Awareness of malocclusion and desire of orthodontic treatment in 18-year old Swedish men

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The awareness of a person of any dentitional or occlusal anomaly and his desire to receive orthodontic treatment was studied in a group of 18-year old men in whom such anomalies had previously been diagnosed by an orthodontist. The desire for treatment and awareness of the anomalies were studied from answers to questions bearing on the state of the teeth and occlusion. About 16% of the men had received earlier orthodontic therapy with appliances.

Good agreement was found between the actual frequency of individuals with missing teeth and the frequency who reported that teeth had been extracted or were missing for some other reason. The frequency of awareness of dentitional, space or occlusal anomalies, on the other hand, was low, especially for anomalies in the lateral segments. Awareness of anomalies and the desire to receive orthodontic treatment were equally frequent for anomalies in the upper and lower jaws, but varied somewhat with type of anomaly. Only 4% of the individuals thought that they needed orthodontic treatment although as many as 60% were judged by the orthodontist to be in need of such treatment, and in half of these individuals the need was considerable.

Key-words: Malocclusion; orthodontics

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Many recent studies of the prevalence of malocclusion in Scandinavian population in series of children (*Helm*, 1968, 1970; *Björk & Helm*, 1969; *Myllärniemi*, 1970; *Ingervall, Seeman & Thilander*, 1972; *Thilander & Myrberg*, 1973) and in adults (*Ingervall*, 1974) have all demonstrated a high total frequency of malocclusion and need of orthodontic treatment. In these studies the need of treatment has been assessed by the examiner while the individuals awareness of malocclusion, like the desire for treatment, has not been investigated. In many types of malocclusion, however, these questions are of fundamental importance when deciding whether orthodontic treatment should be given or not. The frequency of awareness of malocclusion and desire for treatment are therefore also relevant to the planning of the resources of orthodontic care.

An attempt to get an estimate of the demand for orthodontic treatment was maah by *Lindegård et al.* (1971). These authors compared the judgement of the need of treatment of selected cases of anomalies of various types done by ortho-

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dontists with that of parents of children in school-age. This study, however, only gives an indirect picture of the demand for treatment because the individuals with the actual anomalies were not questioned.

That the desire for treatment is considerably lower than the objectively demonstrated need of treatment was shown by *Myrberg & Thilander* (1973b) who reported that about one fifth of school children with diagnosed anomalies declined orthodontic treatment.

Although many studies of the frequency of malocclusion have been performed only few have taken the frequency of awareness of malocclusion and the desire for treatment into consideration. It was therefore decided to investigate these questions by an inquiry by questionnaire in a series of adults in which the prevalence of malocclusion was known.

MATERIAL AND METHODS

Questionnaires were sent to 287 of 301 individuals in a material of 18-year old men previously studied for prevalence of malocclusion (*Ingervall*, 1974) (the addresses of the remaining 14 subjects were unknown). 278 (97%) filled in and returned the questionnaires. The loss was thus 3%, but since no questionnaires were sent to 14 of the subjects the response frequency was, strictly speaking, 92%.

The questionnaire consisted of 12 main questions, including 6 with subordinate questions or follow-up questions. The questions are given in the description of the results. The answers to the questions were compared with the anomalies found and reported in the previous paper (*Ingervall*, 1974). Unless otherwise stated, the response frequencies are based on the number of questionnaires filled in and returned (278), while the frequency of malocclusion is based on the findings in the 301 individuals in the original material.

RESULTS

The answers to the questions 1—5 are given in Table I. 22% reported that tooth or teeth had been extracted because of crowding, 6% because the tooth had been damaged by decay, 2% because of accidents, while 2% answered that they did not know.

The answers to questions 2 and 3 should be compared with the frequency of missing teeth in the original material, in which teeth (excluding third molars) were missing in 38% of the individuals.

Table I. *Answers to questions 1—5*

Question	Answer (%)		
	Yes	No	Do not know
1. »Do your teeth give you any trouble now?»	6.5	87	6.5
2. »Have you had any permanent tooth extracted?»	32	62	6
3. »Is any tooth missing that has not been extracted?»	8	78	14
4. »Have you ever had orthodontic treatment with an appliance?»	15.5	82	2.5
Follow-up question »If you have not had any orthodontic treatment, has any such treatment been offered you?»	5	81	14

Irregularity of upper front teeth

Question 5. »Do you have any irregularity of the upper front teeth?»

Answer: Yes 17%, no 77%, do not know 6%.

The follow-up question: »If you have an irregularity of the upper front teeth, what is it that is wrong?», was answered in the following way:

	Frequency (%) of those individuals who answered »yes» to question 5	Frequency (%) calculated on basis of entire material (n=278)
A. Teeth crowded	38	6.5
B. Teeth too widely spaced	17	3
C. Teeth oblique	32	5.5
D. Teeth do not occlude properly	17	3
E. Teeth projecting	11	2
F. Tooth (or teeth) missing	13	2
G. Other defect	13	2

Since the sum of the frequencies for the individuals who answered »yes» to question 5 exceeded 100, it is obvious that many of them reported more than one type of irregularity.

Question 6: »If you have any irregularity of the upper front teeth, do you feel that it affects your:

A. appearance
B. chewing
C. speech
D. other function?»

Of the 47 individuals who gave an affirmative answer to question 5 (»Do you have any irregularity of the upper front teeth?»), question 6 was answered affirmatively with the following frequencies:

A. appearance 57%, B. chewing 17%, C. speech 11%, D. other function 6%, while the remainder answered in the negative or said they did not know.

The objective recording of anomalies showed that the frequency of crowding in the maxillary incisor segment was at least 9% and the frequency of spacing about 8%. The frequencies of individuals with rotation and tipping of the upper front teeth in the original material were 16% and 6%, respectively, and the frequency of individuals with inversion of incisors was about 4%. Extreme maxillary overjet was recorded in 10% and mandibular overjet in 2% of the individuals. The frequencies of a frontal open bite and deep bite were 3% and 9%, respectively.

Irregularity of lower front teeth

Question 7: »Do you have any irregularity of the lower front teeth?»

Answer: Yes 15%, no 78%, do not know 7%.

The follow-up question: »If you have an irregularity of the lower front teeth, what is it that is wrong?», was answered in the following way:

	Frequency (%) of those individuals who answered »yes» to question 7	Frequency (%) calculated on basis of entire material (n=278)
A. Teeth crowded	81	12
B. Teeth too widely spaced	2	0.4
C. Teeth oblique	29	4
D. Teeth do not occlude properly	7	1
E. Teeth projecting	0	0
F. Tooth (or teeth) missing	2	0.4
G. Other defect	7	1

Question 8: »If you have an irregularity of the lower front teeth, do you feel that it affects your:

A. appearance
B. chewing
C. speech
D. other function?»

Of those who answered to question 7 affirmatively (»Do you have any irregularity of the lower front teeth?»), some gave

an affirmative answer also to question 8 viz: A. appearance 29%, B. chewing 12%, C. speech 15%, D. other function 7%. The remainder replied no or that they did not know.

In the original material the frequency of crowing in the mandibular incisor segment was 11% and that of spacing about 3%. The frequencies of individuals with rotated or tipped lower front teeth were 17% and 4%, respectively, and the frequency with midline displacement in the lower jaw was 24%.

Irregularity of lateral teeth

Question 9: »Do you have any irregularity of the upper lateral teeth?»

Answer: Yes 7%, no 80,5%, do not know 12,5%.

The follow-up question: »If you have an irregularity of the upper lateral teeth, what is it that is wrong?», was answered in the following way:

	Frequency (%) of those individuals who answered »yes» to question 9	Frequency (%) calculated on basis of entire material (n=278)
A. Teeth crowded	5	0.4
B. Teeth to widely spaced	5	0.4
C. Teeth oblique	5	0.4
D. Teeth do not occlude properly	16	1
E. Other defect	11	0.7

The sums of the frequencies of the various alternative answers given by those who answered in the affirmative to question 9 was less than 100, which means that many individuals gave no answer to this question.

Question 10: »Do you have any irregularity of the lower lateral teeth?»

Answer: Yes 7%, no 77%, do not know 16%.

The follow-up question: »If you have an irregularity of the lower lateral teeth, what is it that is wrong?». The answers were as follows:

	Frequency (%) of those individuals who answered »yes» to question 10	Frequency (%) calculated on basis of entire material (n=278)
A. Teeth crowded	16	1
B. Teeth to widely spaced	5	0.4
C. Teeth oblique	11	0.7
D. Teeth do not occlude properly	16	1
E. Other defect	16	1

In the original material the frequency of crowding of the maxillary lateral segments was about 3% and the corresponding figure for spacing was about 7%.

The frequencies of individuals with crossbite or scissorsbite in one or more lateral segments were 19% and 8%, respectively, in the original material. The frequency of lateral open bite was about 10%. Besides the above space and occlusal anomalies in the original material, a unilateral distal molar occlusion was recorded in about 21% and bilateral in 13%, as well as uni- and bilateral mesial molar occlusion, each in 6%.

The frequency of crowding of the mandibular lateral segments in the original material was 8% and the frequency of spacing was about 10%.

Question 11: »If you have any irregularities of lateral teeth, do you feel that it affects your:

A. appearance
B. chewing
C. speech
D. other function?»

Of those who gave an affirmative answer to question 9 and/or 10 this question was answered in the affirmative with the following frequencies: A. appearance 13%, B. chewing 21%, C. speech 13%, D. other function 13%. The remaining subjects

answered in the negative or said they did not know.

Need of treatment

Question 12: »Do you think you are in need of orthodontic treatment?»

Answer: Yes 4%, no 85%, do not know 11%.

	Frequency (%) of those individuals who answered »yes» to question 12	Frequency (%) calculated on basis of entire material (n=278)
A. To correct upper front teeth	58	2.5
B. To correct lower front teeth	50	2.1
C. To correct lateral teeth	25	1.0

The answer to question 12 should be compared with the total frequency of malocclusion and the objective need of treatment. Dentitional anomalies (malformed teeth, persistent deciduous teeth, rotated and tipped front teeth and inverted incisors) were noted in about 35% of the individuals, space anomalies in 52% and occlusal anomalies in 65%. When the need of treatment was judged by an orthodontist (objective need) with a 5-grade scale (4=severe need, 0=no need) about 60% of the individuals were found to be in need of treatment and in about 30% the need was substantial (grades 2, 3 and 4), Table II.

A significant association was found between the individual's desire to receive orthodontic treatment and the objectively estimated need. Individuals who answered in the affirmative to question 12 were, on the average, in greater need of treatment, as judged from objective findings, than individuals who answered in the negative ($P<0{,}001$ according to Mann-Whitney's U-test). The association between subjective and objective need of treatment is also apparent from the distribution of

Table II. *Frequency of affirmative answers to question 12 (»Do you think you are in need of orthodontic treatment?») in individuals with different grades of objectively assessed need of treatment (grade 4 not included because this class included only 2 individuals)*

Objective need of treatment			Frequency of affirmative answers to question 12.	
Grade	N	%	N	%
4	2	0.7	—	—
3	27	9.0	5	18.5
2	58	19.3	4	6.9
1	87	28.9	3	3.4
0	127	42.2	0	0.0

objective need of the individuals with affirmative answers to question 12 (Table II). Of the individuals in need of treatment grade 3, 18,5% reported that they thought they were in need of orthodontic treatment while only 3,4% with need grade 1 thought that they were in need of such treatment.

The individual's awareness of different types of anomalies

In order to find out whether the degree of awareness of an anomaly and the desire to receive treatment varied with the type of the anomaly, the frequency of affirmative answers of individuals who, according to objectively demonstrated malocclusion, had different types of anomalies was studied. The frequencies of affirmative answers by individuals with anomalies of the front teeth are given in Table III and in individuals with anomalies of the lateral teeth in Table IV.

Table III shows that it was the occurrence of an anomaly of missing or malformed upper front teeth that the individuals were most often aware of. The individuals were also often aware of man-

Table III. *Frequency of affirmative answers to question 5 (»Do you have any irregularity of the upper front teeth?»), question 7 (»Do you have any irregularity of the lower tront teeth?») and question 12 (»Do you think you are in need of orthodontic treatment?») by individuals with objectively demonstrated anomalies*

Anomaly recorded	Frequency of affirmative answers		
	Quest. 5	Quest. 7	Quest. 12
Missing or malformed upper front teeth, persistent upper deciduous front teeth	77	—	23
Missing or malformed lower front teeth	—	0	0
Rotated upper front teeth	27	—	2
Rotated lower front teeth	—	28	4
Tipped upper front teeth	29	—	6
Tipped lower front teeth	—	23	0
Inverted incisors	31	—	15
Crowding in maxillary incisor segment	46	—	4
Crowding in mandibular incisor segment	—	50	15
Spacing in maxillary incisor segment	44	—	9
Spacing in mandibular incisor segment	—	25	13
Extreme maxillary overjet	26	13	3
Mandibular overjet	17	67	17
Frontal open bite	22	22	0
Deep bite	14	7	4
Midline displacement of mandible	—	19	3

Table IV. *Frequency of affirmative answers to question 9 (»Do you have any irregularity of the upper lateral teeth?»), question 10 (»Do you have any irregularity of the lower lateral teeth?») and question 12 (»Do you think you are in need of orthodontic treatment?») by individuals with objectively demonstrated anomalies*

Anomaly recorded	Frequency of affirmative answers		
	Quest. 9	Quest. 10	Quest. 12
Missing or malformed upper lateral teeth	9	—	5
Missing or malformed lower lateral teeth	—	7	5
Crowding in maxillary lateral segment	23	—	23
Crowding in mandibular lateral segment	—	14	7
Spacing in maxillary lateral segment	6	—	9
Spacing in mandibular lateral segment	—	7	7
Distal molar occlusion (uni- or bilateral)	8	7	2
Mesial molar occlusion (uni- or bilateral)	3	6	6
Lateral open bite (in one or more segments)	10	12	4
Crossbite (in one or more segments)	7	7	5
Scissorsbite (in one or more segments)	4	17	8

dibular overjet and crowding of the teeth in the maxillary and mandibular incisor segments and spacing of the teeth in the maxillary incisor segment. Treatment was desired most often by individuals with missing or malformed upper front teeth followed by those with mandibular overjet, inversion of incisors and crowding of the teeth in the mandibular incisor segment. Of those with other anomalies such as extreme maxillary overjet and frontal open and deep bite, only few or none desired treatment.

Comparisons of Tables III and IV show that fewer individuals were aware of anomalies in the lateral segments and fewer desired treatment for such anomalies than those with anomalies of the front teeth. The anomaly which the individuals were most often aware of, and for which they most often desired treatment was crowding in the maxillary lateral segments (Table IV) which included crowding of the canines.

DISCUSSION

The group of 18-year old men studied were representative of the male population of this age in the south and middle of Sweden regarding physical variables (*Lewin*, 1973) and school education (*Ingervall*, 1974). The number of individuals who did not cooperate was so small that its effect on the results can have been only negligible.

Good agreement was found between the objectively demonstrated frequency of individuals with missing teeth and the frequency of individuals who reported that teeth had been extracted or were missing for some other reason. The individuals were obviously well aware of the teeth that had been extracted and the teeth that were missing because of hypodontia. The frequency of affirmative answers to the question »Is any tooth missing that has not been extracted?» was 8%, while the objectively recorded frequency of hypodontia in the Swedish population has been found to be 6—7% (*Grahnén*, 1956; *Ingervall, Seemen & Thilander*, 1972; *Thilander & Myrberg*, 1973). The objectively demonstrated frequency of hypodontia refers to the 28-teeth dentition while the frequency of individuals with one or more third molars missing is much higher (25% according to *Grahnén*, 1956). In most of the individuals studied the third molars had not erupted (*Ingervall*, 1974) for which reason the figures for missing teeth that had not been extracted refer to the 28-teeth dentition, which shows the good agreement between the individual's awareness of hypodontia and the true frequency. This good agreement corroborates the results presented by *Helöe* (1972).

The frequency of individuals who reported that they had received orthodontic treatment as well as the frequency that had been offered such treatment but had declined agrees with the figures that might have been expected from experience in the orthodontic departments of the public dental care (*Linder-Aronson*, 1967).

As expected, the individuals were most often aware of irregularities of the front teeth. Both the awareness of such irregularities and the desire for treatment were equal for the upper front teeth and the lower front teeth. This is noteworthy because it is often assumed that patients desire treatment of anomalies of the upper front teeth more often than those of the lower front teeth.

Of the individual types of anomaly of the front teeth, the individuals were most often aware of crowding and spacing and

somewhat less often of rotation and tipping. A high percentage of individuals were also aware and desired treatment of inverted incisors and mandibular overjet. They were less often aware of extreme maxillary overjet and frontal open and deep bite and individuals with those anomalies desired treatment much less often than did those with inversion of incisors and mandibular overjet. In the objective evaluation of the need of treatment (*Socialstyrelsen*, 1966), much importance is attached to extreme maxillary overjet and deep bite. But many individuals with these anomalies did not desire treatment, which should be borne in mind when weighing the objective and subjective need of treatment before deciding upon orthodontic treatment.

As expected, the individuals were less often aware of anomalies in the lateral segments than of the front teeth. Neither did anomalies of the upper and lower lateral segments differ regarding the frequency of awareness of anomalies or desired treatment. The percentage of individuals who were aware of crowding in the upper lateral segments and who wished treatment was high. This objective recording of malocclusion included, as previously mentioned, crowding in the region of the canines, which may help to explain the relatively high frequency of awareness and desire for treatment.

The correlation between the individuals desire for treatment and the objectively evaluated need of treatment was in agreement with the results presented by *Lindegård et al.* (1971). These authors found that a group of parents of children in school-age estimated the need of treatment in the same way as a group of orthodontists.

The results of the present investigation apply only to the male population of the age in question. It is possible that a corresponding investigation of women of the same age would reveal a higher degree of awareness of anomalies and a more frequent desire to receive treatment than that found in the present material. Awareness and desire to receive treatment may also vary with age. That the awareness of malocclusion may differ in children from that in the present material is suggested by the results presented by *Cohen* (1970).

Apart from the proportion of men who had received or declined orthodontic treatment the individuals in the present investigation had not been informed of the significance of anomalies. If they had been informed, the frequency of individuals who desired orthodontic treatment would surely have been larger, but it would also have increased the frequency of awareness of the anomalies.

The orthodontic treatment given has reduced the frequency of anomalies and the need of orthodontic treatment, compared with the situation in children (*Ingervall*, 1974). The objective persisting need of treatment, like the frequency of anomalies is, however, very high but very many of the individuals with anomalies do not wish to be treated for them. This is the most important finding in the investigation. However, in contrast with the situation in children some of the men had already received orthodontic treatment.

Before deciding whether orthodontic treatment should be started or not, one must weight objective and subjective need of treatment against one another. Many orthodontists assume, often without proper supportive evidence, that the subjective need of treatment is large. Such general assumptions are contradicted by the findings in the present investigation.

In the evaluation of the need of treatment of an anomaly, much importance is often attached to defects believed to impair the patient's appearance and the belief that the patient therefore wants to have the anomaly corrected. But judging from the present investigation, there is a considerable risk of overestimation of the subjective need of treatment, because the majority of the individuals were not aware of any anomaly and only 4% were interested in orthodontic treatment, though objective need of such treatment was noted in as many as 60%. This low figure for awareness of anomalies and treatment desired is in line with the results published by *Myrberg & Thilander* (1973a), who found that one fifth of all patients who had received long and extensive orthodontic treatment had not even considered whether treatment had been successfull or not.

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