Post-traumatic Stress Disorder Among Patients with Orofacial Pain

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Aims: *To examine the presence and impact of post-traumatic stress disorder (PTSD) in a sample of patients seeking treatment for orofacial pain.* ***Methods:*** *One hundred forty-one consecutive patients with an array of orofacial pain conditions were screened using a structured clinical interview for PTSD and the PTSD Symptom Checklist—Civilian Version (PCL), a brief PTSD self-report inventory. Additionally, participants received a clinical examination and self-report questionnaires to assess pain, coping styles, and presence of post-traumatic symptoms.* ***Results:*** *Thirty-three (23%) patients received a full lifetime or current PTSD diagnosis, with an additional 11 patients receiving a partial PTSD diagnosis. Only 5 of these 44 patients had ever been previously diagnosed with PTSD. PTSD symptoms were associated with higher pain scores (*$P < .05$*) and affective distress (*$P < .01$*). Furthermore, discriminant function analyses suggested that the PCL accurately classified 89% of these cases (sensitivity = .85, specificity = .90, postive predictive power = 74%, negative predictive power = 95%).* ***Conclusion:*** *These results suggest that PTSD is prevalent in the orofacial pain setting and that PTSD symptomatology is associated with increased pain and affective distress that may complicate clinical presentation. Furthermore, PTSD can be accurately and efficiently assessed using a brief, self-report inventory.* J OROFAC PAIN 2005;19:309–317

Key words: orofacial pain, post-traumatic stress disorder, temporomandibular disorders

Orofacial pains represent a diverse group of conditions associated with the hard and soft tissues of the head, face, neck, and intraoral structures.[1] They include headaches and neurogenic pains, but the most common underlying conditions are the temporomandibular disorders (TMD).[2] TMD reflect a constellation of symptoms affecting the temporomandibular joint, the muscles of mastication or both. Although the etiology of TMD is still unclear,[3] it is a common condition, affecting approximately 12% of the US population,[4–6] with TMD pain being a primary reason for seeking treatment.[5] As with other chronic pain conditions, psychosocial factors such as depression, anxiety, and somatization appear to play a major role in the maintenance and severity of TMD.[2,7] Although behavioral and psychological characteristics are routinely assessed in the TMD setting,[8] post-traumatic stress disorder (PTSD) has been largely unexplored.

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PTSD is a cyclic pattern of recurring symptoms in response to a traumatic event that commonly includes persistent re-experiencing of the event, avoidance of stimuli associated with the trauma, and symptoms of increased arousal.[9] There is considerable co-occurrence of PTSD and chronic pain, and the 2 conditions may interact as to negatively impact the course and outcome of treatment of either disorder.[10,11] Only 2 studies have explored the co-occurrence of PTSD in a facial pain population. Aghabeigi and colleagues[12] found that after depression, PTSD was the most common psychiatric diagnosis in a clinic sample of facial pain patients. More recently, Lindroth and colleagues[13] found that compared to patients with intracapsular pain, facial pain patients with masticatory muscle pain reported greater PTSD symptomatology.

PTSD has been more widely documented in other chronic pain populations.[10,11] In regard to patients with fibromyalgia syndrome, 2 studies[14,15] found prevalence rates of PTSD-like symptoms of 56% and 57%, respectively, and 1 study[16] found a prevalence rate of PTSD of 20%. Similarly, 31% of a sample of headache patients with a history of motor vehicle accidents (MVA) merited a diagnosis of PTSD.[17] Other studies with pain and MVA patients[18,19] have found prevalence rates as high as 50%. It is important to note that none of the patients in these studies had ever been previously diagnosed with PTSD. Furthermore, when efforts are made to detect PTSD symptoms, it is clear that the pain presentation is far more complicated in those with PTSD symptoms when compared to those without.[20]

The majority of studies describing the association between PTSD, other psychiatric disorders, and chronic pain have utilized selected treatment-seeking samples. As a result, the prevalence rates reported in those studies may be inflated. Recently, however, a large community-based study was conducted and data from the US National Comorbidity Survey[21] was used to examine the association between psychiatric disorders and chronic arthritis pain[22] . Nearly 6,000 participants completed structured psychiatric interviews and self-reports of pain and disability associated with a variety of medical conditions. Individuals with chronic pain were more likely than those without chronic pain to experience mood and anxiety disorders. Consistent with previous studies, even after controlling for other medical conditions, depression was significantly associated with chronic pain (odds ratio [OR] = 2.0) and co-occurred in 20.2% of those with chronic pain. However, the associations between chronic pain and panic disorder (OR = 2.66) and PTSD (OR = 2.45) were stronger than the association between pain and depression.

Taken together, these clinical and epidemiologic studies suggest that PTSD is present in the chronic pain setting and has an impact on course and treatment. However, the condition may be overlooked due to the inherent difficulty of performing thorough psychiatric assessments on patients presenting to a pain clinic. Attempts have been made to diagnose PTSD in the pain clinic through structured clinical interviews designed specifically for the pain setting[23] or a written screening test designed for the pain setting,[24,25] but neither of these methods has been used in the research setting. Another possibility for screening for PTSD in the pain clinic environment is to use a common assessment instrument such as the PTSD Checklist—Civilian Version[26] (PCL) that has been validated in other clinical settings. The PCL has been widely used in other medical settings[27,28] and is especially useful when administration of a structured interview is not feasible.[26]

In the present study, a structured clinical interview was used to examine PTSD in an orofacial pain population. All consecutively presenting patients who consented to participate were assessed for PTSD. The impact of PTSD on self-report of pain and affective distress was evaluated by comparing pain patients with lifetime or current PTSD symptoms to those without PTSD symptoms. Additionally, the PCL was validated by comparing results from this measure to results from the structured clinical interview for PTSD. It was expected that significant PTSD symptomatology would result in greater reports of pain and affective distress and that the PCL would have adequate psychometric properties for identifying PTSD in an orofacial pain population.

Materials and Methods

Participants

Two hundred and thirty-three consecutive new patients who presented at the Orofacial Pain Center at the University of Kentucky College of Dentistry were asked to participate in the study. One hundred and eighty patients initially consented to participate, and 141 (123 females, 18 males) completed the full battery of measures. Of the latter, 92.9% were Caucasian, 3.5% were African American, and 2.8% were Native American. One patient did not report his or her race. The average age was 36.4 years, and the

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average duration of pain was 53.6 months. Average pain severity was 5.2 on a 10-cm visual analog scale (VAS) with anchors of 0 (no pain) and 10 (worst possible pain). Seventy-one participants (50.4%) were diagnosed with masticatory muscle pain/myofascial pain as the primary diagnosis,[29] 22 (15.6%) with internal derangements of the articular discs, and 48 (34.0%) had various conditions that included neuralgia, migraine, neuropathic, and dental or arthritic pain. Available data on those who refused to participate were compared to those who consented. No differences on demographic information or pain duration were detected ($P > .05$ for both). Those who refused to participate, however, had higher pain severity than those who consented (7.4 versus 6.6, $P < .05$).

Instruments

PTSD. The presence of current and lifetime PTSD was assessed using the PTSD portion of the Structured Clinical Interview for DSM IV Disorders[30] (SCID-IV). The SCID is among the most frequently used instruments in the diagnosis of PTSD and is typically used as the standard by which to evaluate other instruments.[31] It has high interrater reliability and is highly correlated with self-report measures of PTSD.[32] Although there is no diagnostic classification for partial PTSD in the psychiatric nomenclature, the presence of partial PTSD is clinically relevant.[18,33] Participants were classified as having partial PTSD if they met criteria A (traumatic event), B (re-experiencing), and C (avoidance), but not criterion D (hyperarousal), or if they met criteria A, B, and D, but not C. Participants were classified with full PTSD if they reported sufficient symptoms to meet all 4 criteria.[9] Current PTSD was diagnosed if participants reported symptoms at present. Lifetime PTSD was diagnosed if participants reported a history of such symptoms but did not meet current diagnostic criteria. Either a graduate student in clinical psychology or a licensed clinical psychologist administered the SCID. Each clinician received formal training in the use of the SCID for the diagnosis of PTSD. Twenty-two of these interviews were tape recorded and reviewed by a doctoral student in clinical psychology who was blind to the previous assessor's diagnosis. Reviews of these tapes resulted in 100% agreement (k = 1.0) between coders and included 5 full lifetime PTSD diagnoses, 3 partial lifetime PTSD diagnoses, and 14 patients with no symptoms of PTSD. Although the ideal method for confirming reliability of diagnoses would have been to conduct separate interviews with the same subjects and analyze agreement by the k statistic, this was not possible because of the availability of subjects and interviewers. The second examiner was limited to the information collected by the first examiner in determining a diagnosis, and this likely inflated the agreement and k values.

PCL. The PCL[26] is a self-report rating scale for assessing PTSD. It consists of 17 items that correspond to the DSM-IV criteria for PTSD. Participants are instructed to report how much they have been bothered by each symptom on a 5-point rating scale, with 1 corresponding to "not at all," and 5 corresponding to "extremely." The original study provided psychometric data, including test-retest reliability of .96 and validity of k = .64 for the diagnosis of PTSD. The PCL shows high correlations with other self-report inventories for PTSD. Additionally, the PCL shows high correlations ($r = 0.93$) with the Clinician Administered PTSD Scale and an overall diagnostic efficiency[28] of 0.90.

Pain Severity and Coping. The Multidimensional Pain Inventory[34] (MPI) is a 60-item self-report inventory designed to assess cognitive, behavioral, and affective responses to pain. Previous research[34,35] evaluating the psychometric properties of the MPI demonstrated that the MPI had good internal consistency (0.70 to 0.90) and satisfactory test-retest stability (0.62 to 0.91). Section I of the MPI includes 5 scales that describe pain severity and patients' cognitive and affective responses to pain. Section II assesses patients' perception of how their significant others respond to the patients' pain complaints. Section III consists of various types of common activities: household chores, outdoor tasks, activities away from home, and social activities. In addition to these scales, the MPI classifies patients as dysfunctional (DYS), Interpersonally Distressed (ID), or Adaptive Copers (AC) based on their levels of pain, activity, and social support.

Psychological Distress. Depression, anxiety, and somatization were assessed using the Symptom Checklist 90-R38 (SCL-90R).[36] Subscale scores for these measures have internal consistency and test-retest reliability between 0.77 to 0.90, and between 0.78 to 0.90, respectively. Items corresponding to the depression and somatization scales have been shown to be valid and reliable indicators when compared to other self-reports with TMD patients.[8]

Procedures. After participants gave informed consent, a licensed clinical psychologist or 1 of 4 clinical psychology graduate students administered a

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Table 1 Participant Characteristics by PTSD Group

Variable	PTSD–	PTSD+	*P*
Age	36.3 (1.3)	36.6 (1.5)	NS
Pain duration (wk)	202.7 (32.4)	239.5 (48.4)	NS
Education (y)	15.3 (1.1)	12.5 (.4)	NS
Psychological distress (t-scores)			
Depression	53.9 (1.1)	63.7 (1.6)	< .01
Anxiety	51.6 (1.1)	60.9 (1.9)	< .01
Somatization	57.8 (1.0)	66.4 (1.5)	< .01
Marital status			NS
Single	31 (33%)	18 (43%)	
Married	62 (67%)	23 (55%)	
Other	0 (0%)	1 (2%)	
Employment status			< .05
Unemployed	27 (30%)	21 (50%)	
Employed at least part time	63 (70%)	20 (48%)	

Values shown reflect mean (±SE) or percentage within group.

brief psychosocial history interview to assess personal and family history of medical and psychiatric disorders. The interviewer then asked if the participant had ever experienced an event that fits the traumatic stressor definition in the DSM-IV. A list of typical PTSD-triggering events as denoted in the DSM-IV was read to the participant, and information was gathered on age, cognition, and affect at exposure. This methodology for assessing the experience of traumatic events has been used in prior research studies.[37] The PCL was then given to each participant. The PTSD portion of the SCID interview was then administered. If an interview could not be scheduled in the clinic, the participant was interviewed over the telephone, and the call was tape recorded. One study comparing telephone interviewing and in-person clinical interviewing using the SCID found almost identical results with the use of the 2 methods.[38]

Statistical Analyses

Participants were divided into 2 groups for analysis of the impact of PTSD symptoms on pain: *(1)* patients with current or lifetime history of full or partial PTSD (PTSD+; n = 44); and *(2)* patients with no history of PTSD (PTSD–; n = 97). Separate *t* tests and χ^2 analyses were conducted to compare the 2 groups on all demographic and psychosocial characteristics. Since sample sizes and covariance matrices were unequal, thus making multivariate analysis of variance results invalid, analysis of variance procedures (ANOVA) were conducted instead. To assess the effect of PTSD on pain and coping, ANOVAs were conducted on the 5 scales from Section I of the MPI (Pain Severity, Life Interference, Life Control, Affective Distress, and Social Support). To protect against Type I error as a result of numerous analyses, a stringent alpha level of $P = .01$ was adopted. Differences in the MPI classification of the PTSD groups were tested using χ^2 analysis. Validity of the PCL was determined using Cronbach's α coefficient and discriminant function analysis (DFA). Since PTSD is not a unidimensional construct but is rather composed of criteria represented by intrusion, avoidance, and arousal, each criterion measured by the PCL as well as the total score was evaluated for internal consistency. DFA, using the PCL scale as a single independent variable, was used to examine how accurately the total score was able to classify subjects as PTSD+ or PTSD–.

Results

PTSD in the Pain Clinic Setting

Sixteen patients (11.3%) met criteria for a full current PTSD diagnosis. Seventeen additional patients (12.1%) met criteria for a full lifetime PTSD diagnosis. Six patients (4.3%) met criteria for a partial current PTSD diagnosis, and 5 (3.5%) met criteria for a partial lifetime diagnosis. A total of 44 (31.2%) of the patients who consented to participate and completed the study met full or partial PTSD criteria. Only 5 of these patients were ever formally diagnosed with PTSD. Twenty-two patients were currently symptomatic.

Demographic and psychosocial information comparing the PTSD+ and PTSD– groups are presented in Table 1. There were no between-group differences with respect to age, duration of pain, or marital status. A higher proportion of the PTSD+ group was unemployed ($P < .05$). Furthermore, the PTSD+ group reported higher levels of depression, anxiety, and somatization ($P < .01$ for all).

PTSD, Pain, and Coping with Pain

Table 2 contains the mean t scores for the MPI Section I scales. The PTSD+ group reported greater affective distress and life interference due to pain, and less perceived control compared to the PTSD– group. The PTSD+ group reported higher pain severity compared to the PTSD– group, although the difference did not meet the more stringent alpha level of .01 and thus was not considered sig-

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Table 2 Mean t Scores (+SE) for Pain Variables by PTSD Group

Variable	PTSD–		PTSD+			
	Mean	SE	Mean	SE	*F*	*P*
Pain severity	37.8	1.7	45.2	2.5	5.9	.016
Affective distress	43.5	1.0	50.4	1.3	15.1	.001
Life control	53.6	.81	48.4	1.2	12.9	.001
Interference	26.6	1.7	37.5	3.0	11.4	.001
Social support	44.7	1.4	46.3	2.2	0.38	.539

Table 3 Proportions of MPI Classifications by PTSD Group

MPI classification	PTSD–		PTSD+	
	n	%	n	%
DYS	11	24.4	11	44.0
ID	5	11.1	5	20.0
AC	29	64.4	9	36.0

$\chi^2 = 5.24$, $P = .07$

Table 4 Sensitivity, Specificity, and the Positive and Negative Predictive Power of the PCL

PCL cut score	Sensitivity	Specificity	PPP	NPP	% correctly classified
38	0.85	0.90	0.68	0.95	87.0
39	0.85	0.90	0.74	0.95	89.1
40	0.82	0.91	0.75	0.94	89.1
41	0.82	0.92	0.77	0.94	89.9
42	0.79	0.92	0.76	0.93	89.1
43	0.79	0.93	0.79	0.93	89.9
44	0.76	0.94	0.81	0.93	89.9
45	0.76	0.94	0.81	0.93	89.9

nificant. Of the 141 patients, 70 could be classified into 1 of the 3 primary MPI cluster profiles: DYS, ID, or AC. Table 3 presents the number and proportion of patients in each group who were classified into 1 of the profiles. The χ^2 analysis of these proportions approached significance ($\chi^2 = 5.24$, $P = .07$), with 64% of the PTSD+ group fitting into the 2 profiles that reflected difficulty in adaptation to pain (DYS and ID). In contrast, more than 64% of the PTSD– group fit the AC profile.

Accuracy of the PCL in Detecting PTSD

Internal Consistency. Coefficient alphas were calculated as estimates of the reliability for each symptom cluster of PTSD (eg, intrusion, avoidance, hyperarousal). The intrusion cluster corresponds to items 1 through 5 of the PCL and resulted in a coefficient alpha of 0.92. The avoidance cluster corresponds to items 6 through 12 of the PCL and resulted in a coefficient alpha of 0.90. The hyperarousal cluster corresponds to items 13 through 17 of the PCL and resulted in a coefficient alpha of 0.86. The total score consisting of all items resulted in a coefficient alpha of 0.95. Thus, each symptom cluster and total score as measured by the PCL resulted in satisfactory reliability.

Discriminant Ability of the PCL. DFA was used to test the utility of the PCL for detecting PTSD in a facial pain population. Individuals with lifetime PTSD received a mean PCL score of 56.1, versus 27.1 for those without lifetime PTSD ($F(1,122) = 145.00$, $P < .01$). The PCL scale was first analyzed as a continuous variable wherein an optimal predictive matrix is estimated. This method revealed that the PCL was able to accurately classify 89.9% of the cases. Since these cases are the same ones used to estimate the coefficients for classification, this estimation is usually overly optimistic. While it would have been ideal to split the sample so that 1 portion was used to estimate the classification function and another portion was used to cross-validate the estimation, the sample was too small to adequately do so. The statistical software package SPSS provides an alternative method to diminish the optimistic bias. In this "leave-one-out" procedure, each case is classified into a group according to a classification function from all the data except the case being classified.[39] This more conservative approach resulted in the PCL correctly classifying 89.1% of the cross-validated grouped cases.

Table 4 shows the sensitivity, specificity, and negative and positive predictive values for a series of cutoff scores for the PCL. The optimal cutoff score that maximizes each of these values (PCL score of 41) resulted in a sensitivity of 82%, specificity of 92%, negative predictive power (NPP) of

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94%, and positive predictive power (PPP) of 77%. This cutoff score accurately classifies nearly 90% of assessed patients.

Discussion

This study identified the occurrence of PTSD in an orofacial pain clinic setting, examined the impact of PTSD symptoms on pain levels, affective distress and coping, and examined the accuracy of a brief, self-report screening instrument for detecting PTSD in the pain clinic setting. Results demonstrated that approximately 1 out of 3 patients presenting to a tertiary care clinic for orofacial pain had significant PTSD symptomatology, and 11% were currently symptomatic. Although 44 patients had significant PTSD symptomatology, only 5 of these were ever formally diagnosed. These data are remarkable when compared to reports of PTSD in community samples that estimate prevalence in the general population from 1% to 14%.[9] The results also suggested that PTSD can be efficiently screened using a brief self-report inventory (PCL). Furthermore, the high prevalence of PTSD symptoms in orofacial pain patients is clinically meaningful because those patients presenting with PTSD symptoms also present with more severe pain complaints and a more dysfunctional coping style than those without PTSD symptoms.

Traumatized individuals are more likely to present for care to primary or specialist medical practitioners rather than mental health care providers.[40,41] This implies the need to incorporate proper assessment of trauma in the primary or specialist medical care setting. While it may be impractical to expect that PTSD be formally assessed using lengthy clinical interviewing in a pain clinic setting, it is reasonable to use a brief, self-report symptom inventory as a screening device to alert health practitioners to a likely PTSD+ patient. This study demonstrated the efficiency and diagnostic accuracy of the PCL for identifying PTSD in an orofacial pain population.

Identifying those patients most at risk for PTSD is of particular importance for a measure used as a screening instrument, and this study suggests several possible cutoff scores with which to do so. The data suggest that an optimal cutoff score of 41 results in maximized sensitivity and specificity. Previous research[27] in a sample of MVA victims suggests that a slightly higher cuttoff score of 44 results in optimal efficiency and maximized sensitivity and specificity. Given that this measure should only be used as a screening device, a lower cutoff score that maximizes sensitivity and NPP might be suitable for diagnostic classification. Maximizing sensitivity will increase the likelihood of identifying more positive cases. While this strategy would not be appropriate if positive classification could result in great harm, in this case it would result in increased attention, concern, and referral for a behavioral health consultation. Hence, maximizing sensitivity and NPP at the cost of specificity and PPP is a reasonable course of action for such a screening instrument.

These results also suggest that pain and coping in response to pain are related to PTSD symptoms. Although the results only approached significance, the majority of the participants with PTSD symptoms were classified as DYS or ID, whereas participants without significant PTSD symptoms were most frequently classified as AC. Consistent with previous findings in patients with fibromyalgia,[13,15] it appears that PTSD symptoms significantly affect pain and efforts to cope with pain in orofacial pain patients.

The high rate of comorbidity between PTSD and chronic pain and the association between PTSD symptoms, pain, and coping suggests that the 2 disorders may be related. Psychological and neurohormonal models have been proposed to account for the co-occurrence and the association between the 2 disorders. Sharp and Harvey[11] proposed that a number of psychological pathways contribute to mutual maintenance of PTSD and chronic pain. For example, attentional biases present in chronic pain and PTSD may predispose a patient to attend to threatening or painful stimuli. The pain itself may be a reminder of the traumatic event and trigger an arousal response that can, in turn, aggravate the pain condition. Avoidance strategies may be adopted to minimize both the pain and the disturbing thoughts, but deconditioning could contribute to more pain and disability. Alternatively, Asmundson and colleagues[20] have proposed a shared vulnerability model wherein anxiety sensitivity is a predisposing factor to both conditions. When those with high levels of anxiety sensitivity encounter a stressor, threat, or pain, they respond with more fear, physiological responsivity, and avoidance, which further increase the chances that the pain and PTSD symptoms will be maintained over time.

Research with orofacial pain patients also suggests a number of important neurohormonal pathways explaining the association between the 2 disorders. First, chronic maladjustment to traumatic events may lead to long-term physiological changes that could exacerbate a pain problem via

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sequelae from sympathetic nervous system activation. The autonomic up-regulation that is associated with PTSD is frequently evident in orofacial and other chronic pains,[42–44] may represent a state which increases the pain experience itself,[28] and may result in alterations in central pain regulatory autonomic mechanisms that limit capacity to control pain.[45–47] Similarly, while the sympathetic nervous system prepares the organism to deal with acute stressors, the opioid system prepares the organism for adaptation to traumatic stress.[48] As counterregulatory neurohormones released during stress, opioid peptides inhibit the action of excitatory mechanisms of the sympathetic nervous system.[49] Without this inhibitory feedback in those with PTSD, appropriate reductions in overactivity of the sympathetic nervous system may fail to occur.[50,51] Recent evidence[52] suggests that some women with TMD may have important differences in these same neurohormonal pathway compared to men and other women with TMD. While pain-free women demonstrated a positive relationship between plasma β-endorphin levels and ischemic pain tolerance, women with TMD with higher β-endorphin levels had lower ischemic pain tolerance. The authors suggest that women with TMD are less able than pain-free women to engage opioid pain-inhibitory mechanisms. The same mechanisms are implicated in the continued up-regulation associated with PTSD.

The findings of the present study also have important treatment implications. Numerous investigations have shown that tailoring treatments for chronic pain patients based on accurate psychosocial assessments can be more effective in the long term because tailored treatments address mechanisms provoking problematic behavioral and cognitive responses to pain.[7,53,54] Cognitive behavioral therapy has demonstrated efficacy for both TMD[53] and PTSD.[55] Treatment matching approaches using cognitive behavioral therapy have been successfully applied to TMD[53,56] and could include consideration and treatment of PTSD. Similarities between the 2 approaches include education, relaxation, cognitive restructuring, and exposure and could be combined so that patients understand the potential link between the 2 disorders. Already, case studies[22,57,58] suggest that psychological treatment for PTSD in pain patients ameliorates pain symptoms, improves psychosocial functioning, and assists with efforts to return to work.

This study has several limitations. First, the sample consisted of patients presenting for care to a university-based tertiary clinic. Traumatized individuals are more likely to present for care to primary or specialist medical practitioners rather than to mental health care providers.[41] This suggests that the frequency of PTSD may be higher in an orofacial pain setting than in other treatment settings. However, other studies have shown that a high percentage of primary care patients present with PTSD symptoms[59,60] and that primary care patients with continued trauma response experience more pain and impaired social functioning compared to patients with no trauma or traumatic response.[61] Second, the SCID was not used to screen for major depressive disorders. Although the PTSD+ group had higher levels of psychological distress according to the SCL90-R, the proportion of patients meeting diagnostic criteria for depression was not ascertained. Further, the design of the present study was cross-sectional, and therefore no causal relationship between PTSD symptomatology, pain, and clinical presentation can be inferred. Longitudinal studies might better explore the nature of these relationships.

The presence of psychological distress and behavioral problems in patients with TMD has been well documented. In addition to depression and somatization, PTSD symptoms may also be common in this population. Given the impact this condition may have on pain complaints and clinical presentation, recognition of PTSD symptomatology is essential for effective assessment and treatment of orofacial pain. The PCL is a brief self-report instrument that can accurately and efficiently assess PTSD in the pain clinic setting.

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