Diagnostic Subgroups of Craniomandibular Disorders Part II: Symptom Profiles

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An overview is given of the following four well-defined diagnostic subgroups of patients who have craniomandibular disorders: those with a mainly myogenous component; those with internal derangement with reduction; those with internal derangement without reduction; and those with osteoarthrosis. Although it was inevitable that the subgroups were not completely homogeneous, symptom profiles differed considerably. There even seemed to be reasons to distinguish two osteoarthrosis groups in future research. Although the identification of clinically significant factors in a given patient with craniomandibular disorders remains a difficult clinical task, the symptom profiles provide a framework that may give more insight into the background of the complaint and into possible contributing factors. The symptom profiles also provide the possibility of a more directed choice of treatment and a treatment evaluation that is aimed at the specific characteristics of the subgroups. It therefore may be concluded that, to increase insight into craniomandibular disorders, the evaluation of diagnostic subgroups has to be preferred in the assessment of a heterogeneous group of patients with craniomandibular disorders.
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To gain more insight into the prevalence and the value of specific factors associated with craniomandibular disorders (CMD) within diagnostic subgroups, it is necessary to use unequivocal subjective and objective assessment methods.

In the present study, a group of 522 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 divided into four well-defined diagnostic subgroups and a mixed group. The diagnostic inclusion and exclusion criteria for the classification into the subgroups, the description of the variables studied, and the statistical methods used have been described in Part I of this article. Furthermore, the interpretation of self-report and clinical data has been discussed, and an overview of the distribution of all variables over the diagnostic subgroups has been given. In this part of the article, the symptom profiles of the four diagnostic subgroups of patients with CMD are presented and discussed. These symptom profiles were formed on the basis of the findings that have been presented in Part I of this article.

Symptom Profiles

CMD With a Mainly Myogenous Component

The largest subgroup, which contained 33% of the patients, was the group of patients with CMD with a mainly myogenous component (group M). In comparison with the other groups, group M had an average median age (35 years) and an average percentage of women (81%). The most often mentioned chief complaints were pain in the region of the masticatory system (45%) and more diffuse pain of the head and/or the neck (33%). The course of the complaint in the past was relatively often fluctuating, and 77% of the patients reported chronicity. Compared to the other groups, this group had a relatively large number of patients with severe dysfunction and included the most patients who reported being severely hindered by their complaint.

The patients of group M reported on average a pain intensity of 52 on the visual analog scale (VAS), one to several periods of pain per day, and periods of pain, which on average, ranged from several hours to one day. Pain was not confined to the masticatory system only; these patients also reported the highest number of pain locations (four) of the head and the neck. Although 70% of the patients in group M reported pain to be increased by movements of the jaw, this was less often than patients in the other subgroups. Pain was relatively more often increased by general and external factors like posture, movements of the neck, heat, cold, and emotional factors. On clinical examination, these patients showed the highest percentage of tenderness on palpation of the musculature and neck pain.

As in agreement with the self-report findings, on clinical examination the patients of group M had an average score for restriction of movement and a low percentage of joint noises. Although no significant differences between the groups could be found during the clinical examination, patients of group M reported the highest percentages of clenching and grinding. With respect to occlusal factors, patients of group M showed average scores.

Concerning psychosocial variables, the patients of group M reported the lowest percentage of problems but had higher scores for depression and worrying than the other groups. Only 74% of the patients of group M reported to feel healthy. The patients also reported a relatively high percentage of recurrent headache (57%) and the highest scores for ear complaints and neck, shoulder, and back complaints. They reported average scores for the other general health factors.

Internal Derangement With Reduction

Twenty percent of the total patient group was classified in the subgroup of patients with internal derangement with reduction (group ID+R). This group was relatively young (mean age 29 years), and only 71% were women. A relatively high percentage of the patients was employed (59%) or was student (24%), which may be related to the age and gender distribution of the subgroup. The most often mentioned chief complaint was the presence of joint noises (46%); a history of clicking and locking was reported by 52% of the patients. The patients showed the highest percentages of mild anamnestic and clinical dysfunction, and 41% reported that they were not hindered by their complaint.

The patients of group ID+R reported the lowest percentages of pain (50%) and a mean of only two pain locations. If pain existed, it was of relatively low intensity (43 on the VAS). On average, patients reported one to several pain periods per week and pain periods of approximately one to several hours. Pain was increased mainly by jaw movements (83%). As in agreement with these self-report findings, the patients showed relatively low percentages of pain during the clinical examination of the masticatory system and the neck.

Patients of group ID+R reported the highest percentage of joint noises as determined by questionnaire and clinical examination. They also had the largest ranges of active and passive movements and reported the lowest percentages of feeling stiffness in the cheeks and fatigue on awakening. With respect to parafunctions, more than half of the patients reported regular lip, tongue, cheek biting, and 34% reported nail biting.

Although the patients of group ID+R reported having problems the most often, they reported low to average scores on all other psychosocial items. They also scored low with respect to the use of medication, other musculoskeletal complaints, and all other general health factors.

Internal Derangement Without Reduction

The group of patients with internal derangement without reduction (group ID–R) was the smallest subgroup, which contained 6% of the total patient group. Group ID–R had the lowest mean age (28 years) and the highest percentage of women (91%). The chief complaints mentioned most often were pain in the region of the masticatory system (63%) and an impaired function of the masticatory system (31%). Only 55% of the patients reported their complaint to be chronic, while 66%

of the patients described a history of clicking and/or (transient) locking. Although these patients showed the highest percentages of severe anamnestic and clinical dysfunction, they also most often reported that their complaint only moderately hindered them.

The patients of group ID–R reported the highest percentage of pain (90%) and an average of three pain locations. Patients reported, on average, a pain intensity of 42 on the VAS, one to several pain periods per day, and a duration of the pain periods of approximately one hour. Pain was reported to increase most often by movements of the jaw and eating. The latter was confirmed by the high percentage of pain during the functional examination of the masticatory system.

Relatively low average ranges for active and passive opening were found in this group, which is in agreement with the self-report findings concerning locking and a restriction of movement. Only 7% of the patients of group ID–R reported to be grinding, a finding that was not in line with the percentage found during the clinical examination (87%). The patients reported average scores for the other parafunctional habits. Concerning the occlusal factors, they showed the lowest percentage of (non)working-side interferences.

The patients of group ID–R reported low scores on the psychosocial items, except for having a busy lifestyle. Although the patients of this group reported using analgesics the most often, they also reported feeling relatively healthy. The patients scored relatively low on the general health characteristics, except for headache. The highest incidence (31%) of familial occurrence of CMD was found in this group.

Osteoarthrosis

Of the total patient group, 8% of the patients were classified as having osteoarthrosis (group OA). The patients of group OA had the highest mean age (47 years). Patients (46%) of group OA reported that pain in the region of the masticatory system was their chief complaint more often than other complaints. A relatively large number also reported ear complaints (9%). Of the patients, 26% reported the complaint to be fluctuating with no clear course, 24% reported a sudden start, and 21% reported a history of clicking and/or locking of the jaw. Chronicity was reported by 78% of the patients. The patients showed average scores for the severity of the complaint and the hindrance it caused.

The patients of group OA showed average scores for the presence of pain (70%) and an aver-

age of three pain locations. A relatively high percentage of patients reported pain in the temporomandibular joints (TMJs) (54%) and the ears (15%). The mean pain intensity was relatively high (51 on the VAS), and patients reported, on average, from one to several pain periods per day and a duration of several hours per pain period. The patients reported waking because of the pain more often than other patients, and the pain was relatively often reported to be increased by movements of the jaws (73%), eating (69%), changes of posture (17%), and cold (41%). The patients had average scores for pain in the functional examination and relatively low scores for pain on palpation of the musculature.

Although the patients of group OA had the highest percentages of crepitation in the functional examination, they reported only average scores for crepitation in the questionnaire. Group OA had a relatively low percentage of oral parafunctional habits, the highest percentage of full prosthesis wearers, and a slightly higher percentage of patients with loss of posterior tooth support.

Fewer patients of group OA reported a busy life than the other groups. They reported slightly higher percentages of worrying and doubt and average scores for the other psychosocial variables. A relatively low percentage of patients reported feeling healthy (79%), and a high percentage reported using medication (46%). These patients also reported relatively more complaints of neck, shoulders, and limbs, and the highest percentage of rheumatism (10%).

Discussion

CMD With a Mainly Myogenous Component

The symptom profile of our myogenous subgroup resembles the reports of myogenous subgroups of other studies in many aspects. The report of diffuse facial pain, the variability of the pain within short periods of time, and the relatively higher impact of the complaint on daily life in myogenous patients are also described by other authors.[1-4] Comparable to these findings, Malow et al[5] found that myogenous patients, compared to control patients, have a lower pain threshold and a greater tendency to report pain in reaction to experimental pain stimulation. That the pain was relatively less often reported to be provoked by function of the jaw, and relatively more often by external factors than the other subgroups, was consistent with findings of Isacsson et al[2] and Fricton et al.[6] These

findings point toward a possible associated psychologic component, which may be expressed by the higher scores for depression and worrying in group M. This higher incidence of psychosocial factors is in line with the findings of many other studies.[1,4,6–8]

Comparable to findings of Schokker et al[9] and Hijzen and Slangen,[10] there was a higher incidence of recurrent headache and ear complaints in group M than in the other subgroups. A possible explanation for this is given by Fricton et al,[6] who reported a connection between several myofascial trigger points of the masticatory muscles and pain in the area of head and ears in myogenous patients. The relatively higher incidence of neck and shoulder complaints was also found by Linde and Isacsson,[11] and the overall higher level of musculoskeletal complaints is in line with the report of Krogstad et al,[12] who found that pain and tenderness of the masticatory muscles are related to muscle tenderness elsewhere in the body. All these factors may be responsible for the relatively lower perception of feeling healthy in the myogenous group, a finding that is consistent with findings of other authors.[2]

A part of the confusion regarding myogenous disorders originates from a lack of obvious organic findings, the many apparent contributing factors, the frequently associated psychologic and behavioral complicating factors, and the lack of a unified theory to explain this complex phenomenon.[6] Craniomandibular disorders with a mainly myogenous component are often conceptualized as a psychophysiologic condition that is likely to be responsive to stress.[13,14] As such, pain is supposed to result from stress-induced hyperactivity of the masticatory muscles. Support for this concept was given by the descriptive studies of Yemm[15] and Lundeen et al[4] in which connections between muscle hyperactivity and muscle pain and between stress and muscle hyperactivity were reviewed. Another model, which is consistent with the above-mentioned concept, was given by Travell and Simons,[16] who stated that myofascial pain may be caused by myofascial trigger points. According to the authors, the development of trigger points can be brought on by direct injury, microtrauma (such as parafunctional oral habits), and more general factors that weaken the muscle. Patients in group M had a high level of some parafunctions and a higher incidence of psychosocial factors than patients in the other subgroups, which may be supportive for the aforementioned models. However, one should be cautious when drawing such conclusions because the argumentation of cause and effect could also work the other way around. For instance, Keefe and Gil[17] have described that pain itself can be considered as an important stressor and as such can influence psychosocial factors. Von Korff et al[18] described a higher psychologic impairment in patients with more current pain conditions, and Lund et al[19] stated in their pain-adaptation model that pain itself can cause dysfunction.

Although this symptom profile does not give insight into the etiology of myogenous CMD, it can be concluded that CMD with a mainly myogenous component should not be looked on as a disorder with local signs and symptoms only, but rather as a local expression of a more generalized musculoskeletal disorder with the associated psychosocial factors.

Internal Derangement

The diagnoses internal derangement with reduction and internal derangement without reduction are less controversial in comparison with the other subdiagnoses because of their tangible diagnostic characteristics that can be confirmed by imaging. In our study, patients with internal derangement were relatively young, which is in agreement with the findings of other authors.[2,20] Group ID–R contained relatively more women (91%) than group ID+R (71%), a finding that is also reported by Pullinger and Seligman[21] and Harness et al.[7] An explanation for this phenomenon may be that women are more prone to internal derangement without reduction because of a larger general joint mobility, which offers them less protection against microtrauma and macrotrauma.[22] However, other studies[23] show only weak correlations between the mobility of the mandible and of peripheral joints in young women. Another explanation may be that women, who do have a smaller maximal mouth opening than men,[24] are more functionally hindered by a decrease of this maximal mouth opening, and therefore seek treatment more often than men.

The differences in characterization between groups ID+R and ID–R concerning the severity and the impact of the complaint were also reported by Isacsson et al,[2] Eriksson and Westesson,[25] and Helkimo and Westling.[20] Also similar to our findings, Isacsson et al[2] observed that the pain was associated with mandibular movements in both groups. This pain during movement is assumed to be caused by traction and tearing of the herniated, pathologically altered posterior disc attachment and mechanical compression of nerve fibers during mouth closure.[26]

In the literature, the incidence of psychosocial factors in patients with internal derangement is mostly described as part of an arthrogenous group to allow comparisons with a myogenous group.[1,2,4,7] In these studies, arthrogenous patients showed relatively low percentages of psychosocial factors. Our findings for patients in the ID+R and ID–R groups are in agreement with this. It is striking that the patients of group ID–R, who, on average, reported severe pain, showed such low scores for accompanying psychosocial factors. An explanation could be found in the acute nature of the complaint or in the fact that most patients reported one pain complaint, a finding that is reported to be related to low levels of psychologic distress.[18] Supplementary, we found that the patients with internal derangement had good general health, as Isacsson et al[2] and Linde and Isacsson[11] also observed. This may partly be due to the low mean age since it is known that general health problems are more common in elderly people.[27] The patients of group ID–R only showed higher percentages of recurrent headache, which may partly be explained by accompanying muscle symptoms such as muscle splinting.

It has been hypothesized that internal derangement without reduction is the more advanced condition of internal derangement with reduction and may, in some cases, be a precursor of osteoarthrosis[25,28] or be an accompanying sign of a not-yet radiographically detectable osteoarthrotic process.[29] This hypothesis is supported by our results in that most patients of group ID–R reported a history of clicking and locking. Although Westesson and Lundh[30] reported that progression to a closed lock seems more likely in patients with pronounced joint pain, disturbed joint function, temporary locking, and a deep anterior recess of the lower joint compartment, the underlying process for a progression to a closed lock is still unclear. From our data it seems that parafunctional biting habits may have had some influence; although the patients of group ID–R only showed an average incidence of parafunctional habits, the patients of group ID+R reported lip, cheek, tongue, and nail biting more often. A high percentage of parafunctional habits in patients with internal derangement was also described by Helkimo and Westling.[20] Besides an increased load on the joint tissues, microtrauma as induced by these habits implies an increased activity in the superior lateral pterygoid muscle.[31] It is stated that, especially in incisal clenching and nail biting, the activity of the superior lateral pterygoid muscle braces the anterior band of the disc, thus stretching the disc attachments.[32]

It may be concluded that in most cases, internal derangement is a disorder that is confined mostly to the TMJ and that is expected to react positively to local therapy. Internal derangement with reduction is the first and mildest form, which may or may not progress to a further stage. Internal derangement without reduction is a relatively severe dysfunction of the TMJ, which can be accompanied by muscle splinting and headache. Except for parafunctional biting habits, our data do not provide further confirmation of a theory or indications for a cause of internal derangement.

Osteoarthrosis

The symptom profile of our osteoarthrosis subgroup resembles the reports of other osteoarthrosis studies in many aspects. The relatively high mean age, the most important pain locations in the TMJs and the ears, and the finding that pain increases during the day and during function are also reported by other authors.[24,33-36] Crepitation, a sign of perforation or disruption of the disc and denudation of subchondral bone, and a major clinical criterium for osteoarthrosis in our study, is also reported by many other authors.[24,25-37]

The relatively high mean age of group OA may be responsible for many of the characteristics of this group. Although there is evidence to support the concept that the increased load on the TMJ due to loss of posterior tooth support induces structural bone changes,[37,38] as Helöe and Helöe[39] reported that dental and prosthetic status had seemingly no influence on the findings of CMD in an elderly population, this correlation may be weak. Fenlon and McCartan[27] and Kopp[34] reported that general health problems are more common in elderly people, and Von Korff et al[18] described a cumulative probability of developing multiple pain conditions with age, and therefore a higher psychologic impairment in elderly patients. The higher scores of general health factors and slightly higher scores of psychosocial factors in group OA may also have been caused by the higher mean age of the patients rather than being a characteristic of osteoarthrosis. Also, the incidence of rheumatic disorders is reported to increase with age.[37,40] However, the report of Helöe and Helöe[39] that symptoms of CMD in an elderly population occurred most often in patients who complained of rheumatism or general joint pain leads to a stronger association than age alone.

Although fundamental information about the natural history of osteoarthrosis of the TMJ is lacking, it is stated that at least two different dis-

ease processes may lead to signs and symptoms of osteoarthrosis.[21,24] In the first hypothesis, internal derangement with reduction, internal derangement without reduction, and osteoarthrosis are thought to be consecutive stages of one degenerative process.[25,28,29] This hypothesis is supported by Westesson and Rohlin,[41] who reported internal derangement to be correlated with osteoarthrosis, and by our findings that 21% of the patients of group OA reported a history of clicking and locking. In resemblance with the symptom profiles of groups ID+R and ID–R, these patients have a local, relatively severe disorder and should be treated accordingly. According to the second hypotheses, primary osteoarthrosis may develop as part of the same disease process occurring in other joints, with the incidence increasing with age.[39,40] This hypothesis is not only confirmed by autopsy findings showing that osteoarthrosis may also occur without signs of internal derangement,[42] but also by the findings in our study that group OA had the highest mean age, and that 45% of the patients reported that pain started suddenly or had increased steadily. Accordingly, primary osteoarthrosis should not be looked on as a disorder with local signs and symptoms only, but rather as a local expression of a more generalized musculoskeletal disorder. In the light of these basal differences and their consequences for treatment planning, it seems necessary to clinically distinguish two osteoarthrosis groups in future research.

Mixed Signs and Symptoms

Patients with pronounced signs and symptoms of more than one group were placed in the mixed group. Because the literature shows that combined disorders usually show a combination of the characteristics of the disorders concerned,[8,43] it may be assumed that characteristics of more than one group are of importance in the mixed patient group.

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Resumen

Subgrupos de diagnóstico de los desórdenes craneomandibulares. Parte II. Pertiles de los síntomas

Se realiza una presentación sobre los siguientes cuatro subgrupos de diagnóstico bien-definidos correspondientes a pacientes que padecen de desórdenes craneomandibulares (DCM): aquellos con un componente miógeno principalmente; aquellos con un malfuncionamiento interno con reduccion; aquellos con un malfuncionamiento interno sin reducción; y aquellos con osteoartrosis. Aunque fue inevitable el hecho de que los subgrupos no eran completamente homogéneos, los perfiles de los síntomas se diferenciaron considerablemente. Parece que aún así hay razones para distinguir a los dos grupos de osteoartrosis en investigaciones futuras. Aunque la identificación de factores clínicamente significativos en un paciente dado con DCM es todavía una tarea clínica difícil, los perfiles de los síntomas proveen una estructura que puede dar un discernimiento mejor del fundamento de la queja y de los factores contribuyentes. Los perfiles de los síntomas también ofrecen la posibilidad de una selección de tratamiento mas orientada y una evaluación de tratamiento que está mas a la altura de las características específicas de los subgrupos. Se concluye por lo tanto, que para aumentar el discernimiento de los DCM, la evaluación de los subgrupos de diagnóstico debe ser preferida en la evaluación de un grupo heterogéneo de pacientes con DCM.

Zusammenfassung

Diagnostische Untergruppen bei Myoarthropathien. 2. Teil. Symptomprofile.

Es werden die vier folgenden, klar definierten diagnostischen Untergruppen von Patienten mit Myoarthropathien beschrieben: Jene mit einer hauptsächlich myogenen Komponente, jene mit einer Diskusluxation mit Reduktion, jene mit einer Diskusluxation ohne Reduktion, und jene mit einer Arthrose. Obwohl es unvermeidlich war, dass die Untergruppen nicht vollständig homogen waren, unterschieden sie sich bezüglich der Symptomprofile beträchtlich. Die Resultate legen sogar nahe, bei zukünftigen Untersuchungen zwei Arthrosegruppen zu unterscheiden. Obwohl die Identifizierung eines klinisch signifikanten Faktors bei einem gegebenen Patienten eine schwierige klinische Aufgabe bleibt, liefern die Symptomprofile einen Rahman, welcher mehr Einsicht in den Hintergrund der Beschwerden und der dazu beitragenden Faktoren geben kann. Die Symptomprofile erlauben auch eine gezieltere Wahl der Behandlung, welche den spezifischen Charakteristika der Untergruppen besser entspricht. Daher darf gefolgert werden, dass bei der Beurteilung einer heterogenen Gruppe von Patienten mit Myoarthropathien die Evaluation einer diagnostischen Untergruppe bevorzugt werden soll.