

Fluctuation of temporomandibular disorders in accordance with two classifications: the Helkimo dysfunction index and treatment need grouping

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We studied the fluctuation of temporomandibular disorders, applying two classification systems, in a 2-year follow-up study of 411 subjects. In general, the fluctuation was not large. There were no major differences between the two classifications. In our opinion, a decision to treat a patient on the basis of the treatment need grouping would not lead to overtreatment. The study design suffered from the fact that it is not possible to separate the fluctuation of the TMD itself and the fluctuation of its signs and symptoms from each other, owing to the descriptive nature of the diagnosis 'temporomandibular disorder'.

□ *Diagnosis, oral; overtreatment; temporomandibular joint disorder*

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In clinical dentistry the commonest problems needing treatment, such as dental caries, periodontal diseases, and anatomic malpositions, usually show practically no major fluctuation of clinical signs and, in most cases, are understood to have an irreversible nature. Of course, the subjective symptoms of these states do fluctuate. Problems with temporomandibular disorder (TMD) seem to behave in a different manner. Both the clinical signs and the subjective symptoms come and go, and the order of events and the possible progression of the state are unknown. Diagnoses are descriptive, classifications vary, and no agreement on the etiology has so far been found (1–9). Consequently, reports underscore the varying and ephemeral nature of the clinical picture and often recommend reversible treatment principles for TMD therapy (10–14).

Even though every clinician and researcher 'knows' that the symptoms and signs of TMD vary over time, there are very few studies concerning the fluctuation of TMD. Analyses of fluctuation call for follow-up studies, which, in general, are rare in stomatognathic physiology. We have found only a few reports based on empirical follow-up analyses (15–26). The subjects in these studies have mostly been young, often also orthodontic patients. Kopp's fluctuation study (15) is based on a short, 6-week follow-up. Wänman & Agerberg have published fluctuation charts in a 2-year follow-up study with 258 young subjects (16, 17) on the basis of the Helkimo dysfunction index. Unfortunately, they did not describe the individual grouping of a subject for all three examinations. In addition, they did not exclude the subjects who had been treated for TMD during the study.

The descriptive nature of the diagnosis, TMD, may be the major reason for the conceptual difficulties of a fluctuation study. If a diagnosis is based only on a

description of clinical status, we are forced to say that the disease fluctuates, even if what we wanted to say was that the signs and/or symptoms of the disease fluctuate. In comparison, although subjects with migraine have no signs or symptoms between the disease attacks, we are accustomed to saying that the patients have migraine all the time. Is it then, in principle, fair or incorrect to say that subjects may also have TMD all the time even though they are temporarily without signs and symptoms of TMD? In other words, if we had a non-descriptive diagnosis of TMD, would we still speak about the fluctuation of TMD in the same manner as we do today?

We conducted a preliminary analysis of the changes in TMD signs and symptoms in a follow-up study and compared the fluctuation figures when applying the Helkimo dysfunction index and our recently introduced TMD treatment need grouping, to clarify the questions about TMD fluctuation.

Subjects and methods

We collected, in 1992–93, a random sample of 515 subjects stratified on the basis of age: 25, 35, 45, 55, or 65 years, for a 2-year follow-up, to be examined 3 times at 12-month intervals. Altogether 446 subjects participated in all the examinations, but 35 of the subjects were treated for TMD symptoms during the follow-up years and, therefore, were excluded from the present analysis. Thus, a total of 411 subjects were left for the fluctuation analyses. A detailed distribution of the subjects on the basis of age and gender has been published earlier (27).

All the subjects were interviewed and clinically examined at 12-month intervals in 1993–95 by a

Table 1. Fluctuation of temporomandibular disorder during a 2-year follow-up study of a stratified adult sample of 411 subjects, measured by both the Helkimo dysfunction index (0,1,2,3) and the treatment need (APN; = active, passive, no treatment need) grouping. There are 64 possible combinations for the Helkimo index and 27 for the APN grouping for 3 consecutive examinations. Six subjects with major improvement during the follow-up are indicated in **bold** and underlined figures and explained in detail in the text

Helkimo index Examination				APN grouping Examination				Helkimo index Examination				APN grouping Examination			
1	2	3	n	1	2	3	n	1	2	3	n	1	2	3	n
0	0	0	17	n	n	n	115	2	0	0	1	a	n	n	0
0	0	1	10	n	n	p	30	2	0	1	3	a	n	p	0
0	0	2	1	n	n	a	0	2	0	2	1	a	n	a	0
0	0	3	0	n	p	n	20	2	0	3	0	a	p	n	<u>1</u>
0	1	0	5	n	p	p	21	2	1	0	1	a	p	p	11
0	1	1	23	n	p	a	4	2	1	1	22	a	p	a	4
0	1	2	0	n	a	n	0	2	1	2	7	a	a	n	<u>1</u>
0	1	3	0	n	a	p	0	2	1	3	2	a	a	p	6
0	2	0	0	n	a	a	<u>0</u>	2	2	0	0	a	a	a	<u>7</u>
0	2	1	0				190	2	2	1	8				30
0	2	2	0					2	2	2	11				
0	2	3	0					2	2	3	2				
0	3	0	0					2	3	0	0				
0	3	1	0					2	3	1	3				
0	3	2	0					2	3	2	4				
0	3	3	<u>0</u>					2	3	3	<u>1</u>				
			56								66				
1	0	0	24	p	n	n	42	3	0	0	0				
1	0	1	33	p	n	p	22	3	0	1	0				
1	0	2	4	p	n	a	0	3	0	2	0				
1	0	3	0	p	p	n	20	3	0	3	0				
1	1	0	24	p	p	p	74	3	1	0	0				
1	1	1	147	p	p	a	12	3	1	1	0				
1	1	2	18	p	a	n	1	3	1	2	<u>1</u>				
1	1	3	2	p	a	p	10	3	1	3	0				
1	2	0	0	p	a	a	<u>10</u>	3	2	0	0				
1	2	1	11				191	3	2	1	<u>3</u>				
1	2	2	10					3	2	2	0				
1	2	3	5					3	2	3	1				
1	3	0	0					3	3	0	0				
1	3	1	1					3	3	1	0				
1	3	2	2					3	3	2	0				
1	3	3	<u>0</u>					3	3	3	<u>3</u>				
			281								8				
											411				411

specialist in stomatognathic physiology (M. Kuttilla), applying methods recommended for TMD (5). A detailed description of the applied methods has been published earlier (27). On the basis of the findings, the subjects were then classified by the examiner in accordance with their TMD treatment need into active, passive, or no treatment need groups. A subject was included a) into the active treatment need group if s/he needed treatment for TMD regardless of treatment need for other oral health problems, b) into the passive treatment need group if s/he needed treatment for TMD in connection with other dental treatment due to minor TMD signs and/or symptoms, to ensure that other dental problems were adequately treated, or c) into the no treatment need group if TMD problems did not call for treatment in any circumstance. The classification was performed in the same manner for

each year. The principles of this classification system have been published earlier (27).

The clinical and anamnestic details were also registered in accordance with the Helkimo dysfunction index at the same examination, but the calculation of the Helkimo index figures was postponed for 6 months, to avoid a 'contamination' effect of the classification on the basis of the treatment need grouping. After 6 months the dental assistant counted the Helkimo index figures, without knowing the results from the earlier classification. This classification was also made every year in the same manner. After that the fluctuation of TMD, applying both classifications, was analyzed.

Results

According to both the Helkimo index and the treatment

need grouping the fluctuation was small in the three examinations. For the Helkimo index 43% of the subjects were classified into the same group for every examination, and only 7% of the subjects changed their group more than one step—that is, from group 0 to 2, or from group 1 to 3, or vice versa. Nobody changed his/her group from group 0 to 3 or vice versa. Ten subjects, 3.5%, classified into group 1 at base line were later once classified into group 3. Four subjects classified into group 3 at base line were later classified once into group 2 and once into group 1. One of them had his dentures corrected and had altogether 30 physical treatments for neck symptoms during the study period. The three remaining 'spontaneously healed' subjects had received new prostheses during the study period.

Two of these four subjects showing improvement according to the Helkimo index were classified into the passive treatment need group at all examinations, and the other two were twice classified into the active treatment need group and into the passive treatment need group at the third examination.

For the treatment need grouping 48% of the subjects were classified into the same group at all three examinations. When only the active and no treatment need groups were considered, the figure for correct positive classifications was 93%, and the figure for correct negative classifications 98%. This means that the decision to treat or not to treat on the basis of the first examination would have been correct in 95% of the cases in the light of the later examinations. Two subjects classified into the active treatment need group at base line were later once classified into the no treatment need group, and four subjects classified into the no treatment need group at base line were later classified once into the active treatment need group. One of the two subjects with major improvement without treatment was a woman who had had continuous nocturnal bruxism and a highly stressed life period at base line. The bruxism disappeared slowly during the study period without any therapy, and the stress figures also went down. She had started regular physical activities during the study to relieve the stress, but she had been given no physical treatment. During the study four of her teeth were filled, and one wisdom tooth was extracted. In the Helkimo classification she belonged to group 1 at all examinations. The other subject with major improvement, also a woman, had had physical therapy for neck problems after the second examination. In the Helkimo classification she was in group 1 at the first and third examination and in group 2 at the second examination. No dental or gnathophysiological treatment was performed during the study period.

The classifications in accordance with the Helkimo index and the treatment need grouping were not identical, but no major or systematic differences were found. A detailed fluctuation chart for all subjects in accordance with both classifications for all examinations is given in Table 1.

Discussion

The intraexaminer variation—not measured in the present study owing to the practical difficulty of arranging repeated visits—between the examinations may explain part of the fluctuation. The observed fluctuation was not as large as we expected before the study. If we had treated all the subjects classified into the active treatment need group at base line, practically no overtreatment would have occurred in this study population. On the other hand, the vast majority of the subjects classified into the no treatment need group at base line were stable and in no need of any active treatment for TMD throughout the study. The very high percentages of correct classifications on the basis of the treatment need are understandable because we had a large 'grey zone', the group with passive treatment need. Not a single subject, except the two described above, classified into the active treatment group at base line was healthy at the reexaminations, but they could cope with their TMD problems without treatment. Because many of the subjects who moved from the active treatment need group into the passive treatment need group at the later examinations needed treatment such as periodontal or prosthetic care, one cannot too easily condemn their possible TMD treatment as overtreatment. Our study period is, however, too short to reveal possible tendencies in the passive treatment need group in the long run. With regard to the first of the two subjects showing major improvement according to the treatment need grouping without treatment, the difference between the classifications is at least partially explained by the fact that the Helkimo index does not place any specific emphasis on bruxism, even if severe.

The treatment for TMD and the exclusion from the study of altogether 35 subjects during the follow-up certainly affected our results, but we cannot guess the direction of the effect. They were all classified into the active or passive treatment need group and treated either by one of the authors (M. Kuttilla) or by their own dentist in connection with their normal dental care. Their clinical status, signs and symptoms, and treatment outcomes will be described in a separate analysis.

In the study by Wänman & Agerberg (17) 60% of the subjects did not change their group during the study. Their subjects were, however, younger than ours, 17 years old at base line. Consequently, the frequencies of signs and symptoms of TMD were low, and the signs and symptoms mild. It is also possible that erupting third molars affected their results. Therefore, direct comparisons are not possible.

The Helkimo index was originally constructed and is still used for epidemiologic purposes. Therefore, it cannot, as such, be applied for treatment need analyses. In our study only eight subjects, 2%, were classified into group 3. This seems to be too small a figure to be used as an indicator of treatment need because practically all studies in this field suggest 5–10% treatment need

figures in adult populations. On the other hand, the combination of groups 2 and 3, for instance, would lead to too large figures—in the present study to 18% treatment need. According to our grouping, 7% of the subjects were classified into the active treatment need group at base line, 8% at the second, and 9% at the third examination (27). These figures are in line with most studies dealing with treatment need for TMD. Our sample, however, was not necessarily representative of the whole population because we originally wanted to include equal numbers of subjects from all five selected cohorts. Therefore, we cannot draw too strong conclusions with regard to the treatment need figures in general. One natural source of differences between the two classifications is that the Helkimo index consists of four grades but the treatment need grouping only of three grades.

Our results suggest that the general opinion about the fluctuation of signs and symptoms of TMD may be an overestimation based on the descriptive nature of the diagnosis or an argument reflecting the attitude of avoiding occlusal treatment as an irreversible procedure for a problem understood as a reversible one. The basic question, however, still needs answering. We still do not know whether it is correct to compare TMD problems with diseases such as migraine, which show fluctuation in clinical and subjective symptoms but are understood as permanent states. An answer to this question is not possible without a non-descriptive definition of TMD, based on a deeper understanding of the etiology and progression of these problems, so that it becomes possible to ask whether it is correct to try to separate the diagnosis and the signs and symptoms of the disorder from each other. Only then can we raise the question of whether it is typical for patients with TMD to show signs and symptoms that fluctuate. In our opinion, there is no point in conducting detailed long-term fluctuation studies before conceptual clarifications based on well-formulated hypotheses about the nature of TMD are available.

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