

Diagnostic Subgroups of Craniomandibular Disorders

Part I: Self-Report Data and Clinical Findings

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An overview is given of the most commonly investigated signs and symptoms associated with craniomandibular disorders as detected in a population of patients with craniomandibular disorders and in four defined diagnostic subgroups. The information was collected with a questionnaire and during an extensive clinical examination. Comparison of self-report and clinical data indicated that these two methods reveal different aspects of the patient's complaints and should be interpreted in their own way. The results showed that no statistically significant differences could be found between the four diagnostic subgroups with respect to occlusal factors, trauma, and clinically assessed parafunctional habits. The groups differed considerably with respect to general characteristics, pain variables, signs of craniomandibular disorders, self-reported parafunctional habits, psychosocial factors, and general health factors. However, despite the reduction in clinical characteristics of the four subgroups, there was little reduction in the diversity of factors associated with craniomandibular disorders. This implicates that almost all factors associated with craniomandibular disorders may influence the initiation and perpetuation of the different disorders in the individual patient, and therefore, remain of interest in future research.

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Craniomandibular disorders (CMD) is a collective term embracing a number of clinical problems that involve the temporomandibular joint (TMJ), the masticatory muscles, or both. The more common and obvious symptoms of CMD are pain of the TMJ and the masticatory muscles, an impaired range of movement of the mandible, and joint noises. These symptoms may occur in different combinations and gradations. Furthermore, headache, ear, neck, and shoulder complaints; psychosocial variables; general health factors; and objective findings like occlusal interferences and parafunctional habits are often reported to be more or less related to CMD.¹ Epidemiologic studies in nonpatient groups² and studies describing heterogeneous patient groups³⁻⁶ have provided a general insight into the role of these factors in the onset and perpetuation of CMD but are also controversial.

To allow for a more unequivocal interpretation of their data, some authors tried to reduce the clinical variability of their heterogeneous patient group by forming diagnostic subgroups. There is agreement in the literature⁷ that patients with clinical signs and symptoms of CMD can be clustered into subgroups suffering from CMD with a mainly myogenous component, internal derangement with and without reduction, and osteoarthritis. In many studies,⁸⁻¹⁶ these diagnostic subgroups have been described. Comparisons

between two or more diagnostic subgroups of CMD have also been reported.¹⁷⁻²² However, because of the different diagnostic criteria used to classify subgroups, there may be poor agreement among the patient groups of the various studies.²³ Some authors¹⁹ classified their patients on the basis of a combination of inclusion and exclusion criteria. Others^{9,17,21} used strict inclusion criteria to select patients for one subgroup but allowed signs and symptoms characteristic of other diagnoses to be present. Yet, other authors^{18,20,22} classified their patients into myogenous and arthrogenous subgroups in which all arthrogenous diagnoses were combined. These different criteria may have contributed to the inconsistency regarding the characteristics of the subgroups. Therefore, the insight has grown that only a classification that is based on general inclusion and exclusion criteria can lead to a reasonable and unequivocal application and interpretation of decision criteria and, thus, to more comparable diagnostic subgroups.²⁴

Another reason why a consensus has not yet been reached as to which CMD-related factors are important in the diagnostic subgroups might be the use of self-report questionnaires versus the use of clinical examination only. Since studies²⁵⁻²⁸ reporting the correspondence between self-reports and clinical data show divergent correlations, some of the inconsistencies might be due to the different examination methods used.

Because more insight into the prevalence of specific factors in diagnostic subgroups of CMD may enable a more directed choice of treatment and a better prognosis, the aim of the present study was to compare the presence of signs and symptoms associated with CMD in the four main subgroups of patients with CMD: those with a mainly myogenous component, those with internal derangement with reduction, those with internal derangement without reduction, and those with osteoarthritis. In Part I of this article, the distribution of the signs and symptoms associated with CMD in the total CMD patient group and the four well-defined subgroups is given. Furthermore, to interpret the signs and symptoms correctly, information collected with a questionnaire and during an extensive clinical examination is compared. In Part II of the article, the symptom profiles of the four subgroups are presented.

Materials and Methods

A total of 522 randomly selected patients with signs and/or symptoms of CMD who were referred

to the Department of Craniomandibular Disorders and Orofacial Pain of the University Hospital of Utrecht in Utrecht, Netherlands, was included in the study.

Questionnaire

After patients had first contacted the department, they were requested, by mail, to fill out a comprehensive questionnaire^{29,30} and bring it when they came for their first visit. The questionnaire contained questions about the following:

1. Quantitative and qualitative aspects of pain in the head, neck, and shoulders, such as the pain location(s) (which the patient could mark on a drawing of head, neck, and shoulders), the pain intensity as measured on a visual analog scale (VAS), and factors influencing pain
2. Symptoms of CMD, such as joint noises and a limited mouth opening
3. Parafunctional habits, such as grinding, clenching, and nail biting
4. Psychosocial factors
5. Complaints in the region of head and neck and general health factors

For administrative reasons, about 8% of the patients did not receive a questionnaire. From the patients who received a questionnaire, more than 90% ($n = 438$) responded.

Clinical Examination

All patients were examined extensively by one of five dentists who took part in the study. The examination included:

1. Patient history, consisting of chief complaint, history of the present illness, and dental, medical, and personal history of the patient
2. Extraoral and intraoral inspection including postural habits, asymmetries, and signs indicating oral parafunctional habits
3. Examination of occlusion
4. A functional examination of the masticatory system consisting of active movements, passive movements, and palpation, supplemented by the joint-play test, compression, and the static pain test if indicated³¹
5. An examination of the cervical spine consisting of active movements
6. Panoramic radiography, supplemented by transcranial radiography if remodeling was visible

Classification

Based on the whole set of data and according to inclusion and exclusion criteria corresponding to those described in the (at that time recently published) guidelines¹ of the American Academy of Craniomandibular Disorders (now known as the American Academy of Orofacial Pain), the patients were classified in one of the following diagnostic subgroups.

CMD With Mainly a Myogenous Component (Group M). Inclusion criteria: intermittent or chronic pain in the region of the masticatory muscles, *and/or* pain in the region of the muscles during the functional examination, *and/or* muscle palpation pain. Exclusion criteria: pronounced signs *and/or* symptoms characteristic for an arthrogenous CMD *or* radiographic evidence of joint pathology.

Anterior Disc Displacement With Reduction (Group ID+R). Inclusion criteria: clicking (reciprocal) *and/or* transient locking. Exclusion criteria: pronounced signs *and/or* symptoms characteristic for a myogenous CMD, *or* asymptomatic clicking only, *or* radiographic evidence of joint pathology.

Anterior Disc Displacement Without Reduction (Group ID-R). Inclusion criteria: report of a restriction of movement after a period of clicking *and/or* restriction (painful) of movement during the functional examination. Exclusion criteria: pronounced signs *and/or* symptoms characteristic of a myogenous CMD *or* radiographic evidence of joint pathology.

Osteoarthritis (Group OA). Inclusion criteria: crepitation; *or* pain in the region of the TMJ at rest, during the functional examination, or on palpation; *and* radiographic evidence of joint pathology. Exclusion criteria: pronounced signs *and/or* symptoms characteristic of a myogenous CMD.

Mixed Group. Inclusion criteria: pronounced signs *and/or* symptoms of more than one diagnostic subgroup.

Before the study was started, the dentists were calibrated with regard to the diagnostic criteria. During the study, a working diagnosis was established based on the patient evaluation and according to the criteria. This first diagnosis was verified retrospectively by one of the authors (AML-S), and in the few cases that the diagnosis did not match the criteria, it was adjusted after consultation with the examiner concerned.

Statistics

The prevalence of the anamnestic and clinical variables was determined for the whole patient group

and for the four subgroups. From these data, Helkimo's anamnestic and clinical dysfunction indexes³² were calculated.

Differences between subgroups concerning dichotomous variables were analyzed using chi-square tests in 2×2 contingency tables. With respect to the continuous variables, one-way analyses of variance followed by Student-Newman-Keul's multiple comparisons test were used to determine significant differences between the subgroups.³³ The percentage agreement and Cohen's kappa were calculated to determine the connection between comparable self-reports and clinically assessed data.³⁴

Results

Based on the diagnostic criteria, 33% ($n = 171$) of the total patient group ($n = 522$) were classified as group M. Concerning the arthrogenous subgroups, 20% ($n = 105$) of the patients were classified as group ID+R, 6% ($n = 32$) as group ID-R, and 8% ($n = 44$) as group OA. The mixed group, 33% ($n = 170$) of patients, consisted of patients with a combination of myogenous and arthrogenous disorders ($n = 110$), patients with signs and symptoms of internal derangement and osteoarthritis ($n = 56$), and patients with combinations of internal derangement with and without reduction ($n = 4$). Because the findings of the mixed group resembled those of the total group in so many aspects, these results are not presented separately.

The socioeconomic characteristics of the total group and the four diagnostic subgroups are given in Table 1. The mean age of the total patient group was 34 years (range, 15 to 82 years). The subgroups differed with regard to mean age, sex, and occupation. The patients' chief complaints and the course of the complaint in the past, which also differed among the four groups, are given in Table 2. The mean duration of the complaints was 24 months: 56% of the patients reported having the complaint for more than 12 months, and 43% reported having received treatment previously. Of the patients, 57% had a unilateral complaint. Helkimo's anamnestic and clinical indexes³² and the impact of the complaint on daily life are depicted in Table 3. Again, the scores in the diagnostic subgroups differed considerably. The pain locations and self-reported and clinically assessed pain characteristics of the groups are shown in Tables 4a to 4c. The amount of pain, the pain locations, and the character of the pain was different for the four subgroups. The distribution of

Table 1 Socioeconomic Characteristics of the Total Patient Group and of the Diagnostic Subgroups

	Total (n = 522)	M (n = 171)	ID+R (n = 105)	ID-R (n = 32)	OA (n = 44)	F ratio/significance
Mean age (years) (SD)	34 (14)	35 (14)	29 (11)	28 (11)	47 (19)	19.58*** OA/all M/ID+R M/ID-R ID+R/ID-R*
Females (%)	81	81	71	91	82	
Occupation (%)						
Employed†	55	53	59	39	36	ID+R/OA*
Students	17	10	24	32	10	M/ID+R, ID-R**
Housewives	24	32	15	29	39	ID-R/OA*
Pensioners, unemployed	5	5	2	0	15	ID+R/M, OA** ID-R/OA*

* $P < .05$ ** $P < .01$ *** $P < .001$

†No statistically significant differences could be found among the groups concerning the different job levels (total group: 25% unskilled workers, 20% skilled workers, and 10% professionals).

Table 2 Chief Complaints and History Data (%) of the Total Patient Group and of the Diagnostic Subgroups (Oral History Data, n = 522)

	Total	M	ID+R	ID-R	OA	Significance
Chief complaint						
Pain in the region of the masticatory system‡	42	45	25	63	46	ID+R/M, ID-R*** ID+R/OA*
Diffuse pain face, head and/or neck	18	33	6	3	11	M/ID+R, ID-R*** M/OA**
Joint noises	17	5	46	3	16	ID+R/all*** M/OA*
Impaired function of the masticatory system§	14	8	21	31	11	M/ID+R** M/ID-R*** ID-R/OA*
Ear complaints	5	4	2	0	9	OA/ID+R*
Other complaints	4	5	0	0	7	†
Course in the past						
History of clicking and/or locking	31	14	52	66	21	ID-R/M, OA*** ID+R/M*** ID+R/OA**
Sudden start complaint	12	15	7	9	24	OA/ID+R***
Steady increase of pain	22	33	12	6	21	M/ID+R*** M/ID-R**
Fluctuating, No clear course	27	36	15	15	26	M/ID+R*** M/ID-R*
Different course	8	2	14	4	8	†
Chronic complaint (> 6 months)	78	77	78	55	78	ID-R/all*

* $P < .05$ ** $P < .01$ *** $P < .001$

†Not tested.

‡Region of the TMJs and the masseter and temporal muscles.

§Difficulties with the activities of daily life like chewing and yawning.

Table 3 Helkimo's Anamnestic and Clinical Dysfunction Index³² and the Influence of the Disorder on the Daily Life of the Total Patient Group and of the Diagnostic Subgroups (n = 522)

	Total	M	ID+R	ID-R	OA	Significance
Ai: Anamnestic index						
Ai0, symptom-free	0	1	0	0	2	NS
Ai1, mild symptoms	12	3	31	3	16	M/ID+R, OA*** ID+R/ID-R**
Ai2, severe symptoms	88	96	70	97	81	M/ID+R, OA*** ID+R/ID-R** ID-R/OA*
Di: Clinical index†						
Di0, symptom-free	0	0	0	0	0	NS
Di1, mild symptoms	30	25	53	16	29	ID+R/M, ID-R*** ID+R, OA*
Di2, moderate symptoms	36	35	35	39	34	NS
Di3, severe symptoms	33	40	12	45	37	ID+R/all***
Influence on daily life						
Not hindered	28	21	41	19	25	M/ID+R*** ID+R/ID-R*
Fairly hindered‡	54	49	53	66	58	M/ID-R+
Moderately to severely§ hindered	18	31	6	16	18	M/ID+R*** ID+R/OA*

* $P < .1$ ** $P < .05$ *** $P < .01$ **** $P < .001$

NS = Not statistically significant.

†Because palpation of the lateral pterygoid muscle was not included in the clinical examination, the clinical index was modified on the item muscle pain: if three or more palpation sites were painful, five points were scored.

‡Hindered during eating only.

§Hindered during leisure interests, work, or sleep.

Table 4a Pain Locations of the Total Patient Group and of the Diagnostic Subgroups (Questionnaire Data)

	Total (n = 438)	M (n = 135)	ID+R (n = 86)	ID-R (n = 29)	OA (n = 41)	F ratio/significance
Pain report (%) (SD)	72 (3.5)	78 (3.7)	50 (2.5)	90 (2.8)	70 (4.0)	ID+R/M, ID-R*** OA/ID+R, ID-R*
Mean number of pain locations (SD)	3.4 (3.5)	4.2 (3.7)	1.8 (2.5)	3.3 (2.8)	3.2 (4.0)	11.06***ID+R/all
Pain locations† (%)						
Region TMJ	54	48	42	53	54	NS
Ear region	10	7	3	3	15	OA/ID+R*
Region masseter muscle	45	55	30	60	46	M/ID+R*** ID+R/ID-R***
Region temporal muscle	33	42	18	23	32	M/ID+R*** OA/ID+R*
Frontal region	25	32	15	17	24	M/ID+R**
Parietal region	11	14	5	7	7	M/ID+R*
Neck region	25	35	10	27	20	M/ID+R*** ID+R/ID-R*
Region sternocleidomastoideus muscle	9	12	5	3	7	M/ID+R*

* $P < .05$ ** $P < .01$ *** $P < .001$

NS = Not statistically significant.

†Identical areas on both sides of the head and neck were combined.

Table 4b Pain Characteristics of the Patients Who Reported Pain in the Total Patient Group and in the Diagnostic Subgroups (Questionnaire Data, n = 314)

	Total	M	ID+R	ID-R	OA	F ratio/significance
Mean intensity of pain† (SD)	48 (24)	52 (24)	43 (26)	42 (22)	51 (24)	2.53, NS
Frequency pain periods‡ (SD)	3.8 (1.2)	4.0 (1.1)	3.2 (1.4)	4.3 (0.6)	4.1 (0.9)	8.43*** ID+R/all
Duration pain periods§ (SD)	5.1 (2.3)	5.6 (2.0)	4.4 (2.4)	4.2 (2.8)	4.9 (2.1)	5.48**M/ID+R M/ID-R
Awakening of pain¶ (SD)	1.7 (1.0)	1.7 (1.0)	1.5 (0.8)	1.4 (0.7)	2.0 (0.9)	2.84* OA/ID-R
Increase (%) of pain by						
Movements of the jaw	78	70	83	93	73	ID-R/M*
Having a meal	53	47	53	68	69	ID-R/M* OA/M*
Change of posture	13	16	6	4	17	M, OA/ID+R+
Movements of the neck	22	30	17	18	14	M/ID+R, OA+
Cold	26	33	21	7	41	M, OA/ID-R** OA/ID+R*
Heat	10	12	8	4	0	M/OA*
Emotional factors¶	29	35	25	18	21	M/ID-R+

+P < .1

*P < .05

**P < .01

***P < .001

NS = Not statistically significant.

†Intensity as measured in mm on a visual analog scale (VAS) of 100 mm.

‡Frequency as measured on a 1 to 5 rating scale: 1 = less than once a month; 2 = one to several times a month; 3 = one to several times a week; 4 = one to several times a day; 5 = always.

§Duration as measured on a 1 to 7 rating scale: 1 = several seconds; 2 = several minutes; 3 = about a quarter of an hour; 4 = about one hour; 5 = several hours; 6 = about one day; 7 = longer than one day.

¶Awakening on a 1 to 5 rating scale: 1 = never; 2 = sometimes; 3 = regularly; 4 = often; 5 = very often.

¶Factors such as disappointment, sorrow, nervousness.

Table 4c Pain (%) Reported During the Clinical Examination by the Total Patient Group and by the Diagnostic Subgroups (Clinical Data, n = 522)

	Total	M	ID+R	ID-R	OA	Significance
Masticatory system						
Pain during the functional examination†	76	86	50	88	77	M, ID-R/ID+R*** OA/ID+R**
Palpation pain masseter muscle	76	87	58	65	61	M/ID+R, OA*** M/ID-R**
Palpation pain temporal muscle	40	52	20	26	29	M/ID+R*** M/ID-R, OA*
Palpation pain TMJ	63	61	49	58	63	M/ID+R†
Neck						
Pain active movements‡	42	48	29	26	38	M/ID+R*
Restricted movements	39	53	24	11	50	M/ID+R, ID-R*** OA/ID-R** OA/ID+R*

+P < .1

*P < .05

**P < .01

***P < .001

†Examination consisting of active movements and functional tests (no palpation).

‡Active movements: flexion, extension, lateroflexion, and rotation. In group M, most restriction and pain was provoked by lateroflexion; in group OA, by flexion, extension, and rotation.

Table 5a Signs of CMD in the Total Patient Group and in the Diagnostic Subgroups (Questionnaire Data, n = 438)

	Total	M	ID+R	ID-R	OA	F ratio/significance
Clicking† (SD)	3.0 (1.5)	2.3 (1.5)	4.1 (1.2)	3.2 (1.5)	2.4 (1.3)	32.58***ID+R/all ID-R/M ID-R/OA
Crepitation† (SD)	3.0 (1.6)	2.7 (1.5)	3.3 (1.7)	3.1 (1.5)	2.9 (1.7)	2.98* M/ID+R
(Transient) locking or restricted move- ments jaw† (SD)	2.0 (1.2)	1.6 (1.0)	2.2 (1.1)	3.0 (1.5)	1.6 (0.8)	16.22***ID-R/all ID+R/M ID+R/OA
Stiff-feeling cheeks† (SD)	2.1 (1.2)	2.2 (1.2)	1.8 (1.1)	2.4 (1.6)	1.9 (1.1)	2.66* M/ID+R ID+R/ID-R
Fatigue on awakening† (SD)	1.6 (0.9)	1.6 (1.0)	1.3 (0.7)	1.7 (1.0)	1.7 (0.8)	2.72* M/ID+R

*P < .05

**P < .01

***P < .001

†Score as reported on 1 to 5 rating scale: 1 = never; 2 = sometimes; 3 = regularly; 4 = often; 5 = very often.

Table 5b Signs of CMD and Ranges of Movement (mm) During the Clinical Examination in the Total Patient Group and in the Diagnostic Subgroups (Clinical Data, n = 522)

	Total	M	ID+R	ID-R	OA	F ratio/significance
Clicking (%)	48	24	94	31	21	ID+R/all***
Crepitation (%)	16	9	5	9	55	OA/all***
Mean active maximal mouth opening (SD)	45 (9)	45 (7)	49 (8)	34 (8)	44 (8)	28.44***ID-R/all ID+R/M ID+R/OA
Mean passive maximal mouth opening (SD)	50 (8)	49 (7)	52 (7)	39 (9)	48 (7)	20.62***ID-R/all ID+R/M ID+R/OA
Mean active lateral movements (SD)	10 (3)	10 (3)	11 (3)	8 (3)	10 (2)	5.84***ID-R/all

***P < .001

signs and symptoms of CMD in the different groups, as assessed with the questionnaire and during the clinical examination, are given in Tables 5a and 5b. Self-reported and clinically assessed parafunctional habits are outlined in Tables 6a and 6b. Relatively more patients of group M reported clenching and grinding than did other patient groups, whereas the percentage of grinding and clenching found during the clinical examination was equally distributed among the different groups. Patients of group ID+R showed higher percentages of parafunctional biting habits. Equally distributed over the various subgroups, 12% of the patients had an anterior head position, and 33% of the patients showed a facial asymme-

try. The occlusal variables of the different groups are shown in Table 7. Group OA had a higher percentage of edentulous patients. Only small differences could be found between the subgroups with regard to the other occlusal characteristics. The psychosocial characteristics of the groups are given in Table 8. The groups differed only with regard to a busy life-style and the presence of problems, depression, and worrying. General health characteristics are shown in Table 9. In general, groups M and OA reported higher percentages of general health problems.

The self-report data and clinical data were consistent with respect to the contribution of comparable items, such as pain report, clicking, and

Table 6a Parafunctional Habits (%) in the Total Patient Group and in the Diagnostic Subgroups (Questionnaire Data, n = 438)

	Total	M	ID+R	ID-R	OA	Significance
Clenching	34	47	22	30	11	M/ID+R, OA***
Grinding	18	24	13	7	14	M/ID+R, ID-R+
Lip, tongue, cheek biting	41	34	55	44	17	ID+R/M, OA***
Nail biting	25	24	34	25	12	M, ID-R/OA*
Abnormal oral behavior†	23	26	20	16	15	ID+R/OA**
						NS

* $P < .1$ ** $P < .05$ *** $P < .01$ **** $P < .001$

NS = Not statistically significant.

†Total score abnormal tongue postural habits (9%), abnormal lip closure (4%), rigidity of jaw during speaking (10%), and/or Sunday Face (3%).

Table 6b Trauma and Parafunctional Habits (%) in the Total Patient Group and in the Diagnostic Subgroups (Clinical Data, n = 438)

	Total	M	ID+R	ID-R	OA	Significance
Trauma†	37	34	34	30	34	NS
Clenching	79	77	82	84	71	NS
Grinding‡	85	85	85	87	88	NS

NS = Not statistically significant.

†Trauma total group: 19% impact injury, 10% excessive stretching.

‡Slight occlusal wear 62%, moderate occlusal wear 37%, severe occlusal wear 1%. Most occlusal wear was found in the front (51%) and on the cuspids (40%).

Table 7 Edentulous Patients (%) in the Total Patient Group (n = 522) and Occlusal Characteristics (%) of the Dentate Patients in the Total Patient Group and in the Diagnostic Subgroups (Clinical Data, n = 438)

	Total	M	ID+R	ID-R	OA	Significance
Presence of full prosthesis	7	8	5	3	18	OA/ID+R** OA/ID-R*
Loss of posterior molar support	14	10	11	13	20	OA/M+
ICP disturbance	21	25	15	17	25	NS
RCP-ICP interference†	51‡	51	56	52	48	NS
(Non)working-side interferences§	36¶	41	33	21	43	ID-R/M, OA*

* $P < .1$ ** $P < .05$ *** $P < .01$

NS = Not statistically significant; RCP = Retruded contact position; ICP = Intercuspal position.

†RCP-ICP slide was not assessable in 2% of the patients.

‡85% asymmetric slide, 15% symmetric slide.

§Side interference was not assessable in 1% of the patients.

¶Cuspid guidance 37%, balanced guidance 28%, working-side interference 11%, nonworking-side interference 25%.

Table 8 Psychosocial Characteristics of the Total Patient Group and of the Diagnostic Subgroups (Questionnaire Data, n = 438)

	Total	M	ID+R	ID-R	OA	F ratio/significance
Having a busy life (%)	68	62	74	82	48	ID+R, ID-R/OA*
Presence of problems (%)	26	22	35	25	30	M/ID+R*
Have been overstrained†	1.3 (0.6)	1.4 (0.7)	1.2 (0.4)	1.3 (0.4)	1.3 (0.7)	0.94NS
Feeling depressive†	1.9 (0.7)	2.0 (0.8)	1.7 (0.7)	1.6 (0.7)	1.8 (0.5)	3.83*M/ID+R
Feeling nervous†	1.7 (0.8)	1.8 (0.9)	1.7 (0.9)	1.4 (0.6)	1.6 (0.6)	2.11NS
Feeling annoyed†	1.8 (0.8)	1.8 (0.8)	1.8 (0.9)	1.6 (0.6)	1.6 (0.6)	1.45NS
Feeling worried†	1.8 (0.8)	1.9 (0.9)	1.6 (0.7)	1.5 (0.6)	1.9 (0.7)	3.48*M/ID+R M/ID-R
Feeling anxious†	1.5 (0.8)	1.6 (0.9)	1.4 (0.7)	1.4 (0.6)	1.6 (0.7)	0.66NS

*P < .05

NS = Not statistically significant.

†As reported on a 1 to 5 rating scale: 1 = never; 2 = sometimes; 3 = regularly; 4 = often; 5 = very often.

Table 9 General Health Characteristics of the Total Patient Group and of the Diagnostic Subgroups (Questionnaire Data, n = 438)

	Total	M	ID+R	ID-R	OA	F ratio/significance
Feeling healthy (%)	81	74	88	96	79	M/ID-R** M/ID+R* ID-R/OA* ID+R/OA*
Use of analgesics (%)	13	14	8	25	7	ID-R/ID+R, OA*
Use other medication (%)	35	36	27	46	46	ID+R/OA*
Complaints head and neck region						
Recurrent headache (%)	54	57	41	59	39	M/ID+R, OA*
Eye complaints†	1.6 (0.9)	1.6 (1.0)	1.5 (0.8)	1.4 (0.6)	1.9 (1.3)	1.94NS
Ear complaints††	2.1 (1.3)	2.2 (1.3)	1.6 (1.0)	1.8 (1.2)	2.0 (1.1)	4.17**M/ID+R
Dizziness†	1.8 (0.9)	1.9 (1.0)	1.7 (0.8)	1.8 (1.0)	1.6 (0.6)	2.14NS
Throat complaints†§	2.0 (0.9)	2.1 (0.9)	1.9 (0.9)	1.9 (0.6)	2.0 (0.9)	0.78NS
Musculoskeletal complaints (%)						
Neck complaints	41	56	17	36	41	M/ID+R*** OA/ID+R** ID-R/ID+R*
Shoulder complaints	29	37	12	32	31	M/ID+R*** ID-R, OA/ID+R*
Low back pain	32	38	25	21	31	M/ID+R†
Complaints one or more limbs	51	53	36	46	54	M, OA/ID+R*
Rheumatism	3	3	0	0	10	OA/ID+R**
Familial occurrence CMD	17	16	17	31	8	ID-R/OA*

*P < .1

**P < .05

***P < .001

NS = Not statistically significant.

†As reported on a 1 to 5 rating scale: 1 = never; 2 = sometimes; 3 = regularly; 4 = often; 5 = very often.

††Ear complaints such as ear pain, a dull or stuffed feeling, or tinnitus

§Complaints such as problems with swallowing or a feeling of a lump in the throat.

No statistically significant differences could be found among the scores of the four diagnostic subgroups with respect to general health problems such as cardiovascular disorders (21%), disorders of the digestive system (30%), allergic

restriction of movement, to the distinction of subgroups (Tables 4a, 4c, 5a, and 5b). The levels of agreement and kappa values of the self-report findings versus the clinical data for comparable separate items are shown in Table 10. With the exception of clicking, the agreement between the items of both sets of data was low.

Discussion

Diagnostic Procedure

The way of classifying the diagnostic subgroups in the present study is in line with Mohl and Ohrbach,²⁴ who stated that the gold standard for diagnosis in CMD is currently based upon an evaluation of the chief complaint, history, clinical examination, and, when appropriate, imaging. Besides the use of appropriate diagnostic tools, another basic requirement for a proper diagnosis is an acceptable reliability of the diagnostic procedure.²⁴ In a previous study, we found the interexaminer reliability of the functional examination of the masticatory system to be satisfactory for the three main symptoms of CMD, namely, pain, joint noises, and restriction of movement.³⁵ In another study, our functional examination proved to discriminate well between the different diagnostic subgroups.³¹

To achieve an unequivocal interpretation of the clinical data, we have chosen the generally recognized diagnostic criteria as described in the guidelines of the American Academy of Craniomandibular Disorders.¹ The diagnostic subgroups were kept as well-defined as possible by using inclusion and exclusion criteria. These criteria turned out to be applicable in clinical practice. However, because early subclinical arthrotic changes are not detectable radiographically, the presence of joint pathology may be somewhat underrated.^{15,36} Moreover, because of the close topographical and functional relationship between the TMJ and the masticatory muscles, it was inevitable that some signs and symptoms characteristic for another diagnosis were present in each diagnostic subgroup.

Data Interpretation

Questionnaires are often used to assess signs and symptoms of CMD, factors related to CMD, and general health factors. The items of the questionnaire we used in our study are similar to those of frequently used questionnaires measuring different

Table 10 Agreement and Kappa Values of the Questionnaire Data (Q) Versus the Data of the Clinical Examination (CE)

	%Q	%CE	% agr.	Kappa
Pain masseter muscle	45	76	53	0.10
Pain temporal muscle	33	40	62	0.18
Pain TMJ	54	63	57	0.13
Total of pain masticatory system	72	76	69	0.21
Clicking	57	48	74	0.49
Crepitation	39	16	61	0.08
Restriction of movement	52	25	65	0.30
Clenching	34	79	47	0.12
Grinding	18	85	32	0.06
Pain neck	43	42	67	0.34
Restriction of movements neck	43	39	68	0.37

aspects of CMD such as the TMJ scale and the craniomandibular index.^{37,38} These questionnaires have shown to be sensitive to both the occurrence of and the change in signs and symptoms of CMD. In the report of pain, the VAS is considered to be one of the best methods available for estimating the intensity of pain.³⁹ The identification of the pain location on a drawing has also been found to be reliable.^{40,41}

Differences between subgroups concerning comparable characteristics such as pain report, clicking, and restriction of movement were identified by the self-report findings as well as by the clinical examination. It appears that both the questionnaire and the clinical examination provided information about the severity and kind of complaint. This may explain earlier reported positive correlations between self-report and clinical data.^{37,38,42} However, there was mostly a poor agreement when items were compared with each other in the total patient group, which is in accordance with the results of other authors.^{25,27,28} This discrepancy could be caused by several factors. One source might include the patient's concern for and awareness of bodily sensations.⁴³ In our sample, patients seemed well aware of joint noises but less aware of bruxism and clenching. A second factor could include the transient character of the symptoms themselves, as described for joint noises by Kopp⁴⁴ and for pain by Raphael and Marbach.⁴⁵ During a clinical examination, current signs and symptoms of CMD are registered, whereas in a questionnaire signs and symptoms are recorded over a longer period. We found that the agreement for joint noises was better than for pain, which is in agreement with the findings of Kopp.²⁵

However, on the basis of our data it would seem that the patients had difficulty distinguishing between clicking and crepitation.

The lack of agreement between self-report and clinically registered pain could be because latent pain is easily provoked during the functional examination, because reported pain symptoms and palpation pain are different entities,²⁵ or because pain seems subject to forgetting.⁴⁶ Fenlon and McCartan⁴⁷ stated that the report of general health factors is also subject to lack of motivation, social desirability bias, and deliberate deception. As illustrated by results of Friction et al⁹ and Harness et al,⁴⁸ it can be assumed that some of the psychosocial characteristics scored somewhat lower for this reason also.

It seems that subjective factors play a large role in the perception of signs and symptoms of CMD, which makes an unequivocal interpretation and rapportage of this complex phenomenon difficult. It may therefore be concluded that self-report data and clinical data are different entities that both provide information but that should be interpreted in their own way.

Distribution of Variables

The age and gender distribution of the patient group referred to our Department of Craniomandibular Disorders and Orofacial Pain is similar to that of patient groups described in the literature.^{3-5,12,20,48} Concerning the clinical characteristics, our patient group is very similar to the patient groups as described by Lundeen et al⁴ and Dworkin et al.¹

Significant differences were found between the four subgroups for most of the items, except for occlusal interferences, trauma, parafunctional habits as clinically assessed, and some psychosocial factors. Occlusal interferences were found to the same extent in patients of the four diagnostic groups and with the same incidence as in epidemiologic studies in nonpatient groups.² This supports both the statement of the American Academy of Craniomandibular Disorders¹ that occlusal interferences might not even be primarily related to CMD and the report of Pullinger et al⁴⁹ that occlusion cannot be considered the unique or dominant factor in defining CMD populations. On the other hand, the incidence rates of both trauma and parafunctions (microtrauma) indicate that they may play a role in the initiation and perpetuation of the complaint in each of the subgroups.^{1,50}

The distribution of general characteristics, pain variables, signs of CMD, parafunctional habits as reported in the questionnaire, psychosocial factors,

and general health factors over the subgroups are discussed in Part II of this article in which we describe the four symptom profiles. These symptom profiles differed considerably in many aspects. However, despite the reduction in clinical characteristics, there was little reduction in the diversity of CMD-associated factors and possible etiologic factors in the four subgroups. This indicates that none of the CMD-associated factors was pathognomonic for one of the subgroups. Moreover, all the CMD-associated factors could influence the initiation and perpetuation of the different disorders in the individual patient, and therefore remain of interest in future research.

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Resumen

Subgrupos de diagnóstico de desórdenes craneo-mandibulares. parte I. Información auto-reportada y hallazgos clínicos

Se realiza una presentación de los signos y síntomas investigados mas comúnmente asociados con desórdenes craneo-mandibulares (DCM), tal y como han sido detectados en una población de pacientes con DCM y en cuatro subgrupos de diagnóstico definidos. La información fue reunida con un cuestionario y durante un examen clínico extenso. Al comparar el auto-reporte y la información clínica se determinó que estos dos métodos revelan aspectos diferentes de las quejas de los pacientes y deberían ser interpretadas a su manera. Los resultados demuestran que no se pudieron encontrar diferencias estadísticamente significativas entre los cuatro subgrupos de diagnóstico con respecto a los factores oclusales, trauma, y hábitos parafuncionales determinados clínicamente. Los grupos se diferenciaron considerablemente con respecto a las características generales, a las variables de dolor, a los signos de DCM, hábitos parafuncionales auto-reportados, factores psicosociales, y factores de salud general. Sin embargo, a pesar de la reducción de las características clínicas de los cuatro subgrupos, hubo una pequeña reducción en la variedad de factores asociados con los DCM. Esto implica que casi todos los factores asociados con los DCM pueden influenciar la iniciación y perpetuación de los diferentes desórdenes en el paciente individual, y por lo tanto, seguirá siendo un tema de interés en investigaciones futuras.

Zusammenfassung

Diagnostische Untergruppen bei Myoarthropathien. 1. Teil. Eigenberichte und klinische Ergebnisse.

Es werden die üblicherweise untersuchten Myoarthropathiezeichen und -symptome beschrieben, welche in einer Population von Patienten mit Myoarthropathien sowie in vier definierten diagnostischen Untergruppen gefunden werden. Die Informationen wurden mit einem Fragebogen und einem ausführliche klinischen Untersuchung gesammelt. Der Vergleich von Eigenbericht und klinischen Daten zeigten an, dass diese zwei Methoden verschiedene Aspekte der Beschwerden des Patienten enthüllen und es sollte daher jede auf ihre eigene Weise interpretiert werden. Die Resultate zeigten, dass zwischen den vier diagnostischen Untergruppen keine statistisch signifikanten Unterschiede gefunden werden konnten bezüglich okklusalen Faktoren, Trauma und klinisch beurteilten parafunktionellen Gewohnheiten. Die Gruppen unterschieden sich beträchtlich bezüglich genereller Charakteristika, Schmerzvariablen, Zeichen von Myoarthropathien, selbstberichteter parafunktioneller Gewohnheiten, psychologischer Faktoren und allgemeiner Gesundheitsfaktoren. Trotz der Beschränkung auf wenige klinische Charakteristika bei den vier Untergruppen zeigte sich ein weites Spektrum von mit Myoarthropathien verbundenen Faktoren. Dies weist darauf hin, dass fast alle Faktoren verbunden mit Myoarthropathien die verschiedenen Störungen beim einzelnen Patienten auslösen und aufrechterhalten können. Daher bleiben sie für die zukünftige Forschung weiterhin von Interesse.