (2017) 392–401.
- [44] Kulkarni GB, Rao GN, Thennarasu K, Gururaj G. Aspirin for acute episodic tension-type headache in adults. *Cochrane Database of Systematic Reviews* 12 (2011) 1465–858.
- [45] Lipton RB, Diener HC, Robbins MS, Garas SY, Patel K. Caffeine in the management of patients with headache. *Journal of Headache and Pain* 18(1) (2017) 107.
- [46] Haag G, Diener HC, May A, Meyer C, Morck H, Straube A, et al. Self-medication of migraine and tension-type headache: Summary of the evidence-based recommendations of the Deutsche Migräne und Kopfschmerzgesellschaft (DMKG), the Deutsche Gesellschaft für Neurologie (DGN), the Österreichische Kopfschmerzgesellschaft (Ö. *Journal of Headache and Pain* 12(2) (2011) 201–17.
- [47] Bendtsen L, Evers S, Linde M, Mitsikostas DD, Sandrini G, Schoenen J. EFNS guideline on the treatment of tension-type headache - Report of an EFNS task force. *European Journal of Neurology* 17 (2010) 1318–25.
- [48] Bendtsen L, Jensen R, Olesen J. A non-selective (amitriptyline), but not a selective (citalopram), serotonin reuptake inhibitor is effective in the prophylactic treatment of chronic tension-type headache. *Journal of Neurology Neurosurgery and Psychiatry* 61(3) (1996) 285–90.
- [49] Ashina S, Bendtsen L, Jensen R. Analgesic effect of amitriptyline in chronic tension-type headache is not directly related to serotonin reuptake inhibition. *Pain* 108(1–2) (2004) 108–14.
- [50] Fumal A, Schoenen J. Tension-type headache: current research and clinical management. *The Lancet Neurology* 7(1) (2008) 70–83.
- [51] Manna V, Bolino F, Cicco L Di. Chronic Tension-Type Headache, Mood Depression and Serotonin: Therapeutic Effects of Fluvoxamine and Mianserine. *Headache: The Journal of Head and Face Pain* 34(1) (1994) 44–9.
- [52] Trindade E, Menon D, Topfer LA, Coloma C. Adverse effects associated with selective serotonin reuptake inhibitors and tricyclic antidepressants: A meta-analysis. *Canadian Medical Association Journal* 159(10) (1998) 1245–52.
- [53] Banzi R, Cusi C, Randazzo C, Sterzi R, Tedesco D, Moja L. Selective serotonin reuptake inhibitors (SSRIs) and serotonin-norepinephrine reuptake inhibitors (SNRIs) for the prevention of migraine in adults. *Cochrane Database of Systematic Reviews* 4 (2015) 1465–858.
- [54] Boz C, Altunayoglu V, Velioglu S, Ozmenoglu M. Sertraline versus amitriptyline in the prophylactic therapy of non-depressed chronic tension-type headache patients. *Journal of Headache and Pain* 4(2) (2003) 72–8.

- [55] Zissis NP, Harmoussi S, Vlaikidis N, Mitsikostas D, Thomaidis T, Georgiadis G, et al. A randomized, double-blind, placebo-controlled study of venlafaxine XR in out-patients with tension-type headache. *Cephalalgia* 27(4) (2007) 315–24.
- [56] Ferguson JM. SSRI antidepressant medications: Adverse effects and tolerability. *Primary Care Companion to the Journal of Clinical Psychiatry* 3(1) (2001) 22–7.
- [57] Bendtsen L, Jensen R. Mirtazapine is effective in the prophylactic treatment of chronic tension-type headache. *Neurology* 62(10) (2004) 1706–11.
- [58] Watanabe N, Omori IM, Nakagawa A, Cipriani A, Barbui C, McGuire H, et al. Safety reporting and adverse-event profile of mirtazapine described in randomized controlled trials in comparison with other classes of antidepressants in the acute-phase treatment of adults with depression: Systematic review and meta-analysis. *CNS Drugs* 24(1) (2010) 35–53.
- [59] Verhagen AP, Damen L, Berger MY, Passchier J, Koes BW. Lack of benefit for prophylactic drugs of tension-type headache in adults: A systematic review. *Family Practice* 27(2) (2009) 151–65.
- [60] Lampl C, Marecek S, May A, Bendtsen L. A prospective, open-label, long-term study of the efficacy and tolerability of topiramate in the prophylaxis of chronic tension-type headache. *Cephalalgia* 26(10) (2006) 1203–8.
- [61] Stillman MJ, Zajac D, Rybicki LA. Treatment of Primary Headache Disorders with Intravenous Valproate: Initial Outpatient Experience. *Headache* 44(1) (2004) 65–9.
- [62] Jackson JL, Kuriyama A, Hayashino Y. Botulinum toxin A for prophylactic treatment of migraine and tension headaches in adults: A meta-analysis. *JAMA - Journal of the American Medical Association* 307(16) (2012) 1736–45.
- [63] Rollnik JD, Tanneberger O, Schubert M, Schneider U, Dengler R. Treatment of tension-type headache with botulinum toxin type A: A double-blind, placebo-controlled study. *Headache* 40(4) (2000) 300–5.
- [64] Harden RN, Cottrell J, Gagnon CM, Smitherman TA, Weinland SR, Tann B, et al. Botulinum toxin a in the treatment of chronic tension-type headache with cervical myofascial trigger points: A randomized, double-blind, placebo-controlled pilot study. *Headache* 49(5) (2009) 732–43.
- [65] Toldo I, Rattin M, Perissinotto E, De Carlo D, Bolzonella B, Nosadini M, et al. Survey on treatments for primary headaches in 13 specialized juvenile Headache Centers: The first multicenter Italian study. *European Journal of Paediatric Neurology* 21(3) (2017) 507–21.
- [66] Jensen R. Diagnosis, epidemiology, and impact of tension-type headache. *Current Pain and Headache Reports* 7(6) (2003) 455–9.
- [67] Bruehl S, Carlson CR, McCubbin JA. Two brief interventions for acute pain. *Pain* 54(1) (1993) 29–36.
- [68] Blanchard EB, Andrasik F, Ahles TA, Teders SJ, O’Keefe D. Migraine and tension headache: A meta-analytic review. *Behavior Therapy* 11(5) (1980) 613–31.

- [69] Ziółkowska AM, Trusz S, Bąbel P. Techniques of behavioral therapy for chronic pain and their effectiveness according to the results of meta-analyses. *Postepy Psychiatrii i Neurologii* 23(1) (2014) 10–6.
- [70] Andrasik F. Biofeedback in headache: An overview of approaches and evidence. *Cleveland Clinic Journal of Medicine* 77(Suppl 3) (2010) S72–6.
- [71] Leventhal H, Brissette I, Leventhal EA. The common-sense model of self-regulation of health and illness. In: Cameron L, Leventhal H, editors. *The self-regulation of health and illness behaviour*. London: Routledge; 2003. pp. 42–65.
- [72] Martin PR, Aiello R, Gilson K, Meadows G, Milgrom J, Reece J. Cognitive behavior therapy for comorbid migraine and/or tension-type headache and major depressive disorder: An exploratory randomized controlled trial. *Behaviour Research and Therapy* 73 (2015) 8–18.
- [73] Malone MD, Strube MJ. Meta-analysis of non-medical treatments for chronic pain. *Pain* 34(3) (1988) 231–44.
- [74] Melchart D, Streng A, Hoppe A, Brinkhaus B, Witt C, Wagenpfeil S, et al. Acupuncture in patients with tension-type headache: Randomised controlled trial. *British Medical Journal* 331(7513) (2005) 376–9.
- [75] Linde K, Allais G, Brinkhaus B, Manheimer E, Vickers A, White AR. Acupuncture for tension-type headache. *Cochrane Database of Systematic Reviews* 4 (2016) 1465–858.
- [76] Torelli P, Jensen R, Olesen J. Physiotherapy for tension-type headache: A controlled study. *Cephalalgia* 24(1) (2004) 29–36.
- [77] Posadzki P, Ernst E. Spinal manipulations for tension-type headaches: a systematic review of randomized controlled trials. *Complementary Therapies in Medicine* 20(4) (2012) 232–9.
- [78] Cho S, Song T, Chu M. Sleep and Tension-Type Headache. *Current Neurology and Neuroscience Reports* 19(7) (2019) 44.