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Relation between stress and symptoms of craniomandibular disorders in adolescents

Abstract

The psychophysiologic theory proposes that stress can precipitate craniomandibular disorders (CMD) and that stress correlates more strongly to disorders of the masticatory muscles than to temporomandibular joint disorders. Empirical reports show only low correlations between emotional stress and CMD signs and symptoms, and that some of them might be spurious. In the present study this correlation was assessed in 417 adolescents from 11 to 16 years old. Data from the clinical examination were used to construct two indices: 1) The number of muscles sites tender to palpation, and 2) signs from the joint and restricted movement. Results show that global stress was only significantly correlated with the muscle index (r = .20), but not with the other index. Only the multiple regression analyses regarding muscle disorders had a significant beta weight of global stress that remained significant when controlling for the intervening variables age, gender and psychosomatic symptoms. The pattern of the stress-specific and unspecific CMD signs was consistent with the postulated stress model. Since there are positive results with regard to the stress model in patient samples and in this unselected sample of adolescents, further research is indicated, including the concept of somatization more explicitly.

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Introduction

Myoarthropathies of the masticatory system (MAP), i.e. craniomandibular disorders (CMD) can be defined as a collective term embracing a number of clinical problems that involve the masticatory musculature, the temporomandibular joint, or both (McNeill 1990). It is generally thought that muscle and joint disorders have multifactorial etiologies. The psychophysiologic theory discussed in this paper proposes that stress or other emotional conditions can be co-factors in the etiology of CMD. Stress induces parafunctional habits, which are viewed as tension relieving mechanisms, and which in turn can cause muscle

overuse. According to this working hypothesis, stress should correlate more to muscle disorders than to joint disorders.
People react to stress with different bodily systems (Lacey 1967). Some react through the head and neck muscles, and some of these become CMD patients. Indeed, CMD patients seem to respond more to stressors in the facial and masticatory muscles than in other muscles (Flor 1991). The psychophysiological responses are interpreted as indicative of an idiosyncratic muscular response pattern to personally relevant stressful situations.
There are two methods that can be used to evaluate the stress model: a) experimental studies, and b) the epidemiological approach (also used in this study).
a) Experimental studies analyze the reaction to experimentally-induced stressors. Looking to studies testing the assumption that individuals diagnosed with myofacial pain have elevated EMG activity in the facial or masticatory muscles and/or that these muscles are particularly responsive to stressors, the results are mixed. Some studies have found high levels of EMG activity at baseline for temporomandibular disorder (TMD) patients (Dahlstrom et al. 1985, Kapel et al. 1989, Rao & Glaros 1979), while others have not (Glaros 1996). Similarly, some studies have found that TMD patients respond more to stressors in the facial and masticatory muscles than in other muscle or physiological response systems (Kapel et al. 1989, Flor et al. 1992) while others have not (Intieri et al. 1994).
b) Epidemiological studies analyze the relationship between the degree of emotional stress and the degree of CMD. Subjects with high emotional stress or distress (Selye, 1956) should develop more frequently CMD-symptoms compared to subjects with low stress. Correlation analyses can be used to assess the relationship between emotional stress and CMD symptoms. There are several studies assessing the relation between stress and CMD. In a literature review (Sieber 1998), 21 out of 23 studies reported a weak but significant relation between stress and CMDs. In most of these studies stress was correlated to a general index of CMD without distinguishing between muscle and joint disorder. Exceptions are the following four studies:
Schiffman et al. (1992) found a positive correlation of r = .21 between stressful life events and mandibular dysfunction for the total sample of n = 250 nursing students. In the subpopulation of normal subjects, the correlation between life events and the index assessing the number of muscle sites tender to palpation (r = .20) was stronger than between life events and degree of jaw dysfunction (r = -.06). In the subpopulation of subjects with only muscle disorders, stressful life events were positively but only weakly associated with the muscle index MI (r = .36), but not with the dysfunction index DI (r = .09). In the study by Steed (1998) on 269 temporomandibular disorder patients, the stress scale was significantly correlated to pain report (r = .32) and to palpation pain (r = .20), but not to the joint dysfunction scale (r = .09). In the study by Wexler & Steed (1998), the same instrument had been used (561 patients) resulting in the same pattern of significant correlations. De Leeuw et al. (1994a) distinguished patients with CMD with mainly a myogenous component and patients with mainly an arthrogenous component. The stress theory was not supported directly in this study. However, patients with CMD-myo reported more general health symptoms than patients with CMD-arthro. These results show that pain report and tenderness to muscle palpation were significantly correlated to stress; however, this was not the case with the degree of jaw dysfunction.
Out of the few studies addressing the stress-specific effect on the masticatory muscles most studies were based on a patient sample. However, it is not clear whether or not stress is associated with the development of CMD-specific muscles symptoms in non-patient samples and in adolescence. If stress is a specific contributing factor already at the beginning of the development of a CMD, it might be possible to differentiate between a stress-specific and a non-stress-specific pattern in the etiology of CMD. The identification of this pattern already at the beginning could lead to a more profound etiological basis of the stress model. It would support the stress concept since the direction of causality in adolescent subjects is rather from stress to CMD symptoms than from the symptoms to stress.
However, the low correlations between stress and CMD symptoms found in the mentioned studies may be a result of a third variable indicating that the role of the stress model has little or no relevance as an etiologic factor. Contemporary stress theories indicate that stress cannot be considered a direct reaction to external stressful factors. Subjects' appraisal, reappraisal and coping potential play a crucial role (Lazarus & Folkman 1984, Frydenberg 1996). We therefore have to include intervening variables in the model. It is possible that controlling for an intervening variable makes the relationship between stress and CMD symptoms vanish. If stress is associated with pain report, there is a possibility that such an association may reflect individual differences in "negative affectivity": Individuals prone to report negative stress may also react more amply, and report more pain, while having their muscles palpated. In this model, the degree of palpation pain is modified by the concept of the "pain-prone personality" (Engel 1959) or – using a more modern concept – "somatization" (Lipowski 1988, Escobar et al. 1991). Somatization is a term which has been used to describe a range of behaviors: reporting numerous physical symptoms and frequent utilization of health care. It is a dimension of personal functioning characterized by the tendency to experience and/or report numerous physical symptoms. Implicit in most definitions of somatization is that the behavior is in excess of that which would be explained by clinically observable pathologic processes (Wilson et al. 1994). It would be possible that external stress per se has no relevant effect on CMD and that the reported weak associations are spurious and a result of the "pain-prone personality" or "somatization". This hypothesis is supported by the fact that several studies reported a greater incidence of emotional reactions and psychophysiological disorders, such as migraine headache, dermatitis, and ulcers, as well as a higher incidence of a variety of bodily complaints and somatic diseases in patients with myofascial pain dysfunction (Berry 1969, Gold et al. 1975, Weinberg & Lager 1980, Steed 1998, Wexler & Steed 1998).
In the present study, the intention was to highlight the impact of stress on CMD symptoms. We anticipated a stronger correlation between stress and the signs on palpation of the joints and muscles than between stress and the other CMD signs and symptoms in adolescents. We further analyze the strength of association when the concept of "somatization" is included in the model. If the stress model is a relevant etiological factor, the relationship between stress and CMD symptoms has to remain significant when including the intervening variable "somatization" in the analyses.

Materials and methods

Subjects

Participants were all pupils (n = 447) from 11 to 16 years old from the junior high school in a suburban community of Lugano in

the southern part of Switzerland. During routine dental screening in the first half of the school year, data on CMD signs were recorded by the third author. In a separate study about five months later, the same pupils completed a psychological questionnaire assessing life events, school problems, stress and social support (ALLIDI & MAGATON 1990). In the present analysis, the data from both studies are included. Out of 447 pupils, 30 (7%) had to be excluded from statistical analyses, because they did not participate in both investigations or refused to give their names. The remaining 417 pupils (198 female, 219 male) had a mean age of 13.1 years with a standard deviation (SD) of 1.5.

Clinical examination

CMD signs and symptoms were assessed in a similar way to those at the Clinic for Masticatory Disorders and Complete Dentures of the University of Zurich, where the clinical investigator (third author) had been calibrated. We used the classification schema proposed by NIELSEN et al. (1988, 1989). (For details see RUGGIA 1990, SIEBER et al. 1997.) The Research Diagnostic Criteria (DWORKIN & LERESCHE 1992) were not available at that time. However, the used technique is similar to the techniques proposed in the Research Diagnostic Criteria. The following three categories of dysfunction had been constructed:
Category A comprised eight signs of the joint: clicking on opening and closing (each left and right); crepitation; TMJ pain, deviation on opening and deviation in protrusion. Each sign that is present is scored with one point to form INDEX-A.
Category B: Muscles and joints tenderness to palpation (total 22 items, values 0 or 1) were used to form INDEX-B. The following items (left and right) were included: temporalis anterior/medial/posterior/tendon; pterygoideus medialis; deep masseter; superficial masseter; suprahyoidal; sternocleidomastoid; tenderness on palpation lateral and posterior.
Category C: This category "opening capacity" includes the following four items: active opening, laterotrusion right and left, and protrusion. Since the measurements of movement capacity of this study were similar to those of the Danish study (NIELSEN et al. 1988, 1989), the similar values and classification procedures were used for our study. The four items were then added to form INDEX-C. – The Swiss and the Danish study showed similar prevalences in two of the three dysfunction classes and a similar pattern of dysfunction categories (SIEBER et al. 1997).

Dysfunction index

SCHIFFMAN et al. (1992) divided the signs of craniomandibular pain and dysfunction into items that reflected jaw and joint functioning problems and termed Dysfunction Index (DI), and items that reflected muscle and capsule tenderness problems, termed Palpation Index (PI). The PI includes items related to tenderness with palpation of intraoral and extraoral jaw muscles, neck muscles, and the TMJ capsule. In order to have similar and comparable indices, we added the items of INDEX-A and INDEX-C into the new dysfunction index (DYSIND). It has a mean of M = 0.5, SD = 0.9, and values from 0 (n = 299) to 5 (n = 2). Its correlation to INDEX-A is r = .94, to INDEX-B r = .06, and to INDEX-C r = .37. The INDEX-B representing muscle and capsule tenderness problems, is comparable to the palpation index PI from SCHIFFMAN et al. (1992). It has values from 0 (n = 81) to 22 (n = 2) with a mean of M = 4.8, SD = 4.4, n = 417.

Diagnostic subgroups

According to the stress theory we expect higher stress scores in those diagnostic subgroups which have more frequent muscular disorders compared to subgroups with only moderate or no muscle disorders. We divided the total population into five diagnostic subgroups using the two variables INDEX-B and DYSIND:
Group 1: Subjects with no disturbance, n = 61 (INDEX-B = 0, DYSIND = 0).
Group 2: Subjects with symptoms but no muscle disorders, n = 20 (DYSIND > 0, INDEX-B = 0).
Group 3: Subjects with only moderate muscle disorder (1–9 points on INDEX-B) and no other symptoms, n = 196 (DYSIND = 0).
Group 4: Subjects with severe muscle disorder (> 9 points) and no other symptoms, n = 42.
Group 5: Subjects with severe muscle disorder (> 9 points) and other symptoms, n = 17.
Others not selected: n = 80, 1 missing.

Stress questionnaires

Critical life events: An adapted form of the "Life Events Checklist" (LEC) for adolescents (JOHNSON & MCCUTCHEON 1980, 1986) was used including 23 of the 46 original items. This questionnaire assessed the prevalence of the 23 life events in the past 12 months and the evaluation of the events with either "good" or "bad". We used the index *sum of negative life events* of a person by a simple count of negative events. Daily hassles: School problems were considered as an important aspect of daily hassles and were evaluated by means of a shortened form of the "Survey of Middle School Stressors" (ELIAS M. 1987: Guidelines for scoring the survey of middle school stressors. Non-published manuscript received on friendly concession from the author). Out of the original 28 items, ten were excluded because they were inappropriate for the situation at this school. The pupils indicated if an item represented a problem for them or not. *Global stress indicator:* Both stress indicators, the sum of negative life events and the sum of school problems, were added up to the *global stress indicator.* The average number on this index was 6.64 (SD = 3.5, n = 415, min. = 0, max. = 19, median = 6.0). The correlations of the two indicators to the global stress indicator were both r = .80 (SIEBER et al. 1999). The correlation between the global stress indicator and age was r = .03 and to gender r = .10 ($P < .05$).
In order to compare groups with different stress-levels, we divided the sample into three groups: a) Subjects with low stress (< 5 positive stress-items, M = 2.7, n = 117), b) subjects with moderate stress (5–8 items, M = 6.5, n = 196) and c) subjects with high stress (9–19 items, M = 11.5, n = 102).

Psychosomatic symptoms

Several studies (see introduction) reported a greater incidence of emotional reactions and psychophysiological disorders in patients with myofascial pain dysfunction. According to the concept of "somatization", these patients react more amply and report more muscle pain. As a result of that, external stress per se has no unique effect on CMD. In the present study, psychosomatic symptoms were included in the analyses in order to test the association between stress and CMD symptoms when psychosomatic symptoms are included in the multiple regression analysis. The following 13 items (complaints during the past six months) assessed together with the stress questions have been included (five graded scale with seldom/never = 1; once in a month; once in a week, several times in a week; daily = 5): headache, back pain, belly aches, nausea, loss of appetite, confusion, sadness, nervousness, fatigue, insomnia with wild

dreams, concentration disturbances, sweating (without physical stress). The 13 items were added up to the index „psychosomatic symptoms" (M = 22.0, SD = 7.4, median = 20, n = 416, min. = 13, max. = 50). The reliability of this scale (Cronbach alpha = .83) and consistency checks were good. The index had the following correlations to other variables: to the state of health r = –.23, to the number of doctor visits r = .23, to the consumption of medicaments r = .28 and to global stress r = .37 (all $P < .01$).

Data analyses

Correlation analyses between the dysfunction items/dysfunction indices and the stress scores were computed with Pearson correlations using two-tailed tests. A minimum level of p = 0.05 for statistical significance was used. Analysis of variance (ANOVA) was also used. To test the possible spurious effect of stress on CMD symptoms, we used multiple regression analyses including the variable "psychosomatic symptoms" as intervening variable. All statistical data analyses were performed with SPSS/PC (1990).

Results

INDEX-A (signs of the joint), INDEX-C (opening capacity) and its linear addition, the dysfunction index, had all no significant correlations to the three stress indicators (Table I). However, the "muscle-index" INDEX-B had significant correlations to all three stress indicators with r = .20 ($P < 0.001$) to global stress. Out of the 22 items of INDEX-B, four had significant ($P < 0.05$) correlations to the global stress indicator using correction of the *P*-values. The strongest correlation was between the deep masseter and global stress (r = .20) and between the TMJ palpation lateral left and global stress (r = .18). A list including the correlations between all 34 items and the three stress indicators is available from the first author.

Diagnostic subgroups

We expected higher stress scores in those diagnostic subgroups which have more frequent muscular disorders compared to subgroups with only moderate or no muscle disorders. The mean values of the three stress scores for five diagnostic subgroups are presented in Table II. We focussed first on the global stress indicator. Group 1 had the lowest global stress score (M = 5.6), group 5 had the highest one (M = 8.2). The analysis of variance over all five groups was significant with F(4,330) = 3.02, $P = 0.01$. Subjects with symptoms but no muscle disorders (group 2) had no significantly increased mean score compared to group 1 with no disturbances, however, subjects with severe muscle disorder but no other symptoms (group 4) had higher global stress scores compared to subjects with no disturbance (Tukey multiple range test). There is a rank order between no, moderate and severe muscle disorder with increasing global stress holding the dysfunction index constant at zero. These results indicate that symptoms of muscle disorder are related to increased stress. However, the combination of severe muscle disorder and other symptoms was also related to stress. With regard to negative life events and daily hassles, the results were similar, but only the analysis of variance on negative life events was significant (F[4,330] = 3.07, $P = 0.017$).

Different stress groups

According to the stress model we expected that in the high stress group muscle/joint symptoms (INDEX-B) would be more frequent than signs from the joint (INDEX-A) or signs related to the mandibular movement capacity (INDEX-C). There was a significant difference with regard to INDEX-B (ANOVA F[2,411] = 6.66, $P = 0.001$) using three stress groups (Table III). In the high stress group, the mean score of INDEX-B was higher (M = 6.1) compared to the low or moderate stress group (M = 4.1, M = 4.4). The difference between the moderate and

Table I Pearson correlation coefficients between the dysfunction indices and three stress indicators and psychosomatic symptoms

dysfunction	global stress	negative life events	daily hassles	psychosom. symptoms
signs from joints (INDEX-A)	.04	.04	.03	.04
muscle/joint palpation (INDEX-B)	.20***	.17***	.15**	.17***
movement capacity (INDEX-C)	.05	.06	.03	–.03
DYSIND (INDEX A+C)	.06	.06	.04	.02

** $P < 0.01$ *** $P < 0.001$

Table II Means (M) and standard deviations (SD) of the three stress indicators for five diagnostic subgroups

group		global stress[1)] M	SD	negative life events[2)] M	SD	daily hassles M	SD
1	no disturbance	5.6[3), 4)]	3.0	1.1[5)]	1.1	4.5	2.4
2	symptoms, but no muscle disorder	6.4	4.2	1.3	1.4	5.1	3.3
3	only moderate muscle disorder	6.5	3.3	1.4	1.3	5.1	2.8
4	severe muscle disorder but no other symptoms	7.6[3)]	3.8	1.9 [5)]	1.9	5.6	2.7
5	severe muscle disorder and other symptoms	8.2[4)]	5.1	1.8	2.2	6.4	3.5

[1)] ANOVA: $P < 0.01$ [2)] ANOVA: $P < 0.02$

[3), 4), 5)] multiple range test Tukey-B $P < 0.05$

Table III Means and standard deviations of the three indices INDEX-A, –B, –C and the dysfunction index (INDEX-A + B) for three different stress groups: low, moderate, high global stress.

group	INDEX-A M	SD	INDEX-B[1)] M	SD	INDEX-C M	SD	DYSIND M	SD
low stress	0.4	0.8	4.1[2)]	4.1	0.0	0.2	0.4	0.8
moderate stress	0.4	0.9	4.4[3)]	4.1	0.1	0.4	0.5	0.9
high stress	0.4	0.8	6.1[2), 3)]	5.1	0.1	0.2	0.4	0.9

[1)] ANOVA: F(2,411) = 6.66, $P = 0.001$

[2), 3)] Tukey-B multiple range test $P < 0.05$

high stress group was significant (Tukey-B multiple range test $P < 0.05$). The differences with regard to INDEX-A, INDEX-C and DYSIND (sum of INDEX-A + C) were small and nonsignificant. – Muscle problems do play a more significant role in subjects with high stress than in subjects with low or moderate stress.

Psychosomatic symptoms

The index "psychosomatic symptoms" was significantly correlated only to the muscle index (INDEX-B) r = .17 ($P < 0.001$; Table I), but not with the other indices. Subjects with myogenous signs reported more psychosomatic symptoms than subjects without. This correlation is close to that of stress and INDEX-B with r = .20. (Correlation between stress and psychosomatic symptoms: r = .37, $P < 0.001$). To test the direct effect of global stress on INDEX-B, we used multiple regression analyses with the INDEX-B as criterion variable and the four predictors, global stress, psychosomatic symptoms, age and gender. The multiple correlation was significant with R = .29; $R^2 = 0.09$, adjusted $R^2 = 0.08$, $P < 0.0001$. Global stress had a significant β-weight with β = .16, p = 0.001, and the variable "psychosomatic symptoms" had a β of .12, $P = 0.02$. Gender had no significant β-weight, but age had a β of –0.19, $P = 0.0001$. There was no interaction between age and global stress. The results show that global stress had a small significant overall effect on INDEX-B, even when psychosomatic symptoms were included in the analyses. This was also demonstrated in group comparisons selecting only subjects with high values on the scale "psychosomatic symptoms" (over median). In this subgroup, subjects with low stress (n = 37) had a mean value on INDEX-B of 4.3. The mean value in the group with moderate stress (n = 113) was 4.9 and increased in the group with high stress (n = 72) to M = 6.2. (ANOVA: F[2, 219] = 2.87, $P = 0.05$).

Discussion

In the present study, CMD-specific muscle symptoms and jaw dysfunction were correlated to stress in an unselected sample of adolescents. This makes it possible to analyze whether or not stress is related to the development of CMD-specific muscle symptoms in non-patient samples. If stress has a specific contributing factor already at the beginning of the development of a CMD, it might be possible to differentiate between a stress-specific and a non-stress-specific pattern of CMD signs and symptoms.

The results show – in accordance with the mentioned theory – a stronger correlation between stress and the signs on palpation of the joints and muscles than between stress and the other CMD signs and symptoms. The correlations between the muscle/joint index and the stress indicators were significant ($P < 0.001$) and between r = .15 and r = .20, but the correlations between the dysfunction index and the stress indicators were not significant. This was also true when using rank order correlations. The results are consistent with the stress model. The correlations were low and comparable to the low correlations found in other studies (Steed 1998, Wexler & Steed 1998, Schiffman et al. 1992). There was a difference in time between the clinical examination and the self-reported data concerning stress and somatization. We assume that this time lag rather decreased than increased the correlation between CMD symptoms and stress.

Looking at different diagnostic subgroups we found the lowest mean stress score in group 1 (no symptoms), higher stress scores in group 3 and 4 (with muscle disorders) compared to group 2 (with symptoms but without muscle disorders), higher stress scores in group 4 than in group 3, and a rank order from group 1 to group 4 with increasing stress scores. The results are consistent with the stress model.

Analyses with regard to different stress groups showed that muscle problems do play a more significant role in subjects with "high stress" than in subjects with "low or moderate stress". Negative life events and daily hassles have about the same (small) impact on muscle disorders. Both aspects should be included when stress is correlated to muscle disorders. Global stress was significantly correlated to the number of doctor visits (r = .21) and the consumption of medicaments indicating, that in this study, stress is a valid concept showing that there is a relation to restricted health. According to the results of multiple regression analyses including age and gender, global stress had a small significant overall effect only on the muscle/joint palpation index, but not on the other two dysfunction indices.

It is interesting to see that the psychosomatic symptoms were only significantly correlated to the "muscle index", but not to the dysfunction index. This result is consistent with those of de Leeuw et al. (1994a) who found that patients with CMD-myo (mainly a myogenous component) had poorer health than patients with CMD-arthro (mainly an arthrogenous component) and control subjects. Since psychosomatic symptoms are also associated with stress (in the present study with r = .37), it is possible that stress and CMD symptoms both are a result of the "pain-prone personality" or "somatization" and that the correlation between stress and CMD symptoms will disappear, if the variable "psychosomatic symptoms" is included in the analyses.

The possible spuriousness was investigated in one study on CMD patients and controls (de Leeuw et al. 1994b) using analyses of covariance and controlling for pain report (head, neck, shoulders), age, and sex. The results were not influenced by differences in these three intervening variables. In the present study, stress had a direct effect on CMD symptoms that did not disappear when the scale "somatization" was included in the analysis. The correlation was not spurious. However, psychoso-

matic symptoms also had a direct effect on CMD symptoms indicating that the concept of somatization should be included more explicitly in the stress model. This conclusion is consistent with the results of a case control study (List et al. 2001) finding that in adolescents with TMD, somatic complaints, stress, and emotional problems play a prominent role. The probability of emotional problems appears to be greatest in those individuals diagnosed with myofacial pain and least in those with disk displacement (Glaros 2000–01). The psychosomatic symptoms may account for the development of muscle pain in the masticatory system (Carlson et al. 1998). Since patients with TMD reacted to laboratory stressors with greater anger than did control subjects (Curran et al. 1996), the style of aggressiveness (Ruggieri et al. 1999) may be included in future research.

Overall, these results show that there are stress-specific and stress-unspecific CMD signs and symptoms in this unselected sample of adolescents and that the muscle/joint palpation signs in contrast to the dysfunction signs are relevant to stress. The fact that there was a significant correlation in this study on younger subjects (with a shorter length of time between the impact of stress and the development of CMD symptoms compared to that of adults) is in agreement with the postulated etiological model that stress is related to mandibular dysfunction via its muscle hyperactivity. Also in children aged six to eight years emotionally stressful states (measured by the urinary catecholamines) increased the probability of developing TMJ tenderness (Vanderas et al. 2001). Compared to studies on patients, the analysis of the stress concept in younger subjects leads to a more profound basis since the direction of causality in adolescent subjects is rather from stress to CMD symptoms than from the symptoms to stress. This is due to the fact that stress is already present at that time but there is no chronic development of CMD in young subjects as is true for most CMD patients. The fact that the correlation between stress and CMD symptoms was not spurious is in agreement with the stress concept.

However, the low correlation indicates that the model is incomplete. Several questions have to be addressed in future research: It is not clear on what level of the stress scale stressors are relevant with regard to CMD (e.g. showing high catecholamine values), and how the factor "time" (duration of stress) is relevant. Stress may induce parafunctional habits which are viewed as "normal" tension relieving mechanism. The specific role of the stress concept in the process from normal muscle activity to muscle overuse to muscle disorder has to be studied in more detail. Increased reliability and validity of the instruments assessing CMD and stress are another goal of research.

Since there are positive results with regard to the stress model in patient samples and in this unselected sample of adolescents, further research is indicated including the concept of somatization.

Zusammenfassung

Die psychophysiologische Theorie postuliert, dass emotionaler Stress ein Ursachenfaktor für craniomandibuläre Störungen (CMD) sein kann und dass Stress eher mit muskulären als mit gelenkassoziierten Symptomen in Verbindung steht. Empirische Studien belegen nur einen schwachen Zusammenhang zwischen Stress und craniomandibulären Störungen. In der vorliegenden Studie wurde der Zusammenhang bei 417 Schülern im Alter zwischen 11 und 16 Jahren aus dem Kanton Tessin untersucht. Die zahnmedizinische Untersuchung erfolgte durch den Schulzahnarzt, die Erfassung der emotionalen Belastungen (Schulstress, life events) mittels Fragebogen. Emotionale Belastung war entsprechend der theoretischen Annahme mit dem Muskelindex signifikant korreliert (r = 0.20), nicht aber mit dem Index für Gelenksymptome. Die Vermutung, wonach der signifikante Zusammenhang auf eine erhöhte Bereitschaft zur Somatisierung zurückzuführen wäre, konnte nicht bestätigt werden. Die Studie belegt die Bedeutung des Stressmodells für die Entstehung craniomandibulärer Störungen; die Erklärungskraft ist jedoch gering. Weiterführende Studien werden benötigt, um die Relevanz des Stressmodells zu präzisieren.

Résumé

La théorie psychophysiologique suggère que le stress serait responsable de l'apparition des désordres craniomandibulaires (DCM) et qu'il aurait une corrélation plus marquée avec les désordres d'origine musculaire plutôt que ceux qui trouvent leur origine dans l'articulation temporomandibulaire. Les rapports empiriques ne relèvent que des faibles corrélations entre le stress émotionnel et les signes et symptômes des DCM. Dans cette étude, la relation a été investiguée parmi 417 adolescents dont l'âge était compris entre 11 et 16 ans. Les données obtenues des examens cliniques ont été utilisées pour l'établissement de deux indices: 1) le nombre de sites musculaires douloureux à la palpation, et 2) signes de désordres articulaires et restriction des mouvements. Les résultats montrent que le stress ne serait corrélé qu'avec l'index musculaire (r = .20). L'analyse à régression multiple du stress global montre une valeur bêta significative uniquement par rapport à l'index musculaire, qui, de plus, reste significative lorsque la valeur est corrigée en fonction de l'âge, du sexe et des symptômes psychosomatiques. Les mécanismes des DCM «stress-spécifiques» et «non-spécifiques» sont cohérents avec le modèle du stress postulé. Maintenant que ce modèle a été validé parmi un échantillonage de patients et d'adolescents non sélectionnés, il serait indiqué de continuer la recherche dans cette direction en incluant de manière plus explicite le concept de somatisation.

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