Prevalence of Temporomandibular Disorder Diagnoses and Psychologic Status in Croatian patients

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Summary

The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) uses a dual axis system for diagnosing and classifying TMD patients. The objective of the study was to explore the prevalence of different types of TMD, psychologic distress, and psychosocial dysfunction in Croatian TMD patients and to compare data between Croatian and Swedish, American and Asian TMD patients. One hundred and fifty-four consecutive patients (117 female and 37 male) referred to the Department of Prosthodontics and Department of Oral Surgery, School of Dental Medicine in Zagreb, Croatia, were included in the study. The mean age of the Croatian population was 39 ± 14.5 years. Frequency distributions and descriptive statistics were obtained through the use of SPSS statistical programe (version 10), and chi-square statistical analyses were performed ($P < 0.05$) to evaluate gender differences. Group I (muscle) disorder was found in 64.9% of the patients; Group II (disc displacement) disorder was found in 31.8% and 27.3% of the patients in the right and left joints, respectively; Group III (arthralgia, arthritis, arthrosis) disorder was found in 21.4% and 26% of the patients in the right and left joints, respectively. Axis II assessment of psychologic status showed that 19.5% of patients yielded severe depression scores and 27.3% yielded high nonspecific physical symptom scores (somatization). Psychosocial dysfunction was observed in 21.4% of patients based on graded chronic pain scores (Grade III and IV). Axis I and II findings of Croatian TMD patients were generally similar to their Swedish, American and Asian cohorts. In all 4 populations, women of child-bearing age represented the majority of patients. The most common type of RDC/TMD diagnoses was muscle disorders. A considerable portion of TMD patients were clinically depressed, with

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elevated levels of nonspecific physical symptoms. These results suggest that the RDC guidelines are valuable in helping to classify TMD patients, support the usefulness of the RDC/TMD for gathering research and clinically relevant data, allowing international and cross-cultural comparison of clinical findings.

Key words: *temporomandibular disorders, RDC/TMD protocol, psychologic distress, psychosocial dysfunction.*

Introduction

By definition, temporomandibular disorders (TMD) is a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joints and associated structures, or both (1). TMD are a common cause of orofacial pain conditions (2), and pain is the most common symptom of TMD (3).

Findings from epidemiologic and experimentation-interventation studies indicate that TMD is a chronic pain condition that shares the major characteristics of other common chronic pain conditions, notably headaches and back pain (4, 5). The etiology of TMD is now considered to be multifactorial, although the relative importance of individual etiological factors is still controversial. Psychosocial factors play an important role in the etiology of TMD, adaptation to pain and eventual recovery. TMD patients exhibit a variety of psychological and behavioral characteristics including increased somatization, stress, anxiety and depression (6-10).

Several diagnostic protocols have been introduced for assessing and classifying TMD (1, 11-16). Although many investigators have attempted to explain the mind-body or physical-psychological interface over the last three decades, there are few instruments capable of supporting these approaches. The critical shortcomings severely limiting the generalizibility of almost all of these diagnostic systems are: (a) lack of operational criteria with demonstrated scientific reliability for measuring or assessing clinical signs and symptoms of TMD, and (b) absence of clearly specified criteria for the muscle and/or joint conditions or subtypes of TMD (eg, myofascial pain disorder, internal derangements, degenerative joint disease) (17, 18). However, with the advent of the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) (17), a novel opportunity now exists for a more precise examination of how the mind and the body interact according to the biopsychosocial model for chronic pain.

The aims of the present study were to examine the prevalence of the different types of TMD, psychologic distress, and psychosocial disability in Croatian TMD patients, to compare findings between Croatian and other TMD patient populations by using the same diagnostic RDC/TMD protocol, and to study gender differences in physical diagnoses, depression, nonspecific physical symptoms, and psychosocial dysfunction.

Materials and Methods

Subjects

A total of 154 patients (117 female and 37 male) were selected from 160 consecutive patients referred to the Department of Prosthodontics and Department of Oral Surgery, School of Dental Medicine in Zagreb, Croatia. Patients aged younger than 18 years (5 patients), those with medically diagnosed polyarthritis (1 patient), and those with no RDC/TMD-defined clinical TMD conditions were excluded from the study. The mean age of the Croatian patient population was 39 ± 14.5 years. All participants signed informed consent and the study was approved by the Ethics Committee, School of Dental Medicine, University in Zagreb, Croatia.

Methods

The 1996 National Institute of Health Conference Statement (19) noted that a significant problem in the TMD field is the lack of a diagnostic classification system based on etiology rather that signs and symptoms. To carry out etiologic studies, a reliable and valid diagnostic protocol is required to distinguish cases from normal subjects and to distinguish subdiagnoses among the TMD cases.

The RDC/TMD were developed to address the above-mentioned shortcoming (20). The project efforts yielded a set of research diagnostic criteria for TMD, which were offered to allow standardization and replication of research into the most common forms of muscle- and joint-related research. The RDC/TMD uses a dual axis system (Axis I and II) for diagnosing and classifying TMD patients. Axis I assigns physical diagnoses of the most commonly occurring masticatory muscle and/or TMJ disorders. Three major physical diagnostic groups are included:

- Group I. Muscle Disorders
  - Ia. Myofascial pain with limited opening
  - Ib. Myofascial pain without limited opening
- Group II. Disc displacements (right and left)
  - IIa. Disc displacement with reduction
  - IIb. Disc displacement without reduction with limited opening
  - IIc. Disc displacement without reduction without limited opening
- Group III. Arthralgia, arthritis, arthrosis (right and left)
  - IIIa. Arthralgia
  - IIIb. Arthritis of the TMJ
  - IIIc. Athrosis of the TMJ.

The diagnostic system as proposed is nonhierarchical and allows for the possibility of multiple diagnoses for a given subject. The rules for assigning diagnoses are as follows: A subject can be assigned at most one muscle (Group I) diagnosis (either myofascial pain or myofascial pain with limited opening, but not both). In addition, each joint may be assigned at most one diagnosis from Group II and one diagnosis from Group III. That is, diagnoses within any given group are mutually exclusive. This means that, in principle, a subject can be assigned from zero diagnoses (no diagnosable muscle or joint conditions) to five diagnoses (one muscle diagnosis plus one diagnosis from Group II and one diagnosis from Group III for each joint). In practice, cases assigned more than three diagnoses are very rare (17).

With the introduction of the RDC Axis II, both the clinician and the researcher confront an instrument that distinguishes itself from other technology in its ability to define the often complex internal relationship of the elements that constitute chronic pain. Axis II is used to assess behavioral, psychological, and psychosocial factors acknowledged to be relevant to diagnosis and management of the TMD patient: 1) pain status variables, including average, current, and worst pain intensity; 2) functional mandibular limitations; 3) psychological distress, based on SCL-90 subscales, specifically, depression and endorsement of nonspecific physical symptoms suggesting somatization tendencies; and 4) graded scale of chronic pain (GCP), which integrates pain intensity and interference into a single 0 - IV hierarchical scale to categorize level of pain severity (4, 17, 21, 22).

The SCL-90-R instrument is a brief, multidimensional inventory design to screen for a broad range of psychological problems and symptoms of psychopathology (somatization, obsessive-compulsive disorder, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism). Axis II of the RDC/TMD assesses the biobehavioral domain for chronic pain and contains two subscales extracted from the SCL-90-R because of their high relevance for pain disorders: depression and somatization. Depression is the psychological mood characterized by feelings of sadness, helplessness, hopelessness, guilt, despair, and futility; somatization is the process whereby a mental condition is experienced as a bodily symptom. Both psychological parameters were measured with the subscales or Symptom Checklist-90 (SCL-90) (23).

The GCP scale indicates both the extent to which pain is perceived by the patient and the degree to which the pain is disabling. Grade 0 identifies patients who do not report TMD pain but who may report symptoms of discomfort, such as jaw stiffness or troublesome TMJ clicking sounds. Grade I identifies patients reporting low pain intensity and

low levels of TMD-pain related interference in usual psychosocial activities. Grade II identifies patients reporting moderate-high levels of pain intensity (? 5 on a 0-10 scale) but low levels of pain-related activity interference. Patients characterized as Grade III (moderate interference) and Grade IV (high interference) show incrementally higher levels of psychosocial interference. Characteristic pain intensity and disability measures are combined to classify the GCP scale of TMD patients as psychosocially functional (TMD patients with GCP scores in the I - II range) or psychosocially dysfunctional (TMD patients with GCP scores in the III - IV range) (24).

Statistical methods

Frequency distributions and descriptive statistics were obtained through the use of SPSS version 10 for Windows (SPSS, Chicago, IL), and chi-square statistical analyses were performed ($P < 0.05$) to evaluate gender differences.

Results

Of the 160 consecutive referrals to the Department of Prosthodontics and Department of Oral surgery, School of Dental Medicine, Zagreb, Croatia, 5 were excluded from the present study because of age (five adolescents were younger than 18 years) and one because of the presence of medically diagnosed rheumatoid arthritis. Analyses reported below are for the remaining 154 TMD patients referrals. The age-gender distribution of the Croatian patients is given in Figure 1. One hundred and seventeen patients (76%) were women, with a mean age of 39.4 years (range from 18 to 78 years); thirty-seven (24%) were men, with a mean age of 37.5 years (range from 18 to 72 years). The Croatian group had a female-to-male gender ratio of 3.2:1. The Croatian patients were all Caucasian and at least moderately well educated (63%).

Axis I: RDC/TMD diagnoses

The patients were classified into one or more of the three diagnostic groupings created by the RDC/TMD for classifying the most common forms of TMD. The distributions of diagnoses resulting from the RDC/TMD examination are shown in Figures 2 to 4. Group I diagnoses were found in 64.9% Croatian TMD patients. 46.8% exhibited myofascial pain and 18.1% exhibited myofascial pain with limited opening (Figure 2). Group II (disc displacement) disorders were found in 31.8% of the right TMJs and 27.3% of the left TMJs in Croatian patients. The most common form of Group II disorder in Croatian patients was disc displacement with reduction (29.9% of the right and 26% of the left TMJs). Disc displacement without reduction and with limited opening was found in 1.9% of the right and 1.3% of the left TMJs, while diagnosis of disc displacement without reduction and without limited opening was not found in examined Croatian patients (Figure 3). Group III (arthralgia, arthritis, and arthrosis) disorders were found in 21.4% of the right TMJs and 26% of the left TMJs of the Croatian patients. TMJ arthralgia was a much more prevalent diagnosis in the Croatian group (18.8% of the right TMJs and 22.1% of the left TMJs). TMJ arthritis was found in 1.9% of the right TMJs and 2.6% of the left TMJs and TMJ arthrosis was found in 0.6% of the right TMJs and 1.3% of the left TMJs in the Croatian group (Figure 4).

Axis II: Psychosocial assessment

The second axis, RDC Axis II, measures characteristic pain intensity, pain-related disability (GCP Scale), depression, nonspecific physical symptoms (otherwise characterized by somatization tendencies) and limitations related to mandibular functioning (jaw disability checklist).

Pain was the main reason for 80% of Croatian patients seeking treatment. The mean values for TMD pain intensity was 4.6 ± 1.8 in the Croatian group. The jaw disability checklist of the RDC/TMD is a composite of 12 items concerning limitations in activities related to mandibular functioning. The checklist measures the number of activities limited - not the degree of limitation in mandibular functioning. The most frequently reported activities that were impaired by TMD were chewing (64.3%), eating hard food (61.7%) and yawning (53.9%), and the rarest were drinking (2.6%), eating soft food (1.3%) and having your usual facial appearance (0.6%). The mean number of limited activities was 2.6.

Thirty-two items from the SCL-90 were included to provide scale scores for depression and somatization - the tendency to report disturbing nonspecific physical symptoms. Figure 5 shows the distributions of normal, moderate, and severe scores for depression and somatization scale scores (SCL--90) in Croatian TMD clinic patients. Nineteen and a half percent of Croatian TMD patients yielded severe depression scores, and 27.3% experienced severe levels of somatization scores using US-derived standards.

The distributions of graded chronic pain status of TMD patients are shown in Figure 6. The RDC/TMD uses a graded chronic pain scale (Grade 0 - IV) developed to more accurately quantify the level of pain-related psychosocial function. For the Croatian TMD patients, 21.4% exhibited dysfunctional chronic pain (Grade III and IV).

Significant gender differences were only observed for TMJ arthralgia and severe somatization score ($p < 0.05$), but no significant gender differences were reported for the remaining physical diagnoses, depression and psychosocial status in a Croatian TMD patient population (Table 1).

Discussion

The RDC/TMD criteria for both Axes I and II have been used in numerous clinical research studies to characterize physical, psychological, and psychosocial factors associated with TMD as well as the relationship among these factors (7, 18, 20, 25, 26). The RDC/TMD has been suggested as a model system for the diagnosis and assessment of all chronic pain condition (26). The RDC/TMD Axis I have been found to be reliable and clinically useful for adult populations in a variety of clinical settings (18, 27). In a recent study, Dworkin et al (24) analyzed the reliability, validity, and clinical utility of the depression, non-specific physical symptoms, and graded chronic pain scales comprising the RDC/ /TMD Axis II and concluded that the major RDC/ /TMD Axis II measures demonstrate psychometric properties suitable for comprehensive assessment and management of TMD patients.

One of the aims of the study was to compare findings between Croatian and other TMD patient populations (18, 28) by using the same diagnostic RDC/TMD protocol. The Croatian group had a gender ratio of 3.2:1, compared to the female-to-male ratio in the Swedish, American and Asian groups of 3.6:1, 5.0:1, and 3.1:1, respectively. In the present study, for all 4 TMD cohorts, women of child-bearing age represented the majority of patients. The gender and age distribution suggests a possible link between TMD and the female hormonal axis (29). There are a number of potential explanations that may account for the over-representation of female in TMD patient samples. TMD pain in the general population is estimated to be approximately two to three times more common in women than in men (30). Women have been found to seek treatment for TMD four to seven times more than men (3), suggesting there may be a sex role or psychosocial differences in the appropriateness of seeking assistance for pain problems (31). Females have also been reported to demonstrate a tendency to monitor bodily symptoms significantly more than males (32), and endogenous female reproductive hormones have been implicated as potentially contributing to the etiology of the disorder.

The RDC/TMD group the most common forms of TMD into 3 diagnostic categories or groups (muscle disorders, disc displacement, and other joint conditions (arthralgia, arthritis, and arthrosis)) and allow multiple Axis I diagnoses to be made for a given patient. The most common type of RDC/TMD diagnoses was muscle disorders in Croatian TMD patients. These findings are consistent with the higher prevalence of muscle disorders in the general population (33). In contrast to Croatian, Swedish and American TMD patients, more Asian patients suffered from myofascial pain associated with limited opening. This may be attributed in part to the generally smaller jaw structures, and thus smaller range of mandibular opening, of Asians. The most frequent form of disc displacement (Group II disorders) in Croatian subjects was disc displacement with reduction (31.8% of the right TMJs, and 29.3% of the left TMJs), while disc displacement without reduction showed fairly low prevalence rates (around 3% for either TMJs). Group III (arthralgia, arthritis, arthrosis) disorders were found in 22.4% of the right TMJs and 26% of the left TMJs of Croatian patients. Higher rates of TMJ arthralgia were observed, while the

prevalence of TMJ arthritis and TMJ arthrosis was generally low. In conclusion, the prevalence rates of these disorders had a similar distribution pattern in all 4 TMD patient cohorts. The rates reported here for RDC/TMD diagnoses of joint disorders of all kinds do not include confirmation by MRI and arthrograms joint imaging. While there appears to be good agreement concerning the distribution of TMD subtypes based on the RDC/TMD definitions across the populations studied any differences in prevalence rates for TMD subtypes cannot be attributed to methodological differences (18, 28).

Pain is unquestionably the most common presenting symptom and, overwhelmingly, the most frequent reason for seeking TMD treatment (3, 24). It is also well-known that TMD pain is frequently accompanied by psychological distress - notably depression and somatization, and can be associated as well with psychosocial disability, including pain-related interference with usual work, home, and interpersonal activities and extensive use of health care services (24, 34, 35). In the Croatian group, 80% of the clinical patients reported pain. Similar findings were found in all 4 TMD populations. TMD patients are particularly interesting from a psychosocial perspective. Fascinating questions arise regarding the cause of the disorders, evaluation of pain and disability, patient management, predictions of outcome, the relationship between TMD and depression, and the role of cognitive factors in the presentation and course of TMD (10). In the present study, Axis II findings for depression, nonspecific physical symptoms associated with somatization were very similar between TMD cohorts (18, 28). A significant minority in all 4 groups met criteria of RDC/TMD for severe depression (approximately 20%) and severe nonspecific physical symptoms (approximately 30%). These results are consistent with findings from a study of psychiatric morbidity in American TMD patients (34) and those of Auerbach et al (36), who also found that a considerable number of TMD patients were clinically depressed. Statistically significant gender difference was only observed for TMJ arthralgia and elevated nonspecific physical symptoms score. The reason for this observation is not known and warrants further investigations involving more patients. The finding with regard to the psychologic status of Croatian patients must be interpreted with caution, because the normative values used to define these extreme categories were derived from a large US group. No reliability and validity testing or population-based standardized depression and somatization scores have been reported, and Croatian-derived standards must be established for accurate interpretation of results.

No significant gender difference was reported for graded chronic pain in Croatian TMD patients. Although the percentage of Croatian, Swedish and American TMD patients that were psychosocially dysfunctional was 3 to 5 times higher than that of Asian TMD patients, no gender differences were observed in graded chronic pain status. The lack of significance between genders could be attributed to their small sample sizes, but the bases for these observations are still not known. Further cross-cultural and ethnical investigations are necessary before relationships between clinical TMD and psychological variables can be confirmed.

Psychological interventions such as stress management, biofeedback, and habit reversal should be introduced as part of the total management of TMD patients (35, 37). Finding and implementing the correct intervention in a timely manner is important. Early intervention may prevent the suffering that results from a chronic pain condition, prevent further increase in psychopathology and impairment, and save the health care industry a great deal of time and expense. Thus the dentist may want to use psychological tests to evaluate patients, or refer patients for psychological testing, if the pain appears to be unmanageable with procedures they have been trained to provide (38).

Conclusions

The findings of the RDC/TMD Axis I and Axis II in this study showed a remarkably high degree of concordance and similar distribution patterns between the Croatian, Swedish, American and Asian TMD patients. Comparisons can be made between different groups of TMD patients when the same set of examination procedures, the same clinical diagnostic algorithms, and the same history methods are used to assess behavioral, psychologic, and psy-

chosocial factors. Results from this study are valuable in helping to explore how differences across cultural and ethnic groups, physical, and other structural factors contribute to the differential rates of expression of TMD subtypes.

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