Research Diagnostic Criteria Axis II in Screening and as a Part of Biopsychosocial Subtyping of Finnish Patients with Temporomandibular Disorder Pain

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Aims: *To assess Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) Axis II variables in an initial psychosocial screening and as a part of biopsychosocial subtyping of Finnish referral patients with TMD pain for adjunct multidisciplinary assessment.* ***Methods:*** *Consecutive Finnish referral patients with TMD pain (n = 135) participated in this questionnaire-based survey. Psychosocial screening was based on Graded Chronic Pain Scale (GCPS) and culturally adjusted Symptom Checklist 90-revised (SCL-90R) depression scale scores and subtyping on GCPS pain-related interference in accordance with previous treatment tailoring studies. Biopsychosocial subtyping variables included symptoms of depression and somatization, general health, pain-related worry, sleep dysfunction, and coping ability. Subtype comparisons were analyzed with Bonferroni adjusted P values and multivariable logistic regression (SAS 9.3).* ***Results:*** *Based on psychosocial screening, 44% of the patients were psychosocially uncompromised (TMD subtype 1), 33% moderately, and 23% severely compromised (TMD subtypes 2 and 3). Compared to TMD subtype 1, TMD subtype 2 patients reported intermediate scores, and the most vulnerable TMD subtype 3 had the poorest general health, most elevated depression, somatization, worry and sleep dysfunction, and poor coping ability (P < .05). According to multivariable logistic regression, depression and worry levels were significantly higher in TMD subtype 3 compared to TMD subtype 1, whilst patients in TMD subtypes 1 and 2 reported significantly better coping ability compared to TMD subtype 3 (P < .05).* ***Conclusion:*** *The Finnish RDC/TMD Axis II was found reliable in initial TMD pain patient screening and with further biopsychosocial assessment identified three main TMD subtypes, two with compromised psychosocial profiles for adjunct multidisciplinary assessment.*
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Key words: biopsychosocial, multidisciplinary assessment, RDC/TMD Axis II, TMD pain

Temporomandibular disorders (TMD) represent a number of clinical conditions that involve the temporomandibular joints, masticatory muscles, and associated structures, and share the common symptoms of pain and jaw function limitations. There is now general consensus that TMD are a common form of persistent orofacial pain and resemble musculoskeletal disorders and chronic pain disorders in general.[1] Consistent with studies in other common chronic pain disorders, such as low back pain and headache, patients with persistent symptoms of TMD also show psychosocial illness impact on their lives, eg, maladaptive coping, affective disturbance, and somatization.[2–4] Therefore, there is support for the use of the biopsychosocial model, both in the understanding as well as the assessment and management of TMD.[2–4]

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It is also now acknowledged that to prevent chronicity it is important to recognize those patients who are more vulnerable to develop complex psychosocial symptoms and pain interference.[3,5–8] Vulnerable patients are also more prone to increased use of health care and societal influences, such as sick leave and inactivity, and may be best managed by a multidisciplinary approach. Therefore, there is increasing support for the view that the subjective and biopsychobehavioral elements related to the pain experience should be systematically evaluated.[4] In fact, the recent recommendations state that "biobehavioural assessments should be conducted for screening purposes on all TMD patients presenting with pain, especially persistent pain"[3] and special algorithms have been provided for clinicians as guidelines, ie, the Research Diagnostic Criteria for TMD (RDC/TMD; www.rdc-tmdinternational.org).[9]

The RDC/TMD has been extensively used since 1992 and recommended as a model system for the assessment of TMD and persistent pain in general.[10–12] It has been translated into several languages using specific comprehensive guidelines for cultural equivalency by the International RDC/TMD Consortium and is currently being updated to the Diagnostic Criteria of TMD (DC/TMD).[13] Additionally, RDC/TMD Axis II psychosocial assessments have been used to identify patients with low versus high pain-related disability based on the Graded Chronic Pain Scale (GCPS) as a basis for tailored treatments.[14–16] For example, when patients with elevated levels of pain interference, ie, RDC/TMD Axis II GCPS disability scores of II-High, III, and IV were selected for comprehensive care programs (cognitive-behavioral intervention in combination with the usual conservative treatment), the treatment outcomes were found more efficacious in reducing TMD pain and in increasing patient-perceived ability to control pain than the usual treatment immediately posttreatment, whilst the long-term results varied from fairly comparable to superior. These patients were also found to have elevated psychological distress, which together with other individual factors may have influenced the long-term treatment responses and contributed to pain chronicity in general, as found also in other pain-related conditions.[4,17]

The aim of this study was to assess the Finnish version of RDC/TMD Axis II (RDC/TMD_FIN[18]) variables in an initial psychosocial screening and as a part of biopsychosocial subtyping of Finnish referral patients with TMD pain for adjunct multidisciplinary assessment. For that purpose, the relationship between RDC/TMD Axis II GCPS and additional biopsychosocial variables, such as symptoms of depression and somatization, overall general health, pain-related worry, sleep dysfunction, coping, and patient-perceived treatment goals and expectations were analyzed. The working hypothesis was that psychosocially vulnerable patients with TMD pain need early identification, and RDC/TMD Axis II and the additional biopsychosocial methods used in this study are suitable for screening and subtyping patients with compromised psychosocial adaptation for adjunct multidisciplinary assessment and treatment planning.

Materials and Methods

The participants in this study were consecutive patients with TMD referred to the Department of Oral Diseases of Turku University Central Hospital over a 2-year period, 2010–2011 (n = 135). All participants gave informed consent according to the Ethics clearance by the hospital. The inclusion criteria in this study were that the patients referred to the department's tertiary specialist care unit had experienced TMD pain in the past 6 months according to the RDC/TMD criteria (RDC/TMD_FIN[18]).

All patients were assessed in a standardized way by three experienced TMD/orofacial pain specialists and completed a comprehensive multidimensional questionnaire including the following items for this study.

TMD Pain Patient Screening

RDC/TMD_FIN GCPS Scores. Patients were classified into GCPS grades based on the RDC/TMD Axis II_FIN (GCPS grades I–IV).[9,19] The GCPS grades were derived from seven standardized, culturally validated questions measuring *(1)* characteristic pain intensity (CPI), *(2)* pain-related interference, and *(3)* disability points. The CPI scores (0–100) were calculated from the 0–10 ratings of current, worst, and average pain intensity. Pain-related interference (0–100) included 0–10 ratings of interference with daily, social, and work/household activities. The total disability points score (0–6) was derived from the points measuring disability days (0–3) and pain interference (0–3) on daily, social, and work activities during the past 6 months.[9,19] According to the GCPS classification, patients with low pain intensity (CPI < 50) and no or low disability points (0–2) were graded as GCPS grade I, and those with high pain intensity (CPI ≥ 50) and no or low disability points (0–2) as GCPS grade II. Patients in GCPS grade III scored high disability point scores (3–4) that were moderately limiting, and those in GCPS

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grade IV scored high disability point scores that were severely limiting (5–6). Patients in GCPS grade II were further subdivided into two grades, based on disability point scores according to Dworkin et al[14,15] as follows: GCPS grade II-Low = no disability (disability points = 0) and GCPS grade II-High = low disability (disability points = 1–2).

RDC/TMD_FIN Depression and Somatization Scores Based on the Symptom Checklist 90-Revised (SCL-90R). SCL-90R–based questions were derived from the RDC/TMD_FIN,[18] which had been assessed for cultural equivalency according to the RDC/TMD Consortium guidelines. A total of 20 questions measured symptoms of depression (depression scale score). Nonspecific physical symptoms included 12 somatization questions with pain items and 7 somatization questions without pain items (somatization scale scores). To avoid potential intercultural variation, raw mean and median scores were calculated for each SCL-90R score, and SCL-90R box plots were generated to include the interquartile ranges (25th and 75th percentiles) as well as the minimum and maximum scores.

TMD Pain Patient Subtyping

Subtyping was based on the GCPS pain intensity and pain-related interference variables, SCL-90R symptoms of depression and somatization, and selective additional biopsychosocial assessment variables related to overall general health, pain-related worry, sleep dysfunction, and the ability to control and/or decrease pain and patient-perceived treatment goals and expectations. Patient-perceived general health status was rated on a 5-point scale (1 = excellent, 5 = poor). Patients' level of concern about their pain condition was rated on a 0–10 scale (0 = not at all worried, 10 = extremely worried).[1] Sleep dysfunction was assessed by the average score of three SCL-90R questions measuring sleep disturbance (difficulty falling asleep, restless sleep, and early-morning awakening, range 0 to 4). Coping questions were derived from the Coping Strategies Questionnaire, measuring ability to control pain (range 0 to 6) or the ability to decrease pain (range 0 to 6).[20] Patients were also asked to indicate their self-perceived goals and treatment expectations regarding the need for treatment to improve pain control, jaw function, and/or stress management skills (0 = no, 1 = yes).

Psychosocial TMD pain patient screening was based on GCPS and SCL-90R depression scale scores. The biopsychosocial TMD pain subtyping assessments were analyzed in three groups based on the GCPS pain-related interference and in accordance with the system used in previous TMD treatment tailoring studies[14–16] as follows: *(1)* TMD subtype 1 = GCPS grades I and II-Low; *(2)* TMD subtype 2 = GCPS grade II-High; and *(3)* TMD subtype 3 = GCPS grades III and IV.

Statistical Analysis

The associations between categorical variables were evaluated using the chi-square test. The differences in the continuous variables were analyzed with the Kruskal-Wallis test and pairwise comparisons with the Mann-Whitney *U* test using Bonferroni adjusted *P* values. The reliabilities of the SCL-90R variables were statistically assessed using standardized Cronbach alpha coefficients. TMD subtyping results were further analyzed using a multivariable logistic model for all independent psychosocial variables in the model. Results are expressed using odds ratios (OR) with their 95% confidence intervals (CI). Statistical analyses were done using the SAS System for Windows, version 9.3. *P* values < .05 were considered statistically significant.

Results

Demographic Data of the Subjects

The mean age of the patients (n = 135) was 45.3 years (SD 15.2) and 78% of the subjects were female. According to the distributional data for socioeconomic background, the majority had received higher education (59%), were married (78%), and were employed (54%). There were no significant differences in the age and sex distribution or the socioeconomic background related to the level of education and marital status between the five GCPS grades or the three TMD subtypes. A significantly higher percentage of patients in TMD subtype 3 (74.1%) were unemployed compared to TMD subtypes 1 and 2 (39.2% and 36.6%, respectively) (*P* = .004).

TMD Pain Patient Screening

The results of the screening process indicated that over 20% of the patients scored high levels of TMD pain-related disability (GCPS grades III = 15.6% and IV = 6.7%); ie, they belonged to TMD subtype 3 (Table 1). Over 30% experienced low levels of pain interference associated with their TMD problem (GCPS grade II-High; ie, TMD subtype 2), while the rest, about 44%, reported no or only low levels (n = 3/59) of pain interference (GCPS

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Table 1 TMD Pain Data of the Study Sample (n = 135)

	TMD subtype 1	TMD subtype 2	TMD subtype 3	*P**
n (%)	59 (43.7%)	45 (33.3%)	31 (22.9%)	
Pain interference, 0–10; mean (SD)				
Daily activities	2.22 (2.14)	5.60 (1.82)	7.47 (1.44)	A
Social activities	0.85 (1.35)	4.28 (1.75)	7.32 (1.97)	A
Work/housework	0.75 (1.20)	4.10 (4.50)	7.17 (1.46)	A
Pain intensity, 0–10; mean (SD)				
Current	3.25 (2.06)	5.45 (2.02)	6.68 (2.18)	B
Worst	6.17 (2.35)	8.41 (1.25)	8.68 (1.28)	C
Average	4.47 (2.01)	6.81 (1.50)	7.44 (1.38)	D
Pain type				.064
Constant (40%)	33.33	36.36	58.62	
Fluctuating (60%)	66.67	63.64	41.38	
Pain duration (y)	4.85 (8.31)	8.57 (9.29)	5.73 (7.86)	.314

*A: 1 vs 2, $P < .001$; 1 vs 3, $P < .001$; 2 vs 3, $P < .001$.
B: 1 vs 2, $P < .001$; 1 vs 3, $P < .001$; 2 vs 3, $P = .034$.
C: 1 vs 2, $P < .001$; 1 vs 3, $P < .001$; 2 vs 3, $P = .738$.
D: 1 vs 2, $P < .001$; 1 vs 3, $P < .001$; 2 vs 3, $P = .229$.

grades I = 23.7% and II-Low = 20%; ie, TMD subtype 1). All GCPS pain-related interference ratings in TMD subtype 1 were significantly lower compared to TMD subtypes 2 and 3, whilst TMD subtype 3 had significantly higher ratings compared to TMD subtypes 1 and 2 ($P < .001$; Table 1). GCPS pain intensity variables, including the current, worst, and average TMD pain were significantly lower in TMD subtype 1 compared to TMD subtypes 2 and 3 ($P < .001$; Table 1). No significant differences in worst and average pain-intensity levels were found between TMD subtypes 2 and 3, apart from current TMD pain intensity ($P = .034$). The fluctuating type of pain was more common in TMD subtypes 1 and 2 (66.7% and 63.6%, respectively) compared to TMD subtype 3 (41.4%). The mean duration of TMD pain was 6.3 years (SD 8.6); ie, all patients in this study had chronic/persistent TMD pain. No significant differences were found between the five GCPS grades or the three TMD subtypes regarding this variable.

Cronbach alpha coefficients were computed to assess the internal reliability of the SCL-90R scale scores on depression (0.98), somatization with pain items (0.81), and somatization without pain items (0.84). The alpha values indicated reliability and good internal inter-item consistency for all three SCL-90R scores in the present study sample.

Figure 1 shows box plots of the SCL-90R depression score screening data in each GCPS grade. The mean SCL-90R depression levels were significantly elevated in GCPS grades III and IV (mean 1.34, SD 0.88; mean 2.22, SD 0.71, respectively) in comparison to GCPS grades I and II-Low (mean 0.56, SD 0.59; mean 0.55, SD 0.62; $P < .05$ and $P < .001$, respectively). A significant difference was also found between GCPS grade II-High (mean 0.91, SD 0.69) and GCPS grade IV ($P < .001$).

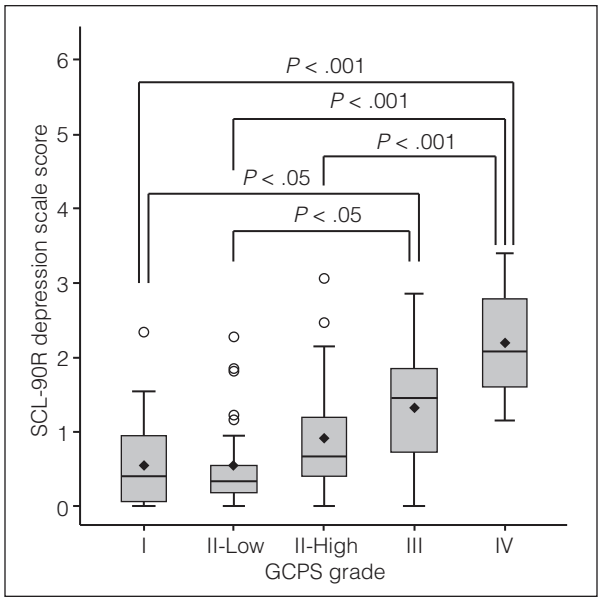

Fig 1 Box plot of SCL-90R depression scale screening data for each Graded Chronic Pain Scale (GCPS) grade. Shown are median (solid line inside the box), mean (diamond inside the box), 25th and 75th percentiles (lower and higher boundaries of box), whiskers (the lowest value within 1.5 interquartile range of the lower quartile or the highest value within 1.5 interquartile range of the upper quartile), and outliers.

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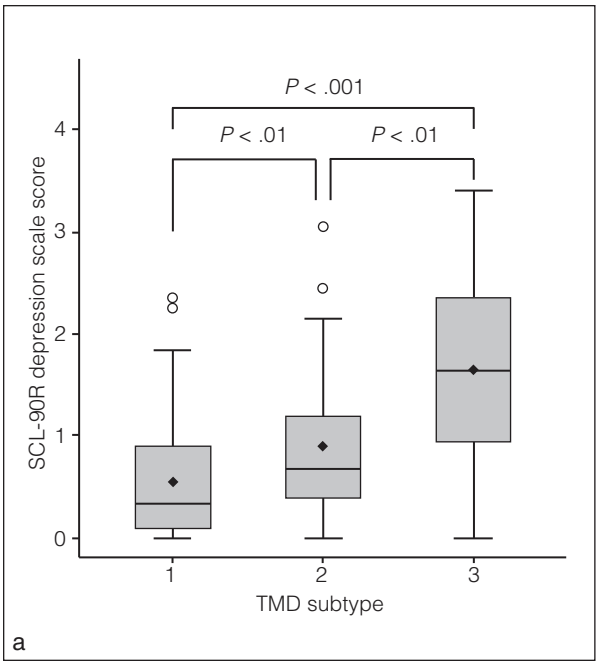

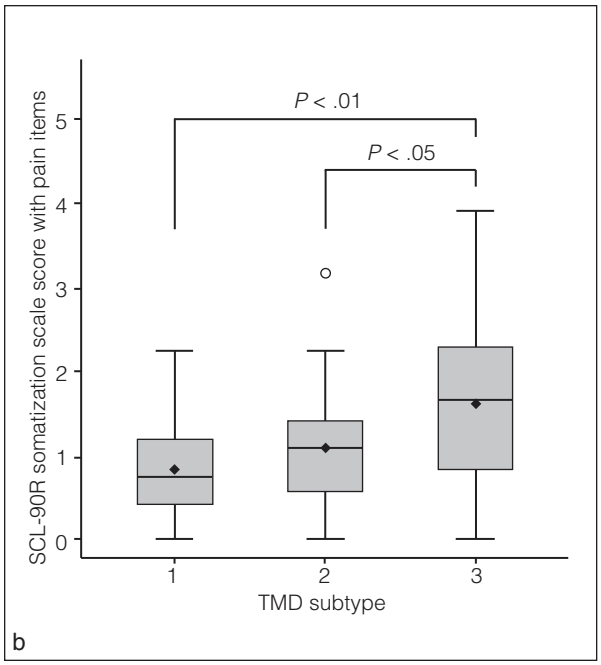

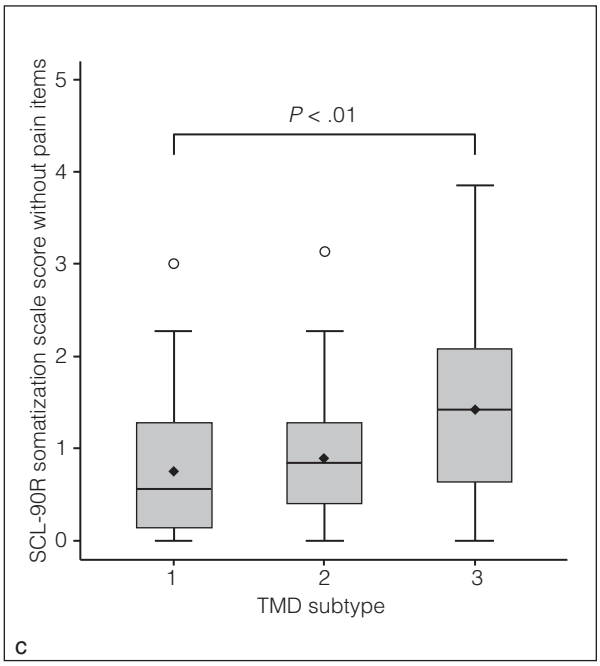

Figs 2a to 2c Box plots of SCL-90R scores for each TMD subtype. Each box plot shows median (solid line inside the box), mean (diamond inside the box), 25th and 75th percentiles (lower and higher boundaries of box), whiskers (the lowest value within 1.5 interquartile range of the lower quartile or the highest value within 1.5 interquartile range of the upper quartile), and outliers.

TMD Pain Patient Subtyping

Depression scale scores for patients in TMD subtype 2 were significantly higher than in TMD subtype 1 (P = .004) and significantly lower than in TMD subtype 3 (P = .002) (Fig 2a). The depression scale scores were significantly higher in TMD subtype 3 in comparison to TMD subtype 1 (P = .0003). Both somatization scale scores (with and without pain items) in TMD subtype 3 (Figs 2b and 2c) were significantly higher than in TMD subtype 1 (P = .003 and P = .005, respectively), while no significant differences were found between TMD subtypes 2 and 1. A significant difference was found in somatization scale scores with pain items between TMD subtypes 2 and 3 (P = .044), whilst there was a trend

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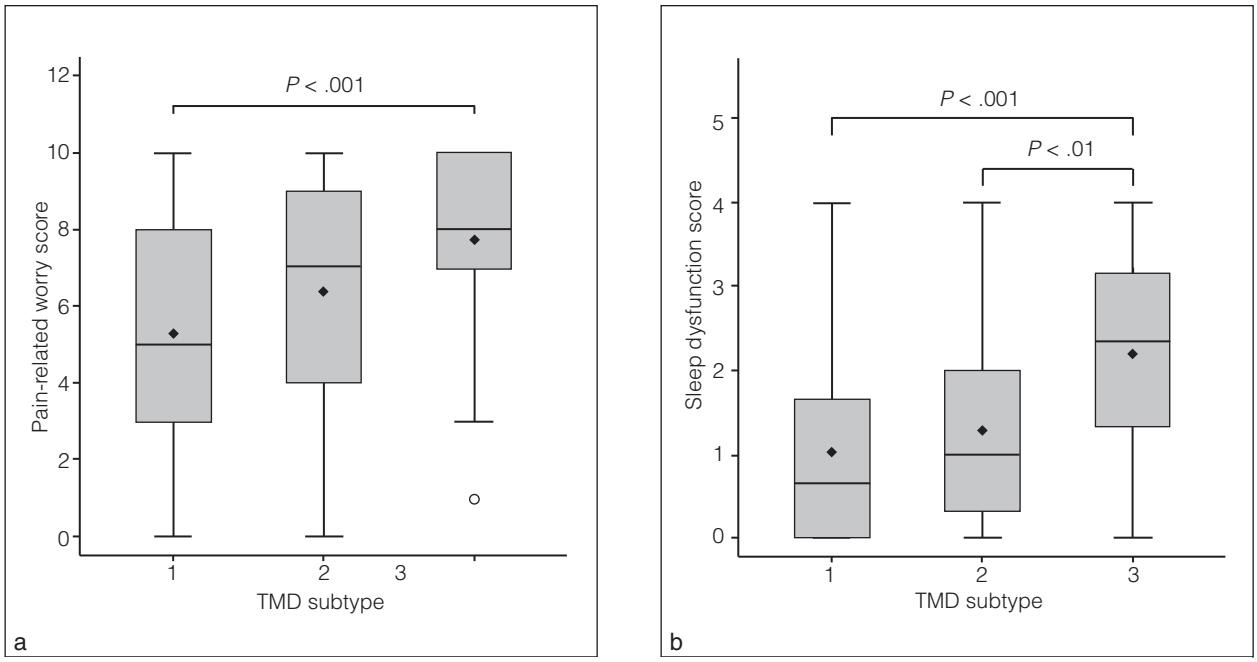
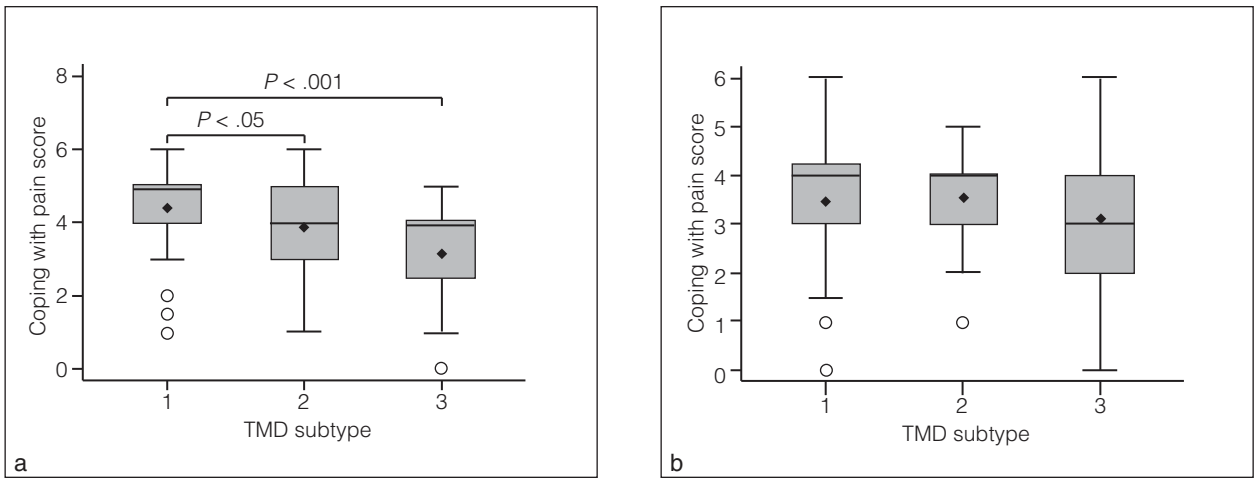


Figs 3a and 3b Box plots of *(a)* pain-related worry and *(b)* sleep dysfunction scores in each TMD subtype. Shown are median (solid line inside the box), mean (diamond inside the box), 25th and 75th percentiles (lower and higher boundaries of box), whiskers (the lowest value within 1.5 interquartile range of the lower quartile or the highest value within 1.5 interquartile range of the upper quartile), and outliers.



Figs 4a and 4b Box plots of ability to *(a)* control or *(b)* decrease TMD pain in each TMD subtype. Shown are median (solid line inside the box), mean (diamond inside the box), 25th and 75th percentiles (lower and higher boundaries of box), whiskers (the lowest value within 1.5 interquartile range of the lower quartile or the highest value within 1.5 interquartile range of the upper quartile), and outliers.

towards significance between TMD subtypes 2 and 3 in somatization scale scores without pain items ($P = .053$).

The biopsychosocial data related to perceived general health status, pain-related worry, sleep dysfunction, and coping ability with TMD pain are shown in Figs 3 and 4 in each TMD subtype. A total of 33.6% of the participants rated their general health as less than good. General health was rated better in TMD subtypes 1 and 2 ($P < .0001$) compared to TMD subtype 3. The level of pain-related worry was significantly higher in TMD subtype 3 compared with TMD subtype 1 ($P = .0003$), but not in comparison with TMD subtype 2 ($P = .07$; Fig 3a). Patients in TMD subtypes 1 and 2 reported significantly lower levels of sleep dysfunction

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Table 2 Associations Between the Psychosocial Variables and the TMD Subtypes by Multivariable Logistic Regression

Variable	Odds ratio	95% Confidence Interval for odds ratio	*P*
Depression Scale score			**.038***
A	1.91	0.63–5.83	.254
B	0.33	0.10–1.07	.065
C	5.74	1.48–22.23	**.011**
Somatization Scale score with pain items			.130*
A	0.04	0.001–1.17	.061
B	0.20	0.02–2.35	.203
C	0.17	0.01–6.55	.344
Somatization Scale score without pain items			.075*
A	36.50	1.44–926.30	.029
B	4.44	0.46–43.25	.200
C	8.22	0.29–235.23	**.218**
Pain-related worry			**.037***
A	1.14	0.91–1.43	.246
B	0.85	0.72–1.01	.068
C	1.34	1.06–1.70	**.015**
Sleep dysfunction			.464*
A	1.30	0.69–2.46	.424
B	1.44	0.78–2.65	.247
C	0.90	0.44–1.86	**.784**
Ability to control pain			**.002***
A	0.46	0.25–0.84	**.013**
B	1.47	0.95–2.27	.085
C	0.31	0.16–0.60	**.001**
Ability to decrease pain			.084*
A	1.32	0.76–2.27	.322
B	0.73	0.49–1.08	.114
C	1.81	1.03–3.19	.039

* Overall *P* value.
A = TMD subtype 3 compared to 2; B = TMD subtype 1 compared to 2; C = TMD subtype 3 compared to 1. Significant *P* values in bold.

in comparison to TMD subtype 3 ($P < .001$ and $P = .005$, respectively; Fig 3b). Patients in TMD subtype 1 reported significantly better ability to control their TMD pain compared to TMD subtype 2 ($P = .048$) and subtype 3 ($P < .001$), while there was only a trend towards a significant difference in group comparisons between TMD subtypes 2 and 3 ($P = .054$; Fig 4). All TMD pain patients reported a need to improve pain control and jaw function, whilst those belonging to TMD subtype 3 additionally indicated a greater need to improve stress management skills ($P < .001$).

Table 2 shows the further analysis by multivariable logistic regression between the three TMD subtypes and the psychosocial variables, including depression scale score, somatization scale scores (with/without pain), pain-related worry, sleep dysfunction, and the ability to control or decrease pain. Overall significance was found for SCL-90R depression scale score (overall $P = .038$), pain-related worry ($P = .037$), and ability to control pain ($P = .002$). The depression scale and pain-related worry scores were significantly higher in TMD subtype 3 compared to TMD subtype 1. The most significant association was found in the level of perceived ability to control pain; patients in TMD subtypes 1 and 2 reported significantly better ability to control their TMD pain in comparison to TMD subtype 3 ($P = .001$ and $P = .013$, respectively).

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Discussion

The RDC/TMD Axis II_FIN and the additional biopsychosocial assessment variables used in this study were found suitable for screening and subtyping of patients with TMD pain, and the results highlight the need for early identification and adjunct multidisciplinary assessment and treatment planning for patients with compromised psychosocial adaptation.

Three main subtypes of TMD pain patients with different psychosocial adaptation were identified, two of which had compromised psychosocial profiles. While nearly half of the patients presented with uncomplicated TMD pain–related psychosocial profiles (TMD subtype 1), about one-fifth reported severe or moderate levels of psychosocial disability associated with severe levels of psychological distress (TMD subtype 3) and a further 30% had low levels of disability associated with moderate levels of psychosocial impairment (TMD subtype 2). The most psychosocially compromised or vulnerable TMD pain patients could be identified in the initial screening by the RDC/TMD Axis II_FIN. In further analyses, these patients showed other distinguishing features, such as poor overall general health status, elevated pain-related worry and sleep dysfunction, poor coping skills, and self-perceived need for stress management. These patients were given the option to be evaluated by an experienced pain psychologist, and the majority accepted this option as part of a comprehensive treatment planning for their TMD pain problem. Additionally, this study identified an intermediate subtype of patients with moderately compromised psychosocial adaptation (moderate levels of psychological distress and intermediate scores on general health status, pain-related worry, sleep dysfunction, and the ability to cope with their pain in comparison to the uncomplicated and psychosocially dysfunctional TMD pain patients). The most distinguishing feature for patients in this TMD subtype 2 compared to TMD subtype 3 was their self-perceived ability to cope with their TMD pain, despite high-intensity pain and pain-related interference.

The assessment of the RDC/TMD Axis II as a screening tool formed part of the cultural validation process of the Finnish translation of the RDC/TMD Axis II_FIN criteria.[9,18] Severe pain-related interference scores (GCPS grades III and IV) and/or psychological distress (elevated SCL-90R depression scores) were used in the clinical screening approach as a basis to refer patients for additional assessment by an experienced pain psychologist. The results of the screening process indicated that over 20% of the patients scored high levels of TMD pain-related disability, which is in line with previous studies that have indicated high disability in about 5% to 25% of the patient samples in various secondary and tertiary TMD/orofacial pain treatment centers despite differences in procedures of referral.[5,21] For the SCL-90R assessment, raw mean scores and the overall data distributions were calculated to avoid potential cross-cultural differences. This assumption was based on the Finnish SCL-90 validation study by Holi et al[22] that reported significantly higher culture-specific general population–based norms compared to American population norms.[4,22,23] Similar needs for cultural adjustments have been noted in other studies with already established SCL-90 criteria,[24,25] whilst others have noted potential ethnic, racial, and cultural differences that should be taken into consideration, eg, when prevalence values are compared.[23,26–31] Otherwise, the SCL-90 has been widely used in chronic pain assessment for medical disorders and found valid, reliable, and with good clinical utility in comparison to other more extensive assessment instruments.[3,4,12] The 39-item SCL-90R Axis II, with components extracted from the 90-item SCL-90, also has been found reliable.[32] It is important to acknowledge that this component of the RDC/TMD Axis II assessment is not recommended to yield psychiatric diagnoses, but merely to screen for significant psychosocial distress.[5,23] With these cautions in mind, it can be concluded that the RDC/TMD Axis II_FIN was found reliable and with good clinical utility in initial patient screening in the present study.

The additional biopsychosocial measures used in the present study were selected based on the multidimensional pain assessment model and/or as potential risk factors for chronic pain and included evaluations related to general health, pain-related worry, coping ability, sleep dysfunction, and patient-perceived treatment needs.[2–4,11,33–37] The selection of these variables was not meant to be all inclusive, and it is possible that potentially more important biopsychosocial variables will emerge in the now ongoing large prospective OPPERA studies, as well as from the development of DC/TMD assessment methods.[23,36] The biopsychosocial assessments used in the present study nevertheless support the evidence that pain, including TMD-related pain, is an individual, subjective, and multidimensional phenomenon and that it is influenced by a variety of aspects in addition to what is included in the RDC/TMD Axis II. The value of a dual-axis instrument such as the RDC/TMD is that it gives information on the disease axis as well the illness impact axis, and it has shown general utility in a diversity of studies, including clinical and epidemiological studies and

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TMD treatment trials.[11,14,15,23,31] Two randomized controlled-treatment trial (RCT) studies used a new subdivision of patients based on the GCPS disability scoring wherein the GCPS grade II was subdivided into GCPS grades II-Low and II-High.[14,15] This new subdivision of the GCPS was applied as a potential subtyping method in the additional evaluations in the present study; ie, patients were regrouped into those with psychosocially dysfunctional TMD pain profiles (TMD subtype 3, including those with GCPS grades III and IV) and those with psychosocially more functional TMD pain profiles (TMD subtypes 1 and 2, including those with GCPS grades I and II-Low or GCPS grade II-High).[5,14,15] The present biopsychosocial assessment results support the subdivision of GCPS grade II as applied in previous treatment-tailoring studies by Dworkin et al.[14,15] The additional assessments, especially in terms of coping with pain, indicated that the classification into three subtypes appeared also clinically relevant compared to the two groups used in previous RCT studies.[14–16]

The subtyping of TMD pain patients into three subgroups is somewhat similar to the classification presented by Rudy et al[38] and Flor and Turk,[39] as the TMD subtype 2 patients seemed to form an intermediate group between uncompromised and most psychosocially dysfunctional or vulnerable TMD pain patient groups in the present study. Taking into consideration the Finnish general-population norms, patients in TMD subtype 3 scored on average severe levels of depressive symptoms, while those in TMD subtype 2 reported moderate levels of depressive symptoms, but significantly lower than TMD subtype 3 and significantly higher than TMD subtype 1 patients. This is in line with previous studies indicating that depression is strongly related with pain-related disability.[4,11,31,37,40] The functional TMD subtype 1 included three subjects with low disability that may have influenced the larger SCL-90R data distribution in GCPS grade I in comparison with GCPS grade II-Low (Fig 1). This indicates that in future studies, a subdivision of the GCPS may be needed even in the GCPS grade I. Those in TMD subtype 2 could also be differentiated from the dysfunctional group on the level of sleep dysfunction. The most distinguishing feature of this group compared to TMD subtype 3 was the level of perceived pain control; ie, the patients were able to cope/function with their TMD pain. The study provides continuing support for the view that some TMD patients manage to function with their pain problem regardless of high pain intensity. This is in contrast to the dysfunctional subgroup of patients who obviously need broader, in-depth evaluation of their pain problem and treatment aiming to decrease maladaptive cognitions and increase adaptive coping.[3,16,41] The TMD subtype 2 patients were not identified in the initial screening to be in need of referral to a psychologist, but appeared to suffer more from recurrent TMD pain and moderate levels of psychosocial pain impact. This patient group with moderately compromised psychosocial profiles may warrant additional clinical attention and adjunct management of the identified individual maintaining factors, eg, to further improve coping ability and thus avoid pain chronicity.

This study was based on the evaluation of RDC/TMD Axis II and in addition mainly psychosocial aspects of TMD in a referral patient sample with TMD pain. The assessments were standardized, and only experienced personnel were involved in the patient recruitment and assessment, but the study findings are limited in terms of sample selection and being only cross-sectional. Because the participants were referred to a tertiary specialist care unit, the findings cannot be generalized to the primary care setting; the patients with TMD pain in this study were quite skewed towards more chronic or persistent TMD pain patients, and the extra assessments used in the present study may not be needed very often in the primary care setting. The sample size did not allow sex-related comparisons, and as the purpose was to evaluate mainly psychosocial aspects of TMD, the Axis I assessments are not reported as part of this study.

The findings of the present study could have important clinical implications, as they gave strong evidence that patients with TMD pain vary in their psychosocial profiles, which should be a consideration in the initial assessment and screening of TMD pain patients. The subtyping used in this study could form a potential example for a more effective tailoring method for adjunct multidisciplinary assessment and treatment planning for the more psychosocially vulnerable TMD pain patients. For example, the psychosocially uncompromised or subtype 1 patients are probably helped by minimal or conservative TMD interventions, which is supported by findings of two RCT studies with functional TMD patients.[15,42] TMD subtypes 2 and 3 patients will require additional clinical attention, as indicated in previous comprehensive care RCT studies,[14–16] eg, treatment strategies that incorporate individually tailored and integrated biomedical and biobehavioral treatments to avoid the risk of TMD chronicity or poor response to therapy. The most psychosocially compromised subtype 3 patients would probably benefit from early referral to a pain psychologist as a part of multidisciplinary treatment planning. Further studies are needed to test these hypotheses.

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