

# Influence of Depression and Somatization on Acute and Chronic Orofacial Pain in Patients with Single or Multiple TMD Diagnoses

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## ABSTRACT

To examine whether psychological variables such as depression and non-specific physical symptoms (somatization) influence pain entity among acute and chronic TMD patients with one or more TMD diagnoses (muscle disorders, MD; disc displacements, DD; and arthralgia, arthritis, arthrosis, AAA). One hundred and fifty-four patients (37 male and 117 female; mean age, 39.0±14.5 years) with Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) protocol were selected. Differences in mean depression and somatization scores between acute and chronic TMD patients, as well as TMD patients with one or multiple TMD diagnoses were compared by using the parametric T-test for independent samples. The majority of patients were acute TMD patients (81.8%), while the remaining 28 patients (18.2%) were chronic TMD patients. 62% of patients had only one TMD diagnosis (MD or DD or AAA), 31% of patients had two diagnoses (MD+DD, MD+AAA, DD+AAA) and, finally, 7% of patients had three diagnoses (MD+DD+AAA) according to the RDC/TMD protocol. According to the SCL-90 psychometric evaluation, 19.5% of patients presented a severe depression score (>1.105), 27.3% of participants presented a severe somatization score with pain items included (>1.000). The results of the t-test for independent samples showed statistically significant differences between acute and chronic TMD patients ( $p<0.001$ ), as well as between patients who were assigned one diagnosis ( $p=0.019$ ) and patients who had two or more diagnoses ( $p<0.001$ ); for mean levels of depression and somatization scores. Chronic TMD patients and patients with multiple TMD diagnoses had higher rates of depression and somatization in this study. These results could be used in a tailored strategy of TMD treatment.

**Key words:** depression, somatization, acute pain, chronic pain, temporomandibular disorders

## Introduction

Temporomandibular disorders (TMD) are musculo-skeletal conditions characterized very often by pain in the TMJ and/or the associated masticatory muscles. Temporomandibular disorder pain is by far the most common of the chronic orofacial pain conditions, and it is similar to back pain in its intensity, persistence, and psychological impact. The etiological concepts in the field of TMD are numerous (idiopathic, multifactorial, biopsychosocial, etc.) and mostly controversial. Despite current gaps in the profession's knowledge, as well as an ability to measure etiological factors, most TMDs can be managed clinically, based entirely on the application of research-based treatment protocols to specific TMD diagnostic categories<sup>1-4</sup>.

The evaluation of psychological profiles between different subgroups of TMD patients has led to conflicting results. Whereas some authors found that significant psychological differences exist between patients with either muscle or jaw joint problems<sup>5-8</sup>, others have found no differences between subgroups<sup>9,10</sup>. One study found that patients with masticatory muscle pain presented more dysfunctional behavioral profiles and significantly higher psychological distress than the intracapsular pain group<sup>11</sup>. Furthermore, Epker et al.<sup>12</sup> found that acute TMD patients with a muscle disorder (e.g. myofascial pain) are more likely to develop chronic TMD. These findings suggest considerable differences in psychosocial profiles between patients with different diagnoses of

TMD and complex interactions between them. The contradictory findings may be attributed in part to the lack of standardized diagnostic criteria for defining subtypes of TMD and to the approach chosen for psychological assessment. On the other hand, from a therapeutic point of view, it is crucial to differentiate acute from chronic TMD patients. Grzesiak<sup>13</sup> provided an overview of acute *versus* chronic TMD pain, and the rationale for distinguishing the two, in order to develop predictive models that allow for unique and more effective treatment interventions. Garofalo et al.<sup>14</sup> devised an algorithm to distinguish risk factors in patients with acute jaw pain who progress to develop chronic pain from those in patients who do not. Early identification and conservative treatment may pre-empt costly, more invasive treatments, lost time from work and the social repercussions of chronic pain and disability<sup>15,16</sup>.

The purpose of the study was to examine whether psychological variables such as depression and non-specific physical symptoms (somatization) influence pain among acute and chronic TMD patients with single or multiple diagnoses using the RDC/TMD questionnaire.

## Materials and Methods

This study involved 154 participants selected from patients referred to the Department of Prosthodontics and Department of Oral Surgery, School of Dentistry, University of Zagreb, manifesting symptoms in the orofacial region. Patients younger than 18 years, those with medically compromised conditions, and those with no RDC/TMD-defined clinical TMD parameters were excluded from the study. Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD)<sup>17</sup> is the most valuable instrument for diagnosing and classifying TMD subtypes. The RDC/TMD uses a dual axis system that allows: on axis I – a physical diagnosis based on pathophysiology; coordinated with on axis II – an assessment of TMD-pain and related parafunctional behaviors, psychological distress and psychosocial dysfunction. Accordingly, RDC/TMD guidelines for examination were adopted to assign axis I diagnosis and classify most common TMD forms into three categories: muscle disorders (MD), disc displacements (DD) and other joint conditions (arthralgia, osteoarthritis and osteoarthritis, AAA). Psychological symptoms of the patients (axis II) were assessed by use of the Symptom Checklist – 90 – Revised (SCL-90-R) (18), a psychometric test used for evaluation of a broad range of psychological problems and symptoms of psychopathology (symptom scales of somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism). In the present study, only subscales for depression and somatization were employed. This modified version of SCL-90-R test consists of 32 items, of which 20 items were designed for assessing depression, 7 items for somatization with pain included and 5 items for somatization with pain excluded. Patients were circled the answers on 5-point rating scale (none, little, moderate, significant,

severe) and for that they needed 10 minutes. Based on the SCL-90-R scores obtained, patients were categorized as follows: no depression (<0.535), moderate depression (0.535–1.105); severe depression (>1.105); no somatization with pain items included (<0.500); moderate somatization with pain items included (0.500–1.000); severe somatization with pain items included (>1.000); no somatization with pain items excluded (<0.428); moderate somatization with pain items excluded (0.428–0.857); and severe somatization with pain items excluded (>0.857). The study was approved by the Ethic Committee, School of Dentistry, University of Zagreb, Croatia.

## Results

One hundred and fifty-four TMD patients (117 female and 37 male) were participated in this study. The average age of the examined TMD patient population was 39.0±14.5 ( $\bar{X}\pm SD$ ) years (range age 18 – 78 years). Female to male ratio was 3.2:1. Orofacial pain was the predominant symptom in 80% of patients seeking treatment in the present study. Among 126 acute TMD patients (81.8%), 95 were female (61.7%) and 31 male (20.1). The remaining 28 patients (18.2%) were chronic TMD patients. 95 patients (61.7%) were assigned only one diagnosis (MD or DD or AAA), 48 patients (31.2%) were assigned two (MD+DD, MD+AAA, DD+AAA) and, finally, 11 patients (7.1%) were assigned three diagnoses (MD+DD+AAA) according to the RDC/TMD protocol (Table 1).  $\chi^2$ -test revealed no statistically significant difference between genders ( $\chi^2=8.04$ ;  $df=6$ ,  $p=NS$ ). In accordance with the

TABLE 1  
DISTRIBUTION OF SINGLE AND MULTIPLE RDC/TMD  
DIAGNOSES ACCORDING TO GENDER

Single and multiple rdc/tmd diagnoses		Gender		Total
		Male	Female	
MD	N	15	40	55
	%	9.7%	26.0%	35.7%
DD	N	10	18	28
	%	6.5%	11.7%	18.2%
AAA	N	2	10	12
	%	1.3%	6.5%	7.8%
MD + DD	N	5	9	14
	%	3.2%	5.8%	9.1%
MD + AAA	N	2	18	20
	%	1.3%	11.7%	13.0%
DD + AAA	N	2	12	14
	%	1.3%	7.8%	9.1%
MP + PD + AAA	N	1	10	11
	%	0.6%	6.5%	7.1%
Total	N	37	117	154
	%	24.0%	76.0%	100.0%

N – number of patients; MD – muscle disorder; DD – disc displacement; AAA – arthralgia, osteoarthritis and osteoarthritis

**TABLE 2**  
DESCRIPTIVE STATISTICS, SKEWNESS AND TESTING DISTRIBUTION FOR DEPRESSION AND NONSPECIFIC PHYSICAL SYMPTOMS (SOMATIZATION) IN THE TOTAL SAMPLE

	Descriptive statistics			Asymmetry coefficient	Kolmogorov-Smirnov test	
	N	$\bar{X}$	SD	Skewness	Z	p
Depression scale	154	0.66	1.43	0.867	1.39	0.57
Non-specific physical symptoms scale(pain included)	154	0.72	1.54	0.762	1.23	0.66
Non-specific physical symptoms scale(pain excluded)	154	0.62	1.54	1.035	1.19	0.74

N – number of patients;  $\bar{X}$  – mean value; SD – standard deviation; Z – value from Kolmogorov-Smirnov test; p – level of significance

**TABLE 3**  
THE RESULT OF T-TEST FOR INDEPENDENT SAMPLES FOR DEPRESSION AND PHYSICAL NONSPECIFIC SYMPTOMS (SOMATIZATION) BETWEEN ACUTE AND CHRONIC TMD PATIENTS

	F	p (F)	t	$\Delta\bar{X}$	df	p
Depression scale	3.082	0.054	-6.166	-0.50786	152	0.000
Non-specific physical symptoms scale(pain included)	0.005	0.946	-8.423	-0.80204	152	0.000
Non-specific physical symptoms scale(pain excluded)	0.105	0.747	-8.190	-0.78999	152	0.000

F – F – ratio; p(F) – level of significance for F-ratio; t – t-test;  $\bar{X}$  – mean value; df – degrees of freedom; p – level of significance.

SCL-90-R psychometric test, of the total number of TMD patients, 19.5% of participants presented a severe depression score, 27.3% of participants presented a severe somatization score with pain items included and 24.7% of participants presented a severe somatization score with pain items excluded. Methods of descriptive statistics (mean value, standard deviation), the asymmetry of the (Skewness), as well as Kolmogorov – Smirnov normality test for psychological variables are presented in Table 2. All the psychological variables tested were normally distributed ( $p < 0.05$  for 95% probability) showing a typical Gaussian curve.

Given the normal distribution of the sample tested, the parametric t-test for independent samples was used to define the level of significance in differences between acute and chronic TMD patients, as well as in differences between one, two or more TMD diagnoses. The results of the t-test for independent samples presented in Table 3 show statistically significant differences between acute and chronic TMD patients for mean levels of depression and somatization with or without pain items included ( $p < 0.001$ ). Table 4 shows a statistically significant difference in the level of depression ( $p = 0.019$ ) and somatization with or without pain items included ( $p < 0.001$ ) between patients who were assigned one diagnosis and patients who were assigned two or more diagnoses according to the RDC/TMD protocol.

## Discussion

Most researchers in the TMD field have observed that the primary symptom that determines treatment seeking behavior is the facial and head pain experienced by these patients. The majority of TMD patients in this study had acute pain (82%), one diagnosis (61.7%). A con-

siderable number of TMD patients were clinically depressed (19.5%) and had elevated levels of non-specific physical symptoms (27.3%). The prevalence of these clinical TMD diagnoses and psychological variables are consistent with those of Swedish, American, Asian and Croatian cross-cultural studies in which the RDC/TMD protocol was used<sup>19–21</sup>. The prevalence of psychological variables should be taken with caution because there is no published data concerning the prevalence rates of depression, somatization and chronic pain in Croatian population; therefore these findings could not be compared.

The classification of temporomandibular disorders traditionally has been dominated by the identification of underlying etiological factors, with little focus on understanding these disorders according to their duration of pain. Acute pain has a sudden onset, and usually responds to traditional treatments. If not properly diagnosed and treated acute pain may become chronic. The need for differentiation among subgroups stems from findings suggesting that the treatment of patients as a homogenous group may interfere with the ability to determine the efficacy of different interventions. It is well known that both acute and chronic pain have psychological associations, a responsible clinician must take that fact into account while treating all patients with TMD<sup>3,22,23</sup>.

In the present study statistical analysis showed differences in mean depression and non-specific physical symptoms scores between acute and chronic patients. We found that the chronic TMD patients had the higher rates of depression and somatization suggesting that these psychological difficulties could possibly exacerbate the condition. This is in accordance with findings from a previous study by Gatchel et al.<sup>22</sup>. They showed that the duration of pain reported by patients with TMD appears to affect their psychological functioning, as is the case

**TABLE 4**  
THE RESULT OF T-TEST FOR INDEPENDENT SAMPLES FOR DEPRESSION AND PHYSICAL NONSPECIFIC SYMPTOMS (SOMATIZATION) IN PATIENTS WITH ONE OR MORE TMD DIAGNOSES

	F	p(F)	t	$\bar{\Delta X}$	df	p
Depression scale	0.481	0.489	-2.371	-0.16768	152	0.019
Non-specific physical symptoms scale(pain included)	1.719	0.192	-3.654	-0.31596	152	0.000
Non-specific physical symptoms scale(pain excluded)	1.576	0.211	-3.245	-0.28421	152	0.001

F – F – ratio; p(F) – level of significance for F-ratio; t – t-test;  $\bar{X}$  – mean value; df – degrees of freedom; p – level of significance

with other pain conditions. As a result, the detection of possible psychological disorders in patients with acute TMD (particularly somatoform and affective disorders) will be valuable in preventing the development of chronicity and predicting treatment problems and complications in these patients.

The results of this study showed that mean levels of depression and somatization were higher in patients who have had multiple physical diagnoses. This implies that TMD patients with pain that comes from multiple sites (masticatory muscles and temporomandibular joints) are more psychologically disturbed from TMD patients where pain comes from a single source, or individual parts of the masticatory system. There are numerous studies<sup>10,24–28</sup> that have confirmed the association between psychological variables and clinical signs and symptoms of TMD, especially pain. Depression and somatization were highly significantly correlated with pain estimates. On the other hand, other studies showed that depression and somatization scores were not associated with a specific pain location. Yap et al.<sup>26</sup> examined TMD patients according to the RDC/TMD and no significant differences in mean depression and somatization scores were ob-

served between patients with a myogenous pain-related diagnosis and those with joint pain-related diagnosis. Reissmann et al.<sup>27</sup> have found similar results in their study i.e. depression, like somatization, was unrelated to pain diagnosis.

An appreciable psychological and psychosocial upset has been shown to interact negatively with all forms of therapy, from medicines to surgery. Moreover, it has been repeatedly demonstrated that psychosocial factors are consistently better predictors of long-term treatment outcome than physical findings, diagnosis, or amount of treatment sought. This study also demonstrated that the higher scores of depression and somatization, pain duration (acute or chronic), pain persistence, multiple sites of pain are important predictors of pain prognosis. It is, therefore, recommended that the level of psychological functioning in TMD patients be routinely assessed as one means of developing a better integrated, more rational, and more comprehensive approach to managing the problem. Knowledge of complex interactions between physical symptoms and psychosocial factors is essential to improve our general understanding of TMD and to tailor TMD treatment strategies.

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## UTJECAJ DEPRESIJE I SOMATIZACIJE NA AKUTNU I KRONIČNU OROFACIJALNU BOL KOD PACIJENATA S JEDNOM ILI VIŠE DIJAGNOZA TEMPOROMANDIBULARNOG POREMEĆAJA

### S A Ž E T A K

Svrha istraživanja bila je ispitati utjecaj psiholoških varijabli poput depresije i nespecifičnih fizičkih simptoma (somatizacija) na entitet boli kod akutnih i kroničnih pacijenata s postavljenom jednom ili više dijagnoza temporomandibularnih poremećaja (mišićni poremećaji, MD; pomaci diskusa, DD; te artralgiya, artritis, artroza, AAA). Stotinu pedeset i četiri pacijenta (37 muškaraca i 117 žena; prosječna dob, 39,0±14,5 godina) ispitano je pomoću standardnog dijagnostičkog protokola za ispitivanje temporomandibularnih poremećaja (RDC/TMD). Razlike u prosječnim vrijednostima depresije i somatizacije između akutnih i kroničnih pacijenata s temporomandibularnim poremećajima, kao i pacijenata kojima je postavljena jedna ili više dijagnoza bile su uspoređivane upotrebom parametrijskog T-testa za nezavisne uzorke. Većina pacijenata s temporomandibularnim poremećajem bili su akutni pacijenti (81,8%), dok su preostalih 28 pacijenata (18,2%) bili kronični pacijenti. 62% pacijenata imalo je samo jednu dijagnozu (MD ili DD ili AAA), 31% pacijenata imalo je dvije dijagnoze (MD+DD, MD+AAA, DD+AAA) te 7% pacijenata imalo je tri dijagnoze (MD+DD+AAA) u skladu sa RDC/TMD protokolom. S obzirom na SCL-90 psihometrijsko ispitivanje, 19,5% pacijenata pokazalo je izraziti rezultat depresije (>1,105), a 27,3% pacijenata pokazalo je izraziti rezultat somatizacije uključujući pitanja o boli (>1,000). Rezultat t-testa za nezavisne uzorke pokazao je statistički značajne razlike između akutnih i kroničnih pacijenata s temporomandibularnim poremećajem ( $p < 0,001$ ), kao i između pacijenata kojima je bila postavljena jedna dijagnoza ( $p = 0,019$ ) i pacijenata koji su imali dvije ili više dijagnoza ( $p < 0,001$ ); za prosječne rezultate depresije i somatizacije. Kronični pacijenti s temporomandibularnim poremećajem i pacijenti s više postavljenih dijagnoza temporomandibularnog poremećaja imali su više stope depresije i somatizacije u ovoj studiji. Rezultati studije mogli bi se koristiti u provođenju ciljane strategije liječenja temporomandibularnih poremećaja.