

Investigation of the Psychological Status of 162 Female TMD Patients with Different Chronic Pain Severity

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Objective: To evaluate the level of psychosocial difficulties in patients with temporomandibular disorders (TMD) by using the Symptom Checklist 90 revised (SCL-90-R), and determine whether there is an association between psychosocial status and chronic pain severity.

Methods: One hundred and sixty-two female patients who came to the Center for TMD and Orofacial Pain of Peking University Hospital of Stomatology were randomly included in this study. SCL-90-R was used to assess the psychological status of the TMD patients. This instrument was also used to assess psychological status and pain-related disability in chronic pain patients and a seven-item questionnaire was used to grade chronic pain severity (GCP). Univariate analysis of variance and correlation analysis were performed to determine the association between psychological status and chronic pain severity.

Results: A total of 126 female TMD patients complained of pain in the temporomandibular joint. One hundred and sixteen patients had low disability, with 83 (51.3%) having low intensity pain (Grade I), 30 (18.5%) having high intensity pain (Grade II) and only 13 (8%) with high disability (Grade III pain). The patients were divided into four groups according to their GCP scores. The scores of all the factors of SCL-90-R were significantly different among the groups. The incidence of psychosocial symptoms was also significantly different among the groups. The psychosocial status of patients with high disability was the worst among the four groups.

Conclusion: The GCP severity is a suitable tool to assess the psychosocial and physical status of TMD chronic pain. Some TMD patients have psychological problems and symptoms of psychopathology, especially those with high disability. Physicians should keep this possibility in mind when treating patients with TMD chronic pain.

Key words: chronic pain, disorders psychology, Symptom Checklist 90, temporomandibular

Temporomandibular disorders (TMD) have often been viewed in the context of a biomedical model that focuses on somatic disease and structural dysfunction^{1,2}.

Recent work, however, has shown that TMD patients show increased stress, depression, anxiety and somatization compared with healthy controls³⁻⁷. TMD patients share some psychosocial factors experienced with other chronic conditions⁸⁻¹¹. Findings from epidemiological and experimental intervention studies indicate that TMD is a chronic pain condition that shares the major characteristics of other common chronic pain conditions, notably headache and back pain^{8,9}. Because chronic pain is associated with psychological, behavioural and social factors in addition to physical pathology, these factors must be considered if an accurate understanding of the aetiology and course of TMD is to be developed.

The present study used the Symptom Checklist 90 revised (SCL-90-R)¹² and grade chronic pain severity (GCP)¹³ to evaluate the levels of psychosocial difficul-

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Table 1 Graded chronic pain severity classification

Classification	Description
Grade 0	No TMD pain in prior 6 months
Low disability	
Grade I (low intensity)	Characteristic pain intensity < 50 and less than three disability points
Grade II (high intensity)	Characteristic pain intensity ≥ 50 and less than three disability points
High disability	
Grade III (moderately limiting)	Three or four disability points, regardless of characteristic pain intensity
Grade IV (severely limiting)	Five or six disability points, regardless of characteristic pain intensity

Table 2 Frequency distribution (percentage) for GCP classification of 162 female TMD patients

Classification	Cases	Composing ratio %
Grade 0	36(36/162)	22.2
Grade I	83(83/162)	51.3
Grade II	30(30/162)	18.5
Grade III	13(13/162)	8.0

ties in patients with TMD, and to determine whether there is an association between psychosocial status and chronic pain severity.

Patients and methods

The study was conducted at the Center for TMD and Orofacial Pain at Peking University Hospital of Stomatology in the period between March and December, 2004. A total of 162 female patients aged from 18 to 40 years were randomly selected for the present study. The patients with medically diagnosed polyarthritis were excluded.

All of the patients were diagnosed with clinical TMD conditions according to the diagnostic classification proposed by Xu-Chen Ma and Zhen-Kang Zhang^{14,15}. The SCL-90-R test and the GCP severity classification (Table 1) were used to assess patients’ psychosocial conditions. The SCL-90-R test contains 90 items. Its brevity makes it easy for patients to complete and is ideal for measuring symptom change throughout treatment. Nine primary symptom dimensions provide an overview of a patient’s symptoms and the intensity at a specific point in time.

Study groups

A total of 162 patients were divided into four groups (Table 2) according to the GCP severity classification³. In the present study, no patient reported pain severe enough to be classified as Grade IV.

Statistical analysis

Data were analysed with SPSS 11.0. Univariate analysis of variance and correlation analysis were performed to determine the relationship between psychological status and chronic pain severity. These groups were compared using multivariate analysis of variance (MANOVA), with follow-up univariate ANOVAs to detect individual scale differences since the MANOVA was significant. Canonical correlation was performed to determine the association between psychological status and diagnostic subgroup. A value of *P* < 0.05 was considered statistically significant.

Results

- Among the 162 patients, 126 patients (77.8%) complained of temporomandibular joint pain. A total of 116 patients (69.8%) had low disability with 83 patients (51.3%) having low intensity pain (Grade I), 30 (18.5%) with high intensity pain (Grade II), and 13 (8%) had high disability (Grade III) (Table 2).
- The scores of all factors of SCL-90 were significantly different among the four groups (*P* < 0.001) (Table 3). The Grade III group had the highest scores among the four groups, indicating that the patients of the Grade III group had more psychological distress.
- The incidence of psychosocial symptoms was significantly different among the four groups classified according to GCP (Table 4). The patients of the GCP III group had high incidences of all psychosocial

**Table 3** Scores of SCL-90-R for different GCP groups (mean \pm SD)

	SOM (F1)	O-C (F2)	I-S (F3)	DEP (F4)	ANX (F5)	HOS (F6)	PHOB (F7)	PAR (F8)	PSY (F9)
Grade 0 (n = 36)	1.36 \pm 0.39 ‡ \oplus	1.56 \pm 0.50 \oplus	1.41 \pm 0.54 ‡ \oplus	1.40 \pm 0.48 ‡ \oplus	1.33 \pm 0.41 ‡ \oplus	1.41 \pm 0.46 ‡ \oplus	1.19 \pm 0.33 ‡ \oplus	1.28 \pm 0.35 ‡ \oplus	1.21 \pm 0.32 ‡ \oplus
Grade I (n = 83)	1.45 \pm 0.45 \oplus	1.53 \pm 0.44 ‡ \oplus	1.42 \pm 0.43 ‡ \oplus	1.40 \pm 0.47 ‡ \oplus	1.30 \pm 0.32 ‡ \oplus	1.40 \pm 0.36 ‡ \oplus	1.21 \pm 0.37 ‡ \oplus	1.32 \pm 0.44 ‡ \oplus	1.19 \pm 0.23 ‡ \oplus
Grade II (n = 30)	1.61 \pm 0.48 * \oplus	1.79 \pm 0.58 #‡	1.69 \pm 0.56 *# \oplus	1.72 \pm 0.74 *# \oplus	1.59 \pm 0.58 *# \oplus	1.75 \pm 0.63 *# \oplus	1.41 \pm 0.46 *# \oplus	1.52 \pm 0.57 *# \oplus	1.38 \pm 0.41 *# \oplus
Grade III (n = 13)	2.09 \pm 0.54 *#‡	2.4 \pm 0.89 *#‡	2.19 \pm 0.90 *#‡	2.51 \pm 0.76 *#‡	2.23 \pm 0.71 *#‡	2.19 \pm 0.71 *#‡	1.81 \pm 0.54 *#‡	1.96 \pm 0.78 *#‡	2.04 \pm 0.61 *#‡

* Compared with Grade 0, there was a significant difference ($P < 0.05$).

Compared with Grade I, there was a significant difference ($P < 0.05$).

‡ Compared with Grade II, there was a significant difference ($P < 0.05$).

\oplus Compared with Grade III, there was a significant difference ($P < 0.05$).

SOM: somatization; O-C: obsessive compulsive; I-S: interpersonal sensitivity; DEP: depression; ANX: anxiety, nervousness; HOS: hostility; P-A: phobic anxiety; PAR: paranoia; PSY: psychoticism

Table 4 Incidence of psychosocial symptoms in patients with different GCP

	SOM F1	O-C F2	I-S F3	DEP F4	ANX F5	HOS F6	PHOB F7	PAR F8	PSY F9
Grade 0 (n = 36)	2.7%	5.4%	2.7%	5.4%	5.4%	5.4%	5.4%	2.7%	5.4%
Grade I (n = 83)	7.2%	1.2%	1.2%	4.8%	1.2%	1.2%	4.8%	2.4%	0%
Grade II (n = 30)	10%	6.7%	13.3%	10%	6.7%	13.3%	6.7%	6.7%	6.7%
Grade III (n = 13)	46.2%	38.5%	38.5%	76.9%	53.8%	38.5%	76.9%	84.6%	46.2%
χ^2	17.32	20.7	26.7	6.74	39.6	23.44	6.91	5.79	38.9
P	0.001	0.000	0.000	0.081	0.000	0.000	0.075	0.122	0.000

SOM: somatization; O-C: obsessive compulsive; I-S: interpersonal sensitivity; DEP: depression; ANX: anxiety, nervousness; HOS: hostility; P-A: phobic anxiety; PAR: paranoia; PSY: psychoticism

Table 5 Correlations between chronic pain grade and the scores of the factors of SCL-90-R of 162 TMD patients

	F1	F2	F3	F4	F5	F6	F7	F8	F9
GCP	0.3296	0.3222	0.2830	0.3741	0.3676	0.3415	0.3004	0.2616	0.3747

symptoms such as depression, phobic anxiety and paranoia.

- A significant correlation was found between chronic pain grade and the scores of the factors of SCL-90-R ($P < 0.01$). The representative correlation coefficient was 0.423 ($\chi^2 = 30.692$, $P = 0.00$) (Tables 5 and 6).

Table 6 Representative correlation coefficient

Correlation coefficient	Wilks value	χ^2	P
0.423	0.821	30.692	0.000

Discussion

Pain was defined as ‘an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage’ by the International Association for the Study of Pain (IASP)¹⁶. The ability to experience pain is critical for survival because it causes immediate awareness of injury to the body¹⁷. Pain is an individual experience affected by environmental, emotional and cognitive factors.

How best to describe pain in a definitive clinical way is still disputed now. According to IASP, pain can be a symptom of illness, a result of injury, or can occur with no apparent cause. Pain that results from illness or injury and tapers off or stops on its own or with medical treatment and that lasts no more than 6 months is called ‘acute pain’. Pain that persists more than 6 months after healing has occurred, or because of long-term illness, is called chronic pain. This classification is useful to distinguish acute pain from chronic pain. However, this scheme of classification doesn’t highlight the psychological condition of the TMD patients.

Psychogenic pain is considered to be a physical pain disorder with psychological factors. Mental and emotional disorders may cause, increase or prolong pain. Headache, muscle pain, back pain and stomach pain are the most common types of psychogenic pain¹⁸⁻²⁰. Chronic pain is widely believed to represent disease. It can be made much worse by environmental and psychological factors^{20,21}. Chronic pain often causes patients severe problems, which may persist for weeks, months or years, and may not respond to treatment. Without relief, some patients could lose the ability to eat, sleep, work and function normally²². Treatment depends on the cause and the individual needs of the patient, and it is important for patients and physicians to work together to find the best treatment plan^{23,24}. The present study was focused on providing a way for the dentists to get more psychological information from the patients, who suffered from TMD pain.

In the present study, in order to exclude the influence of gender, only females were chosen. A previous study found that there were some differences in psychological status between male and female TMD patients⁶. In other studies there were also different points about the effect of gender^{25,26}. It has been reported that oestrogen could influence the development, restitution and metabolism of the temporomandibular joint and associated structures such as bone, cartilage and articular disc²⁷. Oestrogen can also influence the regulatory mechanisms of pain²⁸.

The present study revealed that there were significant differences among the four groups on the nine dimensions of the SCL-90-R, including somatization, obsessive compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoia and psychoticism. The results are in agreement with other studies in the field of TMD that have indicated higher levels of psychological distress in TMD patients who had higher GCP grades^{29,30}. The doctor could obtain more psychological information about the TMD patients from the GCP diagnosis.

TMD has been identified as a major cause of non-dental originated pain in the orofacial region and considered to be a subclassification of musculoskeletal disorders^{2,3}. Current research supports the view that TMD is a group of related disorders that may have many common or similar features. One of the most frequent symptoms is pain, usually localised in the muscles of mastication, the pre-auricular area and/or the temporomandibular joint, which is aggravated by jaw movements like chewing and yawning^{23,25}. The precise etiology and mechanism of TMD are still unclear and remain the focus of much debate and controversy. Psychological factors have been implicated in several aspects of TMD^{29,30}. First, stress-related muscle hyperactivity and oral habits have been suggested as etiological factors²⁶. Secondly, psychological factors have been suggested to explain why some patients seem to be more bothered by symptoms and why only a small percentage of patients with symptoms actually seek treatment. Finally, psychological conditions such as depression and secondary gain have been used to explain why some patients do not respond to conventional therapy^{23,30}.

According to the research of Yap²⁹, about 38% of the population examined in the study was moderately to severely depressed. The present study showed that the patients who had higher GCP degrees had more psychological distress, especially the patients who had GCP III. The present study also demonstrated that the patients of the GCP III group were not only depressed but also experienced many other symptoms of psychological distress, such as obsessive compulsive tendencies, interpersonal sensitivity, anxiety and nervousness, hostility, phobic anxiety and paranoia. These results support the clinician’s view that TMD patients are ‘psychologically different’^{23,31}. It is, therefore, essential that psychological factors, if present, should be identified early in the initial management of TMD, as failure to do so may result in unsuccessful treatment and worsening of the patient’s condition³¹⁻³³.

In the present study, SCL-90-R was used to investigate psychological differences in TMD patients. It is a brief, multidimensional, self-reported inventory designed to screen for a broad range of psychological problems and symptoms of psychopathology. A significant correlation was found in the present study between the chronic pain grade and the scores of the factors of SCL-90-RP < 0.01 , which means that the patients with higher chronic pain grades experienced more psychological difficulties. The majority of patients (116 cases, 69.8%) had low disability with almost equal distribution between low (Grade I) and high (Grade II) intensity. Only 13 patients (13 cases, 8%) had high disability that was moderately limiting (Grade III), and none had high disability that was severely limiting (Grade IV), which means only 13 patients felt that the pain of the temporomandibular joint really influenced their daily life. It can be concluded that disability associated with TMD is generally low. There was significant difference in pain severity among the four groups. Patients with Grade III were significantly more distressed compared with other patients. According to knowledge gained from the present study, more psychological difficulties of TMD patients were demonstrated compared with previous studies. From these results the physicians could find the best treatment plan for the patients.

References

- Bell WE. *Orofacial Pains: Classification, Diagnosis, Management*, ed 4. Chicago: Year Book Medical Publishers, 1989.
- Ma XC. Prospects for the research and clinical work of temporomandibular disorders in China. *Zhonghua Kou Qiang Yi Xue Za Zhi* 1998;33:195–197 (in Chinese).
- Dworkin SF. Perspectives on the interaction of biological, psychological and social factors in TMD. *J Am Dent Assoc* 1994;125:856–863.
- Yap AU, Dworkin SF, Chua EK et al. Prevalence of temporomandibular disorder subtypes, psychologic distress, and psychosocial dysfunction in Asian patients. *J Orofac Pain* 2003;17:21–28.
- Ciancaglini R, Gherilone EF, Radaelli G. The relationship between headache and symptoms of temporomandibular disorder in the general population. *J Dent* 2001;29:93–98.
- Xu WH, Ma XC, Guo CB, Wu RG. Psychological status in patients with temporomandibular disorders. *Zhonghua Kou Qiang Yi Xue Za Zhi* 2005;40:359–361 (in Chinese).
- Manfredini D, Bandettini di Poggio A, Cantini E et al. Mood and anxiety psychopathology and temporomandibular disorder: a spectrum approach. *J Oral Rehabil* 2004;31:933–940.
- Scher AI, Lipton RB, Stewart W. Risk factors for chronic daily headache. *Curr Pain Headache Rep* 2002;6:486–491.
- Mongini F, Ciccone G, Ibertis F, Negro C. Personality characteristics and accompanying symptoms in temporomandibular joint dysfunction, headache, and facial pain. *J Orofac Pain* 2000;14:52–58.
- Blasberg B, Chalmers A. Temporomandibular pain and dysfunction syndrome associated with generalized musculoskeletal pain: a retrospective study. *J Rheumatol Suppl* 1989;19:87–90.
- Shaver JL, Lentz M, Landis CA et al. Sleep, psychological distress, and stress arousal in women with fibromyalgia. *Res Nurs Health* 1997;20:247–257.
- Wang ZY. Symptom Checklist 90 (SCL-90). *Shanghai Jing Shen Yi Xue* 1984;2:68–70 (in Chinese).
- Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomandib Disord* 1992;6:301–355.
- Ma XC, Zhang ZK. The classification and diagnostic criteria of temporomandibular disorders. *Zhonghua Kou Qiang Yi Xue Za Zhi* 1998;33:238–240 (in Chinese).
- Ma XC, Zhang ZK. Clinical significance of dual-axis diagnostic criteria and the necessity of treatment for temporomandibular disorders. *Zhonghua Kou Qiang Yi Xue Za Zhi* 2005;40:353–355 (in Chinese).
- Asmundson GJ, Bonin MF, Frombach IK, Norton GR. Evidence of a disposition toward fearfulness and vulnerability to posttraumatic stress in dysfunctional pain patients. *Behav Res Ther* 2000;38:801–812.
- Fedoroff IC, Taylor S, Asmundson GJG, Koch WJ. Cognitive factors in traumatic stress reactions: Predicting PTSD symptoms from anxiety sensitivity and beliefs about harmful events. *Behav Cogn Psychother* 2000;28:5–15.
- Rainero I, Valfre W, Savi L et al. Decreased sensitivity of 5-HT_{1D} receptors in chronic tension-type headache. *Headache* 2002;42:709–714.
- Gold PW, Chrousos GP. Organization of the stress system and its dysregulation in melancholic and atypical depression: high vs low CRH/NE states. *Mol Psychiatry* 2002;7:254–275.
- Peres MF, Sanchez del Rio M, Seabra ML et al. Hypothalamic involvement in chronic migraine. *J Neurol Neurosurg Psychiatry* 2001;71:747–751.
- Hering-Hanit R, Yavetz A, Dagan Y. Effect of withdrawal of misused medication on Sleep disturbances in migraine sufferers with chronic daily headache. *Headache* 2000;40:809–812.
- Pimenta CA, Koizumi MS, Teixeira MJ. Chronic pain and depression: study of 92 patients. *Rev Esc Enferm USP* 2000;34:76–83 (in Portuguese).
- Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: review, criteria, examinations and specifications, critique. *J Craniomandib Disord* 1992;6:301–355.
- McCracken LM, Iverson GL. Disrupted sleep patterns and daily functioning in patients with chronic pain. *Pain Res Manag* 2002;7:75–79.
- Phillips JM, Gatchel RJ, Wesley AL, Ellis E 3rd. Clinical implications of sex in acute temporomandibular disorders. *J Am Dent Assoc* 2001;132:49–57.
- Zhao YP, Ma XC. Temporomandibular disorders related pain interaction with age, sex and imaging changes of osteoarthritis. *Zhonghua Kou Qiang Yi Xue Za Zhi* 2006;41:757–758 (in Chinese).
- Fang ZQ, Ma XC. Study on differential estrogen receptor beta expression of mandibular condylar chondrocyte in temporomandibular joint osteoarthritis. *Hua Xi Kou Qiang Yi Xue Za Zhi* 2006;24:469–472 (in Chinese).
- LeResche L, Saunders K, Von Korff MR et al. Use of exogenous hormones and risk of temporomandibular disorder pain. *Pain* 1997;69:153–160.
- Yap AU, Chua EK, Hoe JK. Clinical TMD, pain-related disability and psychological status of TMD patients. *J Oral Rehabil* 2002;29:374–380.
- Yap AU, Chua EK, Tan KB. Depressive symptoms in Asian TMD patients and their association with non-specific physical symptoms reporting. *J Oral Pathol Med* 2004;33:305–310.
- Ma XC, Zhang ZK. Terminology, diagnostic classification and treatment principle of temporomandibular disorders. *Zhonghua Kou Qiang Yi Xue Za Zhi* 2002;37:241–243 (in Chinese).
- Rantala MA, Ahlberg J, Suvinen TI. Symptoms, signs, and clinical diagnoses according to the research diagnostic criteria for temporomandibular disorders among Finnish multiprofessional media personnel. *J Orofac Pain* 2003;17:311–316.
- Rantala MA, Ahlberg J, Suvinen TI et al. Chronic myofascial pain, disk displacement with reduction and psychosocial factors in Finnish non-patients. *Acta Odontol Scand* 2004;62:293–297.