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Use of Acupuncture in the Complex Treatment for Pain Dysfunction Syndrome of a Temporomandibular Joint

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Abstract

Complex treatment for pain dysfunction syndrome of a temporomandibular joint has been developed and proved pathogenetically. High efficiency in the use of acupuncture in the treatment for pain dysfunction syndrome of a temporomandibular joint as compared to pharmacotherapy and physiotherapy has been demonstrated.

Keywords: Pain dysfunction syndrome of temporomandibular joint, acupuncture.

Contents

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1. Introduction

Pain dysfunction syndrome of a temporomandibular joint (TMJ PDS) is an actual problem of modern dentistry. This is one of the most complicated, difficult to diagnose diseases, faced not only by stomatologists, but also by any physicians of other specialties - neurologists, psychiatrists, endocrinologists, ENT and others. Its prevalence is high enough and in recent years it has a clear tendency to increase. According to various authors, the disease of a temporomandibular joint is found to occur in 20-76% of the population, of which up to 70-89% of cases result from various intra-functional disorders [1-6]. Discussions on the etiology and pathogenesis of this disease continue to this day. The proposed theories compete with each other, and today there are 4 main pathogenic factors in the development of TMJ PDS such as occlusal disharmony, violation of the chewing muscles tone, organic or functional changes of the TMJ, stress and psychological, personality disorders. Increasingly, the literature points to the role of metabolic disorders, neuroendocrine and neuroimmune disorders in the pathogenesis of this disease [4, 6].

Treatment for pain dysfunction syndrome of a temporomandibular joint is a complicated process. Difficulties in therapy choice apparently are due to the ambiguity and multifactor pathogenesis of this disease, the ever-changing views of researchers on its essence, and therefore some methods of treatment are often rejected and other ones are offered. On the other hand, the complexity of the anatomy and kinetics of the TMJ requires a doctor's deep knowledge of anatomy and physiology in order to orient him in a variety of clinical and radiographic manifestations of this syndrome, to identify the leading factor in its development and to draw up an individual treatment plan. A feature of the pharmacotherapy of this pathology is the prolonged use of the drugs, which can result in the development of allergic complications and other side effects. Therefore, it seems appropriate to pathogenetically justified using the non-medicamental methods in the complex treatment for TMJ PDS, such as acupuncture, as well as a comparative assessment of their efficacy.

There are only a few information in the literature on the application of acupuncture in the treatment for functional disorders of a TMJ [4, 7]. We have not found any detailed analysis of the results of using acupuncture in patients with this pathology. Japanese researchers demonstrate preliminary results of treatment of 85 patients with TMJ dysfunction through the use of acupuncture, occlusal splints, and injections into trigger points, which made it possible to achieve the improvement of the 73 patients (85%) for 6 sessions of treatment. The authors plan to continue studies to confirm the efficacy of the proposed method in comparison with other methods [8].

1.1. Objective of Study

To assess the efficacy of using acupuncture in the complex treatment of patients with TMJ pain dysfunction syndrome.

We have developed an algorithm for complex treatment of patients with the TMJ PDS for solving the following tasks: pain relief, withdrawal of mental and emotional stress at presence of asthenic-depressive and depressive-hypochondriac disorders, removal of hysterical states, correction of the anatomical relationship of the joint elements, normalization of functional relationships in chewing and neck muscles, restoration of anatomically and functionally adequate occlusion of dentition, optimization of reparative processes in the cartilage and bone cells articulation at the secondary development of dystrophic disorders in them.

On the base of update ideas of the mechanism of reflex therapeutic effect on the organism, we believed that the first three problems can be successfully solved through acupuncture. It is known that under the influence of rational acupuncture along with the improvement of a general state of patients and normalization of cerebral hemodynamics, pain is eliminated, emotional stress is removed and there is relaxation of the muscles, including the chewing ones. As a result, it contributes to the normalization of the TMJ function and partly to the correction of the anatomic relationships of joint elements, which to some extent solves the last of the tasks. Acupuncture also has immunomodulatory, hyposensitive effect and it activates the whole conducted complex treatment and prolongs its results.

2. Material and Methods of Studies

The efficacy of using acupuncture in the treatment of 20 patients with the pain dysfunction syndrome of TMJ has been studied. In the comparison group, consisting of 20 patients with the same pathology, there was used the pharmacotherapy (analgesics and non-steroidal anti-inflammatory drugs, herbal sedatives, tranquilizers with muscle relaxant effect, antidepressants, muscle relaxants of a central origin as sirdalud and midokalm) and physiotherapeutic methods. The groups of patients were comparable on the main clinical parameters.

Regardless of the methods of treatment the great attention was paid to the first patient’s visit during which we tried to establish trusting relationships with him, because for a patient with TMJ PDS it was often important not what was done, but how it was done.

In the complex of therapeutic measures the patients of both groups were prescribed physical therapy and autogenic training. According to the indicators there was carried on the reposition a disc joint, post-isometric relaxation of the masticatory muscles, the use of TMJ-trainers, orthodontic and orthopedic methods of treatment to restore anatomically and functionally adequate occlusion of teeth. Means and methods improving trophism and reparative processes in cartilage and bone elements of a joint (chondroprotectors, osteogenon) were administered during the development of the secondary dystrophic joint lesions. Procedure of using various therapeutic measures depended on the prevalence of various symptoms in each patient.

The technique of the combined using different methods of acupuncture including corporeal and auricular acupuncture, warming up points and a TMJ area, prolonged auricular acupuncture and pointillage was used. All procedures of acupuncture were performed at the horizontal position of a patient. During the procedure, careful monitoring of a patient's state, blood pressure, rate and rhythm of heartbeats was carried out. For corporeal acupuncture there were predominantly used the acupuncture needles of middle (5 cm) and small (1-2 cm) length, and the latter ones were also used for auricular acupuncture. The prolonged auricular acupuncture was performed by

standard buttons, fixed on the adhesive plaster. Warming was performed by using cigars ("ironing" method) or by using moxa. Acupuncture procedure took into account a patient's general state, clinical manifestations and stages of TMJ PDS development, as well as the presence of concomitant and background diseases, which indicates to the individual approach to the selection of points for action. The most favorable combination of points was used for repeated actions.

On drawing up a plan of acupuncture action, we combined the local, segmental points and points of a broad spectrum of action and also we included the auricular and remote points. The first procedure with using points of a broad spectrum of action for the regulation of various parts of the nervous system was always adaptable. Predominantly the II variant of braking method was applied.

For TMJ PDS acupuncture the most often used corporal points were the followings:
- points of general action: P 7, GI 4, E 36, TR 5, MC 6, V 60, VB 20, VG 20;
- segmental points: VB 20, VG 14, VG 20, V 10, V 11;
- extra-merideonal points: MS 9 and MS 18;

and also the auricular points: AT-55 ("shen-men"), AT-51 ("autonomic nervous system"), AT-22 ("endocrine glands"), AT-25 ("brain stem"), AT-26 ("toothache"), AT-28 (the "brain"), AT-29 ("occiput"), AT-34 ("cortex"), AT-35 ("temple"). For action on the localization zone of the pathological process there were used the auricular points as AT-1 ("tooth analgesia -1"), AT-3 ("bottom of oral cavity"), AT-5 ('upper jaw'), AP-6 ("lower jaw "), AT-7 ("tooth analgesia -2 "), and AT-11 («cheek»).

On auricular diagnostics in some cases there were observed the signs of a zone irritation, located between AT-5 ("upper jaw") and AT-6 ("lower jaw"), and acupuncture has a pronounced therapeutic, in particular anesthetic effect, which gave us a reason to distinguish AT ("TMJ"), the action on which can be used in acupuncture for diseases of the given joint.

Moreover, during the work we used the insertion of a needle into the previously undocumented point located just below the zygomatic arch at the anterior superior surface of the articular head, above and behind the E 7. To find its localization, a patient was asked to open and close a mouth a few times, while palpating the anterior upper surface of the articular head of the mandible. A needle was inserted in a direction obliquely upwards, backwards and inwards to a depth of 0.5 cm, suggesting effects on the upper head of the external pterygoid muscle attached to the capsule and disc of a TMJ.

At presence of concomitant pathology there was conducted the corresponding acupuncture:

- in vertebrobasilar insufficiency, developed against dystrophic diseases of a spine, or a violation of biomechanics of the cervical and thoracic portions we used IG 3, V 60, V 62, TR 5, VB 20, VB 38, VB 39, etc.;

- in sleep disorders P 5, C 3, C 7, R 6, VB 14, VB 20, F 3, F 8 were connected; in emotional disorders - GI 4, GI 11, E 36, RP 6, C 3, C 7, MS 6, VG 11, VC 14 and auricular points AT-55 ("shen-men"), AT-51 ("autonomic nervous system "), AT-100 (" the heart, the first "), AT 34 (" cortex ");

- in gastrointestinal disorders - GI 4, GI 11, E 25, E 36, RP 4, RP 6, V 18, V 19, V 20, V 21 and auricular points AT-87 ("stomach"), AE-97 ("liver"), AT-51 ("autonomic nervous system"), AE-88 ("duodenum") were used.

We applied a single or bilateral acupuncture effect. In acupuncture choice of a side depended on the clinical manifestations of the syndrome. According to the indicators the "wonderful" meridians were used.

We don't present the scheme of acupuncture for TMJ PDS because the clinical picture of a disease is very diverse and the prevalence of certain clinical features in each patient is expressed individually as well as an individual body's response to a therapeutic effect. Therefore, for each patient the selection of "his" combinations of biologically active points and methods of action, depending on the clinical signs was done. The number of sessions, depending on the clinical picture and health of a patient ranged from 2 to 10.

For objectification of comparative evaluation of the results of treatment by using acupuncture techniques and pharmacological and physical therapy there were used the followings:
- «method for evaluating the efficacy of treatment for a face myofascial pain dysfunctional syndrome" [9];
- psychological testing of patients of the compared groups before and after the treatment;
- biochemical blood analysis before and after the treatment.

"Method for evaluating the efficacy of treatment for a face myofascial pain dysfunctional syndrome" is that at the 8 developed scales, inscribed in a circle, there were marked different subjective and objective clinical signs of TMJ PDS available for a quantitative evaluation. Scale I reflects the intensity of pain , II - character, III - prevalence and localization, IV - duration of pain, V - factors resulting in pain, VI - pain on palpation of the masticatory muscles, VII - degree of limitation of mouth opening and VIII - level of personal anxiety. Connecting points, reflecting the relative values of each scale, we have received a polygon inscribed in a circle, called the TMJ PDS" profile of a clinical picture". It enabled us to obtain a graphical representation of a patient's state at the time of examination. Besides, creating such image in a certain period of time in the course of treatment, we can assess the efficacy of the treatment by using different methods.

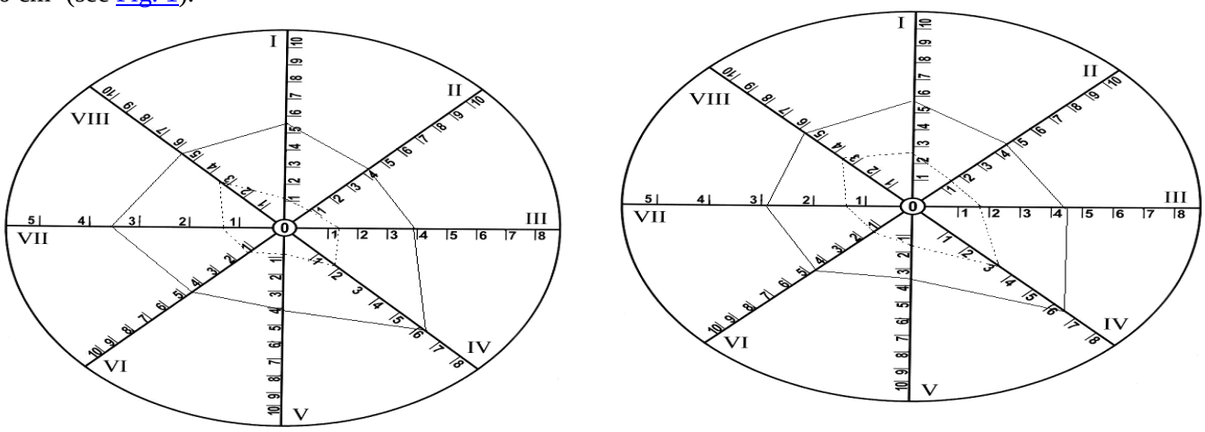
For psychological studies of the compared groups of patients before and after the treatment we applied C. S. Spielberg's diagnostic testing to measure the level of personal and reactive anxiety (PA, RA), Taylor's questionnaire to measure the level of anxiety and tendency to stress, and HAM (health, activity, mood) test for a differentiated self-assessment of health, activity and mood. For determining a degree of normalization of a psycho-emotional state and blood biochemical parameters of the patients with TMJ PDS as a result of the treatment the similar psychological and biochemical studies were performed in 30 healthy young persons (control group).

3. Results of the Studies and Discussion

Criteria of the treatment results were the reduction or disappearance of pain, improvement of general condition, mood, psycho-emotional state of the patients, reduction of the masticatory muscles tension, elimination of limitation

on the mouth opening, jaw movements' normalization, reduction or disappearance of a joint noise, normalization of biochemical parameters of blood serum.

"A method for evaluating the efficacy of treatment of a face myofascial painful dysfunctional syndrome" allowed us to observe quantitatively the dynamics of a clinical course during the process of treatment and to make a comparative evaluation of the results. Mathematical calculations as well as graphical representation of a "profile of a clinical picture" objectively showed higher efficacy of the treatment for the disease in the study group, where acupuncture was used. Thus the area of a polygon, displaying TMJ PDS "profile of a clinical picture" in the study group before treatment was equal on average to 73,34 ± 8,86 cm^2 and decreased as a result of the treatment by 9,23 times, which was 7,95 ± 3,22 cm^2. In a comparison group the area of "profile of a clinical picture" before the treatment was equal to 60,44 ± 7,77 cm^2 and after the treatment it decreased only by 5.84 times and accounted 10,34 ± 0 cm^2 (see Fig. 1).



A B

Figure-1. Dynamics of changes in the profile of the TMJ PDS clinical picture in patients of the main group (A) and of those of a comparison group (B) before (-) and after (---) the treatment.

The results of psychological testing of the compared groups patients also found a significant decrease of anxiety indices (PA, RA, according to Taylor's test) and increase of HAM in patients of a main group after the treatment (Table 1). Thus, the level of reactive anxiety decreased by 20,6% - from 43,6±4,22 to 34,6±1,74 points (R<0,05), personal anxiety - by 17,8% (52,45± 2.1 and 43,1±1,74 points R<0,001), and a tendency to stress according to Taylor's test decreased by 16.8% - from 29,25±1,50 to 24,35±1,62 points (R<0,05). An average level of HAM (health, activity, mood) as a result of the treatment increased by 35% - from 3, 31± 0, 15 to 5, 09±0, 13 points (R<0,001).

As a result of pharmaco- and physiotherapy in a comparison group there was only recorded a trend to lowering the first three indicators. The level of reactive anxiety decreased by 8%, from 41,55±2,04 to 38,25±1,74 points (R<0,05), personal anxiety - by 6.4%, from 54,42±1,39 to 50,95±1,15 points (P < 0,05), tendency to stress according to Taylor's test by 6%, from 29,33±1,67 to 27,57±1,33 points (R<0,05). The level of HAM increased significantly - by 24% (from 3, 39±0, 15 to 4, 46±0, 11, R<0,001), but to a lesser degree than in the study group.

Despite a significant change in the data of mental and emotional state of patients during the treatment compared with the baseline ones, all the studied parameters after the treatment did not reach the level of similar indicators in the healthy individuals represented in the control group, and the difference between them was statistically significant (R<0,001).

The results of the carried on psychological studies corresponded to the clinical observations and showed a more pronounced therapeutic effect of the combined treatment with using acupuncture on the state of psycho-emotional sphere of SDU TMJ patients as compared with the pharmacotherapy.

Table-1. Comparative assessment of the psychological testing results of patients of the main and comparison groups before and after the treatment (as compared with the control group indicators).

Group of studied patients	Level of reactive anxiety	Level of personal anxiety	Level of tendency to stress according to Taylor's test	Level of HAM
Main group (p = 20)				
before treatment	43,6±4,22* P<0,05	52,45±2,1* P<0,001	29,25±1,50* P<0,05	3,31±0,15* P<0,001
after treatment	34,6±1,74*	43,1±1,74*	24,35±1,62*	5,09±0,13*
Group of comparison(p = 20)				
before treatment	41,55±2,04* P>0,05	54,42±1,39* P≥0,05	29,33±1,67* P>0,05	3,39±0,15* P<0,001
after treatment	38,25±1,74*	50,95±1,15*	27,57±1,33*	4,46±0,11*
Control group (p = 30)				
	19,50±1,13	35,53±1,23	20,47±0,95	5,59±0,05

Note: * - difference as compared with the control group indicators is significant.

Results of biochemical studies of serum are presented in Table 2.

Comparative analysis of the results of biochemical studies of serum confirmed the dynamics of the clinical features of TMJ PDS and showed that after the treatment there were the following changes:

- normal neuromuscular transmission and tone of masticatory muscles, as evidenced by a decrease in ATP content in the serum of more than by 20% and a slight increase in the calcium content;

- reduced or eliminated pain, as evidenced by a decrease in the level of histamine in the blood, besides on using acupuncture it happens faster than on using drug treatment, and the result is significant: 48.15% (R<0,001) versus 23.68% (R<0 , 05), respectively;

- removed emotional stress by reducing the activity of stress systems of a body, as indicated by a significant decrease in blood hormone of stress response, more pronounced when using acupuncture: adrenaline - by 39.17% (R<0,001) and cortisol levels by 42.5% (R<0,001), and after medicamental treatment - only by 18.6% (R<0,01) and 6.86% (R<0,5), respectively.

From the above mentioned it should be concluded that the treatment for TMJ PDS by using acupuncture is more effective than the treatment by pharmacotherapy, and psychological testing and biochemical studies of histamine, adrenaline and cortisol content in the serum of patients may be used to assess the efficacy of treatment for pain dysfunction syndrome of a temporomandibular joint.

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Table-2. Comparative results of biochemical studies of blood serum in patients with TMJ painful dysfunction syndrome before and after the treatment with the use of acupuncture, as well as pharmaco-and physiotherapy.

Groups of patients	K mmol/l	Na mmol/l	Ca mmol/l	Mg mmol/l	Cl mmol/l	Protein g/l	Glucose mmol/l	АТФ mkmol/l	Histamin mkmol/l	Adrenalin mmol/l	Cortizol nmol/l	THS mmE/l
Before acupuncture	4,59±0,14	140,23±2,7	0,95±0,04	0,85±0,03	104,81±0,74	75,10±2,73	5,37±0,17	40,13±3,65	0,54±0,04*	0,97±0,06*	414,14±31,66*	1,99±0,15
	p>0,05	p>0,05	p>0,05	p>0,05	p>0,05	p>0,05	p>0,05	p>0,05	p<0,001	p<0,001	p<0,001	p>0,05
After acupuncture	4,46±0,08	141,0±0,85	1,04±0,17	0,90±0,04	103,50±2,81	69,70±2,8*	4,90±0,26	32,13±3,16	0,28±0,03	0,59±0,03	265,7±18,28	1,71±0,17
Before pharmaco-therapy	4,56±0,13	144,66±1,9	0,98±0,03	0,91±0,04	105,2±0,84	74,51±1,94	4,80±0,16	39,71±2,60	0,38±0,03	0,86±0,05*	323,6±18,78*	1,83±0,11
After pharmaco-therapy	p>0,05	p>0,2	p>0,2	p>0,05	p>0,5	p>0,1	p>0,2	p>0,05	p>0,05	p<0,01	p>0,5	p>0,2
	4,29±0,08	142,4±1,7	1,03±0,06	0,78±0,06	105,0±1,11	70,37±1,94*	4,50±0,19	31,05±4,26	0,29±0,04	0,70±0,03	301,4±23,15	1,97±0,10
Control	4,37±0,14	135,9±2,36	1,02±0,05	0,8 ±0,06	108,57±2,29	78,74±2,54	5,02±0,24	32,94±2,08	0,29±0,03	0,52±0,03	238,2±18,05	1,65±0,37

Note: * - indicates a significant difference compared with the control group.