

Depression, Somatization and Anxiety in Female Patients with Temporomandibular Disorders (TMD)

Vlatka Lajnert¹, Tanja Francišковиć², Renata Gržic¹, Daniela Kovačević Pavičić¹, Danko Bakarčić³, Dino Buković⁴, Asja Čelebić⁴, Vedrana Braut¹ and Vesna Fugošić¹

¹ University of Rijeka, School of Dental Medicine, Department of Prosthodontics, Rijeka, Croatia

² University of Rijeka, School of Medicine, Department of Psychiatry, Rijeka, Croatia

³ University of Rijeka, School of Medicine, Department of Paediatric Dentistry, Rijeka, Croatia

⁴ University of Zagreb, School of Dental Medicine, Department of Prosthodontics, Zagreb, Croatia

ABSTRACT

The aim of this research was to determine the possible differences in degrees of depression, somatization and anxiety between the acute and chronic female patients with temporomandibular disorders (TMD), and whether these differences exist in healthy female patients. Ninety female patients were involved in this research; 60 of them were TMD patients of the Dental Polyclinic, while other 30 females came for a routine recall visit and had no problem related to TMD. Patients were aged 22 to 67 years, the average age being 38.5±12 years. All patients were asked to fill in the RDC/TMD protocol and three psychological tests (Emotions Profile Index, Somatization Scale and life Events Scale). Following the analysis of the RDC/TMD protocol and psychological tests, it was determined that the chronic female patients had higher depression and somatization scores in comparison with the acute patients ($p < 0.01$); the acute patients self-perceive higher levels of anxiety in relation to the control group; furthermore, the patients reporting higher levels of depression were more inclined to somatization and had experienced a greater number of stress events in the past six months. It is beyond doubt that patients suffering from the TMD's exhibit higher levels of depression, somatization and anxiety compared to the healthy ones, which proves that physiological factors may play a predisposing role in combination with reduced level of body tolerance to pain, and a decreased tolerance to stress.

Key words: temporomandibular disorders (TMD), depression, anxiety, somatization

Introduction

Temporomandibular disorders (TMD) is a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joints (TMJ), or both. Various clinical conditions are characterized by pain in the pre-auricular area, temporomandibular joints and related muscles; limited or unsymmetrical movements of the lower jaw; temporomandibular joint sounds (cracking, clicking, snapping and creeping) when the lower jaw is in motion^{1–4}.

Epidemiological studies show that 50–75% of the persons in a certain population have at least one sign of TMDs during their life, while 20–25% of the persons suffer from significant symptoms related to the TMDs^{5–7}.

Numerous investigations prove that women suffer from the TMD symptoms 3–4 times more frequently than men. Age and gender distribution point to the relationship between a female reproductive system and TMD symptoms^{8–12}.

During the last decade, many authors have focused their attention to the psychological factors as possible causes of the TMD. It is thought that the personality structure and emotional conditions are important for development of TMDs. Unfavorable conditions and events in one's life, emotional stress, behavioral disorders and bruxism including gritting and grinding the teeth are significantly related to the occurrence of TMD^{5,13–18}.

Psychological factors are most frequently mentioned in relation to pain and dysfunctional problems in the masticatory system. Psychological conditions such as depression were used to explain why certain patients fail to respond to the conventional treatment of the TMD^{8–12}.

A great number of investigations prove the existence of the relationship between the psychological factors and the occurrence of TMD. Female patients with TMD diagnose show higher stress and depression scores^{20–23}. Anxiety is also a significant factor in pain perception. Reduction of anxiety significantly improves the response to therapy. In TMD cases of osteoarthritis and osteoarthritis, pain is often coupled with psychological disorders such as depression and anxiety. In the muscular disorders, bruxism, miospasm or miofascial pain, levels of stress hormones are significantly increased, while the positive psychological tests support the existence of stress^{11,20–23}.

On the other hand, symbolic meaning of the mouth and oro-facial region as the zone of the earliest pleasures for the child in the oral stage of development, gives this disorder a special meaning in the light of a potential symbolization of the psychological conflict which possibly exists and is manifested through depression and anxiety^{23,24}.

Children who have experienced either excessive or unsubstantial satisfaction during the oral phase, i.e. excessive or unsubstantial quantity of stimulation, become orally passive personalities in their adulthood²⁴.

There is still an ongoing search for the exact scientific stronghold concerning the relationship between the mental disorders and TMD, although some clinical reports show that psychological conditions and emotional stress can contribute to etiology, and progression of the TMD symptoms²⁵.

Aims

1. To determine, using a standardized protocol of the diagnostic criteria (RDC/TMD), the prevalence of clinical diagnoses of the TMD, the prevalence of psychological stress (depression and unspecific physical symptoms), as well as the prevalence of psycho-social dysfunction (graded chronic pain) in a sample of female patients with TMD.
2. To determine, using the psychological tests (Emotional Profile Index and Somatization Scale), whether the acute and chronic patients exhibit higher levels of severe depression in comparison with the control group, and whether there is a difference between acute and chronic TMD patients, as well as whether the female patients suffering chronically from TMD have a more severe somatization than females having acute TMD symptoms or healthy women.
3. To determine, using the Life Events Scale, whether the occurrence of the TMD was preceded by a significant stressful event.

Materials and Methods

Research was performed in the Specialist Clinics for Prosthodontics, which is a part of the Dental Polyclinic, School of Medicine in Rijeka, and in the Clinic for Psychotrauma of the Rijeka University Hospital Center on the sample of 90 female patients. Patients were included in the investigation on the grounds of the frequency of their visits to the Dental Polyclinic; namely, the first 30 patients with acute symptoms of TMD (symptoms lasting less than 3 months) were included in the investigation and classified as acute, as opposed to other 30 patients with chronic TMD symptoms (symptoms lasting longer than 6 months), who were included in the investigation and classified as chronic. The remaining 30 patients reported to the Dental Polyclinic due to other symptoms not related to TMD (such as caries, periodontitis, various changes on the oral mucosa), and these represented the control.

All patients received detailed explanation of the purpose and aims of the investigation. They were asked to participate and to sign the informed consent. Ethics committee approved this investigation.

Standardized clinical RDC/TMD protocol (axis II) was used in this research^{26,38}, together with psychological tests (PIE, Somatization Scale and Life Events Scale)²⁷.

The statistical analysis included descriptive statistics, Kolmogorov-Smirnov test, one way ANOVA with Scheffe post hoc ($p=0.05$), and Pearson's coefficient of correlation (r).

Results

Kolmogorov-Smirnov test revealed normal distribution for all variables ($p>0.05$).

Frequency of the depression scores in the TMD females with acute and chronic pain, and in the healthy female controls is shown in Figure 1.

Frequency of the unspecific psychical symptoms (pain items included) is shown in Figure 2.

Frequency of the unspecific physical symptoms score (pain items excluded) is shown in Figure 3.

Kolmogorov-Smirnov test showed normal distribution for the acute, chronic and control groups ($p>0.05$). Average values in the chronic group were 0.83 (0.48); for the acute group 0.70 (0.55); and for the control 0.50 (0.37) points.

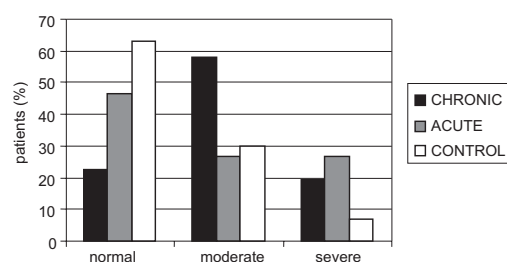


Fig. 1. Patient classification into categories for depression scores.

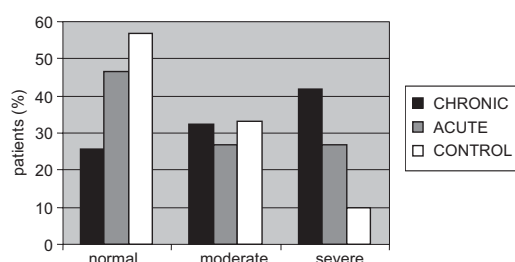


Fig. 2. Patient classification into categories for the unspecific physical symptoms score (pain items included).

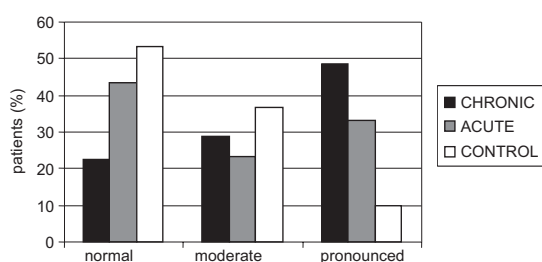


Fig. 3. Classification of the patients into categories for the scale for unspecific physical symptoms (pain items excluded).

Statistical significance on scales for depression, unspecific physical symptoms (pain items included), somatization, reproduction, self-defense and deprivation between the groups of women with chronic, acute and control groups is presented in Table 1.

There was a statistically significant difference between the acute, chronic and control groups regarding the scale for depression ($p < 0.05$), the scale for unspecific symptoms pain items included ($p < 0.05$), scale for somatization ($p < 0.01$), scale for reproduction ($p < 0.05$), scale for self-defense ($p < 0.01$), and scale of deprivation ($p < 0.05$).

Scale for depression is positively correlated with the scale for somatization ($r = 0.68$, $p < 0.01$), recent life events ($r = 0.29$, $p < 0.01$), scale of deprivation (anxiety) ($r = 0.30$, $p < 0.01$) and is negatively correlated with the scale of reproduction (sociability). Obtained correlations prove that the patients who reported higher levels of depression are more inclined to somatization and have experienced a

greater number of stress life events in the past six months. Scale for depression is negatively correlated with the reproduction (sociability) scale ($r = -0.24$, $p < 0.05$) proving that the depressive patients are more inclined to withdraw from the social surroundings and exhibit tendencies towards unsocial behavior, therefore achieving lower values of reproduction (sociability) scores.

Scale of deprivation (anxiety) is positively correlated with the scale of self-defense ($r = 0.25$, $p < 0.05$) and negatively correlated with the scale of reproduction (sociability) ($r = -0.43$, $p < 0.01$), meaning that the persons who feel a greater level of deprivation tend to be more anxious and are more inclined to withdraw from the social surroundings.

Discussion

Temporomandibular disorder is presently considered as the most common chronic oro-facial painful condition²⁸. Majority of physicians believe that it is very important to discern early the acute and the chronic TMD in order to separate the influences of psychological and physical factors. Generally, acute pain is always connected to a well defined cause, has an unpredictable onset, has a typical duration and dissolves upon conclusion of the appropriate therapy. If the pain is not recognized adequately, or if left untreated, it often develops into chronic, lasting for more than six months^{29,30}.

Importance of the psychological factors for development of the TMD grows every day and is potentiated by the inability of proving any other valid etiological factors. According to Green³¹, unresolved psychological issues, such as depression and anxiety, can cause tension which inevitably leads to bruxism and parafunctions, which in turn cause TMD. Transition from the acute to chronic pain has not been sufficiently investigated which is supported by the fact that the TMD-based research is primarily focused on the chronic form.

Psychological factors as etiological factors in development of the TMD can not be ignored, since they play a great role in many painful conditions in the organism, including the TMD. While the acute pain is often coupled with anxiety, as a psychological disorder, the chronic pain is associated with depression and eating disorders (vom-

TABLE 1
RESULTS FOR VARIANCE ANALYSIS OF SCALE FOR DEPRESSION, PHYSICAL SYMPTOMS (PAIN ITEMS INCLUDED), SOMATIZATION, REPRODUCTION, SELF-DEFENSE AND DEPRIVATION, FOR ALL GROUPS

	ACUTE PATIENTS \bar{X} (SD)	CHRONIC PATIENTS \bar{X} (SD)	CONTROLE PATIENTS \bar{X} (SD)	F	p
Scale for depression	24.7 (19.8)	28.97 (15.2)	17.3 (11.1)	3.91	0.02
Scale for unspecific physical symptoms pain items included	0.88 (.811)	1.03 (.582)	.62 (.362)	3.601	0.03
Somatization	10.87 (6.74)	11.06 (7.24)	5.60 (4.47)	7.356	0.000
Reproduction	33.93 (29.02)	41.71 (30.02)	56.20 (29.29)	4.35	0.016
Self-defense	63.93 (25.36)	69.29 (22.77)	48.50 (30.79)	5.037	0.008
Deprivation	80.13 (20.05)	79.06 (21.03)	65.03 (27.20)	4.057	0.02

TABLE 2
DISTRIBUTION OF RESULTS FOR CHRONIC GRADED PAIN IN THE ACUTE AND CHRONIC GROUPS

	ACUTE		CHRONIC		TOTAL	
	N	F	N	F	N	F
Grade 0	0	0	0	0	0	0
Low competence						
Grade I	1	3.3%	7	22.6%	8	13.1%
Grade II	21	70%	16	54.8%	37	62.3%
High incompetence						
Grade III	8	26.7%	5	16.2%	13	21.3%
Grade IV	0	0%	2	6.4%	2	3.3%

N – number of subjects; F – frequency

iting, loss of appetite, etc.). Kinney et al.³² in their research noted that the psychological disorders are the key factors in the development of TMD. They also discovered that the values of psychological disorders extremely outmatch the base levels detected in the epidemiological studies in general population.

The most recent investigations on TMD focus on the relationship between the physical and psychological factors. A number of published papers proved the relationship between the TMD and anxiety, depression and stress, but they failed to reveal the cause of this relationship²¹.

Based on the facts, it is quite easy to set a hypothesis the existence of a so called »psychological predisposition« to one of the TMD types. This condition, described as a decreased ability to fight stress, is related by some authors to the TMD patients, suggesting that their pain tolerance threshold is way below the threshold of the healthy population³³.

The existence of the »psychological predisposition« for the TMD, decreased pain tolerance and stress can explain greater prevalence of women among the TMD patients. Difference in gender is explained, among other things, by estrogen activity. According to some authors estrogen hormone plays a leading role in the TMD etiology, although this hypothesis needs to be additionally investigated³⁴.

As opposed to all these data and results obtained within this investigation, it is possible to claim that the miofascial-type of the TMD is more frequently related to the psychological disorders in comparison with the arthralgic-type³⁵. Spruijt et al. performed a similar investigation on 175 healthy patients and found no difference between the psychological factors and TMJ sounds³⁶. As opposed to that, authors pointed out a relationship between the psychological disturbances and muscular disorders diagnosed by using the RDC/TMD protocol. Emphasis was placed on the personality disorders which, alone or in combination with anxiety and mood disorders, become related with the miofascial-type of the TMD³⁷.

As shown by the results of this investigation, 52.7% of the acute and 77.4% of the chronic TMD patients were moderately to markedly depressive. Furthermore, it was demonstrated that both, the chronic and the acute group differed significantly from the control ($p < 0.05$), while no statistically significant differences were found between the acute and chronic groups ($p > 0.05$). In addition, the patients from the chronic group had higher scores on the self-defense scale in comparison with the patients from the control group ($p < 0.05$). Patients from the acute group were more anxious in comparison with the control ($p < 0.05$), while no statistically significant differences were observed between the acute and chronic groups of patients ($p > 0.05$). Similar results were noted by Yap¹⁹. Čelić et al.³⁸, reported that 55% of the patients were moderately to severely depressed, with 65% of them showing moderate to high levels of somatization.

Based on the results obtained in this investigation, including significantly higher depression, somatization and anxiety scores were obtained in patients with chronic and acute disorders in comparison with the control group, which prove the TMD to be a multietiological disorder caused by interactions of both physical and psychological factors.

Some recent reports^{17,18,39} also prove the multicausal etiology of the TMD, although anxiety and depression may also arise from some organic pathological condition. It is possible that in some patients the predisposing role is played by psychological factors coupled with a decreased tolerance to pain threshold and reduced tolerance to stress²¹.

Based on the results of this study, we can recommend introduction of psychological therapy for the chronic painful conditions. Besides the traditional psychotropic drugs (tricyclic antidepressants), introduction of psychological intervention, stress management and change of habits as a part of the integral treatment of TMD patients with depression, can be effective in reduction of painful conditions and tension in various types of patients suffering from TMD^{40–42}.

REFERENCES

1. YAP AUJ, TAN KBC, CHUA EK, TAN HH, J Prosthet Dent, 88 (2002) 479. — 2. DWORKIN SF, MASSOTH DL, J Prosthet Dent, 72 (1994) 29. — 3. McNEILL C, Temporomandibular disorders: Guidelines for Classification, Assessment, and Management (Quintessence Publishing Co, Chicago, 1993). — 4. RENER SITAR K, ČELEBIĆ A, STIPETIĆ J, MARION L, PETRIČEVIĆ N, ZALETEL-KRAGELJ L, Coll Antropol, 32 (2008) 513. — 5. PERTES RA, SHELDON GG, Clinical Management of Temporomandibular Disorders and Orofacial Pain (Quintessence Publ. Co, Chicago, London, Berlin, 1995). — 6. GRAY RJM, DAVIS SJ, QUOJLE AA, Temporomandibular disorders, a clinical approach (Brit. Dent. Assoc., London 1995). — 7. OKESON JP, Management of temporomandibular Disorders and occlusion (4th ed. Mosby Co, St. Louis, 1998). — 8. LICINI F, NOJELLI A, SEGÙ M, COLLESANO V, Minerva Stomatol, 58 (2009) 557. — 9. MANFREDINI D, MARINI M, PAVAN C, PAVAN L, GUARDANARDINI L, J Oral Rehabil, 36 (2009) 193. — 10. LeRESCHÉ L, MANCL L, SHERMAN JJ, Pain, 106 (2003) 253. — 11. RILEY JL, GILBERT HG, Pain, 90 (2001) 245. — 12. PLESH O, SINISI SE, CRAWFORD PB, GANSKY SA, J Orofac Pain, 19 (2005) 65. — 13. MONGINI F, The stomatognathic system; Function, Dysfunction and Rehabilitation (Quintessence Publishing Co, Chicago, 1984). — 14. CLARK GT, SOLBERG WK, Perspectives in Temporomandibular Disorders. (Quintessence Publ.Co, Chicago, London, Berlin 1987). — 15. American Academy of Craniomandibular Disorders, Craniomandibular disorders: guidelines for evaluation, diagnosis and management (Quintessence Publ.Co., Chicago, Illinois, 1990). — 16. BELL EW, Temporomandibular disorders: Classifications, diagnosis, management, Second edition, (Year book medical publishers, inc. Chicago, 1982). — 17. YAP AU, CHUA EK, TAN KB, CHAN YH, J Orofac Pain, 18 (2004) 220. — 18. AKHTER R, J Med Res, 12 (2007) 535. — 19. CLAROS AG, WILLIAMS K, LAUSTEN L, J Am Dent Assoc, 136 (2005) 451. — 20. HUANG GJ, LeRESCHÉ L, CRITCHLOW CW, MARTIN MD, DRANGSHOLT MT, J Dent Res, 81 (2002) 284. — 21. MANFREDINI D, LANDI N, BANDETTINI DI POGGIO A, DELL'OSSO L, Minerva Stomatol, 52 (2003) 321. — 22. YAP AU, TAN KB, HOE JK, YAP RH, JAFAR J, J Oral Rehabil, 28 (2001) 78. — 23. TURNER JA, DWORKIN SF, MANCL L, HUGGINS KH, TRUELOVE EL, Pain, 92 (2001) 41. — 24. FULGOSI A, Psihologija ličnosti (Školska knjiga, Zagreb, 1989). — 25. MORRISON J, HERBSTEIN J, Compr Psych, 29 (1988) 433. — 26. DWORKIN SF, LeRESCHÉ L, J Craniomand Disord Facial Oral Pain, 6 (1992) 302. — 27. RUST J, GOLOMBOK S, Modern Psychometrics – The science of psychological assessment (Routledge, London, 1999). — 28. KUTTLA M, KUTTLA S, Le BELL Y, ALANEN P, J Orofac Pain, 11 (1997) 242. — 29. GATCHEL RJ, GAROFALO JP, ELLIS E, HOLT C, Jada, 127 (1996) 1365. — 30. PERTES RA, HEIR GM, Dent Clin North Am, 35 (1991) 123. — 31. GREENE CS, Temporomandibular joint disorders (Harding JF, ed. Clark's clinical dentistry. Vol 2. Philadelphia: Lippincott, 1990). — 32. KINNEY RK, GATCHEL RJ, ELLIS E, HOLT C, Jada, 123 (1992) 49. — 33. MAIXNER W, FILLINGIM R, KINCAID S, SIGURDSSON A, HARRIS MB, Psychosom Med, 59 (1997) 503. — 34. FILLINGIM R, EDWARDS R, POWEL T, Pain, 83 (1999) 419. — 35. DAHLSTROM L, Acta Odontol Scand, 51 (1993) 339. — 36. SPRUIJT RJ, WABEKE KB, J Oral Rehabil, 22 (1995) 803. — 37. KIGHT M, GATCHEL RJ, WESLEY L, Health Psychol, 18 (1999) 177. — 38. ČELIĆ R, Istraživanje temporomandibularnih poremećaja primjenom dijagnostičkih kriterija DKI/TMP protokola Disertacija, (Stomatološki fakultet Sveučilišta u Zagrebu, Zagreb, 2003). — 39. SLADE GD, DIATCHENKO L, BHALANG K, SIGURDSSON A, FILLINGIM RB, BELFER I, MAX MB, GOLDMAN D, MAIXNER W, J Dent Res, 86 (2007) 1120. — 40. CLARKE NG, KARDACHI BJ, J Periodont, 48 (1977) 643. — 41. HERSH EV, BALASUBRAMANIAM R, PINTO A, Oral Maxillofac Surg Clin North Am, 20 (2008) 197. — 42. GRAMLING SE, NEBLETT J, GRAYSON R, TOWNSEND D, J Behav Ther Exp Psych, 27 (1996) 245.

V. Lajnert

University of Rijeka, School of Dental Medicine, Krešimirova 40, 51 000 Rijeka, Croatia
e-mail: vlatka.lajnert@ri.t-com.hr

DEPRESIJA, SOMATIZACIJA I ANKSIOZNOST U PACIJENTICA S TEMPOROMANDIBULARNIM POREMEĆAJEM (TMP)

SAŽETAK

Svrha istraživanja bila je utvrditi moguće razlike u stupnjevima depresije, somatizacije i anksioznosti između akutnih i kroničnih TMP pacijentica, te da li postoji razlika u odnosu na zdrave ispitanice. U istraživanje je bilo uključeno 90 pacijentica; 60 od njih su bile TMP pacijentice koje su dolazile u Stomatološku polikliniku, dok je preostalih 30 došlo na redovni kontrolni pregled i nisu imale TMP. Pacijentice su bile starosne dobi od 22 do 67 godina, prosječna dob je bila 38,5±12 godina. Sve pacijentice su popunile DKI/TMP protokol i tri psihološka testa (Profil indeksa emocija, Skala somatizacije i Skala nedavnih životnih događaja). Analizom DKI/TMP protokola i psiholoških testova uočeno je da kronične pacijentice imaju više rezultate na skalama depresije u usporedbi s akutnim pacijenticama ($p < 0,01$); akutne pacijentice izvještavaju o većem stupnju anksioznosti u odnosu na zdrave; dok pacijentice koje imaju više vrijednosti na skalama depresije naginju somatizacijama i izvještavaju o većem broju stresnih događaja u posljednjih šest mjeseci. Bezuvjetno je dokazano da TMP pacijenti pokazuju više vrijednosti na skalama depresije, somatizacije i anksioznosti u usporedbi sa zdravim pacijentima, što ukazuje na to da psihološki faktori mogu igrati važnu ulogu u kombinaciji sa smanjenom tolerancijom na bol i povećanom tolerancijom na stres.