

# OROFACIAL PAIN DISORDERS (OFP), TEMPOROMANDIBULAR DISORDERS (TMD) AND COMORBID CONDITIONS, RECENT CONCEPTS AND EDUCATION IN DENTAL MEDICINE

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## Summary

Orofacial pain refers to pain associated with hard and soft tissues of the head, face and neck, which send impulses through the trigeminal nerve to the CNS to be interpreted as pain. Headaches, neurogenic, musculoskeletal and psychophysiologic pathology, cancer, autoimmune phenomena and tissue trauma represent the diagnostic range for the complaint of OFP. Various potential for pain from trigeminal receptive fields is the cause for a collaboration between the specialists belonging to different fields of medicine and those belonging to different fields of dental medicine. All of them participate in the evaluation and management of OFP. TMD is considered to be the main part of OFP and most practitioners are focused on evaluation, diagnostics and therapy of the disorder. In the sixties, W. Bell inaugurated the term temporomandibular disorder, which was generally accepted in praxis. This term suggested that apart from the problems regarding TMJ, there were also problems concerning masticatory muscles and all disorders associated with the function of masticatory system and their associated tissues.

Different diagnostic systems and protocols are available for the research and classification of the TMD patients. The most common protocol used in research is RDC/TMD protocol (Research Diagnostic Criteria), which enables diagnoses according two axes: Axis I with somatic, and Axis II with psychophysical diagnoses, mostly for chronic TMP patients. In chronic TMP/OFP patients there is an increased probability of comorbid conditions. A need for modern diagnostics and management of TMP/OFP encouraged the development of a new course in graduate and postgraduate education of dental medicine students.

**Key words:** orofacial pain (OP); temporomandibular disorder (TMD); classification system; acute and chronic pain; education.

## INTRODUCTION

The recognition of temporomandibular disorder (TMD) is complicated by the multifactorial etiology and variety of clinical signs and symptoms characterizing the disorder. TMD present a heterogeneous group of pathologies affecting the temporomandibular joints, the masticatory muscles, or both [1-4]. It is characterized by certain clinical signs and symptoms, among most frequent are pain and/or tenderness in preauricular area and/or in the masticatory muscles; a reduction and/or an alteration of the range of joint motion; articular sounds, such as click or crepitus, during mandibular movements. A specific etiology has been demonstrated only for some of these conditions, since most of them have a multifactorial etiopathogenetic pattern.

Temporomandibular disorders are considered to have multifactorial etiology. Numerous local and systemic factors can contribute and determine the onset and progression of a clinical symptomatology [5-7]. TMD symptoms have a normal distribution in the general population, with a peak in the age range 20 to 40 years and a lower prevalence in the youngest and the oldest people. Females are predominantly affected by these disorders, and the reported females to males ratio is about 4:1 in patients' populations [8-12].

The prevalence of TMD signs and symptoms in the general population ranged between 5% and 50%, and the percentage of people seeking help at GPD is about 7%. In order to find TMD patients a screening protocol is suggested to be used routinely.

## SCREENING

Because of the various etiological factors and various efficacy of the different treatment modalities for TMD, the practitioner should be careful in the selection of assessment techniques, and in the choice of treatment modalities. It is a good clinical praxis to start the evaluation with a short clinical Screening Protocol, which can include the following 4 questions:

1. Does it hurt when you open wide?
2. Do you have pain in the jaw and/or the face?
3. Have you lately registered that the jaw is locked or that you can't open wide?
4. Do you have often headache more than once a week.

If the answer is "yes" on any one of the 4 questions, a more thorough history taking and assessment is recommended.

## ASSESSMENT

The main goal of the assessment is to collect relevant data in order to be able to establish a “working diagnosis”. This goal could be accomplished by first ruling out disorders with signs and symptoms mimicking TMD/OFP, such as dental, periodontal, mucosal disorders, other pain conditions, neoplasms, growth disturbances and systemic disorders. To establish an individual working diagnosis some additional investigations and considerations should be taken into account in specific cases and conditions. The diagnostic process for temporomandibular disorders has to be primarily based on a thorough clinical assessment, guided by the certain algorithms [13-15]. The heterogeneity of symptoms of temporomandibular disorders has put up some problems at the diagnostic level that may reflect in treatment planning difficulties. There are some steps in the procedure, which are necessary for the management of TMD patients. The current evidence-based knowledge on TMD diagnosis can be summarized as follows:

- TMD patients should be classified according to a widely accepted scheme, such as the RDC/TMD guidelines for research and epidemiological purposes and
- the AAOP classification in the clinical setting.
- Standardized imaging techniques can be used to gain a better insight into the temporomandibular joint in the attempt to correlate clinical symptoms with specific intrarticular disorders;
- Magnetic resonance is the gold standard for soft tissues allowing to allocate disk position abnormalities and joint effusion, while computerized tomography has to be reserved to the pre-surgical phase of treatment planning. Arthroscopy is recommended if inflammatory and/or adhesions are suspected.

For muscle disorders, whose main symptom is pain, the absence of a gold standard instrument for pain rating makes clinical evaluation itself the most useful diagnostic approach [16]. VAS (visually analog scale) and /or numerical scale for pain are commonly used in patient’s pain evaluation [17].

Clinical examination of occlusion is important for general dentist: some occlusal characteristics are considered as potential risk factors for development of symptoms [18,19]. Attention should be given to: cross bite [20] class II occlusion and overjet, large CO-CR discrepancy [21,22]. Anterior occlusal wear and its progression in relation to age, is to some extent a potential risk factor and should be documented [23,24]. In planning occlusal treatment and in the fabrication of occlusal splints the articulator has a practical clinical value in reducing valuable chair time when inserting the splint.

Clinical assessment of parafunctions (e.g. bruxism) is based on the history and on assessment of occlusal wear because additional reliable clinical tests are not yet available. Bruxism has to be differentiated from dental erosion.

If the temporomandibular condition is part of a generalized disease, patient should be referred via the general medical practitioner to the appropriate specialist (e.g. internal specialist, rheumatologist, neurologist). In cases of suspected concomitant neck/shoulder complaints referral to a practitioner is advised [25].

The practitioner should be careful in the selection of assessment techniques, and the efficacy of the different treatment modalities for TMD, because the etiological factors are not well known yet. In the choice of treatment modalities it is always important to make assessment 'reversible versus nonreversible'. If assessment does not establish a working diagnosis the patient should not be treated but referred.

## DIAGNOSIS

Pain has been defined as "an unpleasant sensory and emotional experience associated with actual or potential damage or described in terms of such damage" (IASP-International Association for the Study of Pain, 1979 [26]). Orofacial pain can be characterized as nociceptive or neuropathic. Other important differentiations are acute vs. chronic pain and benign vs. malignant pain. In the management of TMD the range of working diagnoses for clinicians are mainly nociceptive, rather than neuropathic. Nociceptive pain can be concomitant with neuropathic pain. Any clinician should be knowledgeable as to these differences regarding diagnosis and management, and regarding the difference between site and source of the pain [13,27].

History taking, physical examination and imaging should lead to a **working diagnosis** differentiating between specific and nonspecific disorders, localized and generalized forms, myogenous pain, arthrogenous pain and a combination of both.

There is agreement among scientists that the standard of care for TMD diagnosis is a thorough clinical examination performed according to a validated diagnostic scheme and reliable and repeatable techniques [28-31].

Available evidence suggests that a clinical evaluation performed by a trained investigator has a good diagnostic agreement with magnetic resonance (MR), which is the standard of reference among imaging techniques for the two main groups of joint disorders (disc displacements, inflammatory-degenerative disorders) [32-34].

Computerized tomography (CT) has to be reserved to the most complex post-traumatic and surgical cases requesting an accurate study of osseous structures [35].

## **PSYCHOSOCIAL CONSIDERATIONS**

A chronic pain patient should be referred to a multidisciplinary treatment, knowing that management strategies in chronic TMD/OFP conditions are different from acute and subacute TMD/OFP. Anxiety, depression and somatization disorders have been associated to TMD symptoms, and it is important to provide early diagnosis and proceed patient to different psychosocial assessment. A validated checklist (Axis II evaluation) can help to assess the role of psychosocial factors and inform the patient about the character of these factors. It is important to advise the patient to consult a psychologist, knowledgeable in these conditions (team approach) [14].

## **INTERRELATIONSHIPS**

The field of TMD is multidisciplinary. Specialists in different branches in medicine, dentistry and psychology see individuals with disorders causing dysfunction and/or acute and chronic pain in the orofacial and associated regions. The specialist knowledge presupposes co-operation with health professionals in the area of otolaryngology, neurology, rheumatology, physiotherapy, psychology and psychiatry. Because of the different predisposing and etiological factors, there is a need for co-operation in diagnosing and managing the condition with specialists in different dental fields, such as prosthodontics, endodontics, oral medicine, orthodontics, radiology, oral surgery.

## **TREATMENT MODALITIES**

In assessment, diagnosis and treatment of TMD/OFP, some aspects are not entirely scientifically proven. In daily practice this may result in a dilemma between TMD signs and symptoms, and the treatment need and demand [36].

In general the treatment approach should be careful and well considered [37]. Patients with temporomandibular disorders of myogenous and arthrogenous origin can be successfully treated using conservative non-invasive methods by the general dental practitioner [38]. However, they should be additionally trained in diagnostics, differential diagnosis and in planning a tailored and patient centered therapy. Because of the multifactorial aetiology, different from patient to patient, different therapeutic approaches should be used in seemingly similar cases.

Studies have convincingly shown that a combined treatment approach has more results than a single approach. It is important that the general practitioner treats these patients because up to 5% of the population is demanding treatment for pain and dysfunction of the orofacial region. The general dental practitioner should also

be aware of his limitations and refer to the TMD specialist or other relevant medical specialist in case of psychological components, neuropathic pain or pronounced chronicity.

Current research suggests that individuals without major psychological symptoms do not require more than simple therapy. In contrast, patients with major psychological involvement need multimodal, interdisciplinary therapeutic strategies. The clinician's acceptance of the importance of psychological factors in TMD pain forms the platform for convincingly educating patients about the need for multimodal management [39].

## EDUCATION-GRADUATE AND POSTGRADUATE TRAINING

The Council of the European Academy of Craniomandibular Disorders (EACD) established an Educational Committee to recommend Guidelines for the undergraduate and postgraduate programs in stomatognathic physiology, orofacial pain and temporomandibular disorders (TMD) at dental schools in Europe [29].

At the Faculty of Odontology, University of Malmö, a Curriculum Guidelines for orofacial pain and temporomandibular disorders were presented with the thorough description of attainment, competence and attitude goals for the undergraduate program in dentistry, according to EACD [40].

Orofacial pain is one of the newest disciplines of dentistry, includes the assessment, diagnosis, and treatment of patients with complex chronic orofacial pain and dysfunction disorders, oromotor disorders, and chronic head and neck pain, as well as the pursuit of knowledge of the underlying pathophysiology and mechanisms of these disorders (American Academy of Orofacial Pain) [31]. In most dental schools, the clinical or basic science knowledge of orofacial pain is limited to predoctoral courses, minimal exposure in existing specialties, and a few advanced education programs (only 10 in North America, for example). The small number of existing postdoctoral orofacial pain programs has also limited the number of faculty trained for academic careers in teaching, research, and patient care in this field [41-44].

The development of advanced education programs in orofacial pain recognizes the substantial body of new knowledge and skills required by dentists to focus their careers in this field, provide broad-based patient care, and further develop and expand their knowledge on which clinical practice is based. The duration of these programs is in average 2.5 to 3 years. The curricula of these advanced education programs are consistent with that defined by the American Dental Association's Commission of Dental Accreditation's Standards for Advanced Specialty Education Programs. In addition, the curricula are consistent with standards recognized by

the American Board of Orofacial Pain, the American Academy of Orofacial Pain (AAOP), and the American Dental Education Association.

At the School of Dental Medicine University of Zagreb, the education on temporomandibular disorders (TMD) and orofacial pain (OFP) was implemented in dental curricula for almost 15 years; first through the courses of Gnathology, with simple description of differences between healthy (normal) and dysfunctional stomatognathic system. Then, the first on-line interactive textbook *Gnathology@net* was developed for the students and published on the website [www.sfzg.hr](http://www.sfzg.hr) [45]. Later on, the education about occlusion and management of temporomandibular disorders was transformed into 3 successive courses: Occlusion 1 (basic knowledge of occlusal relationships, orofunction and reconstruction of occlusal surfaces and laboratory exercises in wax up technique -PK Thomas and Lunden), Occlusion 2 – occlusion and function (basic occlusal concepts and rules in different reconstructive situations in prosthodontics, orthodontics, restorative dentistry and endodontics and parodontology) and Occlusion 3 (Occlusion and temporomandibular disorders). Dental students have theoretical and practical seminars and exercises, and in the course Occlusion 3, they are capable to work with TMD patients in clinic. This programme is advanced according to the guidelines and recommendations from EACD (European Academy of Craniomandibular Disorders) and AAOP (American Academy of Orofacial Pain) [29,31,40].

Postgraduate education is organised as a part of the specialisation in Prosthodontics and for GDP through special seminars in the courses for LLL (Life Long Learning).

An international survey relative to the teaching of TMD and orofacial pain (OP) would be of interest and value to dental schools worldwide.

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## Sažetak

### **Orofacijalni bolni poremećaji (OFP), temporomandibularni poremećaji (TMP) i komorbidna stanja; suvremene koncepcije i edukacija studenata dentalne medicine**

Orofacijalna bol podrazumijeva bol vezanu za tvrda i meka tkiva u području glave, lica i vrata koja putem trigeminalnog živca odašilje impulse koji se u CNS-u interpretiraju kao bol. Glavobolje, neurogena, muskuloskeletna i psihofizička patologija te tumori, infekcije, autoimuni fenomeni i tkivne traume mogu biti u dijagnostičkom opsegu orofacijalne boli. Raznoliki potencijal za bol nastalu u receptivnom području n. trigeminusa razlog je da evaluacija i terapija orofacijalne boli zahtijevaju suradnju različitih grana medicine, pri čemu posebnu zadaću ima dentalna medicina i njezine specijalističke grane. Temporomandibularni poremećaj (TMP) smatra se glavnim područjem orofacijalne boli i većina praktičara uglavnom se fokusira na procjenu, dijagnozu i terapiju toga poremećaja. Šezdesetih je godina W. Bell predložio naziv temporomandibularni poremećaj (*engl. TMD, hrv. TMP*) koji je postao popularan i opće prihvaćen. Ta sintagma sugerira ne samo probleme u temporomandibularnim zglobovima, nego uključuje i mastikatorne mišiće i sve poremećaje povezane s funkcijom mastikatornog sustava i okolnih tkiva.

Za potrebe istraživanja i klasifikaciju ispitanika postoje različiti dijagnostički kriteriji i protokoli, a danas je najčešći RDC/ TMD (Research Diagnostic Criteria) koji dijagnoze razvrstava po dvije osi (os I. s dijagnozama somatskih i os II. s dijagnozama psihogenih podloga, većinom kod kroničnih TMP-a). Kod kroničnih pacijenata s TMP/OFP-om povećana je mogućnost komorbidnih stanja. U dentalnoj je medicini potreba za suvremenim dijagnosticiranjem i zbrinjavanjem TMP/OFP-a rezultirala uvođenjem posebnog kolegija na dodiplomskoj razini, a i u poslijediplomskoj edukaciji.

**Ključne riječi:** orofacijalna bol (OP); temporomandibularni poremećaj (TMP); klasifikacijski sustavi; akutna i kronična bol; edukacija.

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