

BRUXISM AND TMD DISORDERS OF EVERYDAY DENTAL CLINICAL PRACTICE

Biljana Kapusevska, Nikola Dereban, Mirjana Popovska, Julijana Nikolovska, Lidija Popovska

St. Panteleimon P.H.O. Dental Clinical Centre, Department of Prosthodontics, Faculty of Dentistry,
Ss. Cyril and Methodius University, Skopje, R. Macedonia

Corresponding Author: Biljana Kapusevska, MD, PhD, St. Panteleimon P.H.O. Dental Clinical Centre, Department of Prosthodontics, Faculty of Dentistry, Ss. Cyril and Methodius University, 1000 Skopje, Majka Tereza PO BOX 17, R. Macedonia, Tel: + 389 (02) 3 29 90 00; Fax: + 389 (02) 3 22 01 41; E-mail: biljanakapusevska@gmail.com

Abstract

Bruxism, as an etiological factor for the development of TMD, includes different disorders of the TMJ and the masticatory muscles, exhibiting pain and disruption of the stomatognathic functions. Our goal was to study patients with bruxism and TMD from everyday dental clinical practice, in terms of diagnosis, identification of etiological factors, classification and treatment of these disorders.

We treated 120 patients, divided into 2 groups of 60 patients. The first group had disorders of the TMJ, and the second of the masticatory muscles. The groups were divided into subgroups of 20 patients with dislocation of the articular disk with or without reduction and inflammation of TMJ. The second group was organized from patients with myofascial pain, myositis and muscular trismus. Our conservative treatment consisted of patient education, NSAID, myorelaxants, fabrication of prosthetics, repositioning and stabilization splints. The progress of the patients was followed immediately after the delivery of the prosthetics and the splint, after 1, 6 and 12 months.

The results showed that in patients with disorders of the TMJ there were visible signs of recovery after 6 months in 68.3% patients, and in 85% after 12 months. In the second group we achieved faster results with the elimination of symptoms. Patients with afflictions of the muscles in 88.3% of cases noticed relief of symptoms even after 6 months and in 98.3% after 12 months.

As therapists we concluded that timely treated complications of bruxism and TMD prevent the destruction of the TMJ, masticatory muscles and the entire stomatognathic system.

Key words: bruxism, TMD, dental clinical practice, TMJ, masticatory muscles, dislocation of the articular disc, TMJ inflammation, myofascial pain, myositis, muscle trismus, repositioning splint, stabilization splint.

Introduction

Most commonly, in dental practice we divide patients in relation to the characteristics of bruxing activity into patients with vertical and with horizontal bruxism. Horizontal bruxism is a pathological condition characterized by involuntary sliding motions of the lower jaw on the transversal referent plane. The main features that afflict patients with horizontal bruxism are: extreme sliding movements in the TMJ (temporomandibular joint), severe attrition on the incisal edges of the frontal and the

cusps of the lateral teeth, involuntary contraction of the pterygoid muscles accompanied by unpleasant nocturnal grinding sounds. Vertical bruxism is a pathological condition characterized by an involuntary clenching motion of the lower jaw on the frontal referent plane. The main features that can be seen in patients with vertical bruxism are: severe loss of teeth substance on the lingual surface of the upper and labial surface of the lower frontal teeth, minimal movements in the TMJ, lowered clinical crown of the lateral teeth and vertical height of

the bite, involuntary nocturnal contraction of the temporal and the masseter muscle and the absence of nocturnal sounds [1]. The complications that can arise from bruxism can be divided into two larger groups: complications to the TMJ and complications to the masticatory musculature. Of the complications to the TMJ, the most common are: displacement of the articular disk with or without reduction, inflammation of the TMJ and ankylosis. The following conditions can be considered as complications to the masticatory muscles: myofascial pain, myositis and muscle trismus. Disc displacement without reduction is the most common diagnosis in patients who are afflicted with clicking and popping sounds from the TMJ. Disk displacement without reduction is diagnosed when the patient suffers a sudden attack of persistent and considerable limitation of the jaw opening, that is lower than 35 mm. Because of the decrease in the mobility of the jaw, the displacement of the disk without reduction is also known as closed lock. The inflammation of the TMJ begins as a process of disintegration of the nutritional substances in the synovial fluid and destruction of the articular surfaces that leads to additional problems in the joint [2]. The muscles that are mostly affected by the activity of bruxism are: m. masseter, m. temporalis, m. pterygoideus lateralis et medialis [3]. Myofascial pain is the most common symptom of the disorders in the masticatory muscles. The patients describe it as a dull pain which can become pulsating with a sense of pressure in the muscle when the disorder is more severe. Myositis is characterized by inflammation of the masticatory musculature that develops as a result of a spreading infection, bruxism, oral parafunctions, external trauma or muscle exertion. Muscle trismus is an involuntary contraction of the muscle that causes pain and decreases the mobility of the mandible [4].

Purpose

The purpose is to show the ever-growing number of patients with bruxism and TMD (temporomandibular disorder) in everyday dental practice, diagnosis, identification of the etiological factors and classification depending of the origin of the complications in the TMJ or the masticatory musculature. This paper aims towards justification of the efficiency and indi-

spensability of the timely restoration of the continuity and integrity of the dental arch in these patients with prosthetic constructions, accompanied with precise and accurate dosage of medicaments and proper selection of appliances for occlusal treatment.

Material and methods

As material we used 120 patients from our every-day clinical practice, who were diagnosed with objective signs and subjective symptoms of the presence of bruxism and TMD. The patients were divided into 2 groups depending on the localization of the disorder in the stomatognathic system, on the TMJ or the masticatory muscles.

The first group of 60 patients was divided into 3 subgroups of 20 patients, depending on the nature of the complications that afflicted the patients. The first subgroup was 20 patients diagnosed with disk displacement with reduction. The second subgroup was 20 patients diagnosed with disk displacement without reduction. The third subgroup was composed of 20 patients diagnosed with TMJ inflammation. The second group, with complications on the masticatory muscles, was of 60 patients who were likewise divided into 3 subgroups. The first subgroup was of 20 patients afflicted with symptoms of myofascial pain, the second included 20 patients diagnosed with myositis and the third subgroup was composed of 20 patients diagnosed with muscular trismus.

In the first subgroup of patients suffering from disk displacement with reduction, at the time of the diagnostic procedure, there were popping and clicking sounds during motion in the TMJ also known as reduction of the joint. (Picture 1) As the patient opened his or her mouth, the condyle translated forward and moved into the intermediate zone of the disc which caused an opening click or pop [5]. As the patient closed his mouth, the condyle retruded and moved back under the posterior band onto the retrodiscal tissue, which caused a closing click or pop [6]. For these patients only preventive education was used. But if the clicking or popping sound was accompanied by locking of the mandible and danger of its persistent fixation, we treated the patient with conservative therapy, in which repositioning splints had the the central placee [8]. (Fig.1) In the

second group of 20 patients who had disc displacement without reduction, we diagnosed the disorder when the patient showed a sudden

attack of persistent and considerable limitation in opening the mouth, no lower than 35 mm. When the patient made attempts to open his or

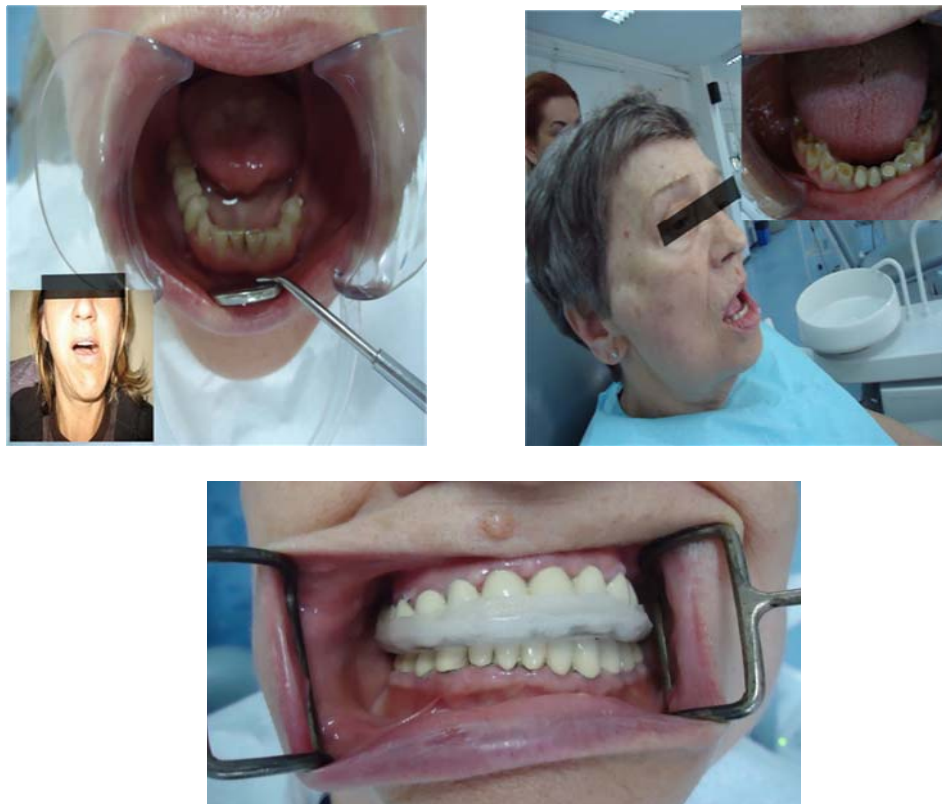


Fig. 1 – Group 1, subgroup 1 and 2 – patients diagnosed with disk dislocation with and without reduction and fabricated repositioning splint

her mouth, the condyle initially rotated around its axis, after this the condyle tried to make a forward translatory movement but was pushed back by the posterior band of the articular disk and could not be seated in the intermediate part of the disk. [7] The translatory movement of the condyle, which is necessary for opening the mouth, in these patients was limited by the articular disk. Because of this, the patients could only open their mouths to a limited extent of 20–30 mm. The contralateral TMJ in the same subgroup of patients could continue the translatory movement even after this limitation, and caused the mandible to slide sideways in the direction of the affected TMJ. The treatment that we administered to our patients consisted of: prosthetic rehabilitation – we fabricated fixed and mobile prosthetic constructions–planning and fabrication of a repositioning splint and prescription of medications such as Naproxen 500 mg, twice a day. The therapeutic repositioning splints that we fabricated for this purpose were hard acrylic appliances for occlusal treatment that covers the entire dental arch and forces the mandible into a forward position, moving the condyle forward and causing decompression on the mandibular disk. (Fig. 1) The indentations of the repositioning splint are impressions of the functional tubers from the opposing teeth. They help to lock the mandible in the protruded position. The anterior occlusal stop is an acrylic prominence in the anterior parts of the repositioning splint. It contacts the lower anterior teeth behind their occlusal contacts and prevents the mandible from sliding backwards. This splint may cause alterations in the occlusion of the patient. The design of the repositioning splint moves the condyles forward together with the protruded position of the jaw and helps with the decompression of the retrodistal tissue, diminishing the inflammation of the TMJ. It also creates conditions inside the

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TMJ fossa for the disk to be repositioned in its physiological arrangement [9]. In the patients with inflammation on the TMJ (from the third subgroup), the diagnosis was confirmed when the patient complained of tenderness in one or several areas of palpation on the TMJ. (Fig. 2) The treatment of these patients consisted of NSAID (non-steroid anti-inflammatory drugs): Ibuprofen (Motrin) 800 mg, three times a day, Naproxen natrium (Naprosyn) 500 mg, twice a day, Naproxen sodium (Anaprox) 550 mg, twice a day.



Fig. 2 – Group 1, subgroup 3 – patients with inflammation of the TMJ

In the second group of patients (first subgroup) with myofascial pain, we diagnosed the disorder according to the subjective description of our patients as a dull pain that transcends into pulsating if the disorder is more severe (Fig. 3). We recommended NSAID such as Ibuprofen 800 mg, three times a day, in adjunction to the other treatments that are suggested for myofascial pain, one of which is stabilization splints. In the subgroup of patients with myositis, we identified the disorder as an inflammatory process of the masticatory muscles with continuous acute pain in the internal parts of the muscle, which was swollen, red and had an increased surface temperature. These muscles exhibited tenderness during palpation and there were also restrictions on the mandibular movements. (Fig. 3) We identified the type of infectious agent and removed it with antibiotic treatment. As an adjunctive therapy we applied NSAID, recommended limited use of the masticatory muscles (with consumption of softer food), elimination of the existent bruxism and

oral parafunctions. In cases where the myositis was caused by the strain in the muscle, we recommended applying a cold cataplasm around the infected area in the first 48 hours. In the third subgroup of patients, with muscle trismus, we diagnosed the disorder by the limitation on the opening of the mouth and prescribed Ibuprofen forte in amounts of 800 mg, three times a day and muscle relaxants, Diazepam 5 mg, 1–2 pills. (Fig. 4) In cases where pharmacological treatment over the course of one month was insufficient to resolve the myospasm, we continued the treatment with fabrication of a stabilization splint. This splint was a hard acrylic appliance for occlusal treatment that covers the entire dental arch, and provides removable and temporary contact between the teeth of the patient and the surface of the splint, ideal for the TMJ and the masticatory muscles, and in such manner facilitates muscle relaxation, stabilization of the position of the mandibular jaw, cessation of the inflammation and the pain in the TMJ, the ear, the head and the masticatory muscles. (Fig. 3) This splint is fabricated when the teeth of the patient are placed in central occlusion and permits free movements of the lower jaw. The smooth surface of the splint, during central occlusion, contacts only the functional tubers of the posterior maxillary teeth and the canine. The main purpose of this surface is to provide an even and equally distributed masticatory force in each of the quadrants of the dental arch. The anterior acrylic build-up disoccludes the contact between the posterior teeth during propulsive movements of the jaw. The canine rise offers cusp to cusp contact with the canine from the opposing dental arch and disoccludes the posterior teeth during the lateral movements of the lower jaw. The loss of contact in the posterior region of the dental arch where the masticatory force has reached its peak minimizes the stimuli sent to the trigeminal sensory nucleus. By eliminating the resistance of teeth contact in excursive movements, the canine rise allows the external pterygoids to contract less intensely and diminishes symptoms of headache and myofascial pain. It eliminates premature and eccentric contacts during lateral movements, because these contacts produce excessive force during the bruxism activity. The final result is relaxation of the masticatory muscles, alleviation of tension headaches and even TMD withdrawal [10].



Fig. 3 – Group 2, subgroups 1 and 2 – patients diagnosed with myofascial pain and myositis and fabricated stabilization splints



Fig. 4 – Group 2, subgroup 3 – patients diagnosed with muscle trismus and the practicing of myofascial exercises after the confirmation of the diagnosis

The time intervals that were designated for examination of the outcome from this treatment on our patients were inspection of the condition of the patients with the appropriate

treatment immediately after the prescription of the treatment protocol and also after 1, 6 or 13 months from the initiation of the treatment.

Results and discussion

With the application of the conservative treatment for TMD to the patients afflicted with bruxism, we determined that the various groups of patients responded differently to the applied treatment protocol. The speed of recovery of the patients was affected not only by the motivation for compliance of the patients, but also by the influence of the nature of the disorder on the stomatognathic system and the intensity of its manifestation. The results were expressed in numerical figures that related to the average values measured on the patients of each group separately. The disorders of the TMJ were more obstinate and persistent in relation to the complications of bruxism that reciprocated on the masticatory muscles. In 14 patients (70%) with dislocation of the articular disk with reduction (first group – first subgroup), there was an improvement in the condition 6 months after the initiation of the treatment protocol and after 12 months there was a complete disappearance of symptoms in 17 of our patients (85%). In 12 of our patients (60%) who had disk dislocation without reduction (first group – second subgroup) we determined improvement after 6 months, and there was total elimination of the symptoms in 15 patients (75%) after 12 months. Of all of the complications of the TMJ, the inflammation had the shortest time of recovery, when we noticed the first signs of improvement in 15 patients (75%) after only 1 month, and complete recovery was established after 6 months in 19 patients (95%). Myofascial pain was the most persistent among the complications from the bruxism with muscular origin. The recovery of the patients with myofascial pain did not begin to show until after 6 months' therapy in 13 patients (65%), and there was a complete recovery after the 12th month in 19 of the examined patients (95%). The recovery of the patients with myositis began only 2 weeks after the beginning of the antibiotic treatment (in all the examined patients – 20), (100%). In the patients with muscular trismus, we did not determine improvement until the end of the first week of treatment in 18 patients (90%), and the symptoms had completely disappeared in 20 patients (100%) after the first month. The therapeutic procedures in patients with disk displacement with or without reduction requi-

red greater patience from the patient. Inflammation of the TMJ is a pathological condition with swiftest recovery from the afflictions that originate from the mandibular joint. The elimination of myofascial pain from the masticatory muscles requires a period of several months, while muscular trismus and myositis can even disappear after less than a month from the initiation of conservative treatment for TMD and bruxism. All this shows that the masticatory muscles react faster to the application of conservative measures in the treatment of TMD in patients with bruxism in relation to the responses of the jaw bones and the TMJ.

Conclusion

Bruxism and TMD as contemporary and everyday disorders of the new age and modern lifestyle, with increasing frequency in the population, demand effective methods for reduction of the harmful repercussions on the stomatognathic system. Patients who have disruption of the integrity of the dental arch must be treated with fabrication of prosthetic constructions. Patients with irregularity of the alignment of the natural teeth should be treated with orthodontic measures. However, most critical for the development of TMD are the patients with bruxism, in which the disorder has a more discreet progression so the patients are not compelled to seek dental health until they notice repercussions in the form of complications on the TMJ and the masticatory muscles. The conservative treatment of TMD in patients with bruxism offers a solution for overcoming these complications without unnecessary surgical interventions and manoeuvres. The treatment of these complications will depend on the motivation of the patient, and the type and degree of the manifestation of the disorder on the stomatognathic system. The treatment outcome is faster and more effective in disorders with muscular origin compared with those of skeletal origin.

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Резиме

БРУКСИЗАМ И ТМД – БОЛЕСТИ НА СЕКОЈДНЕВИЕТО ВО СТОМАТОЛОШКАТА ПРАКТИКА

**Билјана Капушевска, Никола Дерџан,
Мирјана Поповска, Јулијана Николовска,
Лидија Поповска**

Стоматолошки факултет, Стоматолошки клинички центар „Св. Пантелејмон“, Универзитет „Св. Кирил и Методиј“, Скопје, Р. Македонија

Бруксизмот како етиолошки фактор за настанување на ТМД, вклучува различни пореметувања на ТМЗ и мастикаторната мускула-

тура, манифестирајќи болка и попречување во нивните функции.

Цел ни беше прикажување на пациенти со бруксизам и ТМД од секојдневието на стоматолошката практика, начинот на нивното дијагностицирање, откривање на етиолошкиот фактор, класификација на заболувањето и терапијата.

Ординиравме 120 пациенти, поделени во 2 групи од 60 пациенти, каде што првата беше со пореметување во ТМЗ, а втората на мастикаторната мускулатура. Истите беа поделени на подгрупи по 20 пациенти во зависност од пореметувањата: изместување на зглобниот диск со или без редукција и инфламација на ТМЗ. Во втората група беа систематизирани пациенти со: миофасцијална болка, миозитис и мускулен тризмус. Нашата конзервативна терапија беше: едукација на пациентите, НСАИЛ, миорелаксанти, изработка на протетички помагала, репозициони или стабилизациони шини. Иследувањето врз пациентите го изведувавме: веднаш по предавањето на протетичкото помагало и шината, по 1, 6 и 12 месеци.

Резултатите укажаа дека кај пациентите со пореметување во ТМЗ подобрување по 1 месец немаше, по 6 месеци кај 68,3% од пациентите имаше видни знаци на подобрување, додека по 12 месеци кај 85% од пациентите немаше пореметување. Во втората група постигнувавме побрзи резултати при отстранување на симптомите. Кај пациентите со пореметување од мускулно потекло кај 88,3% симптомите беа исчезнати по 6 месечен период. По 12 месеци кај 98,3% од пациентите од втората група имавме позитивни резултати. Како терапевти осознавме дека навремено третираните компликации од бруксизмот и ТМД вршат превенција од оштетувањето на ТМЗ, мастикаторната мускулатура и целиот стоматогнатен систем.

Клучни зборови: бруксизам, ТМД, стоматолошка клиничка практика, ТМЗ, мастикаторна мускулатура, дислокација на артикулационен диск, инфламација на ТМЗ, миофасцијална болка, миозитис, мускулен тризмус, репозициони шини, стабилизациони шини.