Diffusion Model of Pain Language and Quality of Life in Orofacial Pain Patients

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Aims: *To address the following questions: (1) Which words are preferred by different groups of orofacial pain patients to describe their pain experience? (2) Is it possible, based on such descriptions, to obtain a clinical differential diagnosis in these patients? (3) Is there any relationship between the verbal description of pain and self-rated quality of life (QOL)? (4) Can a pattern of modulation of pain language by affective variables (diffusion model) be recognized in orofacial pain patients, as it has in other chronic pain patients? and (5) If so, what might be the clinical usefulness of assessing pain language in these patients?* **Methods:** *A total of 332 consecutive orofacial pain patients filled out an Italian Pain Questionnaire (the Italian analog of the McGill Pain Questionnaire) and were then divided into 6 diagnostic subgroups (sample 1) based on history and clinical findings. In a double-blind setting, the distribution of pain descriptors and indexes was statistically evaluated. From sample 1, a randomly selected sample of 121 patients (sample 2) also filled out a QOL categorical scale. The results of both tests in this sample were compared statistically.* **Results:** *Some significant differences among diagnostic subgroups were found for choice of descriptors and for pain intensity. When a patient's pain description was compared to the corresponding self-evaluation of QOL, a self-perceived worsening of QOL revealed a good correlation with an increase in the number of words chosen, pain intensity, and affective and sensory pain descriptors. A similar significant association was found between self-assessed anxiety and/or depression and the same items.* **Conclusion:** *Although trends in patients' choice of descriptors were evident, differential diagnosis based on only a pain questionnaire was not possible in the different groups of orofacial pain patients examined in this study. The present study suggests the presence of a phenomenon of diffusion in the language of those patients who were experiencing a worsening of their QOL as a result of pain and consequent psychologic distress. This observation can be of clinical usefulness by enhancing the sensitivity of the clinician to the suffering and affective distress experienced by the patient, and it also can be helpful in refining the therapeutic approach for each individual patient.*

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Key words: orofacial pain, pain measurement, quality of life, questionnaires, diffusion model

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Even when there is no obvious tissue damage, the sensation of pain still may be described in terms of such damage.[1] A patient's daily activities, involving not only sensory but also affective and cognitive aspects of living, will be influenced on many levels by the presence of pain. This is especially true in cases of long-lasting (chronic) pain.[2–4]

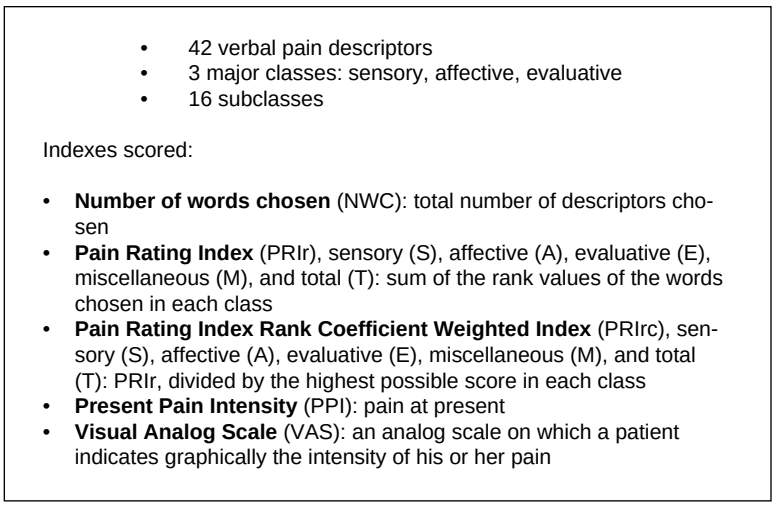

Fig 1 Characteristics of the Italian Pain Questionnaire.

Different levels of this subjective experience have been distinguished, beginning with transduction, the process by which noxious stimuli provoke electrical activity in a specific sensory nerve ending, and ending with the highest cortical elaboration, ie, the complex neuronal interactions that take place in the higher centers of the brain, which lead to suffering.[4] The way a person externalizes suffering has been called *pain behavior*. This refers to the individual's audible and visible actions that communicate his or her suffering to others. Human beings can express their feelings with a powerful tool—namely, language. A skilled clinician can thus receive considerable verbal information from a patient on the level and quality of pain. Pain behavior and pain language are the "other" sources of information on the patient's state, in addition to "objective" clinical findings, where the issue of pain measurement has long been an open question.

Pain Questionnaires

Simple tests such as the McGill Pain Questionnaire (MPQ)[2–5] have been developed to provide valuable information on the multidimensional aspects of pain conditions in English-speaking areas. On the other hand, pain experiences and pain descriptions reflect ethnic and cultural differences.[6–10] In some languages more than a dozen specific pain terms are in common use, each indicating a particular pain experience, while in other languages a single inclusive term is the norm, perhaps with optional qualifiers added to make desired distinctions.[11] In other words, from an anthropologic point of view, the differences in cultural constructions of pain experience must be considered, as well as the particular semiotics of pain expression.[12] For instance, Italian dictionaries contain an average of 127,000 words (Zingarelli[13]), while English dictionaries average 135,000 words (Hazon[14]); thus it can be difficult if not impossible to translate literally a pain descriptor. To overcome such cross-cultural semantic barriers, many national versions of the MPQ have been developed.[15–17] The Italian Pain Questionnaire (IPQ)[18,19] (Fig 1) is an adaptation of the concepts of the original MPQ to the Italian language; it was built ex novo following the original Melzack and Torgerson procedure.[2] After considerable testing, the IPQ has been validated as preserving a close structural parallel with the original; it also shows good reliability and validity.[19]

Pain Description and Medical Diagnoses: Diffusion Model

Several attempts to couple pain descriptions with specific medical diagnoses have been made.[20–22] In the field of chronic orofacial pain, a study using the MPQ correctly predicted the diagnosis in 90% of patients with atypical facial pain or trigeminal neuralgia.[23] However, other researchers found insufficient evidence to confirm the MPQ's potential as a diagnostic tool.[24–26] A possible reason for these different outcomes is that pain language is modulated primarily by affective variables,[25] and therefore the number of descriptors chosen and the intensity implied by the words increase with affective distress. It can be said that pain language becomes *diffuse* as affective disturbance secondary to chronic pain increases. This diffusion characterizes not only affective descriptors but also adjectives that

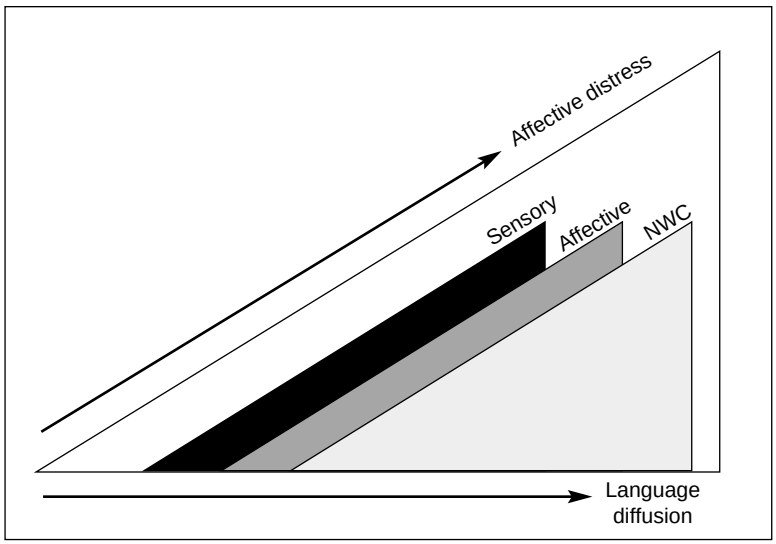

Fig 2 Diffusion model. Arrows indicate a relationship between an increase in affective distress and language diffusion. Triangles indicate number of descriptors chosen, both overall (NWC) and in the sensory and affective domains.

describe the sensory qualities. In other words, as affective distress increases, the language diffuses not only along the affective domain, but also along sensory and intensive domains. A diffusion model (Fig 2) is thus the best way to describe the use of language in pain patients, and this phenomenon is likely to confuse efforts to relate language to medical diagnostic categories.[25,27]

Quality-of-Life Scales

One of the worst characteristics of all chronic pains is that they lead to functional disability, which is reflected in patients' ability to perform physical activities and to engage in social interactions. For this and other reasons, chronic pain patients are likely to manifest signs of anxiety and depression.[28]

Published self-reports[29–31] of symptoms associated with temporomandibular disorder (TMD) pain have been used to create a quality-of-life (QOL) categorical scale (CAT). In this scale, subjects can indicate to what extent their present orofacial condition influences daily activities or states.[32–36] An overall categorical index can thus be calculated, and the higher this index, the worse the QOL.[37–39] The use of self-reports in evaluating psychologic status is further encouraged by the observation that brief self-ratings of psychologic status are useful tools in screening and treatment planning, since they correlate well with more complex psychologic evaluations.[40,41] In the field of chronic orofacial pain, few studies have evaluated symptom report patterns[42,43] or the possible link between pain descriptions and QOL.

Objectives

The aim of the present study was to analyze, in a clinic-based setting, the pain language of a study sample of subjects seeking treatment for orofacial pain problems, and to further expand on previous studies by relating the verbal description of pain to self-ratings of how this experience influences daily activities, ie, the QOL.

The following questions were the foundation of the present study:

- Which words are preferred by different groups of orofacial pain patients in describing their pain experience?
- Is it possible, based on such descriptions, to obtain a clinical differential diagnosis in these patients?
- Is there any relationship between the verbal description of pain and self-rated QOL?
- Can a pattern of modulation of pain language by affective variables (diffusion model) be recognized in orofacial pain patients, as it has been in other chronic pain patients?
- If so, what might be the clinical usefulness of assessing pain language in these patients?

Materials and Methods

Subjects

In a secondary level orofacial pain clinic, a series of 332 consecutive patients (260 females, 72 males) (sample 1) were clinically evaluated after being asked to complete an IPQ and a visual analog scale

(VAS) with the help of short, written instructions. These patients sought care for what they or their doctors considered to be an orofacial problem. Among these patients, a randomly selected subgroup of 121 patients (sample 2) agreed to complete a CAT. The mean time since the onset of the disturbance was 11 months before examination at the clinic, with a range of 3 to 120 months.

Procedures

Each patient was clinically evaluated according to commonly accepted diagnostic criteria (namely, the Research Diagnostic Criteria for TMD [RDC/TMD] and the International Headache Society [IHS] Classification[44,45]) by 2 trained examiners previously tested for inter/intra-rater agreement (> 0.75 kappa value) and blinded to the results of IPQ, VAS, and CAT.

Based on history and clinical findings, 6 diagnostic subgroups were then identified.

1. Actual TMD: pain at present, history and findings consistent with TMD. Three subcategories were further differentiated within this subgroup: *(a)* temporomandibular joint (TMJ) arthralgia, *(b)* masticatory myalgia, and *(c)* combined arthralgia-myalgia.
2. Episodic TMD (eTMD): history of episodic pain consistent with TMD, with no clinical findings at present.
3. Headache: main complaint. A subclassification was not attempted, except for the main distinction between tension-type headache versus migraine. The cut-off value was established as more than 2 episodes per week.
4. Neck pain: main complaint. Also in this subgroup, a specific subclassification was not performed, but the diagnosis came from history, characteristics/behavior of symptoms, postural assessment, and clinical evaluation of active range of motion according to the cervical spine screening examination for dentists.[46]
5. Atypical facial pain (AFP): facial pain not fulfilling other criteria (IHS 12.8).
6. Painless orofacial problems (POP): no pain disturbances. This last was a miscellaneous subgroup in which there was no complaint of any orofacial painful condition. It included patients with various conditions such as TMJ clicking noises, vertigo, posture problems, feeling of malocclusion, referral for malocclusion, bolus hystericus, tinnitus, and painless dental wear. The common feature of this group was the absence of orofacial pain currently or previously. This painless group did not complete the IPQ and filled out only the CAT form.

A yes/no subdiagnosis for the presence of an Axis II–relevant component was assigned to each patient during the diagnostic process. The term *Axis II*, introduced in previously published diagnostic criteria,[44] was used in this research to include various social and behavioral factors leading to a psychologic dysfunction. A diagnosis was considered positive for an Axis II–relevant component when a significant number of psychobehavioral factors (at least 3) were found in the history of the patient.[28]

A psychologist blinded to the patients' clinical diagnoses performed the scoring of the IPQ, VAS, and CAT according to the authors' guidelines. Two comprehensive analyses were performed:

1. The first study (332 subjects; sample 1) dealt with pain language and its features in the whole sample and among the different orofacial pain diagnostic subgroups. The IPQ semantic pain descriptors and derived indexes were evaluated for the pattern of distribution as well as for significant differences between other subgroups and the TMD subgroup.
2. A second study (121 subjects selected randomly from the above patients; sample 2) was performed by testing patients with both the IPQ and CAT. Self-reports of how the present disturbance influenced daily activities, namely QOL, were evaluated in the whole sample and among diagnostic subgroups. In addition, 2 further analyses were performed on sample 2. The first was intended to focus on differences in QOL self-rating values between other pain subgroups and the TMD reference subgroup, while the second evaluated the same relationships between other groups and the POP subgroup to show differences in responses between pain and pain-free patients.

Finally, the verbal description of pain tested with IPQ was compared in the whole sample and in individual subgroups with self-ratings of QOL changes resulting from the present complaint.

Statistical Analysis

Data were presented as mean ± 1 standard deviation for continuous variables when no deviation from Gaussian distribution was evident. When a deviation existed, data were presented as medians and interquartile ranges. Normality assumptions were tested by the Shapiro-Wilks test.[47]

Table 1 Distribution of Diagnostic Subgroups

	Subgroup						
Sample	TMD	eTMD	H	N	AFP	POP	Total
Sample 1							
Raw value (n)	182	34	16	10	20	70	332
Percentage	54.81	10.24	4.81	3.00	6.00	21.00	100
Sample 2							
Raw value (n)	70	14	6	9	6	16	121
Percentage	57.85	11.57	4.95	7.43	4.95	13.22	100

TMD = temporomandibular disorder subgroup; eTMD = episodic TMD subgroup; H = headache subgroup; N = neck pain subgroup; AFP = atypical facial pain subgroup; POP = painless orofacial problems subgroup.

Frequencies were expressed as percentage values. The mean values of continuous variables in 2 subgroups were compared with Student's unpaired *t* test or with the 2-sample Wilcoxon rank-sum test, as appropriate. Comparison between frequencies was performed by the Chi-square test. When multiple comparisons were performed, the Brandt and Snedecor test was used.[48] Comparison among the mean values of continuous variables in more than 2 groups was performed by a Kruskal-Wallis non-parametric analysis of variance. Correlation between variables was assessed by Spearman's non-parametric correlation.

Results

The age range in sample 1 was from 12 to 78 years (mean 36.3, SD 14.34), and the female/male ratio was 3.61/1. The distribution of diagnostic subgroups is shown in Table 1. For sample 2, ages ranged from 13 to 75 years (mean 38.96; SD 16), and the female/male ratio was 5.26/1. The distribution of diagnostic subgroups is shown in Table 1. No statistical differences between sample 1 and sample 2 were found for any of these epidemiologic data.

Study 1

In sample 1, a subdiagnosis of an Axis II–relevant component was significantly ($P = 0.037$) more frequent for AFP patients. Regardless of subgroup distribution, the IPQ factor "number of words chosen" (NWC) was significantly higher in Axis II than in non–Axis II patients ($P = 0.002$). Within the TMD subgroup, no significant differences between subcategories (arthralgia, myalgia, arthromyalgia) were elicited regarding prevalence of the Axis II–relevant component, while the IPQ factor "present pain intensity" (PPI) and VAS scores were significantly higher in the arthromyalgia group when compared to the myalgia group ($P = 0.033$).

The pattern of distribution of various descriptors was evaluated by highlighting the 5 most and the 5 least frequently chosen descriptors for each pain subgroup. Interestingly, only *periodic* was included in the top 5 of all subgroups, and *nagging* appeared in the top 5 of all but the headache subgroup (Table 2). The prevalence among diagnostic groups of the following descriptors differed significantly from chance: *persistent, spreading (widespread), burning, nauseating, oppressive, unbearable, enduring (insistent),* and *exasperating* (Table 3).

When compared to the TMD reference subgroup, AFP patients showed a significantly higher preference for the descriptors *oppressive, unbearable, exasperating, burning,* and *distressing;* the headache subgroup showed a preference for *heavy, nauseating,* and *unbearable;* while *insistent* was chosen significantly less frequently by the eTMD subgroup (Table 4). Within the TMD subgroup, no significant differences between subsets (arthralgia, myalgia, arthromyalgia) were found regarding NWC or choice of descriptors.

Significant differences regarding the general distribution of IPQ indexes among diagnostic subgroups included only the general distribution of PPI ($P = 0.0251$), VAS ($P = 0.0251$), and miscellaneous Pain Rating Index Rank Coefficient (PRIrcM) ($P = 0.035$). Closer inspection revealed that the only difference between the subgroups was low-ranking PPI ($P = 0.033$), VAS ($P = 0.033$), and PRIrcM ($P = 0.008$) in the eTMD subgroup in comparison with the TMD reference subgroup.

Finally, no significant differences in these responses were found in tests for amount of education, patient age, or time since onset of disturbance.

Table 2 Prevalence of Descriptors Among Diagnostic Subgroups (Sample 1)

Subgroup	Top 5 descriptors	Frequency (%)	Bottom 5 descriptors	Frequency (%)
TMD	Periodic (periodico)	53.30	Gnawing (rode)	7.69
	Nagging (fastidioso)	53.30	Biting (come un cane che morde)	7.14
	Sore (da' indolenzimento)	46.70	Suffocating (soffocante)	7.14
	Enduring, insistent (insistente)	43.41	Burning (bruciante)	4.95
	Exhausting (snervante)	40.11	Tearing (dilaniante)	4.40
eTMD	Periodic (periodico)	67.65	Oppressive (oppressivo)	2.94
	Sore (da' indolenzimento)	55.88	Disabling (invalidante)	2.94
	Nagging (fastidioso)	55.88	Suffocating (soffocante)	0.00
	Annoying (noioso)	44.12	Gnawing (rode)	0.00
	Troublesome (disturbante)	38.24	Exasperating (esasperante)	0.00
Headache	Heavy (come un peso)	50.00	Torturing (torturante)	6.25
	Nauseating (da' nausea)	50.00	Widespread (diffuso)	0.00
	Enduring, insistent (insistente)	50.00	Dull (sordo)	0.00
	Periodic (periodico)	43.75	Burning (bruciante)	0.00
	Persistent (persistente)	43.75	Gnawing (rode)	0.00
Neck pain	Periodic (periodico)	60.00	Biting (come un cane che morde)	0.00
	Steady (fisso)	50.00	Tender (rende la parte piu' sensibile al tatto)	0.00
	Sore (da' indolenzimento)	40.00	Piercing (trafigge)	0.00
	Nagging (fastidioso)	40.00	Suffocating (soffocante)	0.00
	Enduring, insistent (insistente)	40.00	Gnawing (rode)	0.00
AFP	Periodic (periodico)	60.00	Dull (sordo)	5.00
	Distressing (mette in agitazione)	55.00	Suffocating (soffocante)	5.00
	Nagging (fastidioso)	55.00	Undefinable (indefinibile)	5.00
	Exhausting (snervante)	45.00	Torturing (torturante)	5.00
	Enduring, insistent (insistente)	45.00	Debilitating (debilitante)	0.00

Table 3 Descriptors Whose Prevalence Differed Significantly from Chance Among Diagnostic Subgroups (Sample 1)

	Raw value (n)					
Descriptor	TMD	eTMD	H	N	AFP	Probability
Persistent (persistente)	62	3	7	3	6	0.040
Spreading, widespread (diffuso)	40	3	0	1	7	0.030
Burning (bruciante)	9	1	0	1	4	0.050
Nauseating (dà nausea)	37	3	8	3	6	0.016
Oppressive (oppressivo)	22	1	2	2	7	0.016
Unbearable (insopportabile)	21	5	7	1	7	0.001
Enduring, insistent (insistente)	79	5	8	4	9	0.029
Exasperating (esasperante)	18	0	2	2	5	0.046

Table 4 Comparison of TMD Descriptor Choices Versus AFP, Headache, and eTMD Subgroup Choices (Sample 1)

Subgroup	Descriptor	Raw value (n)	Probability
AFP subgroup: Descriptors chosen more frequently than in TMD subgroup	Oppressive (oppressivo)	7	0.004
	Unbearable (insopportabile)	7	0.0061
	Exasperating (esasperante)	5	0.034
	Burning (bruciante)	4	0.009
	Distressing (mette in agitazione)	11	0.016
Headache subgroup: Descriptors chosen more frequently than in TMD subgroup	Heavy (come un peso)	8	0.04
	Nauseating (dà nausea)	8	0.006
	Unbearable (insopportabile)	7	0.0006
eTMD subgroup: Descriptors chosen less frequently than in TMD subgroup	Insistent (insistente)	5	0.001

Table 5 Statistically Significant Relationships Between Other Subgroups and POP According to CAT Values (Sample 2)

Subgroup	Item	Probability
TMD: More problems	Masticatory function/appetite	$P = 0.006$
	Self-rating of depression	$P = 0.035$
	Overall QOL index	$P = 0.002$
Headache: More problems	Sleep	$P = 0.022$
	Masticatory function/appetite	$P = 0.046$
	Self-rating of depression	$P = 0.027$
	Overall QOL index	$P = 0.0089$
Neck pain: More problems	Sleep	$P = 0.025$
	Overall QOL index	$P = 0.018$
AFP: More problems	Anxiety	$P = 0.01$
	Overall QOL index	$P = 0.024$

Table 6 Statistically Significant Relationships Between IPQ and CAT Items (Sample 2)

		Probability		
IPQ item	CAT item	All subgroups	TMD subgroup	eTMD subgroup
Overall QOL index	PPI/VAS	$P < 0.001$	$P < 0.001$	$P < 0.001$
	NWC	$P < 0.0001$	$P < 0.0001$	$P < 0.0019$
	Absolute no. of A descriptors	$P < 0.0001$	$P < 0.001$	
	Absolute no. of S descriptors	$P < 0.0001$	$P < 0.0001$	
	PRIrc-A	$P < 0.001$		
	PRIrc-S	$P < 0.001$		
Anxiety	Absolute no. of S descriptors	$P < 0.0129$		
	Absolute no. of A descriptors	$P < 0.0001$	$P < 0.001$	
	PRIrc-A	$P < 0.001$	$P < 0.001$	$P < 0.001$
Depression	Absolute no. of S descriptors	$P < 0.0003$	$P < 0.011$	
	Absolute no. of A descriptors	$P < 0.0001$	$P < 0.0001$	
	PRIrc-A	$P < 0.001$	$P < 0.001$	

Study 2

The general distribution among the pain subgroups of 2 CAT test items was found to be different from chance: sleep ($P = 0.0081$) and mastication/appetite ($P = 0.049$). When compared to the TMD reference subgroup, the eTMD patients scored significantly fewer problems with sleep ($P = 0.021$) and mastication/appetite ($P = 0.0099$), a lower self-rating of depression ($P = 0.037$), and a low-ranking effect on the QOL (overall QOL index) ($P = 0.022$). In the headache subgroup, significantly more sleep problems were reported ($P = 0.03$). The general distribution of CAT values for sleep, mastication/appetite, depression self-rating, and overall QOL index was different from chance among all subgroups (P ranging from 0.04 to 0.0028). When compared to the POP subgroup, the TMD subgroup reported more masticatory function/appetite problems, more self-rated depression, and overall worsened QOL index. The headache patients reported more problems with sleep, masticatory function/appetite, self-rated depression, and overall QOL. In the neck subgroup, significantly more sleep disturbance and worsened overall QOL index were apparent. The AFP subgroup reported significantly higher values for anxiety self-rating and overall QOL index (Table 5).

Regardless of subgroup distribution, the analysis of the relationships between IPQ and CAT tests clearly showed significant associations between a perceived worsening of the QOL and PPI/VAS ratings (Table 6). There also were strong associations between this subjective perception and NWC, raw number of sensory and affective descriptors chosen, and derived indexes (ie, Pain Rating Index Rank Coefficients for affective [PRIrc-A] and

sensory [PRIrc-S] dimensions). Highly significant correlations emerged between anxiety and depression self-ratings and the raw number of categorical descriptors chosen or a derived index (PRIrc-A) (Table 6).

Finally, with respect to single subgroups, both the TMD and eTMD subgroups showed significant associations between perceived worsening of the QOL and PPI/VAS ratings as well as between perceived worsening of QOL and NWC (Table 6). The TMD subgroup showed significant correlations between perceived worsening of the QOL and the raw number of categorical descriptors chosen, between anxiety self-rating and raw number of affective descriptors chosen or the derived index (PRIrc-A), and between depression self-rating and the raw number of sensory/affective descriptors chosen or the derived index (PRIrc-A). The eTMD subgroup showed significant correlations between anxiety and the derived index (PRIrc-A) (Table 6). The other subgroups were not tested because there were insufficient numbers of patients to perform an analysis.

Discussion

The first part of this study revealed an absence of significant differences in IPQ items between TMD patients and the other pain subgroups. It also was noted that the eTMD subgroup features were consistent with an episodic, low-intensity painful disorder. Patients with episodic TMD (history of pain but no actual pain at the time of exam) had to recall their previous pain. There is no general agreement among researchers regarding the sensitive issue of pain memory. The accuracy and reliability of pain patients' retrospective reports are questionable, and moreover there is some evidence that pain itself influences a key cognitive variable such as memory. The eTMD subgroup reports are thus likely to be either underrated or overrated, and the responses of this subgroup should be regarded with care.[49–52]

This study confirmed the involvement of psychologic factors in AFP. Interestingly, the presence of psychosocial and behavioral factors (Axis II component) was significantly linked with an increasing number of words used in describing pain.

The most intriguing data concerning this first part of the study was the evidence of trends in patients' choice of descriptors, with certain subgroups showing a preference for certain words and other subgroups showing a preference for different words. Tearnan and Dar[53] found a high amount of agreement of physicians on the ratings of pain descriptors within pain syndromes, with no differences between specialists or the amount of clinical experience with pain patients, although there is still no consensus whether this agreement is clinically based or comes from the observer's own mind. The observation that there are preferences in patients' descriptors choice is important despite this objection: while a doctor may label a patient on the basis of what he or she sees as a typical description of a disease, one can assume that patients are not actually familiar with the typical description of their undiagnosed disease.

These trends did not reach a clinically significant level of diagnostic value, according to the findings of Atkinson et al.[25] However, the probability of choosing specific words by different diagnostic subgroups is evident. These findings might be partially explained by the fact that broad diagnostic subgroups were chosen, and none of the subgroups represented a true diagnosis—rather, they can be seen as "umbrella categories." However, when different subsets of arthralgia, masticatory myalgia, and arthromyalgia patients in the TMD subgroup were tested individually, no significant differences were found in intensive, sensory, or affective dimensions of pain language.

Cultural influences were confirmed by the present study. For example, one of the most frequent pain language words in Italian, but not in English, was *nagging,* while the term *biting,* for instance, was very rarely chosen by patients in this sample. In this sample, we did not find a significant influence of confounding factors such as age, education, or time since onset of disease on IPQ outcomes.

The second part of this study highlighted the influence of the present complaint on QOL. Assuming that the variables examined are representative enough for the QOL in a western country, the comparison with TMD showed again that the eTMD subgroup was less affected regarding functional and social activities, while worsening of sleep was a main feature of headache patients.

The comparison with the POP subgroup proved that pain affected the overall QOL in all subgroups, except for the eTMD subgroup. The reported problems with functional activities in the TMD patients and with sleep in neck and headache patients is consistent with common features of these disturbances. Interestingly enough, no value regarding QOL in the eTMD subgroup showed significant differences from values scored by the POP subgroup.

The high self-rating of anxiety in the AFP patients could be partly justified (as previously

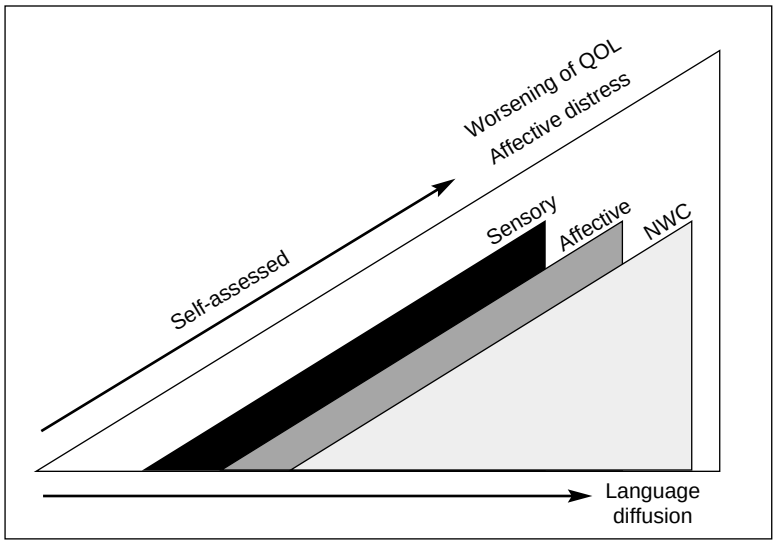

Fig 3 Diffusion model in orofacial pain. Arrows indicate a relationship between an increase in affective distress and worsening of QOL and language diffusion. Triangles indicate number of descriptors chosen, both overall (NWC) and in the sensory and affective domains.

observed[42]) by the patients' concern about the true nature of their pain, ie, suspicions of a malignant disease, and this concern is frequently reinforced by difficulties in diagnosis. In fact, it is reported that affective distress is less evident when the condition is not life-threatening or acute, but becomes overwhelming when the diagnosis is still unknown or the expectation of a bad diagnosis is high.[27,42]

The most interesting results came from the comparison between CAT and IPQ. For the patients in sample 2, it was found that the more intense the pain, the worse the QOL, as one might expect. It was also noted that a self-perceived worsening of overall QOL resulting from the disturbance itself was closely linked to an increase in the number of words chosen, and to an increase in the choice of sensory and affective descriptors or derived indexes. Self-rated anxiety and depression resulting from the disturbance itself showed significant relationships with affective and sensory components of pain language. Interestingly, in the TMD subgroup, an increase in the affective component of pain language was closely linked to higher self-ratings for anxiety and depression. It can be said, in other words, that intensive, sensory, and affective components in the verbal description of pain increase along with the perception of an overall worsening in QOL, and increases in affective and sensory components of language are significantly associated with an increase in affective distress, described as self-perceived anxiety and/or depression caused by the present disturbance.

It has already been noted that the magnitude of affective descriptors as assessed by the MPQ is a good predictor of psychologic distress in chronic pain patients.[54,55] It is notable that in the TMD subgroup of this sample, the affective component of pain description, both in the raw number of affective descriptors and in the weighted index (PRIrc-A), is a good indicator for anxiety and depression as rated by the patient.

These findings (Fig 3) are consistent with the previously cited diffusion model. This study therefore supports the relevance of this pattern of modulation on pain language by affective status in orofacial pain patients. Furthermore, our results are consistent with those reported by Leavitt and Garron[22] regarding the diffusion of pain language of psychologically disturbed patients—that is, they use more total words and more affectively laden descriptors spread over more pain factors than do emotionally undisturbed pain patients. In other words, this diffusion could be considered as the "psychologic counterpart" of a neurophysiologic sensitization, namely a process that leads to an amplified response to painful stimuli. The abovementioned authors concluded that the emotional discomfort associated with pain is more important to the sufferer than any specific physical, temporal, or spatial attribute.[22]

The affective experience of orofacial pain patients, which leads to such a "diffusion" of their pain language, largely influences their responses to questionnaires. This makes their responses less useful for diagnostic purposes. However, this model can be clinically relevant since, for clinicians sensitive to these issues, this diffusion enhances the need for suitable therapy that addresses psychobehavioral

factors as well as physical ones. The present study outcomes also suggest that simple QOL self-reports can help to capture this relationship between language and affective distress, in terms of the amount of psychologic distress that is subjectively felt because of the pain. Moreover, these results are consistent with the report that depression significantly influences MPQ pain description.[54,56] Finally, it can be said in the words of Kremer and Atkinson that ". . . the predominant variable in a patient's verbal description is definitely the affective distress which the patient is suffering."[27]

Conclusions

From the comparison of the verbal description of pain obtained by IPQ scores from 5 subgroups of orofacial pain patients, it can be concluded that the language of pain differs little among specific orofacial pain subgroups. Even where trends are evident, it seems difficult if not impossible to link language to specific diagnoses, probably because a phenomenon of pain language "diffusion" is present in orofacial pain, just as it is in many other pain conditions. This "diffusion" correlates with an increasing importance of the disturbance in the patient's own life situation, because this increase in pain language is closely linked to a perceived deterioration in QOL. Moreover, this diffusion of pain language can indicate an underrated but self-perceived affective distress.

The present study supports the clinical usefulness of assessing pain language in OFP patients (and in TMD patients in particular) with the use of verbal tests, even if they do not lead to precise diagnoses. This limitation is underscored by the observation that instruments such as the IPQ, which deal with the subjective experience of pain, are likely to be a useful measure of affective distress secondary to pain *as perceived by the patient*, according to a diffusion model of pain language. The clinical use of these observations also can improve the therapeutic process, because the sensitivity of the clinician to the suffering and to the affective distress being experienced by the patient is enhanced.

This study emphasizes that pain, as the prominent influencing factor on the QOL, is the most important feature to be addressed in the treatment of orofacial pain. The results also suggest that the emotional discomfort associated with chronic pain must be addressed as well as the pain itself.

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