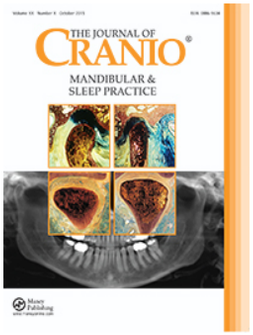

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TMJ

Personality traits are potentially associated with the presence of chronic temporomandibular joint pain in patients without effusion as determined by T-2 weighted magnetic resonance

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ABSTRACT

Objective: The study aimed at investigating personality traits in chronic temporomandibular joints (TMJ) pain patients with and without joint effusion.

Methods: Two groups of chronic TMJ pain patients were recruited. The TMJ pain control group was composed of patients showing magnetic resonance imaging (MRI) signs of TMJ effusion, while the TMJ pain test group included patients with chronic TMJ pain seemingly not justified, due to the absence of MRI-detected disorders. A third set of pain free individuals was selected as a comparison group. All patients completed a personality assessment with the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) instrument, and the between-group differences were assessed for significance by performing an analysis of variance test.

Results: Patients of the TMJ pain test group had higher scores than subjects belonging to the TMJ pain and pain-free control groups in almost all of the MMPI-2 clinical scales. A significant difference was shown for the scales related to concerns about physical health (Scale 1-Hs; $F = 7.74$; $p = .001$) and physical symptoms (Scale 3-Hy; $F = 8.43$; $p = .001$).

Conclusions: Chronic TMJ pain patients without MRI-detected TMJ effusion have a different personality profile than patients with TMJ effusion and pain-free individuals, regarding high levels of concerns about physical health and physical symptoms.

Clinical implications: This study has important clinical implications for temporomandibular disorders practitioners, providing suggestions that symptoms in the TMJ area are not only related to a physical disorder. The possible existence of a psychologically modulated condition in patients who refer pain in the TMJ area without signs of effusion should be carefully taken into consideration.

KEYWORDS
Temporomandibular joint; MMPI-2; personality traits; chronic pain

Introduction

Temporomandibular disorders (TMD) is a collective term embracing heterogeneous clinical problems that involve the temporomandibular joints (TMJ), masticatory muscles, or both [1,2]. Based on recent estimates of their prevalence in the general population, TMDs are emerging as a relevant problem in dental medicine and public health [3]. The most frequent symptoms are pain in the muscles of mastication and/or on the TMJs, joint sounds, and irregularities or limitation of jaw motion [4,5].

The etiology of TMD is still controversial, but it is now widely accepted that personality traits and psychological factors play a much more important role than the anatomy of dental occlusion in the predisposition, perception, and perpetuation of TMD pain as well as treatment outcomes [6–9]. Multicenter studies have shown that a non-negligible percentage of TMD patients attending tertiary clinics have high levels of psychosocial impairment [10]. Interestingly, the attempts to relate the physical diagnoses (i.e. muscle and/or joint symptoms) with one individual's psychosocial profile fell short [11], leading to suggestions that psychosocial issues may discriminate between patient and general population individuals with similar physical diagnoses [12].

At the individual level, as far as TMJ pain is concerned, it is also noticeable that some patients do not exhibit symptoms that might be expected, based on imaging findings. The predictive value of clinical pain to detect magnetic resonance effusion approximates 80% [13]. Clinically, this

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means that some individuals who are seeking TMD treatment due to TMJ pain may have symptoms unrelated with the presence of TMJ effusion. Thus, other factors related to the pain experience may be more important than physical findings to determine clinical symptoms. Due to the importance of psychological factors, such as personality traits, in the pain perception process, [14] such symptoms are thus worthy of being explored from a psychosocial viewpoint, with the aim to assess if there are any other factors that may partly explain the presence of pain.

Based on these premises, the present investigation focused on assessing the hypothesis that subjects with seemingly unexplainable chronic TMJ pain might present a "V configuration" MMPI profile, characterized by high levels of concerns about physical health and symptoms. The presence of TMJ effusion, as detected with magnetic resonance imaging (MRI) [15], was assumed as the reference imaging sign that should be associated with clinical pain. To test the study hypothesis, two groups of patients with chronic TMJ pain, with or without MRI signs of effusion, underwent an assessment of their personality profile and were compared with a control group of healthy subjects.

Materials and methods

Study population and design

Participants in the study were recruited among patients who sought treatment for temporomandibular disorders at the TMD Clinic, Department of Maxillofacial Surgery, University of Padova, Padova, Italy. The potential inclusion was reserved to subjects aged between 18 and 70 years, with TMJ pain lasting from more than six months in the absence of muscle pain and who had undergone MRI of the TMJs. Subjects with other relevant physical health conditions (e.g. cancer, multiple sclerosis, fibromyalgia, etc.) and/or orofacial neuralgias were excluded from further consideration.

Two groups of subjects satisfying the inclusion criteria were then consecutively recruited. The two study groups differed as to the presence of MRI signs of TMJ effusion, so that the first group was composed of chronic TMJ pain patients showing MRI signs of TMJ effusion (TMJ pain-control group), while the other group included patients with chronic TMJ pain seemingly not justified by the MRI findings, due to the absence of MRI effusion (test group). The test group had to show absence of other potential intracapsular disorders that could be associated with chronic TMJ pain (e.g. arthrosis, disc displacement without reduction).

A third group of age- and matched individuals was selected among the attendees of the School of Dentistry, University of Padova, Padova, Italy, for conservative dental care. This group constituted the "non-pain control group."

All patients gave their written consent to undergo the clinical and psychological assessments, and the procedures were approved by the University of Padova's Institutional Review Board (IRB).

The study design provided that potentially eligible participants were first screened for the absence of axis I psychiatric disorders by means of a semi-structured interview (MINI International Neuropsychiatric Interview Plus [MINI-Plus 5.0]) [16,17]. They then underwent an assessment of personality features by fulfilling the Minnesota Multiphasic Personality Inventory (MMPI-2) [18].

A priori calculation of sample size

Based on the study hypothesis, scores in the Minnesota Multiphasic Personality Inventory-2 (MMPI-2) [18] Hysteria scale (Hy-MMPI2) were selected as the main outcome variable for groups comparison and were adopted to perform a priori calculation of the needed sample size. Scores on the Hy-MMPI2 scale may range from 0 to 120, and pilot data gathered at the authors' clinics suggested that an average score of 60 ± 10 could be expected in pain populations. It was hypothesized that, for a between-group difference to be clinically relevant (i.e. minimal clinical important difference [MCID]), it should be at least equal to 25% of the average scores, thus amounting to at least 15 points. Based on such data, the necessary sample size to detect the between-group MCID was calculated by applying the base equation: N (for each group) = $(Z_\alpha + Z_\beta)^2 \times 2 \times (S)^2/D^2$, where N = sample size per group; Z_α = value of type I error; Z_β = value of type II error; S^2 = variance; and D = difference to detect [19,20]. As a result, a sample size of about 12 subjects per group was needed to detect about a 25% between-group difference in mean Hy-MMPI-2 scores with a statistical power of 5% for type I error, viz., false positive results, and 20% for type II error, viz., false negative results. Thus, participants were recruited until the target size of 12 individuals per group was reached.

Clinical and imaging assessment

The clinical assessment for TMD was performed based on the original Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) guidelines [21] by the same trained operator with expertise in TMD clinical assessment and research methodology [12]. The assessment focused mainly on diagnosing the presence of joint pain, to satisfy criteria for a RDC/TMD axis I group III diagnosis of arthralgia. On this point, it should be noted that the updated version of such diagnostic criteria, now called DC/TMD [2], was not available yet at the

time of this investigation. To quantify the level of pain, a visual analogue scale (VAS) was adopted, through which patients were asked to assess the level of their pain on a scale from 0 to 10, where 0 = no pain, and 10 = the most intense pain imaginable.

MRI was carried out with a 1.5 Tesla (GE Signa Contour; GE Medical Systems, Buc, France) with a bilateral dedicated circular (8 cm diameter) surface coil for the right and left TMJs study. Sequential Gradient Echo T1 and Fast Stir T2-weighted bilateral images were made with the subjects at both closed mouth and maximum mouth opening positions. The latter position was obtained by means of a wooden intermaxillary device at the same opening as measured clinically.

To include patients in the TMJ-control group, the presence of effusion had to be detected, based on the identification of a large area of high signal intensity inside the joint space in T2-weighted images. In accordance with the suggestions that a mild to moderate amount of fluid can be detected in normal joints as well, the presence of effusion was defined as an area of high signal intensity (bright signal) greater than 2 mm of superior-inferior height or anterior-posterior length inside either articular compartment [22].

To exclude patients from the test group (i.e. chronic TMJ pain without effusion), the presence of arthrosis was assessed in the T1-weighted images and was diagnosed as a deformation, due to subchondral cyst, surface erosion, osteophyte, or generalized sclerosis [15].

Subjects of the test group had to show an absence of MRI effusion and other relevant intracapsular disorders that could be responsible for chronic TMJ pain even in the absence of joint effusion (e.g. arthrosis, disc displacement without reduction).

To avoid interpretation bias related with the different radiologists assessing the images, magnetic resonance images were interpreted by the expert clinicians of this investigation (D.M.; L.G.N.), who recorded the presence/absence of the different imaging signs by consensus. If consensus was not reached, the certification provided by the radiologist who performed the examination was taken as the final decision.

A third group of subjects was recruited among subjects attending the School of Dentistry for routine conservative care as the pain-free control group, based on the absence of any clinical complaints concerning the TMJ and the jaw muscles.

Psychological and psychiatric assessment

The M.I.N.I.-Plus 5.0 [16,17] was administered by a licensed psychologist (S.C.) who was in charge of this investigation, to exclude the presence of axis I psychiatric disorders in the study population that might influence the MMPI-2 results. Then, the MMPI-2 was used to assess the personality features of the three study groups. To avoid possible bias related with the type of information that was given to the patients, all subjects were informed that the questionnaire was part of a research protocol aiming to identify the relationship between TMJ pain and personality profiles.

The MMPI-2 is a self-report questionnaire that is the most widely used objective personality assessment inventory [18]. It consists of 567 "true" or "false" statements and gives scores on 3 validity scales, 10 clinical scales, and 15 content scales. The three validity scales are: "Lie" (L; high scorers attempt to present themselves in a very positive light); "Frequency" (F; high scorers are presenting themselves in a particularly bad way); "Correction" (K; high scorers tend to be very defensive). The 10 clinical scales are multidimensional and refer to the evaluation of the following traits: (1) "Hypochondriasis" (Hs; high scorers reflect an exaggerated concern about physical health); (2) "Depression" (D; high scorers are usually depressed and distressed); (3) "Conversion Hysteria" (Hy; high scorers complain about physical symptoms with no apparent organic cause); (4) "Psychopathic Deviancy" (Pd; high scorers show a disregard for social and moral standards); (5) "Masculinity/Femininity" (Mf; high scorers are indicative of deviation from gender-stereotypic interests and roles); (6) "Paranoia" (Pa; high scorers show extreme suspiciousness and feelings of persecution); (7) "Psychasthenia" (Pt; high scorers tend to be highly anxious, rigid, tense, and obsessively worrying); (8) "Schizophrenia" (Sc; high scorers tend to have strange beliefs, unusual experiences, and special sensitivities); (9) "Hypomania" (Ma; high scorers tend to be excitable and impulsive); (10) "Social Introversion" (Si; high scorers tend to be shy and to prefer solitary pursuits). The 15 content scales assess variables in four general clinical areas: (1) symptoms of distress (anxiety, fears, obsessiveness, depression, health concerns, bizarre ideation); (2) external aggressive tendencies (anger, cynicism, antisocial practices, type A behavior); (3) negative self-views (low self-esteem); (4) general problem areas (family problems, social discomfort, work interference, negative treatment indicators).

A profile was considered valid based upon interpretation of the L, F, and K scales. For this study's purpose, an MMPI-2 profile was considered valid if the *T*-scores (m = 50; ds = 10) for L were below 75, for F below 100, and between 40 and 65 for the K scale. Total scores were calculated for each scale, and a *T*-score of ≥65 obtained in the clinical and content scales indicated an elevated score. This cut-off score indicates distinct psychological problems or pathology.

Table 1. Demographic features and VAS values of the study sample.

Demographic features	Patients with TMJ effusion	Patients without TMJ effusion	Control group
Patients (*N*)	12	12	12
Mean age (years)	47.9 ± 11.4	40.6 ± 11.5	44.2 ± 12.29
Female:Male	10:2	10:2	9:3
VAS	8.2 ± 1.7	8.1 ± 1.8	–

Statistical analysis

Differences in the MMPI-2 scores between the three study groups were assessed by using univariate analyses of variance (ANOVAs). Significant findings were followed up using Bonferroni *post hoc* comparisons. Also, Pearson's correlation coefficient was used to examine the relationship between pain levels, as measured with 0–10 VAS scores and the personality findings within the two pain groups, in order to underline the presence of different correlation patterns between groups. Statistical significance was set at $p < .05$, and Bonferroni's correction for multiple comparison was applied when needed. All analyses were performed using the Statistical Package for the Social Sciences, Version 21.0 (SPSS, Inc., Chicago, IL, USA).

Results

The three groups did not differ regarding age and sex distribution ($p > .05$; Table 1). The mean scores of current VAS pain levels were not significantly different between the two groups of TMJ pain patients ($p > .05$; Table 1).

As for the between-group differences in the personality features, mean scores of the three groups on the MMPI-2 scales are reported in Tables 2 and 3. ANOVA showed differences between the three groups on Scale 1-Hs ($p = .001$), Scale 3-Hy ($p = .001$), and health concerns (HEA) content scale ($p = .004$). Specifically, patients without TMJ effusion (i.e. test group) had higher scores on the three scales compared to the control group of individuals without pain (respectively, $p = .001$; $p = .001$ and $p = .004$). Moreover, concerning Scale 3 (Hy), patients without TMJ effusion (i.e. test group) had significantly higher scores compared to patients with TMJ effusion (i.e. TMJ pain-control group) ($p = .05$). No differences were found between the three groups in the other scales (Tables 2 and 3).

Concerning the relationship between MMPI-2 scales and VAS levels, patients with TMJ effusion showed a negative correlation between VAS level and BIZ content scale ($r = -.62$; $p = .03$). No other significant correlations were found. Results are shown in Tables 4 and 5.

Discussion

TMD pain is the second most frequent pain disorder, following low-back pain, as well as being the most frequent cause of orofacial pain. The favorable symptoms course with conservative treatment in the absence of psychological impairment [23,24] and the observation that chronic pain is often associated with high levels of psychological distress [25,26] suggest that issues related with one individual's psychosocial sphere are very important both at the diagnostic and therapeutic levels. Interestingly, a single-center [11] and a recent large-sample multicenter study [12] showed an absence of correlation between the levels of psychosocial impairment (e.g. depression, somatization, impact of chronic pain on daily activities) and any specific physical diagnoses (e.g. muscle and/or joint disorders). This means that, at the individual level, other factors related with the pain experience are more important than physical findings to determine the degree of psychosocial impairment.

Findings from this investigation suggested that some personality traits might be associated with the presence

Table 2. Mean scores (and standard deviations) of the three groups in the MMPI-2 clinical scales.

Scales	Patients with TMJ effusion	Patients without TMJ effusion	Control group	*F*(2,39)	*p*	η_p^2
L	56.50 (9.36)	59.44 (12.06)	48.48 (9.39)	4.96	.06	–
F	56.92 (13.77)	51 (11.01)	50 (10.72)	1.39	.26	–
K	46.08 (11.90)	54 (12.31)	50.24 (10.45)	1.29	.29	–
1 HS	60.33 (14.26)	70.11 (13.65)	51.81 (9.45)	7.74	.001*	.28
2 D	58.17(12.16)	60.44 (8.87)	52.57 (7.84)	2.69	.08	–
3 HY	55.83 (12.75)	67.11 (11.29)	50.14 (8.33)	8.43	.001*	.30
4 PD	49.25 (9.15)	50.22 (9.11)	52.62 (8.56)	.59	.56	–
5 MF	50.42 (8.14)	53.22 (6.24)	47.14 (8.69)	1.92	.16	–
6 PA	52.33 (13.61)	57.11 (11.26)	51.81 (8.62)	.65	.53	–
7 PT	51.83 (7.66)	54.11 (5.64)	48.71 (8.62)	1.66	.20	–
8 SC	51.17 (7.80)	52.44 (11.81)	49.14 (8.68)	.46	.63	–
9 MA	48.25 (9.77)	49.44 (11.41)	46.95 (9.30)	.21	.81	–
10 SI	54.92 (7.70)	52.67 (14.10)	50.33 (8.75)	.84	.44	–

Notes: L, lie; F, infrequency scale; K, suppressor scale; HS, hypochondriasis; D, depression; HY, hysteria, PD, psychopathic deviance; MF, Masculinity/Femininity; PA, paranoia; PT, psychasthenia; SC, schizophrenia; Ma, hypomania; SI, social introversion. Small effect size (η_p^2) = .01, medium = .06, and large = .14.
*Significant at $p < .01$.

Table 3. Mean scores (standard deviations) of the three groups in the MMPI-2 content scales.

Scales	Patients with TMJ effusion *M* (SD)	Patients without TMJ effusion *M* (SD)	Control group *M* (SD)	*F*(2,39)	*p*	η_p^2
ANX	53.75 (13.60)	55.22 (11.64)	49.71 (11.06)	.84	.44	–
FRS	54.42 (10.65)	47.44 (9.37)	51 (7.19)	1.65	.21	–
OBS	51.58 (11.38)	47.33 (12.85)	46.48 (10.30)	.83	.44	–
DEP	54.42 (12.15)	48.33 (7.35)	48.19 (10.49)	1.5	.23	–
HEA	61.92 (15.94)	69.55 (16.98)	51.33 (9.68)	6.47	.004*	.25
BIZ	56.64 (14.78)	48.89 (6.92)	49.95 (7.57)	2.14	.13	–
ANG	50 (9.60)	48.89 (12.41)	47.24 (10.46)	.34	.71	–
CYN	53.50 (11.32)	48.11 (11.57)	49 (8.50)	.90	.38	–
ASP	51.17 (8.82)	43.44 (9.77)	49.33 (8.68)	2.05	.14	–
TPA	50.67 (10.82)	43.44 (8.35)	51.14 (10.01)	2.04	.14	–
LSE	54.05 (13.43)	47.44 (6.08)	48.67 (9.70)	1.39	.26	–
SOD	52.33 (11.91)	54.89 (13.64)	48.04 (8.59)	1.45	.25	–
FAM	54.50 (10.19)	48 (12.85)	48.48 (10.91)	1.32	.28	–
WRK	51.50 (11.28)	49.33 (10.88)	48.76 (7.91)	.32	.73	–
TRT	53 (11.09)	45.44 (10.14)	49.33 (9.36)	1.47	.24	–

Notes: ANX, anxiety; FRS, fears; OBS, obsessiveness; DEP, depression; HEA, health concerns; BIZ, bizarre ideation; ANG, anger; CYN, cynicism; ASP, antisocial practices; TPA, type A behavior; LSE, low self-esteem; SOD, social discomfort; FAM, family problems; WRK, work interference; TRT, negative treatment indicators.
*Significant at $p < .01$.

of chronic TMJ pain in patients without MRI signs of effusion. Previous researches showed that the predictive value of clinical findings based on TMJ palpation, with respect to the presence of MRI effusion, is less than 80%. Therefore, it was concluded that not all patients with fluid accumulation within the TMJ have pain and, vice versa, that not all patients with pain have MRI signs of effusion within the TMJ [13]. Results from the current study further suggested that, in the absence of other potential causes of pain referred to the TMJ area (e.g. myofascial pain of jaw muscles, orofacial neuralgias), the latter condition (i.e. chronic TMJ pain without MRI effusion or other signs of intracapsular disease) may be potentially associated with some personality traits related to elevated concerns about physical health and symptoms.

Indeed, patients of the test group had significantly higher scores than those with MRI effusion in the MMPI-2 Scale 3 ($p = .02$), which refers to complaints about physical symptoms with no apparent organic cause. In addition, they also have higher, if not significantly different, scores in the Scale 1 ($p = .07$), which reflects an exaggerated concern about physical health. From a statistical viewpoint, such values need to be re-appraised on larger samples, also considering that the high number of between-group comparisons performed in this study potentially increases the risk for spurious results (i.e. type I error). Notwithstanding, it is interesting to point out that such a psychometric profile reflects the so-called "V configuration" MMPI profile that has also been shown for patients

Table 4. Correlation between scores in MMPI-2 clinical scales and VAS pain levels.

Scales	Patients with TMJ effusion	Patients without TMJ effusion
L	−.42	−.02
F	.11	.61
K	−.01	−.20
HS	−.30	.58
D	−.01	.62
HY	−.24	.40
PD	−.11	.38
MF	−.05	−.19
PA	−.09	.33
PT	−.03	.26
SC	−.21	.57
MA	.06	.06
SI	−.33	.48

Notes: L, lie; F, infrequency scale; K, suppressor scale; HS, hypochondriasis; D, depression; HY, hysteria; PD, psychopathic deviance; MF, Masculinity/Femininity; PA, paranoia; PT, psychasthenia; SC, schizophrenia; Ma, hypomania; SI, social introversion.

Table 5. Correlation between scores in MMPI-2 content scales and VAS pain levels.

Scales	Patients with TMJ effusion	Patients without TMJ effusion
ANX	.06	.33
FRS	.10	.16
OBS	−.10	.03
DEP	−.001	.40
HEA	−.16	.56
BIZ	−.62*	.58
ANG	−.10	.27
CYN	.03	.43
ASP	.17	.51
TPA	−.07	.19
LSE	−.15	.58
SOD	−.28	.47
FAM	.05	.60
WRK	−.17	.25
TRT	.17	.51

Notes: ANX, anxiety; FRS, fears; OBS, obsessiveness; DEP, depression; HEA, health concerns; BIZ, bizarre ideation; ANG, anger; CYN, cynicism; ASP, antisocial practices; TPA, type A behavior; LSE, low self-esteem; SOD, social discomfort; FAM, family problems; WRK, work interference; TRT, negative treatment indicators.
*Significant at $p < .05$.

with chronic pain of different locations (e.g. low back, head and neck) [27,28].

High scores in MMPI-2 scales 1 and 3 in TMD patients have been shown in some previous investigations [29,30]. In addition, an association with personality traits has been reported several times in the TMD literature [26,31,32]. The novelty of current findings lies in the fact that such psychometric features were put into correlation with a specific subtype of patients with pain in the TMJ area, viz., those subjects with pain symptoms seemingly not justified by the MRI picture. A possible explanation is that certain personality traits might be involved in chronic TMJ pain. Notwithstanding, the current cross-sectional study design did not allow drawing cause and effect inferences, and further studies on this topic are needed.

The main limitation of this study lies in the very specific subpopulation of TMD patients that has been recruited. On one hand, the strategy to select individuals based on the purported TMJ pain-MRI effusion correlation was the most suitable approach to exclude other potential confounders for the assessment of an association with personality traits. On the other hand, it should be recognized that the exclusion of patients with other sources of TMD and/or orofacial pain is a limit to the generalization of findings, since it ended up in the inclusion of a very selective sample of subjects. Indeed, currently available epidemiological data suggest that muscle pain, possibly involving multiple TMD diagnoses in association with TMJ disorders, is the most frequent symptom in TMD patient populations [3]. The choice to exclude muscle pain patients from this investigation was due to the lack of accurate instrumental criteria to support the clinical diagnosis [33], which should have limited the validity of personality assessment. In addition, it must also be noted that using different MRI protocols, such as enhanced T1-weighted scans, may provide a more comprehensive depiction of the TMJ status for further evaluations of the disease status [34]. In addition, studies on larger samples can be performed to further increase the internal validity of findings, especially as far as the statistical power that is needed to detect the various thresholds for between-group differences is concerned.

In general, this study has important clinical implications for TMD practitioners. Indeed, it provides suggestions that symptoms in the TMJ area are not only related to a physical disorder. Previous investigations showed that muscle disorders are to be ruled out as possible causes for TMJ pain in subjects without MRI signs of arthritis [35]. These findings further suggest that psychological problems related with an attitude of developing somatic symptoms and chronic pain should also be considered in the pathway to differential diagnosis. The clinical impact of these findings is also important at the therapeutic level, given the potential influence of such personality traits on the treatment outcome, and interventions targeting cognitive, emotional, and behavioral factors may be effective in modifying the expression of pain in these patients. Of course, the time-consuming MMPI-2 instrument is too extensive for a routine orofacial pain assessment as well as for an investigation on large samples. However, the pilot data gathered in this study will help going forward in the definition of individually based approaches to the patients with chronic pain in the temporomandibular joint area to be developed in future research.

Conclusions

The present study investigated the psychological profile of chronic TMJ pain patients with or without MRI-detected signs of TMJ effusion. The study hypothesis was that, in the absence of other potential causes of pain in the TMJ area, subjects without MRI-TMJ effusion might have a peculiar personality profile.

Findings supported such a hypothesis, since it was shown that chronic TMJ patients without T-2 weighted MRI-detected TMJ disorders have a personality profile featuring the MMPI-"V configuration," characterized by high concerns about physical health and physical symptoms. Thus, in the clinical setting, the possible existence of a psychologically modulated condition in patients who refer pain in the TMJ area without signs of effusion should be taken into consideration.

Conflicts of interest

The authors declare they do not have any conflicts of interest.

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