

PHYSICAL REHABILITATION TREATMENT OF THE TEMPOROMANDIBULAR PAIN DYSFUNCTION SYNDROME

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Summary. *We here present a study of a conservative non-surgical treatment of painful temporomandibular joint (TMJ) syndrome administered in thirty patients. The treatment involved TENS applications, and particularly extension exercises of the masseter muscle, temporalis and pterygoid muscles, as well as the local application of ultrasound. The result was an evident improvement in a significant number of cases. We also present the literature review on conservative TMJ treatment.*

Key words: *pain dysfunction temporomandibular joint syndrome, conservative, physical treatment*

Introduction

Back in 1934, Costen described a syndrome observed in the temporomandibular joint (TMJ) region and attributed the phenomenon to the pressure on the nerve fibers within the joint itself as the consequence of the teeth loss in the posterior jaw segments. Therefore, he initially suggested that the treatment of this syndrome should be exclusively within the domain of dentists (1,2).

Later on, after he established the fact that the syndrome occurs in individuals without teeth loss as well, the syndrome was related with malocclusion and bruxism.

Nowadays, it is believed that the temporomandibular pain dysfunction syndrome (TMPDS) is an integral part of the clinical picture of muscular tension of one or more masseter muscles. Moreover, this presentation may sometimes be accompanied by clicking or popping noise in the ear, since it has been demonstrated that 33% of the population can have, as part of the clinical picture, clicking within the TMJ not associated with pain nor significant dysfunction requiring treatment (3).

The number of out-patient examinations of the patients complaining of headache as the consequence of radiation from the TMJ zone, associated with joint pathology or not, is constantly rising. One more thing is of relevance here: a number of advocated treatment modalities for TMPDS is not firmly based on clinical research evidence.

With this article we are trying to make a review of treatment approaches utilized in TMPDS patients in whom there are no osseous changes of the TMJ, nor teeth loss in the lateral portions of the jaws, controlling for the presence of a certain degree of psychologic alteration in the patients.

Materials and Method

The study involved 36 patients of both genders and of different age, referred to us for examination and assessment of their intense headache because of possible TMJ pathology involvement.

The criterion for inclusion into the study and administration of physical therapy was evident uni- or bilateral pain in the TMJ region, with or without noise within the joint on opening and/or closing the mouth.

Since the study design required that the enrolled patients have their own teeth in the posterior portions of the jaws, the vertical jaw relation was preserved. As the study exclusion criteria, we assessed whether the patients had problems eg. legal ones (traffic accidents, sick leave etc.) and there were also the occlusion disorders which could alter the vertical jaw dimension.

During the TMJ assessment and examination on out-patient basis, for each patient we opened the Disease history file, both general and TMJ specific, with palpation examination of the painful spots (temporal, masseter and pterygoid muscles), and mouth opening (in millimeters) was also recorded.

A specific test was taken with the patients – The Beck Depression Inventory. Finally, a panoramic radiogram of the jaws (Ortopantomogram) was taken to exclude the pathology of the jaw joints.

At the Centre for Physical Medicine and Rehabilitation, specific patient work-up took place, involving: articulation balance, neck muscle balance, palpation of the painful neck zones, palpation of possible trigger zones of facial and neck muscles, scapular zone muscles, as well as palpation of fibromyalgic spots in order to exclude such patients from the study (Fig. 1).



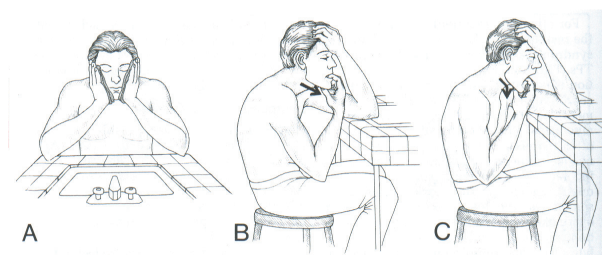
Fig. 1. Palpation of painful TMJ spots

Spinal radiograms of the neck region (P-A and lateral) helped us to record and assess the degree of arthrosis, the position of the neck portion of the spine, styloid processes and other possible anomalies (neck rib, subluxation atlas-axoides, hyperostoses etc.).

Physical medicine treatment consisted of 20 identical sessions for all patients, ultrasound application (Fig. 2) and demonstration exercises of forced stretching (Graph 1) at the level of the neck region, masseter, pterygoid and temporal muscles. Stretching was performed until the onset of a weak pain by clinical judgement, keeping the position for 1 minute and with five repetitions of stretching exercise for the above mentioned muscles/muscle groups.



Fig. 2. Application of ultrasound therapy for TMPDS



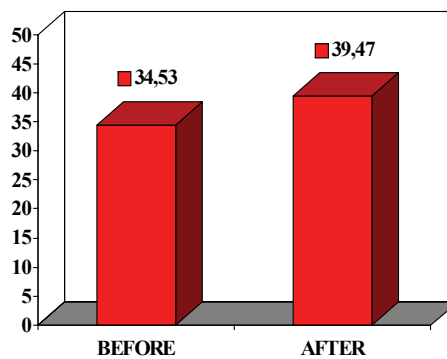
Graph 1. Masseter stretching exercise (A, warm bandage application; B, pulling out of the mandible; C, pulling the mandible forward and downward)

The efficacy of TMPDS treatment was validated in a number of ways: a) analogous pain scale from 0 to 10, during meals, rest and even during sleep; b) use of analgesics before and after treatment (type, amount and intervals); c) mouth opening (in mm) before and after treatment; d) sensitivity of trigger zones (algometrics) before and after treatment; and e) pain in the TMJ on palpatory pressure before and after physical therapy.

The data were statistically processed using t-student's test.

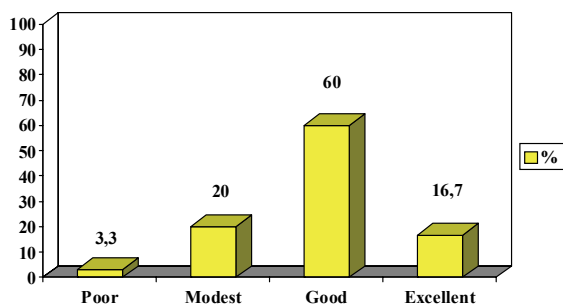
Results

Out of the initial 36 patients enrolled in the study, 6 were excluded due to data loss or for not completing all treatment phases. There were 20% men and 80% women, of average age 32,23 years. The initial (pre-treatment) mouth opening was 34,53 mm, while the respective post-treatment value was 39,47 mm ($p < 0,001$) (Graph 1). The situation after the administered treatment was subjectively considered poor (by 3,3% of the cases); the same as pre-treatment (20%); good (60%) and very good (16,7%) (Graph 2). Pain was assessed 650 using analogue visual scale at the level of masseter, internal pterygoid and trapezius muscles, and pre-tragus zone as well, before and after treatment. Significant pain reduction was observed in all patients (Graphs 3 and 4).

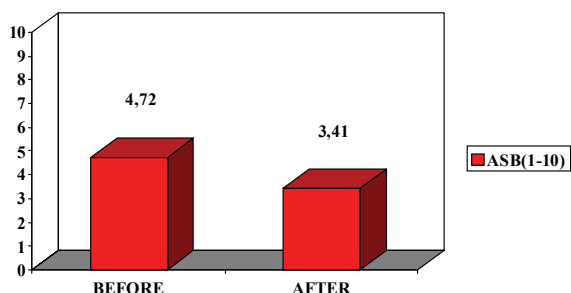


Graph 1. Mouth opening (in mm)

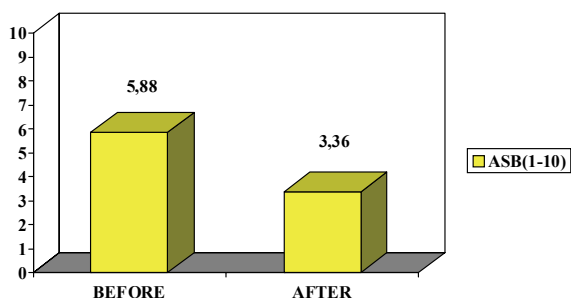
Radiographic assessment of the neck spine demonstrated normal situation in 46,7% of cases; intervertebral spaces were reduced in 26,7%; in 26,8% arthrosis was evident.



Graph 2. Subjective assessment of the treatment



Graph 3. Analogue pain scale: pain during mastication



Graph 4. Analogue pain scale: pain assessment on TMJ palpation

Discussion

Three pathological conditions most commonly affecting the TMJ are arthrosis, internal injury to the joint and TMPDS (4).

The incidence of the symptoms such as pain around jaw joints with headache is compatible with TMPDS and it has been confirmed that 6-12% of the general population is affected (1,2). Women are more commonly affected (2:1), though the proportion may vary during the treatment of jaw joints (5).

Although clinical picture is not always the exact reflection of the findings of nuclear magnetic resonance (NMR) imaging, in this study we applied clinical criteria to exclude the presence of degenerative lesions (6). We also applied the recommendations of the American Institute for Dental Research (7), among which are the following: inspection of head and neck, degree of mandibular movement, absence of pain and noise in the jaw joints, palpation of the TMJ, masticatory and adjacent

muscles, examination of oral tissues and structures and radiographic study.

We also took into account the possible presence of fibromyalgia, a relatively common condition affecting 2% of the population (3,4% of women and 0,5% of men), with higher percentage with advanced age (8).

It is believed today that TMPDS is a localized disease, while fibromyalgia is mostly a generalized disease, with symptoms and pain at multiple sites, including craniomandibular region (9).

However, fibromyalgia can produce symptoms locally, thus resembling TMPDS: irritating pain, muscular tension, fatigue, sleep disorders, and alterations in the sense of psychic lability (8,10,11,12). We therefore excluded all those with clinical presentation which could indicate the presence of fibromyalgia, according to the description of the American College of Rheumatology (13).

We also intended that the planned treatment should be directed towards psychologic factors as well. In many of the relevant studies, investigations took that direction (1,14,15).

Rudy et al. (16) demonstrated in their study that patients react in a variable manner to the same, standardized treatment based on psychologic and behavioral factors. Some other authors have established the variability of clinical presentation among the different degrees of depression and chronic pain of the face and head (17). Different tests have been used to assess depression and/or anxiety as the basis of TMPDS.

Gale and Dixon (18) advocated the use of simple questionnaires (for depression and anxiety separately), to be related to seven depression levels and four anxiety levels which were also used.

Oakley et al. (19) used five questionnaires and one analogue visual scale to determine the level of anxiety, depression, fear and social status of the patient, finding "moderately significant" association between the data obtained and clinical presentation. In this paper we tried to simplify the assessment methodology in order to increase its practical applicability. With that purpose in mind, we followed the footsteps of Phillips et al. (20), who used "Beck's Inventory of Depression".

These authors presented in their work more significant data on the impact of depression in TMPDS patients than in individuals without it. Therefore, they drew the conclusions about the firm association of chronic TMJ changes with depression.

As for the treatment, we think that non-surgical, conservative treatment of TMJ disorders and problems is effective and can be recommended in around 80% of the cases.

As far as we are concerned, the conservative treatment approach we most commonly used is the jaw splint made of thin acrylate (bite plate), which simultaneously serves the purpose of muscle relaxation. It significantly reduces the symptoms (in 70% of the cases), though the physiologic basis of this effect is still unknown (4).

Some other treatment methods have been used, more or less successfully, such as A) acupuncture (21,22,23, 24), in one recently performed review of the papers on that topic (25). We found 74 papers on the use of acupuncture in dentistry and out of these, 14 are TMPDS-related. Three of them produced reliable and controlled results, which are similar to those produced by the treatment with occlusive bite plate. B) use of low-intensity LASER (26,27); C) transcutaneous electric nerve stimulation, TENS (28,29,30) (Fig. 3); D) relaxation techniques through biofeedback and stress control in patients with evident etiopathogenetic component associated with the factors of psychologically altered behavior (31). More and more evidence and better understanding of the biopsychological nature and background of most TMPDS cases indicate the need for the treatment to be uninvasive as much as possible (3,32); E) manipulation and TMJ exercises (33,34,35). Physical therapy aims at re-establishing the normal mandibular physiology using physical techniques which reduce muscular-skeletal pain.



Fig. 3. Application of transcutaneous electric nerve stimulation (TENS) in the TMJ region

In order for all of this to be effectuated, close co-operation of dentists and physiotherapists is mandatory, as well as a thorough knowledge of the management of TMJ problems taking into account wider head and neck areas (36). Though it is generally accepted that the effects of physical therapy on pain alleviation are beneficial, there are few studies on the magnitude of efficacy of physical therapy (37).

It should be mentioned that, regretfully, none of the available treatments of TMPDS is fully effective (37).

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Starting from the assumption that malocclusion is not the fundamental cause of the condition, we should not initiate occlusion treatment (orthodontic; tooth restoration; jaw surgery) aiming to achieve altered bite or teeth position. The experience so far, based on ample documentation of the syndrome, indicate that the management should never start with the procedure which produces irreversible state of occlusion (3).

The initial treatment with most favorable results is usually based on individual exercise programs (37). However, there are few publications in the literature describing such treatment strategy. Nikolakis et al. (38) treated 20 patients with internal TMJ disorder (anterior luxation of the disk without reduction). The treatment consisted of the exercises of various mandibular movements, active or passive, with the correction of head position and general relaxation. In 18 subjects who completed the treatment, it was recorded that the exercises significantly improved mouth opening and further exacerbation of TMJ condition was suspended, while 4 patients did not feel pain anymore.

We used the same clinical criteria (pain spot on occlusion, opening and closure of the mouth, radiographic assessment in normal occlusion) as Cros et al. (39) did in their series. These authors suggest kinesitherapy, with specially emphasized exercises of the TMJ and cervical spine. They described their satisfactory results regarding the improvement of muscle contraction and so called "intentional occlusion", which is very useful in case of relapse.

Santiesteban (40) discussed the topic somewhat earlier, publishing the case report in which the patient with TMPDS and postural neck alterations achieved excellent results with isometric exercises and occlusive splint – both pain and mandibular deviation resolved completely.

In contrast to Santiesteban, Bertolucci (41) believes that forced mandibular movements can hurt or even induce ligament rupture, which is something we did not record in our investigation.

Conclusion

Regarding the question of adequate TMPDS treatment, opinions and attitudes vary, since the factors of various nature are usually involved: biologic, psychosocial, habitual and behavioral.

Physical exercises represent a useful treatment modality for TMPDS patients.

TMPDS treatment should be organized in a multidisciplinary way, with dentists, physiotherapists and psychologists being all equally involved.

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TRETMAN FIZIČKE REHABILITACIJE DISFUNKCIONALNOG TEMPOROMANDIBULARNOG SINDROMA BOLA

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Kratak sadržaj: U ovom radu prikazali smo konzervativno, nehirurško lečenje temporomandibularnog sindroma bola i disfunkcije (TMSBD), primenjenog kod trideset pacijenata. Lečenje se sastojalo od primene TENS-a (transkutane elektro neuralne stimulacije), aplikovanja vežbi za istezanje temporalnog, maseteričnog i pterigoidnih mišića, kao i primene ultrazvuka lokalno. Uočeno je znatno poboljšanje kod većeg broja pacijenata. Takođe je dat prikaz literature o konzervativnom lečenju TMSBD.

Ključne reči: temporomandibularni sindrom bola i disfunkcije, konzervativno lečenje, fizikalna terapija