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Psychiatric (axis I) and personality (axis II) disorders in patients with burning mouth syndrome or atypical facial pain

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ABSTRACT

Background and aims: Burning mouth syndrome (BMS) and atypical facial pain (AFP) are often persistent idiopathic pain conditions that mainly affect middle-aged and elderly women. They have both been associated with various psychiatric disorders. This study examined current and lifetime prevalence of psychiatric axis I (symptom-based) and II (personality) disorders in patients with chronic idiopathic orofacial pain, and investigated the temporal relationship of psychiatric disorders and the onset of orofacial pain.

Method: Forty patients with BMS and 23 patients with AFP were recruited from Turku university hospital clinics. Mean age of the patients was 62.3 years (range 35–84) and 90% were female. BMS and AFP diagnoses were based on thorough clinical evaluation, and all patients had undergone clinical neurophysiological investigations including blink reflex and thermal quantitative tests. Current and lifetime DSM-IV diagnoses of axis I and II disorders were made on clinical basis with the aid of SCID-I and II-interviews. The detected prevalence rates and their 95% confidence intervals based on binomial distribution were compared to three previous large population-based studies.

Results: Of the 63 patients, 26 (41.3%) had had an axis I disorder that preceded the onset of orofacial pain, and 33 (52.4%) had had a lifetime axis I disorder. Rate of current axis I disorders was 36.5%, indicating that only about 16% of lifetime disorders had remitted, and they tended to run chronic course. The most common lifetime axis I disorders were major depression (30.2%), social phobia (15.9%), specific phobia (11.1%), and panic disorder (7.9%). Twelve patients (19.0%) had at least one cluster C personality disorder already before the emergence of orofacial pain. Patients with cluster C personality disorders are characterized as fearful and neurotic. None of the patients had cluster A (characterized as odd and eccentric) or B (characterized as dramatic, emotional or erratic) personality disorders. The most common personality disorders were obsessive–compulsive personality (14.3%), dependent personality (4.8%), and avoidant personality (3.2%). The majority of the patients (54%) had also one or more chronic pain conditions other than orofacial pain. In almost all patients (94%) they were already present at the onset of orofacial pain.

Conclusions: Our results suggest that major depression, persistent social phobia, and neurotic, fearful, and obsessive–compulsive personality characteristics are common in patients with chronic idiopathic orofacial pain. Most psychiatric disorders precede the onset of orofacial pain and they tend to run a chronic course.

Implications: We propose that the high psychiatric morbidity, and comorbidity to other chronic pain conditions, in chronic idiopathic orofacial pain can be best understood in terms of shared vulnerability to both chronic pain and specific psychiatric disorders, most likely mediated by dysfunctional brain dopamine activity.

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1. Introduction

Burning mouth syndrome (BMS) and atypical facial pain (AFP) are persistent idiopathic pain conditions that mainly affect middle-aged and elderly women [1,2]. BMS is characterized by burning, usually bilateral oral mucosal pain, typically reported at more than one site [3,4]. It is likely that with stringent diagnostic exclusion criteria its prevalence in general adult population is between 1% and 5% [3–6]. AFP is described as a deep or superficial diffuse pain with constant or fluctuating intensity, typically spreading unilaterally out over a large area and not following peripheral neuroanatomic distributions [1,7]. No studies have been made of the prevalence of AFP in the general population, but it is obviously rare compared to BMS [1].

The exact pathophysiologies of BMS and AFP are unknown. Both peripheral and central neuropathic mechanisms have been suggested. PET studies have found alterations in brain dopamine activity in both BMS [8,9] and AFP [10], and disturbed inhibitory function of the cingulated gyrus in AFP [11]. Also, a functional magnetic resonance imaging study implied brain hypoactivity in BMS [12]. On the other hand, some indications of peripheral neuropathy have been revealed in both BMS [7,13–16] and AFP [7].

Between 1930 and 1980, most psychiatrists believed that idiopathic facial pain is either a hysterical conversion symptom or a symptom of an underlying psychiatric disorder [17–20]. In studies using structured psychiatric interviews, about half of the patients with BMS and AFP have had at least one life-time axis I disorder, depressive disorders being most frequent, followed by anxiety disorders [21–26]. Neurotic, hostile, emotionally detached and obsessive–compulsive personality traits have been found to be common among patients with chronic idiopathic orofacial pain [19,21,23,27–30]. To our knowledge, the prevalence of personality disorders in patients with chronic idiopathic orofacial pain has been investigated using structured clinical interview in only one study. Maina et al. [31] found that 86% of their 70 patients with BMS had at least one personality disorder, dependent and obsessive–compulsive personalities being the most common ones.

The aims of this study were: (a) to examine current and lifetime prevalence of psychiatric axis I and II disorders in patients with chronic idiopathic orofacial pain, and (b) to investigate the temporal relationship of psychiatric disorders and orofacial pain.

2. Materials and methods

2.1. Patients

Patients with BMS and AFP were recruited for psychiatric interview from the Departments of Neurology or Oral diseases of Turku University Hospital. BMS and AFP diagnoses were based on thorough clinical evaluation described in detail earlier [7,13,32]. All patients with AFP had been previously examined by a neurologist and a dentist, an all except for one by an otorhinolaryngologist. In addition, all patients had undergone clinical neurophysiological testing including blink reflex test and thermal quantitative sensory testing. Patients were recruited for psychiatric evaluation by a letter including complete description of the study and by a telephone call few days later. Exclusion criterion for the study was severe cognitive decline, and four patients were excluded. 13 patients refused to participate in the psychiatric evaluation and one patient could not be reached. Forty patients with BMS and 23 patients with AFP formed the study group, and the participation rate among eligible patients was 82%. Mean age of the patients was 62.3 years (SD 11.3, range 35–84) and the majority of them were female (Table 1). The study protocol was approved by the joint Ethical Committee of Turku University Hospital and University of Turku, and all participants gave their written informed consent.

2.2. Psychiatric assessment

Psychiatric interviews were conducted by physicians, who were trained to use the instruments. Current (previous month) and lifetime DSM-IV [33] diagnoses of axis I disorders were made on clinical basis with the aid of the structured clinical interview for DSM-IV axis I disorders (SCID-I) [34]. Personality disorders were assessed independently of axis I disorders with the SCID-II interview [35]. Lifetime axis I and II disorders were further divided into disorders with onset before and after the onset of orofacial pain. Patients' personal history and history of somatic complaints were also recorded. Patients' somatic and psychiatric patient records of Turku University Hospital were available for interviewers. Duration of psychiatric interviews ranged from 2 to 4 h.

2.3. Statistical methods

Descriptive statistics, such as means, standard deviations, ranges for continuous variables, and frequencies and percentages for categorical variables, were used to assess the patients' background characteristics and diagnostic distribution. Comparisons between the BMS and AFP patients were carried out with Students *t*-tests, chi-square tests and Fisher's exact tests. 95% confidence intervals (CIs) based on binomial distribution were calculated for the rates of psychiatric disorders. CIs based on the rates in 63 patients are relatively broad. Two prevalence rates diverge significantly from each other if their 95% CIs do not overlap. In an attempt to avoid comparing two broad CIs with each other for every disorder, we did not use a specific comparison group for this study. Instead, to assist the reader to compare the prevalence rates between our sample and general population, we calculated 95% CIs based on binomial distribution for three previous large population-based studies, referred in the discussion, from their original data [36–39]. Statistical analyses were conducted using SAS version 8.00-software (SAS Institute, 1999).

3. Results

3.1. Comparison between BMS and AFP patients

Patients with BMS were an average 7.2 years older and the duration of their orofacial pain was an average 4.5 years shorter compared with AFP patients (Table 1). Of the 40 BMS patients, 22 (55%) had at least one lifetime axis I disorder and 6 (16%) at least one personality disorder. The corresponding figures in the group of 23 AFP patients were 11 (48%) and 6 (26%), respectively, and the differences between BMS and AFP patients were not significant (Table 1). The prevalence rates of all axis I disorders between BMS and AFP patients were compared also separately, and no significant differences emerged. The only nearly significant difference ($P = 0.052$) was in the rate of lifetime panic disorder, which was somewhat more common in AFP patients (17.4% vs. 2.5%). Because there were no differences in the rates of axis I and II disorders between BMS and AFP patients, the prevalence rates of the combined group ($N = 63$) are presented in Table 2.

3.2. Axis I disorders

In DSM-IV [33], axis I refers to disorders causing clear-cut psychiatric symptoms, e.g. anxiety or depression. Of the 63 patients assessed, 33 (52.4%, 95% CI = 39.4–65.1%) had at least one lifetime axis I disorder (Table 2). The most common lifetime disorders were major depression (30.2%, 95% CI = 19.2–43.0%), social phobia (15.9%,

Table 1
Characteristics of 63 patients with chronic idiopathic orofacial pain: 40 patients with burning mouth syndrome (BMS) and 23 patients with atypical facial pain (AFP).

	Patients with BMS	Patients with AFP	*P* value	All patients
Sex				
Male (%)	3 (7.5)	3 (13.0)	0.66	6 (9.5)
Female (%)	37 (92.5)	20 (87.0)		57 (90.5)
Age, mean (SD, range)	64.9 (9.7, 35–84)	57.7 (12.5, 37–81)	0.013	62.3 (11.3, 35–84)
Socioeconomic class (%)				
Unskilled	9 (22.5)	1 (4.3)	0.098	10 (15.9)
Blue collar[a]	27 (67.5)	17 (73.9)		44 (69.8)
White collar[a]	4 (10.0)	5 (21.7)		9 (14.3)
Managerial	0 (0)	0 (0)		0 (0)
Duration of orofacial pain in years, mean (SD, range)	7.4 (4.2, 1–18)	11.9 (8.6, 2–35)	0.026	9.1 (11.3, 1–35)
Any lifetime	22 (55.0)	11 (47.8)	0.58	33 (52.4)
Axis I (symptom-based) disorder (%)[b]				
Depressive disorder	14 (35.0)	6 (26.1)	0.46	20 (31.7)
Bipolar disorder	1 (2.5)	0 (0)	1.0	1 (1.7)
Anxiety disorder	19 (47.5)	7 (30.4)	0.18	26 (41.2)
Alcohol dependence	0 (0)	2 (8.7)	0.13	2 (3.3)
Any lifetime	6 (15.9)	6 (26.1)	0.14	12 (19.0)
Axis II (personality) disorder (%)[b]				
Obsessive–compulsive personality	5 (12.5)	4 (17.4)	0.59	9 (15.0)
Avoidant personality	1 (2.5)	1 (4.3)	1.0	2 (3.2)
Dependent personality	2 (5.0)	1 (4.3)	1.0	3 (4.8)

[a] "Blue collar" refers to manual labour and "white collar" to office work.
[b] Some patients had more than one lifetime axis I or II disorder.

Table 2
Rates of DSM-IV axis I and II psychiatric disorders, by onset, in 63 patients with chronic idiopathic orofacial pain: 40 patients with burning mouth syndrome (BMS) and 23 patients with atypical facial pain (AFP).

Diagnosis	Onset before orofacial pain		Onset after orofacial pain		Current (previous month)		Lifetime	
	N	% (95% CI)	*N*	% (95% CI)	*N*	% (95% CI)	*N*	% (95% CI)
Axis I disorders								
Major depressive disorder	13	20.6 (11.5–32.7)	6	9.5 (3.6–19.6)	8	12.7 (5.6–23.5)	19	30.2 (19.2–43.0)
Chronic depression	1	1.6 (0.04–8.5)	0	0	1	1.6 (0.04–8.5)	1	1.6 (0.04–8.5)
Bipolar I disorder	1	1.6 (0.04–11.0)	0	0	1	1.6 (0.04–8.5)	1	1.6 (0.04–8.5)
Generalized anxiety disorder	0	0	2	3.2 (0.4–11.0)	1	1.6 (0.04–8.5)	2	3.2 (0.4–11.0)
Specific phobia	6	9.5 (3.6–19.6)	1	1.6 (0.04–8.5)	7	11.1 (4.6–21.6)	7	11.1 (4.6–21.6)
Social phobia	10	15.9 (7.9–27.3)	0	0	8	12.7 (5.6–23.5)	10	15.9 (7.9–27.3)
Panic disorder	3	4.8 (1.0–13.3)	2	3.2 (0.4–11.0)	3	4.8 (1.0–13.3)	5	7.9 (2.6–17.6)
Post-traumatic stress disorder	2	3.2 (0.4–11.0)	0	0	1	1.6 (0.04–8.5)	2	3.2 (0.4–11.0)
Alcohol dependence	1	1.6 (0.04–8.5)	1	1.6 (0.04–8.5)	1	1.6 (0.04–8.5)	2	3.2 (0.4–11.0)
Any axis-I disorder	26	41.3 (29.0–54.4)	7	11.1 (4.6–21.6)	23	36.5 (24.7–49.6)	33	52.4 (39.4–65.1)
Axis II personality disorders								
Obsessive–compulsive personality	9	14.3 (6.7–25.4)	0	0	9	14.3 (6.7–25.4)	9	14.3 (6.7–25.4)
Avoidant personality	2	3.2 (0.4–11.0)	0	0	2	3.2 (0.4–11.0)	2	3.2 (0.4–11.0)
Dependent personality	3	4.8 (1.0–13.3)	0	0	3	4.8 (1.0–13.3)	3	4.8 (1.0–13.3)
Any personality disorder	12	19.0 (10.2–30.1)	0	0	12	19.0 (10.2–30.1)	12	19.0 (10.2–30.1)

95% CI = 7.9–27.3%), specific phobia (11.1%, 95% CI = 4.6–21.6%) and panic disorder (7.9%, 95% CI = 2.6–17.6%). None of the patients had a psychotic disorder. The specific phobias in seven patients were: (number of patients with the phobia in parenthesis, one patient had two phobias): high places (2), closed places (2), snakes (1), flying (1), spiders (1), and deep water (1).

Comorbidity among lifetime axis I disorders was observed in 15 (45%) of the 33 patients. Eight of the patients had two and seven patients three comorbid axis I disorders. The majority of axis I disorders (79%) had their onset before the emergence of orofacial pain. Psychiatric disorders of patients tended to run a chronic course. Rate of all current axis I disorders was 36.5% (95% CI = 24.7–49.6%), indicating that only about 16% of lifetime disorders had remitted.

3.3. Axis II disorders

In DSM-IV [33], axis II refers to personality disorders. They are divided into three clusters, A, B and C. Patients in the cluster A are characterized as odd and eccentric, in the cluster B as dramatic, emotional or erratic, and in the cluster C as fearful and neurotic. Personality disorders were found in 12 patients (19%, 95% CI = 10.2–30.1%) and they all preceded the onset of orofacial pain. The personality disorders present among the patients were obsessive–compulsive personality (14.3%, 95% CI = 6.7–25.4%), dependent personality (4.8%, 95% CI = 1.0–13.3%) and avoidant personality (3.2%, 95% CI = 0.4–11.0%). Comorbidity among personality disorders was observed in two patients. Eight out of 12 patients (67%) with personality disorders had also a lifetime axis I disorder, and about one-fourth of the patients with a lifetime axis I disorder (8 of 33, 24.2%) had a comorbid personality disorder. All three personality disorders present among our patients belonged to the cluster C.

3.4. Chronic painful physical condition other than orofacial pain

Lifetime chronic painful physical conditions were found in 34 patients (54.0%, 95% CI = 40.1–66.6%). The localizations of the painful conditions were (number of patients with the painful condition in parenthesis, many patients had more than one pain condition): joint/articular (18), limb (5), back (15), headache (4),

gastrointestinal pain (8), and coronary pain (2). In 17 patients (27.0%) chronic pain condition was comorbid with an axis I disorder and in five patients (7.9%) with an axis II disorder. In almost all patients (32 out of 34, 94%) chronic painful physical conditions were already present at the onset of orofacial pain.

4. Discussion

The main findings of the present study were high rates of major depression and cluster C personality disorders, lack of cluster A and B personality disorders, and a tendency of the psychiatric disorders to run a chronic course. In the present study, the rate of current (previous month) major depression (12.7%, 95% CI = 5.6–23.5%) was markedly higher than both the 12-month rate of major depression in the National Comorbidity Survey Replication (NCS-R) in the U.S. (6.7%, 95% CI = 6.2–7.2%) [36], and the 12-month rate of major depression among females aged 30 years and over in the Health 2000 Study in Finland (4.9%, 95% CI = 5.5–7.2%) [38]. The rate of lifetime major depression (30.2%, 95% CI 19.2–43.0%) was significantly higher than in the NCS-R survey (16.6%, 95% CI = 15.8–17.4%) [37]. Majority of the depressive disorders (14/20, 70%) among our subjects preceded the onset of orofacial pain. This finding is in line with earlier reports of high rates of depressive disorders already before the onset of orofacial pain [18,24,40].

In our subjects, the lifetime rates of anxiety disorders were only slightly higher than in population surveys. The lifetime rate of the most common anxiety disorder in our sample, social phobia, 15.9% (95% CI = 7.9–27.3%), was little higher than in the NCS-R survey, 12.1% [36]. The one-month rate of social phobia, 12.7% (95% CI = 5.6–23.5%), was significantly higher than the 12-month rate of social phobia in Finnish female population aged 30 years and over (0.9%, 95% CI = 0.6–1.3%) in the Health 2000 Study [38]. This insinuates that in patients with BMS and AFP social phobia is both more common and more persistent than in the general population. In all patients with social phobia its onset preceded the emergence of facial pain. The lifetime rate of specific phobia, 11.1% (95% CI = 4.6–21.6%), was about the same as in the NCS-R survey (12.1% and 12.5%) [37]. The lifetime rates of panic disorder (7.9%, 95% CI = 2.6–17.6%), generalized anxiety disorder (3.2%, 95% CI = 0.4–11.0%), post-traumatic stress disorder (3.2%, 95% CI = 0.4–11.0%) and alcohol dependence (3.2%, 95% CI = 0.4–11.0%) did not differ significantly from the lifetime rates in the NCS-R survey (4.7%, 5.7%, 6.8% and 5.4%, respectively) [37].

In our sample, the one-month and lifetime rates of at least one axis I disorder were 36.5% (95% CI = 24.7–49.6%) and 52.4% (95% CI = 39.4–65.1%), respectively. The one-month rate was significantly higher than the12-month rate among Finnish females aged 30 years and over, 11.8% (95% CI = 10.7–12.9%), in the Health 2000 Study [38], but the lifetime rate was only slightly higher than in the NCS-R survey [37], 46.4% (95% CI = 45.1–47.7%). These findings imply that in patients with BMS and AFP, axis I disorders tend to run a more chronic course than in the general population. Majority of axis I disorders, 26/33, 79%, preceded the onset of orofacial pain.

In the present study group, 19.0% (95% CI = 10.2–30.1%) of the patients had at least one personality disorder. This rate is significantly higher than in the NCS-R survey (9.1%, 95% CI = 8.4–9.9%) [39]. All personality disorders in our sample belonged to the 'fearful and neurotic' cluster, cluster C, and all of them preceded the onset of orofacial pain. There were no patients with either cluster A or cluster B personality disorders. The rate of cluster C personality disorders in the NCS-R survey, 6.0% (95% CI = 5.4–6.6%) [39], was strikingly lower than the rate in the present sample. In our patients, the rate of obsessive–compulsive personality was particularly high, 14.3% (95% CI = 6.7–25.4%) compared with the rate in the NCS-R survey, 2.4% [39]. The lack of cluster B personality disorders can be partly explained by the high age of our patients (mean 62.3 years), because cluster B disorders tend to decline with advancing age [41]. Our results differ markedly from the previous findings by Maina et al. [31]. In their sample of 102 patients with BMS, at least one personality disorder was found in 85.7% (95% CI = 75.3–92.9%) of the patients [31]. In line with our results, also in their material the highest prevalence rate was found for cluster C personality disorders (42.8%, 95% CI = 31.1–55.2%), and obsessive–compulsive personality disorder was the most common disorder (30.0%, 95% CI = 19.6–42.1%) [31]. It is of interest, that a high rate of cluster C personality disorders, obsessive–compulsive personality disorder in particular, has also been found in patients with fibromyalgia [42]. As a whole, these results are in line with previous studies evaluating personality traits, suggesting that patients with AP and BMS often tend to be neurotic and obsessive–compulsive [19,21,23,28–30].

Lifetime chronic painful physical conditions other than orofacial pain were found in 34 patients (54.0%, 95% CI = 40.1–66.6%), and in almost all patients (94%) chronic pain condition preceded the onset of orofacial pain. In a large survey of a general population sample in five European countries, only 28.6% (95% CI 27.7–29.5%) of the females aged 65 or over reported having at least one chronic painful physical condition [43]. This suggests that idiopathic orofacial pain has a tendency to be comorbid with other chronic pain conditions. Türp et al. [44] have also found that in the majority of female patients with persistent facial pain, the pain distribution was widespread.

Theoretically, chronic idiopathic pain could be associated with psychiatric disorders by several mechanisms [45,46]: (a) there could be a common genetic predisposition to both chronic pain and psychiatric disorders mediated, e.g. by low brain dopamine activity [8–10,47,48]; (b) stress could predispose a patient to both psychiatric disorders and pain by causing reduction of dopamine output in brain [49]; (c) psychiatric disorders could induce alterations in brain functions, which in turn expose patients to pain disorders [50]; (d) chronic idiopathic pain could be either a psychiatric symptom or a psychiatric disorders per se [18,20]; (e) chronic pain could predispose a patient to psychiatric disorders by altering reward-aversion circuitry [51]; and (f) suffering caused by pain could expose a patient to psychiatric disorders and even initiate personality changes [28,45].

Major depression, social phobia and cluster C personality disorders are clinically quite different psychiatric conditions. Nevertheless, both major depression and social phobia have been linked with decreased, and obsessive–compulsive personality with dysfunctional brain dopamine activity [52–58]. Cluster C personality disorders, in general, are characterized by low novelty seeking, neuroticism, persistence, high harm avoidance and fearfulness—traits, which all have been connected to low brain dopamine activity [59–62]. On the other hand, cluster B personality disorders, which were totally absent in our material, are characterized by extroversion, high novelty seeking, impulsivity and low harm avoidance, traits which have been associated with a high brain dopamine activity [60–63]. Pain is a non-motor symptom of Parkinson disease [64], and increasing evidence imply that reduced dopamine activity is associated with pain reception in general [65,66], and also with chronic idiopathic orofacial pain [8–10,47,67] and fibromyalgia [68,69].

Vulnerability caused by reduced dopamine activity could explain the fact that BMS and AFP affect mostly elderly women. Both post-mortem [70] and PET-studies [71,72] have shown that dopamine activity in brain declines with advancing age. PET-studies have found gender differences in brain dopamine activity, particularly in older age groups [73,74], and, in the rat brain, estradiol treatment increases dopamine receptor density [75]. Taken together, results of the present study and previous findings considering the role of dopamine in pain and particular psychiatric

disorders, are in accordance with the assumptions (a)–(c) above. Both axis I and II comorbidity is characteristic for psychiatric disorders [36]. Absence of cluster A and B personality disorders, and a high comorbidity with only specific axis I disorders in our patients, do not give support to mechanism (d) above. With an assumption that our patients could recall the temporal relationships of the various disorders accurately, the finding that 79% of axis I disorders and all personality disorders preceded the onset of orofacial pain makes assumptions (e) and (f) unlikely.

The strengths of our study include thorough diagnostic evaluation of all patients by a multidisciplinary team with several medical specialities, and the assessment of both axis I and II psychiatric disorders with structured instruments. This study has also some limitations. First, our patients were originally referred to the university clinic, and therefore, the findings may not be generalized to all patients with chronic idiopathic orofacial pain. Second, the lack of a comparison group can be regarded as a shortcoming. On the other hand, it is often more productive to compare the broad CIs of a relatively small sample with the narrow CIs of a large population sample than with the broad CIs of a small comparison group [76]. Third, psychiatric and personality disorders may have been more common among those thirteen patients who refused to participate. Fourth, the reliability of retrospective diagnoses and temporal relationship between psychiatric disorders and the onset of orofacial pain may have been compromised by memory disturbances. However, both in a previous study using the same interview method [76] and in the present study, there were no major discrepancies between the somatic and psychiatric symptoms reported by the patients, and their previous hospital records.

5. Conclusions

Our results suggest that major depression, persistent social phobia, and neurotic, fearful, and obsessive–compulsive personality characteristics are common in patients with chronic idiopathic orofacial pain. Most psychiatric disorders precede the onset of orofacial pain and they tend to run a chronic course. We propose that the high psychiatric morbidity in chronic idiopathic orofacial pain can be best understood in terms of shared vulnerability to both chronic pain and specific psychiatric disorders, most likely mediated by dysfunctional brain dopamine activity.

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