Prevalence of Suicidal Ideation, Depression, and Anxiety in Chronic Temporomandibular Disorder Patients

Elizangela Bertoli, DDS, MS
Assistant Professor
Division of Orofacial Pain
University of Kentucky
College of Dentistry
Lexington, Kentucky, USA

Reny de Leeuw, DDS, PhD, MPH
Professor
Division of Orofacial Pain
University of Kentucky
College of Dentistry
Lexington, Kentucky, USA

Correspondence to:
Dr Elizangela Bertoli
University of Kentucky
College of Dentistry
D632-B Chandler Medical Center
Lexington, KY 40536-0297, USA
Fax: 859-257-1847
Email: ebert2@email.uky.edu

Aims: To investigate the prevalence of suicidal ideation (SI), depression, and anxiety in patients with a chronic temporomandibular disorder (TMD). **Methods:** The sample consisted of 1,241 consecutive patients diagnosed with muscle or joint pain, consistent with the Research Diagnostic Criteria for TMD (RDC/TMD), and assigned to one of three groups: Muscle pain (MM) group, joint pain (TMJ) group, and Mixed group. Variables of interest were specific demographics and psychometrics derived from the Symptom Checklist 90-Revised (SCL-90-R): three SI-related items, depression, anxiety, and Global Symptom Index score. Group comparisons were performed with χ^2 tests and *t* tests; the level of significance was set at $\alpha = .05$. **Results:** The mean (± standard deviation) age for the whole sample was 35.76 ± 12.6 years; 88.3% were women. The overall prevalence of SI items from the SCL-90-R was 8.4% for "thoughts of ending your life," 28.5% for "feeling hopeless about the future," and 20.5% for "having thoughts of death and dying." The overall prevalence of depression was 30.4% and overall prevalence of anxiety was 28.9%. Patients in the MM group reported the highest prevalence of SI. Patients in the MM group were significantly more likely to be depressed and anxious compared to patients in the TMJ ($P < .0001$) and Mixed groups ($P < .0001$). **Conclusion:** Elevated levels of SI, depression, and anxiety were reported in a chronic TMD population, especially in those with chronic muscle pain, compared to the general population. These findings emphasize the need for screening for suicidality and other comorbidities in TMD patients suffering from chronic pain.
J Oral Facial Pain Headache 2016;30:296–301. doi: 10.11607/ofph.1675

Keywords: *anxiety, depression, prevalence, suicidal ideation, TMD*

Temporomandibular disorders (TMD), defined as a collection of medical and dental conditions affecting the temporomandibular joints (TMJs) and/or masticatory muscles and associated structures,[1] have an estimated prevalence in the adult population of around 10%.[2] TMD are multifactorial in nature and definite causal factors are not yet identified. Some possible causal factors that have been proposed are history of trauma, occlusion, and systemic and psychological factors.[3] Several reports have found a positive relationship between psychological distress and TMD.[4–6]

Symptoms of depression and anxiety have also been considered as risk factors for TMD.[2,7] Indeed, patients with chronic TMD show greater psychological maladjustment when compared to healthy controls.[8] In chronic pain patients, anxiety and depression may impact a patient's capacity to adapt and to develop coping skills that are essential for patients to manage their pain conditions and their lives. Consequently, a higher rate of suicidal ideation (SI) occurrence may be found in this population.

The prevalence of suicidal thoughts in the general population in the United States is estimated at 3.9%. In adults, the prevalence of serious suicidal thoughts was found to be highest in young adults (7.4% in those between the ages of 18 and 24) and declining in older cohorts.[9] Several risk factors have been associated with SI and include younger age, low educational level, single marital status, mental disorders,[10] anxiety, and mood disorders, especially depression.[11] Prevalence of SI, suicidal attempts, and suicidal completion in chronic pain patients has been reported to range from 7% to 40.9%.[12] Lifetime and current prevalence

of SI in chronic pain patients has been reported to be in the range of 5% to 24%, respectively.[13] Other data suggest that chronic pain patients seem to have at least double the risk for SI when compared to controls without pain.[13] A study in a representative sample of the South Korean population investigated the prevalence of SI in patients with TMD and found that 11.6% reported a history of SI over a 12-month period.[14]

For chronic TMD, it is important to initiate a comprehensive treatment approach. Carlson described the association between TMD chronicity and the need for a comprehensive approach to patient management that incorporates the biobehavioral model, which identifies the significance of psychological factors interacting with physiologic factors in determining the experience for each patient.[15]

Due to the limited amount of literature regarding SI in chronic TMD patients, the main aim of this study was to investigate the prevalence of SI in these patients. Considering the available literature and the interactions between depression and anxiety and TMD, the second aim of this study was to investigate the prevalence of depression and anxiety in chronic TMD patients. It was hypothesized that chronic TMD patients would present with a high prevalence of SI, depression, and anxiety.

Materials and Methods

A retrospective database review was conducted in chronic TMD patients presenting to the Orofacial Pain Center at the University of Kentucky from 1997 to 2014. A total of 2,175 consecutive patients diagnosed with muscle pain, joint pain, or both, consistent with the Research Diagnostic Criteria for TMD (RDC/TMD), were initially analyzed.[16] Inclusion criteria were: at least 18 years old; diagnosis of muscle and/or joint pain; pain severity of at least 3 out of 10 on a numeric rating scale (NRS); and pain duration of at least 3 months. Patients with a secondary diagnosis that was not muscle or joint pain were excluded. Following application of the above-mentioned inclusion/exclusion criteria, the final sample included in this study was 1,241 patients. As part of the Orofacial Pain Center protocol, all participants had already signed a standard consent form allowing the use of their data for teaching and research purposes. This study was approved by the Institutional Review Board of the University of Kentucky.

At their initial visit, patients were examined at the Orofacial Pain Center by calibrated faculty members and residents. Diagnoses were consistent with the RDC/TMD.[16] Patients were divided into three groups based on their primary and secondary diagnoses. The first was the muscle pain group (MM group), which comprised patients with muscle pain only (primary and secondary diagnoses of muscle pain or no secondary diagnosis; RDC/TMD Group I: myofascial pain). The second group (TMJ group) comprised patients with joint pain only (primary and secondary diagnoses of joint pain or no secondary diagnosis; RDC/TMD groups II and III: disc displacements, arthralgia, or osteoarthritis). The third group comprised patients with both muscle and joint pain diagnoses (Mixed group).

As part of the standard initial examination, all patients completed an orofacial pain questionnaire and a battery of psychological questionnaires including the full version of the Symptom Checklist 90 (SCL-90-R). The SCL-90-R is a 90-item, self-report instrument that generates nine symptom dimensions including somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism.[17] Variables of interest for the present study were specific demographics and psychometrics related to depression, anxiety, and general distress (Global Symptom Index-GSI score) derived from the SCL-90-R. To investigate SI, 3 of the 90 items of the SCL-90-R were considered: SCL-90-R items 15, "thoughts of ending your life;" 54, "feeling hopeless about the future;" and 59, "thoughts of death and dying." Items 15 and 54 are part of the symptom dimensions of depression and item 59 is categorized under additional items and not included in any of the dimensions. Item 15 directly investigates thoughts of self-harm and SI, while items 54 and 59 are psychological states frequently described by survivors of suicide attempts. These two items significantly precede both SI and attempted suicide.[18–20] The SCL-90-R items have been successfully utilized in previous studies to explore SI.[21,22] Clinical settings studies also support the use of SI measures from the SCL-90-R items, since these measures show a significant relationship with suicide attempts.[23–25]

On the SCL-90-R, patients are instructed to rate how much the 90 items have "bothered or distressed them during the past week, including today" on a scale from 0, meaning "not at all," to 4, meaning "extremely." For the three items associated with SI, any score higher than 0 was considered positive for the purpose of the present study. The cutoff for clinical significance for symptom dimensions of depression and anxiety is set as a T-score of 63. Pain severity was based on an NRS where 0 indicated "no pain at all" and 10 indicated "the worst pain imaginable."

Statistical Analyses

Preliminary analyses were implemented in the three diagnostic groups (MM, TMJ, and Mixed). Age and gender were analyzed using independent samples

Table 1 Comparisons of Age, Gender, Pain Severity, and Pain Duration Among the Diagnostic Groups

	MM group	TMJ group	Mixed group	Total	*P* value
Mean age ± SD	37.32 ± 11.9*	34.24 ± 13.0	34.76 ± 12.9	35.76 ± 12.6)	.00
Gender, n (%)					
Male	59 (40.7)	32 (22.1)	54 (37.2)	145 (100)	
Female	475 (43.3)	214 (19.5)	407 (37.1)	1,096 (100)	
Total	534 (43)	246 (19.8)	461 (37.1)	1241 (100)	.731
Pain severity (mean ± SD)	7.11 ± 1.9**	6.48 ± 2.0	6.84 ± 1.9	6.84 ± 1.9	< .001
Pain duration (mean ± SD)	48.50 ± 67.8	44.92 ± 67.9	55.80 ± 74.6	50.50 ± 70.5	.101

MM group = muscle pain group; TMJ group = joint pain group; Mixed group = muscle and joint pain; SD = standard deviation.
*MM group was significantly older than both TMJ and Mixed groups.
**MM group reported significantly higher pain severity than both TMJ and Mixed groups.

t tests and χ^2 test. Differences in the prevalence of SI as indicated by the three SCL-90-R items and gender differences among all three diagnostic groups were calculated by using χ^2 tests. Age, pain severity, and pain duration were compared within the three diagnostic groups by using ANOVA with Bonferroni corrections. Last, linear correlations between the three SCL-90-R SI items, depression (item 59 only, as items 15 and 54 are part of the dimension of depression), anxiety, and GSI scores were performed with Pearson's correlation test. Level of significance was set at $P < .05$.

Results

A total of 1,241 patients diagnosed with either muscle pain or TMJ pain were included in this study. A total of 1,096 were female (88.3%). Patients were assigned to one of the three study groups according to their primary and, when present, secondary diagnoses. The MM group was comprised of 534 patients (43% of the total sample), the TMJ group of 246 patients (20%), and the Mixed group of 461 patients (37%).

The mean age for the whole sample was 35.76 ± 12.6 years; Table 1 shows the mean age breakdown for the three diagnostic groups. The patients in the MM group were significantly older than the patients in the other two groups. There were no statistically significant differences with regard to gender among the three diagnostic groups ($P = .731$; Table 1). The mean pain intensity for the whole sample was 6.84 ± 1.9 (NRS scale) and the mean pain duration was 50.5 ± 70.5 months. Pain severity was significantly higher in the MM group compared to the TMJ and Mixed groups ($P = .01$) but there were no statistically significant differences in pain severity when comparing the TMJ group to the Mixed group (Table 1). There were no statistically significant differences ($P = .101$) between the three diagnostic groups in pain duration (Table 1).

The prevalence of SCL-90-R item 15 ("thoughts of ending your life") was 8.4%. Higher prevalence rates were found for SCL-90-R items 54 ("feeling hopeless about the future"; 28.5%) and 59 ("thoughts of death and dying"; 20.5%). There were no statistically significant differences between genders in suicidality.

Prevalence data of the three SCL-90-R items are reported in Table 2. Comparisons among the three diagnostic groups revealed statistically significant differences with χ^2 values: 13.68 for item 15, 35.08 for item 54, and 10.25 for item 59, with respective *P* values of .001, < .0001, and .006, with the MM group reporting the highest prevalence of all three items and the TMJ group reporting the lowest prevalence of all three items. Post hoc tests revealed significant differences between the MM group and TMJ group for all three SCL-90-R items (χ^2 values of 11.45, 30.09, and 9.57, respectively; all *P* values < .002), significant differences between the MM group and the Mixed group for items 15 and 54 (χ^2 values of 5.17 and 14.63, respectively; $P = .023$ and $P < .0001$), and significant differences between the TMJ group and the Mixed group for item 54 (χ^2 value of 6.22; $P = .013$).

The prevalence of depression and anxiety in the whole sample was 30.4% and 28.9%, respectively. Table 3 shows the prevalence data for each group. Post hoc tests showed that patients in the MM group were significantly more likely to be depressed and anxious compared to patients in the TMJ ($P < .0001$) and Mixed groups ($P < .0001$). Patients in the Mixed group were significantly more likely to be depressed compared to patients in the TMJ group ($P = .001$). There were no significant differences between TMJ and Mixed groups regarding anxiety ($P = .133$).

Pearson's correlation tests were conducted to assess the relationship among the three SCL-90-R items (15, 54, and 59), as well as relationships between item 59 and depression and between each of the three items and anxiety, pain severity, and pain

Table 2 Prevalence of SI: SCL-90-R Items Related to SI Among the Groups

	"Thoughts of ending your life" (Item 15)			"Feeling hopeless about the future" (Item 54)			"Thoughts of death or dying" (Item 59)		
	No	Yes		No	Yes		No	Yes	
MM group, n (%)	463 (88.5)	60 (11.5)*	$P = .001$	330 (63.3)	191 (36.7)*	$P < .0001$	397 (75.8)	127 (24.2)*	$P = .006$
TMJ group, n (%)	226 (96.2)	9 (3.8)		197 (83.1)	40 (16.9)		203 (85.7)	34 (14.3)	
Mixed group, n (%)	414 (92.8)	32 (7.2)		335 (74.8)	113 (25.2)		359 (80.5)	87 (19.5)	

MM group = muscle pain; TMJ group = joint pain; Mixed group = muscle and joint pain.
Significant at *$P < .05$.

Table 3 Prevalence of Depression and Anxiety Among the Groups

	MM group (n = 528)	TMJ group (n = 237)	Mixed group (n = 450)	χ^2	*P* value
Depression, n (%)	216 (40.9)	38 (16)	15 (25.6)	55.7	< .0001
Anxiety, n (%)	199 (37.7)	41 (17.4)	111 (24.6)	39.03	< .0001

MM group = muscle pain; TMJ group = joint pain; Mixed group = muscle and joint pain.

Table 4 Pearson Correlations Among All Variables Studied

	SCL-90-R Item 15	SCL-90-R Item 54	SCL-90-R Item 59	Depression	Anxiety	Pain severity	Pain duration
SCL-90-R Item 15		.507**	.566**		.339**	.099**	.033
SCL-90-R Item 54	.507**		.572**		.585**	.137**	.027
SCL-90-R Item 59	.566**	.572**		.487**	.497**	.109**	.058*
Depression			.487**		.789**	.201**	.043
Anxiety	.339**	.585**	.497**	.789**		.173**	.068*

SCL-90-R Item 15: "thoughts of ending your life"; SCL-90-R Item 54: "hopeless about the future"; SCL-90-R Item 59: "thoughts of death or dying."
*Correlation is significant at $P < .05$; **Correlation is significant at $P < .001$.

duration. There were strong positive correlations between the first three SI-related items (Table 4). There were moderate positive correlations between item 15 ("thoughts of ending your life") and anxiety, and between item 59 ("thoughts of death and dying") and both depression and anxiety, and strong positive correlations between item 54 ("feeling hopeless about the future") and anxiety. The correlations between the three SI items and pain severity or pain duration were weak or very weak (Table 4). Overall, there was a strong, positive correlation between the SCL-90-R items assessing suicidality and anxiety. Increases in SI correlated with increases in levels of depression and anxiety.

Discussion

A database review of chronic TMD patients was conducted to analyze the prevalence of SI, depression, and anxiety. The proposed hypothesis, that these three variables would have a high prevalence in TMD patients with chronic pain, was confirmed.

The prevalence of suicidality was investigated using three items from the SCL-90-R. The SCL-90-R explores a list of issues a person is experiencing and how much he/she is distressed or bothered by these issues during the past 7 days, giving an estimate of current prevalence of these issues. In general, the findings regarding SI are comparable with previous studies in chronic pain patients, in which ranges between 5% and 40% were found.[13] In the current study, 8.4% of patients had thoughts of ending their lives, a finding comparable to the findings of Fisher et al, in which the current prevalence of SI was 7% in chronic pain patients that included mainly lower back pain (42%) but also headache and face or mouth pain (14%) and reported lower extremity pain (11%).[26] The prevalence of suicidality in the present study appears slightly lower than that reported in TMD patients in a South Korean population (11.6%).[14] A likely explanation for this discrepancy could be that the authors of that study reported on the prevalence of SI within the last year while in the present study a current prevalence (past 7 days) was reported. It could be expected that the prevalence of SI in the

current study population would be much higher if lifetime history of SI or history over the past year was assessed compared to experiencing these symptoms in the past 7 days. On the other hand, symptoms of SI may fluctuate over time, and assessing the presence of these symptoms at the time that the patient's symptomatology of TMD is significant enough for them to seek care make the findings of the current study particularly meaningful in demonstrating the importance of screening for suicidality when evaluating TMD patients.

Item 54 current, "feeling hopeless about the future," and item 59 current, "thoughts of death and dying," were reported to a greater extent (28.5% and 20.5%, respectively) than item 15 ("thoughts of ending your life," 8.4%). Even though these findings are also comparable to previous studies on current prevalence of SI in chronic pain patients,[27–30] a proxy of SI based on these two items alone is not straightforward, with the question arising of whether these patients really had thoughts of ending their lives. For instance, many people may feel hopeless about the future without having thoughts of ending their lives. Likewise, people may have thoughts of death or dying because they recently experienced a death in the family or because they are taking care of a terminally ill person; thus, they mark the item without actually having thoughts of ending their lives. Nevertheless, strong, positive correlations between these two items and item 15 were observed, meaning that increases in "thoughts of ending your life" was associated with increases in "feeling hopeless about the future" (item 54) and current "thoughts of death and dying" (item 59). Taken together, these items are important and will be an additional tool when screening for SI.

Analyzing the prevalence of SI in the study groups revealed a higher prevalence of positive answers to all three SCL-90-R items for patients in the MM group compared to those in the TMJ group. This finding was not surprising given that previous studies analyzing these two categories of TMD pain (muscle and TMJ) have reported higher levels of psychological distress, depression, pain disability, and exposure to major life stressors in muscle pain patients when compared to TMJ pain patients.[31–33] The fact that pain severity was significantly elevated in this group of patients compared to those in the TMJ group adds to this expectation. Indeed, pain severity has been associated with higher rates of suicidal behavior in chronic pain patients; however, in the current study, neither pain severity nor pain duration showed meaningful correlations with our measures of SI.[34]

The present results also revealed a high prevalence of depression and anxiety in this sample of TMD patients (30.4% and 28.9%, respectively), a finding that is in accordance with previous studies in TMD patients in which this comorbidity has been reported.[35,36] The findings that depression was strongly correlated with item 59 ("thoughts of death and dying") and that anxiety was strongly correlated with all three items of the SCL-90-R further demonstrate the need to explore possible comorbidities when managing patients with chronic TMD pain. The importance of a multidisciplinary approach for TMD is fundamental and has been extensively reported.[17,33,37,38] In fact, Litt and Porto have reported on the importance of identifying TMD patients who do not respond to standard conservative TMD treatment by itself or in addition to cognitive behavioral coping skills training. The authors found that the subgroup of TMD patients (16%) who did not respond to treatment reported more psychological symptoms, poor coping skills, and more catastrophizing when compared to the TMD patients who responded to treatment.[38] In an effort to identify SI and to prevent suicidal completion, clinicians should be able to recognize cues for SI and to evaluate a patient's mental health status in order to make appropriate referrals for proper management.

Limitations of the present study include its retrospective design, which prevents the determination of the causal relationship among the variables studied and TMD. In addition, the study design did not allow evaluation of treatment outcome or how these variables would affect treatment outcome. In a review, Newton-John identified specific risk factors for suicidality in the chronic pain population; these included insomnia, headache, and presence of multiple pain conditions which are frequently seen in the TMD population.[39] The current study did not verify whether these factors could be identified as factors associated with suicidality in TMD patients. Prospective studies would also be valuable to explore suicidality, depression, and anxiety in chronic TMD patients.

Conclusions

This study found that a chronic TMD population reported elevated levels of SI, depression, and anxiety. These findings emphasize the need for screening for suicidality and other comorbidities such as depression and anxiety in TMD patients suffering from chronic pain.

Acknowledgments

The authors report no conflicts of interest.

References

1. The integrated approach to the management of pain. Natl Inst Health Consens Dev Conf Consens Statement 1986;6:1–8.
2. LeResche L. Epidemiology of temporomandibular disorders: Implications for the investigation of etiologic factors. Crit Rev Oral Biol Med 1997;8:291–305.
3. de Leeuw R. Orofacial Pain: Guidelines for Assessment, Diagnosis, and Management, fourth edition. Chicago: Quintessence, 2008.
4. de Leeuw JR, Steenks MH, Ros WJ, Bosman F, Winnubst JA, Scholte AM. Psychosocial aspects of craniomandibular dysfunction. An assessment of clinical and community findings. J Oral Rehabil 1994;21:127–143.
5. Duinkerke AS, Luteijn F, Bouman TK, de Jong HP. Relations between TMJ pain dysfunction syndrome (PDS) and some psychologic and biographic variables. Community Dent Oral Epidemiol 1985;13:185–189.
6. Auerbach SM, Laskin DM, Frantsve LM, Orr T. Depression, pain, exposure to stressful life events, and long-term outcomes in temporomandibular disorder patients. J Oral Maxillofac Surg 2001;59:628–633.
7. Kindler S, Samietz S, Houshmand M, et al. Depressive and anxiety symptoms as risk factors for temporomandibular joint pain: A prospective cohort study in the general population. J Pain 2012;13:1188–1197.
8. Fillingim RB, Ohrbach R, Greenspan JD, et al. Psychological factors associated with development of TMD: The OPPERA prospective cohort study. J Pain 2013;14(suppl):T75–T90.
9. Substance Abuse and Mental Health Services Administration, Center for Behavioral Health Statistics and Quality. Results from the 2013 national survey on drug use and health: Mental health findings. NSDUH Series H-49, HHS Publication No. (SMA) 14-4887. http://www.samhsa.gov/data/sites/default/files/NSDUHmhfr2013/NSDUHmhfr2013.pdf. Accessed 12 August 2016.
10. Kessler RC, Borges G, Walters EE. Prevalence of and risk factors for lifetime suicide attempts in the National Comorbidity Survey. Arch Gen Psychiatry 1999;56:617–626.
11. Calandre EP, Navajas-Rojas MA, Ballesteros J, et al. Suicidal ideation in patients with fibromyalgia: A cross-sectional study. Pain Pract 2015;15:168–174.
12. Fishbain DA, Lewis JE, Gao J. The pain suicidality association: A narrative review. Pain Med 2014;15:1835–1849.
13. Tang NK, Crane C. Suicidality in chronic pain: A review of the prevalence, risk factors and psychological links. Psychol Med 2006;36:575–586.
14. Han DH. The association between temporomandibular disorders and suicide ideation in a representative sample of the South Korean population. J Oral Facial Pain Headache 2014;28:338–345.
15. Carlson CR. Psychological considerations for chronic orofacial pain. Oral Maxillofac Surg Clin North Am 2008;20:185–195.
16. Dworkin SF, LeResche L. Research diagnostic criteria for temporomandibular disorders: Review, criteria, examinations and specifications, critique. J Craniomandib Disord 1992;6:301–355.
17. Derogatis LR. SCL-90-R: Symptom Checklist-90-R: Administration, Scoring & Procedures Manual. Minneapolis: National Computer Systems, 1994.
18. Beck AT, Kovacs M, Weissman A. Hopelessness and suicidal behavior. An overview. JAMA 1975;234:1146–1149.
19. Beck AT, Steer RA, Kovacs M, Garrison B. Hopelessness and eventual suicide: A 10-year prospective study of patients hospitalized with suicidal ideation. Am J Psychiatry 1985;142:559–563.
20. Beck AT, Brown G, Berchick RJ, Stewart BL, Steer RA. Relationship between hopelessness and ultimate suicide: A replication with psychiatric outpatients. Am J Psychiatry 1990;147:190–195.
21. Meng H, Li J, Loerbroks A, Wu J, Chen H. Rural/urban background, depression and suicidal ideation in Chinese college students: A cross-sectional study. PLoS One 2013;8:e71313.
22. Lim HW, Song HS, Hwang YH, et al. Predictors of suicidal ideation in people with epilepsy living in Korea. J Clin Neurol 2010;6:81–88.
23. Miotto P, De Coppi M, Frezza M, Petretto D, Masala C, Preti A. Suicidal ideation and aggressiveness in school-aged youths. Psychiatry Res 2003;120:247–255.
24. Favaro A, Santonastaso P. Suicidality in eating disorders: Clinical and psychological correlates. Acta Psychiatr Scand 1997;95:508–514.
25. Milos G, Spindler A, Hepp U, Schnyder U. Suicide attempts and suicidal ideation: Links with psychiatric comorbidity in eating disorder subjects. Gen Hosp Psychiatry 2004;26:129–135.
26. Fisher BJ, Haythornthwaite JA, Heinberg LJ, Clark M, Reed J. Suicidal intent in patients with chronic pain. Pain 2001;89:199–206.
27. Hinkley BS, Jaremko ME. Effects of pain duration on psychosocial adjustment in orthopedic patients: The importance of early diagnosis and treatment of pain. J Pain Symptom Manage 1994;9:175–185.
28. Treharne GJ, Lyons AC, Kitas GD. Suicidal ideation in patients with rheumatoid arthritis. Research may help identify patients at high risk. BMJ 2000;321:1290.
29. Smith MT, Edwards RR, Robinson RC, Dworkin RH. Suicidal ideation, plans, and attempts in chronic pain patients: Factors associated with increased risk. Pain 2004;111:201–208.
30. Smith MT, Perlis ML, Haythornthwaite JA. Suicidal ideation in outpatients with chronic musculoskeletal pain: An exploratory study of the role of sleep onset insomnia and pain intensity. Clin J Pain 2004;20:111–118.
31. Carlson CR, Reid KI, Curran SL, et al. Psychological and physiological parameters of masticatory muscle pain. Pain 1998;76:297–307.
32. Lindroth JE, Schmidt JE, Carlson CR. A comparison between masticatory muscle pain patients and intracapsular pain patients on behavioral and psychosocial domains. J Orofac Pain 2002;16:277–283.
33. De Leeuw R, Bertoli E, Schmidt JE, Carlson CR. Prevalence of traumatic stressors in patients with temporomandibular disorders. J Oral Maxillofac Surg 2005;63:42–50.
34. Fishbain DA. The association of chronic pain and suicide. Semin Clin Neuropsychiatry 1999;4:221–227.
35. Curran SL, Sherman JJ, Cunningham LL, Okeson JP, Reid KI, Carlson CR. Physical and sexual abuse among orofacial pain patients: Linkages with pain and psychologic distress. J Orofac Pain 1995;9:340–346.
36. Korszun A. Facial pain, depression and stress - connections and directions. J Oral Pathol Med 2002;31:615–619.
37. Bertoli E, de Leeuw R, Schmidt JE, Okeson JP, Carlson CR. Prevalence and impact of post-traumatic stress disorder symptoms in patients with masticatory muscle or temporomandibular joint pain: Differences and similarities. J Orofac Pain 2007;21:107–119.
38. Litt MD, Porto FB. Determinants of pain treatment response and nonresponse: Identification of TMD patient subgroups. J Pain 2013;14:1502–1513.
39. Newton-John TR. Negotiating the maze: Risk factors for suicidal behavior in chronic pain patients. Curr Pain Headache Rep 2014;18:447.