# Symptoms of functional disturbances of the masticatory system

## A comparison of frequencies in a population sample and in a group of patients

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With the aid of questionnaires symptoms of mandibular dysfunction and some general and oral conditions were studied in a group of previous patients and in a randomly selected population sample. From the two materials answers were obtained from 82 persons (81 %) and 1.106 (91 %) respectively. The results confirmed that women are heavily overrepresented in patient materials. This differs from the fairly equal sex distribution found in population studies of mandibular dysfunction. The most frequent symptoms of mandibular dysfunction were TMJ-sounds which appeared in 39 and 79 % and pain on opening the mouth which appeared in 12 and 42 % of the population and patient samples respectively. All symptoms of mandibular dysfunction, headache, clenching of the teeth and unilateral chewing appeared significantly more often in the previous patients, but the number of natural teeth did not differ in the two samples. The general state of health was poorer and general joint — muscle symptoms were more common in the previous patients as well as in those of the population sample with symptoms of mandibular dysfunction. This finding suggests that functional disturbances of the masticatory system often may be related to impaired general health.

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Various opinions of the causes of functional disturbances of the masticatory system have from time to time been published. Formerly many investigators tried to embrace the entire complex in a single etiological hypothesis which has given rise to various theories (for survey see *De Boever*, 1973). In recent years, however, increasing emphasis has been placed on the heterogenous etiological background of the disease.

Symptoms of dysfunction of the masticatory system have previously been studied mainly in patients seeking advise for such symptoms. Only recently have comprehensive epidemiological investigations been available (*Agerberg*, 1974; *Helkimo*, 1974).

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The present investigation was performed with the aid of questionnaires. Symptoms of mandibular dysfunction and general diseases were studied in a population sample and in a group of patients who had been treated earlier. The purpose was to compare symptoms and various background variables.

## MATERIAL AND METHODS

The sample of the general population consisted of every 35th person, aged 15—74 years, in the town of Umeå in the north of Sweden. Of 1.215 randomly selected persons invited to take part in the investigation and who filled in and returned a questionnaire, 1.106 (91 %; 531 men and 575 women) cooperated. The design and performance of the study has been described earlier (*Agerberg & Carlsson*, 1972).

The same questionnaire was also sent to 104 persons, 94 women and 10 men, who had 3—5 years earlier been referred to the Department of Stomatognathic Physiology, University of Umeå because of clinical symptoms referable to the masticatory muscles and/or temporomandibular joints. These previous patients belonged to a material published earlier (*Agerberg et al.*, 1970). Of these, 82 (72 women and 10 men) filled in and returned the questionnaire as well as another questionnaire about residual symptoms, if any. The results of treatment of this group of patients have been described in detail elsewhere (*Agerberg & Carlsson*, 1974).

On the basis of the answers to the questions 7 index values were calculated in an attempt to describe the occurrence and grade of impaired mobility of the mandible, functional pain, symptoms of mandibular dysfunction, orofacial parafunctions, face and head pain, general joint and muscular symptoms, general symptoms. The construction of these indices have been described in detail in a previous paper (*Agerberg & Carlsson*, 1973). In the indices zero denotes absence of symptoms.

*Statistical methods.* The frequencies of symptoms and the index values in the two materials were compared and the significance of differences found was tested with the $\chi^2$-test. The material was also divided into 3 age classes. The following symbols of levels of significance are used in the text and tables: ***$p < 0.001$; **$0.001 < p < 0.01$; *$0.01 < p < 0.05$; N.S. = not significant.

## RESULTS

Only 12 % of the group of previous patients were men, as compared to 48 % in the population sample. The two series differed in age distribution, persons of higher age being more common in the group of patients than in the population sample (Table I). The higher mean age of the patients was also reflected in small differences in occupation, occupational activity and civil status. Academic and postgymnasial education was equally common in both groups, while the percentage who had received only elementary school education was higher among the patients (Table II).

The general state of health of the patients was, on the whole, not so good as that of the population sample, but no such difference was found in the lowest age group (Table III).

General joint and muscle symptoms (besides temporomandibular joint symptoms) were much more common among the patients than in the population sample (Table IV). Frequent headache was also

more common among the previous patients (Table V). In both groups 4 % of the members reported that they had on some earlier occasion sustained a strong blow against the jaw.

Symptoms of dysfunction of the masticatory system and occlusal parafunctions were reported much more often by the patients than by the members of the population sample (Tables VI and VII). On the other hand, no difference was found regarding other types of oral parafunctions.

The patients reported less good chewing ability and chewing mainly on one side than did the individuals in the population sample (Table VIII). The number of natural teeth varied from none (complete

Table I. *Percentage age distribution of the 1.106 members of the population sample examined (I) and of 82 previously treated patients (II)*

| Age group | I | II |
|---|---|---|
| 15—29 years | 40 | 27 |
| 30—49 years | 35 | 32 |
| 50—74 years | 25 | 41 |

Table II. *Percentage distribution of members of the population sample (I) and the patient material (II) divided into groups according to level of education. p in this and the following tables denotes the level of significance according to the $\chi^2$-test of the difference between the two samples*

| Education | I | II | p |
|---|---|---|---|
| 1. Elementary school | 52 | 72 | *** |
| 2. General school examination | 27 | 12 | *** |
| 3. Gymnasium (matriculation) | 10 | 4 | N.S. |
| 4. Postgymnasial education/ academic education | 11 | 12 | N.S. |

Table III. *General state of health in the population sample (I) and in the patient material (II). Percentage distribution according to age*

| | Age | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 15—29 | | 30—49 | | 50—74 | | Total | | |
| | I | II | I | II | I | II | I | II | p |
| Good | 95 | 95 | 91 | 81 | 65 | 56 | 86 | 74 | |
| Less good | 4 | 5 | 8 | 15 | 31 | 38 | 12 | 22 | ** |
| Poor | 0.5 | 0 | 0.5 | 4 | 4 | 6 | 2 | 4 | |

Table IV. *General joint and muscle symptoms in the population sample (I) and in the patient material (II). Figures denote percentage of affirmative answers*

| | I | II | p |
|---|---|---|---|
| 1. Are any of your joints stiff or painful when you wake up in the morning? | 28 | 55 | *** |
| 2. Are any of these joints also swollen? | 8 | 26 | *** |
| 3. Have these joints ever given you any trouble before? | 25 | 70 | *** |
| 4. Have you sought medical advice because of these symptoms? | 21 | 59 | *** |
| 5. Have you ever been in hospital because of such symptoms? | 7 | 22 | *** |

Table V. *Occurrence of headache in the population sample (I) and in the patient material (II). Percentages of affirmative answers*

| How often have you headache? | I | II | p |
|---|---|---|---|
| Hardly ever | 53 | 32 | *** |
| 1—2 times a month | 30 | 27 | N.S. |
| About once a week | 15 | 29 | *** |
| Daily | 3 | 11 | *** |

Table VI. *Pain and symptoms of dysfunction of the masticatory system in the population sample (I) and in the patient material (II). Percentages of affirmative answers to the questions*

| | I | II | p |
|---|---|---|---|
| 1. Do you find it difficult to open your mouth wide? | 6 | 35 | *** |
| 2. Do you find it difficult to take a large bite? | 7 | 35 | *** |
| 3. Do you find it difficult to move your lower jaw to the side or forwards? | 4 | 27 | *** |
| 4. Does it hurt anywhere when you gape? | 12 | 42 | *** |
| 5. Is your lower jaw ever caught or locked during certain movements? | 7 | 26 | *** |
| 6. Do you hear any joint sounds when you move your lower jaw? | 39 | 79 | *** |
| 7. Have you ever before had any of these symptoms? | 28 | 100 | *** |
| 8. Have you ever sought advice for such symptoms? | 7 | 100 | *** |

Table VII. *Frequency of parafunctions. Percentages of positive answers in the population sample (I) and in the patient material (II)*

| Parafunctions | I | II | p |
|---|---|---|---|
| Grinding of the teeth | 10 | 17 | * |
| Clenching of the teeth | 20 | 52 | *** |
| Biting of the cheeks | 9 | 12 | N.S. |
| Biting of the lips | 8 | 12 | N.S. |
| Biting of the tongue | 5 | 2 | N.S. |
| Biting of the nails | 15 | 10 | N.S. |
| Biting of other things | 5 | 2 | N.S. |

Table VIII. *Chewing side and opinion of chewing ability in the population sample (I) and in the patient material (II)*

| Chewing | I | II | p |
|---|---|---|---|
| Chewing most on one side | 33 | 55 | *** |
| Chewing ability | | | |
| good | 78 | 57 | *** |
| fairly good | 19 | 38 | |
| poor | 3 | 5 | |
| Can chew all sorts of food | 94 | 84 | *** |

Table IX. *Number of teeth in different age groups in the population sample (I) and in the patient material (II)*

| | Age | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 15—29 | | 30—49 | | 50—74 | | Total | | |
| Dental status | I | II | I | II | I | II | I | II | p |
| All teeth present | 49 | 50 | 10 | 8 | 2 | 0 | 23 | 16 | N.S. |
| More than 20 teeth present | 44 | 50 | 53 | 58 | 12 | 15 | 39 | 38 | |
| 16—20 teeth present | 2 | 0 | 12 | 8 | 11 | 15 | 8 | 8 | |
| 8—15 teeth present | 1 | 0 | 10 | 5 | 17 | 9 | 8 | 5 | |
| 1—7 teeth present | 1 | 0 | 5 | 5 | 9 | 9 | 4 | 5 | |
| no teeth present | 3 | 0 | 9 | 16 | 50 | 53 | 17 | 27 | |

denture wearers) to a full complement of natural teeth with large differences between the age groups. No statistically significant differences could be found between the two series in this respect (Table IX). 43 % of the patients and 29 % of the population sample wore removable dentures. These usually consisted of a complete upper denture which was worn by 38 % and 25 %, respectively, while 28 % and 17 %, respectively, had a complete lower denture. Partial dentures were seen more often in the lower jaw in the patients (13 % compared with 1 % in the upper jaw) but were equally distributed between the two jaws in the population sample (5 and 4 %, respectively).

The values for all 7 indices used were significantly lower for the population sample than for the previous patients (Fig. 1, Table X).

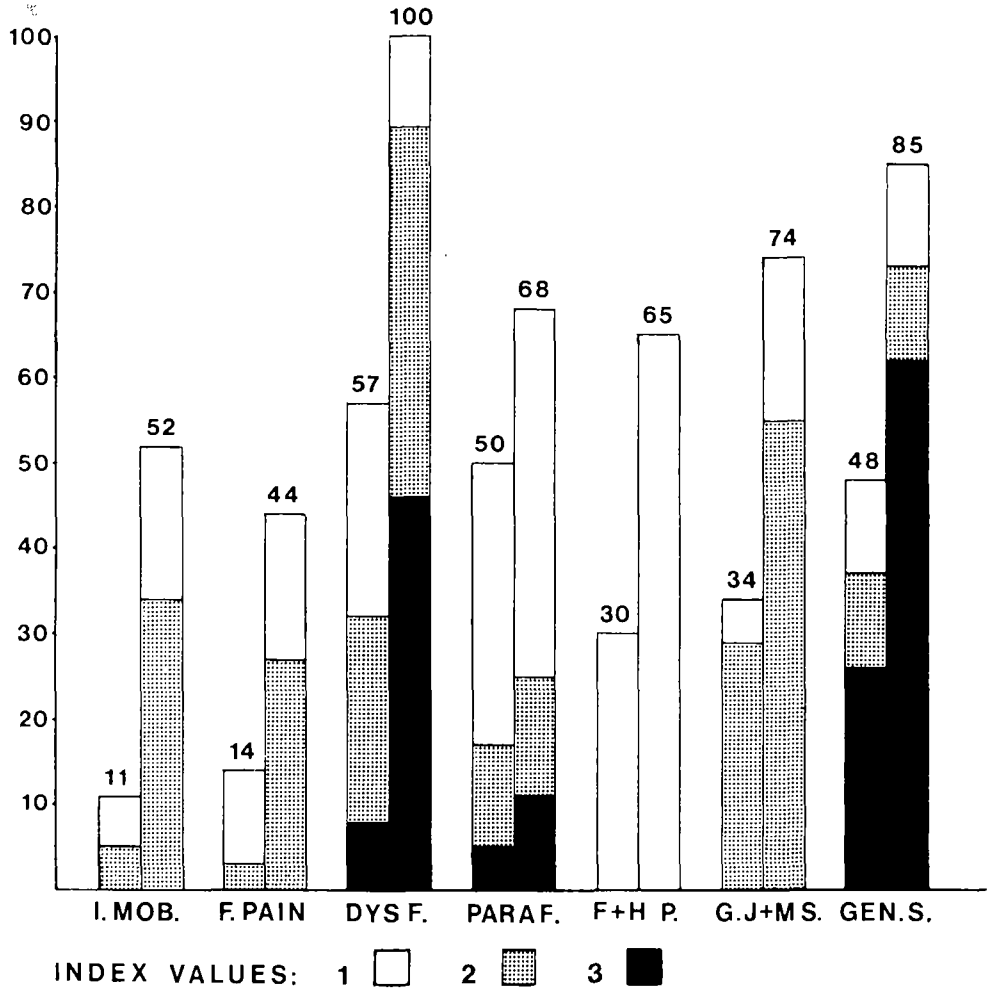


Fig. 1. Percentage distribution of index values for impaired mobility of the mandible (I.MOB.), functional pain (F. PAIN), mandibular dysfunction (DYSF.), oral parafunctions (PARAF.), face and head pain (F.+H.P.), general joint and muscle symptoms (G.J.+M.S.) and general symptoms (GEN.S.) for the population sample (left column of each pair) and the patient material (right column of each pair).

## DISCUSSION

The population sample was collected in the town of Umeå, while the catering area of the department is much larger and includes the entire county of Västerbotten and some patients came even from neighbouring counties. But both series came from the same region in the north of Sweden without relation to a big city.

The sex distribution of the patients confirms the common finding that women are overrepresented in clinical materials. However, the differences in frequency of symptoms of dysfunction between the sexes in epidemiological investigations have been very small (*Agerberg*, 1974; *Helkimo*, 1974).

It has been shown earlier that persons

Table X. *Percentage distribution of index values in the population sample (I) and in the patient material (II). The χ-square test has been performed in 2 x 2 tables with those having index values 0 in one category and the rest in the other*

| | Index value | I | II | p |
|---|---|---|---|---|
| Impaired mobility | 0 | 89 | 48 | *** |
| | 1 | 5 | 18 | |
| | 2 | 5 | 34 | |
| Functional pain | 0 | 86 | 56 | *** |
| | 1 | 11 | 17 | |
| | 2 | 3 | 27 | |
| Dysfunction | 0 | 43 | 0 | *** |
| | 1 | 26 | 11 | |
| | 2 | 24 | 43 | |
| | 3 | 8 | 46 | |
| Parafunction | 0 | 50 | 32 | ** |
| | 1 | 34 | 43 | |
| | 2 | 12 | 14 | |
| | 3 | 5 | 11 | |
| Face and head pain | 0 | 70 | 35 | *** |
| | 1 | 30 | 65 | |
| General joint and muscle symptoms | 0 | 66 | 26 | *** |
| | 1 | 6 | 19 | |
| | 2 | 29 | 55 | |
| General symptoms | 0 | 52 | 15 | *** |
| | 1 | 11 | 7 | |
| | 2 | 11 | 16 | |
| | 3 | 26 | 62 | |

with a higher education are over-represented in series of patients with functional disturbances of the masticatory system (*Franks*, 1965; *Heloe & Heloe*, 1975). This is evidently not the case in the Umeå material. On the contrary, the level of education of the patients was, on the whole, lower — a higher percentage having only received elementary school education — than that of the population sample. This might, however, be explained by the higher mean age of the patients. The same tendency was seen when the population sample was grouped according to age (*Hällqvist, Agerberg & Carlsson*, in preparation).

The finding that the general state of health was poorer and that general joint-muscle symptoms were more common in the patients than in the population sample suggests that the functional disturbances of the masticatory system for which the patients had sought advice might often be a manifestation of a general disease. Analysis of the population sample also showed that persons with symptoms of dysfunction of the mandible more often reported general joint and muscle symptoms and had a poorer state of general health (*Agerberg & Carlsson*, 1973). The same tendency was found in a group of young Swedish men examined for symptoms of dysfunction of the masticatory system (*Molin et al.*, 1975). *Berry* (1969) found a high frequency of other so-called minor diseases in a series of patients with functional disorders of the masticatory system. Even if there are several causes of functional disturbances, and local factors in various components of the masticatory system are justly regarded as essential, the symptoms may be manifestations of a general disease in a given individual.

It is the authors' opinion that the etiology of functional disturbances of the masticatory system is heterogenous and often involves disturbances in general health, psycho-emotional status and occlusal stability and function. The potential risk to be affected by functional disturbances of the masticatory system is increasing with increased interaction (overlapping) of these three factors as suggested in Fig. 2.

The significance of the local functional factors is reflected in the substantially

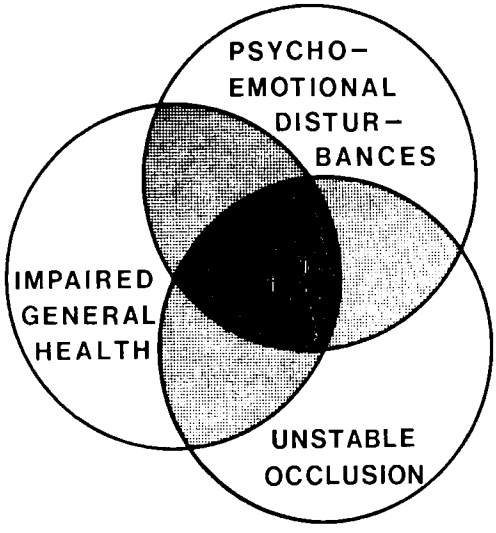


Fig. 2. Interaction of etiological factors. Disturbances of general health, psycho-emotional state and occlusal stability and function are important etiological factors in mandibular dysfunction. Interaction of these factors means an increasing risk of developing dysfunctional symptoms.

higher frequency of occlusal parafunctions in the patients than in the population sample. This difference can probably not be entirely explained by the fact that some patients had been made aware of the parafunctions during the examination and treatment. Another functional factor believed to be of importance in the causation of temporomandibular symptoms is unilateral chewing (*Boering*, 1966; *Franks*, 1967) and seems to have played a role also in the present group of patients. But the mean number of residual teeth did not differ between the patients and the population. Moreover, according to what is taught in stomatognathic physiology today, it is the function of the dentition and not its morphology that is decisive for the state of health of the masticatory system (*Krogh-Poulsen*, 1974).

The higher frequency of partial lower dentures in the group of patients is probably due to treatment by means of molar support in order to stabilise mandibles with only frontal residual teeth against the upper jaw.

The great differences in the index values between the two materials are not surprising since some weight is put on the values by previous symptoms. But even when questions referring to actual symptoms are analysed the previous patients show much more evidence of mandibular dysfunction (Tables X and VI). The problems of residual symptoms in the previous patients have been discussed in another paper (*Agerberg & Carlsson*, 1974).

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