

Awareness of malocclusion and demand for orthodontic treatment among Swiss recruits



Abstract

The awareness of malocclusion and the demand for orthodontic treatment was studied in 421 Swiss army recruits by a questionnaire. The questionnaire contained questions that could be answered with yes or no and questions or statements that should be answered with the aid of anchored analogue scales. The prevalence of malocclusion and the objective need for treatment were evaluated with the Index of Orthodontic Treatment Need (IOTN).

About half of the men who had crowding or spacing of their teeth were aware of their malocclusion. Most of these men found their malocclusion to be of no or little concern. Only about 30 per cent of the men who objectively had an increased overjet or a deep bite were aware of their malocclusion and for around 70 per cent of them this was of no great concern.

The great majority of the men were satisfied with the position of their teeth and the appearance of their face. Only 7 and 3 per cent, respectively, were dissatisfied. Very few men found their occlusion to be a drawback in their professional or social lives and only 10 per cent thought orthodontic treatment to improve their appearance to be necessary.

There were no significant or only weak correlations between the objective need for treatment according to the IOTN and the men's opinions regarding the position of their teeth, facial appearance, the impact of their occlusion on the professional and social lives or the necessity of orthodontic treatment.

Acta Med Dent Helv 3: 123–129 (1998)

Key words: Awareness of malocclusion, Demand for orthodontics, Swiss recruits

Accepted for publication: 27 April 1998

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Introduction

The prevalence of malocclusion and the need for orthodontic treatment in Swiss army recruits were studied in the years 1985 and 1996. In 1996 the examination was made with the Index of Orthodontic Treatment Need (IOTN). Details of the examination and the results were reported earlier (INGERVALL et al. 1998). The IOTN has two components, the Dental Health Component (DHC) and the Aesthetic Component (AC). The DHC records occlusal traits of a malocclusion thought to increase the morbidity of the dentition and its surrounding structures. The AC rates the attractiveness of the dentition. The scores of the AC reflects the aesthetic impairment of a malocclusion. Measured with the DHC 59 per cent of the men had no need for treatment, 27 per cent moderate/borderline need, and 14 per cent need for treatment. According to the AC the percentages of no need, moderate/borderline need, and need for treatment were 84, 13, and 3 respectively.

Malocclusion is present in a majority of adolescents and adults (KELLY & HARVEY 1977, INGERVALL et al. 1978, 1987). However, only a subset of these individuals with a malocclusion will present themselves for orthodontic treatment either as children or adults. In a sample of adult orthodontic patients, appearance was cited most frequently as a reason for seeking treatment (BREECE & NIEBERG 1986). Among the reasons for seeking orthodontic treatment by non-patient school age children and their parents, appearance was cited most frequently (TULLOCH et al. 1984). However, in another study, although children with more severe visible dental irregularities were more likely to consider orthodontic therapy necessary, about one-half of children with moderate to severe irregularities reported that they were very or quite satisfied with their appearance (SHAW 1981).

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While the prevalence of malocclusion and the need for treatment can be recorded with an index, like the IOTN, based on objective criteria, the perception of a malocclusion and the demand for treatment is dependent on the opinion of the individual. Previous studies have revealed large discrepancies between objectively recorded traits of malocclusion and the perception of malocclusion as well as between need and demand for treatment (INGERVALL & HEDEGAARD 1974, INGERVALL et al. 1978, 1987).

While the decision to undertake orthodontic treatment is based upon the evaluation of the sequelae of the malocclusion according to objective criteria (SOLOW 1995), the perception of the malocclusion by the patient must be taken into consideration. It is therefore of great importance to better understand the patients' perception of various types of malocclusion. In systems of orthodontic care delivery where treatment priorities must be made, for financial or other reasons, or during counselling, the patient's perception is of great importance. Several studies have shown that the perception of malocclusion is very different for lay persons, general dentists and orthodontists (SHAW et al. 1975, LUFFINGHAM & CAMPBELL 1976, PRAHL-ANDERSEN et al. 1979, SHAW 1981). The concern about malocclusion has also been shown to be age related with less concern in individuals of lower middle age than in early adulthood (STENVIK et al. 1996a). The aim of the present study was to report on the perception of malocclusion in a group of healthy young adult males and compare this with the objective measures of malocclusion in the same subjects. A further aim of this study was to report on the men's demand for orthodontic treatment and the objective need for treatment.

Subjects and methods

The study included 421 men selected among the recruits of the military training center in Thun, Switzerland, in the year 1996. Their ages varied between 19 and 25 years (median 20 years). Fifty-six per cent of the men had attended school in the German speaking and 43 per cent in the French speaking parts of Switzerland. Only single individuals had attended school in the Italian or Raeto-Romanic speaking parts or outside of Switzerland. Fifty-nine per cent of the men had grown up in a town or a comparable agglomeration, 38 per cent in rural areas and 3 per cent could not be assigned.

As part of the examination the men filled out a questionnaire on their dentitions. The questionnaire contained 8 questions that could be answered with yes or no. These were (in translation):

1. Have you had orthodontic treatment?
2. Do you have spaces between your teeth?
3. Are your teeth crowded?
4. Do your upper front teeth (incisors) bite in front of the lower front teeth (incisors)?
5. Do your upper front teeth (incisors) stand out too far?
6. Do your upper front teeth (incisors) bite behind the lower front teeth (incisors)?
7. Do your upper front teeth (incisors) cover too much of the lower front teeth (incisors)?
8. Do your upper front teeth (incisors) cover your lower front teeth (incisors)?

The reasons for including the questions 2–8 were to find out the degree of consciousness of certain malocclusions among the men i.e., spacing, crowding, increased or reverse overjet, and deep or open bite.

In cases of an affirmative answer, the subjects were asked to report the degree of satisfaction with the treatment (follow-up to question 1) or the degree to which they experienced their mal-

occlusion as disturbing (follow-up to questions 2, 3, 5–8). For this purpose 100 mm long analogue scales were used anchored with completely dissatisfied – completely satisfied (question 1) and extremely disturbing – not disturbing at all (questions 2, 3, 5–8). In addition, five further responses were elicited in the form of 100 mm long anchored analogue scales to the following statements and anchors:

16. The position of my teeth is: extremely unsatisfactory – perfect.
17. The appearance of my face is: extremely unsatisfactory – perfect.
18. My teeth hinder me in my professional life: extremely – not at all.
19. My teeth are a drawback in my social life: extremely – not at all.
20. For my appearance a correction of my teeth is: absolutely necessary – completely unnecessary.

As the study was part of a large investigation covering many aspects of the dentition and the time available was limited the men had to fill out the questionnaire in a relatively short time and without access to a mirror. This was not viewed as a drawback because it prevented the recruits from comparing their occlusion with one another and required that they answered the questions about the appearance of their occlusion on the basis of their persistent impression.

Results

Forty-four per cent of the men reported that they had had orthodontic treatment. The degree of satisfaction with the result of their treatment is shown in Fig. 1. About one third of the men (upper tenth of the scale) answered that they were completely or very satisfied with the treatment result while 10 per cent were completely dissatisfied (lower tenth of the scale). The median answer was 78, implying that most of the men were relatively satisfied with the treatment result. Responses to question 20, the necessity of orthodontic treatment to improve appearance, was analysed for subjects who had already had some sort of orthodontic therapy and for those who had not. Those without previous treatment were less inclined to consider treatment necessary, median response 85, than those with previous orthodontic therapy, median response 80 ($0.01 < p < 0.05$).

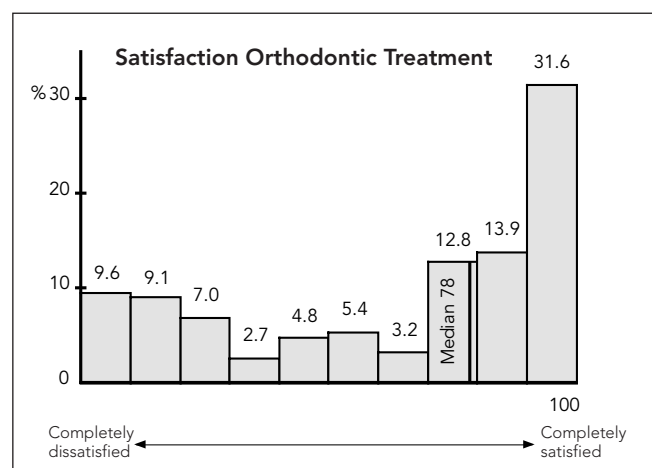


Fig. 1 For those who answered "yes" to the question: "Have you had orthodontic treatment?" ($n=187$), response to the question: "How satisfied are you with the results of your orthodontic treatment?"

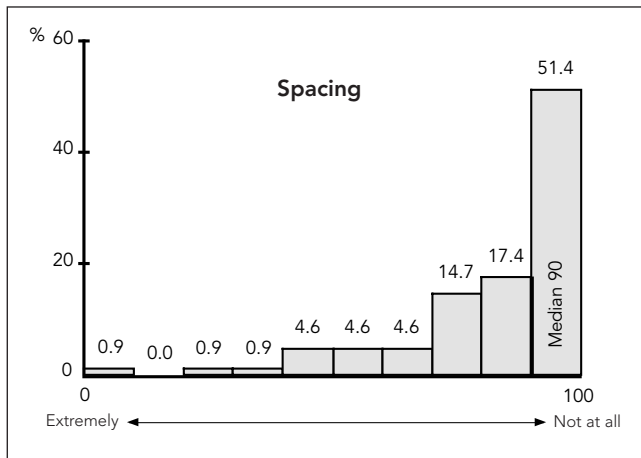


Fig. 2 For those who answered "yes" to the question: "Do you have spaces between your teeth?" (n=109), response to the question: "How disturbing are the spaces between your teeth?"

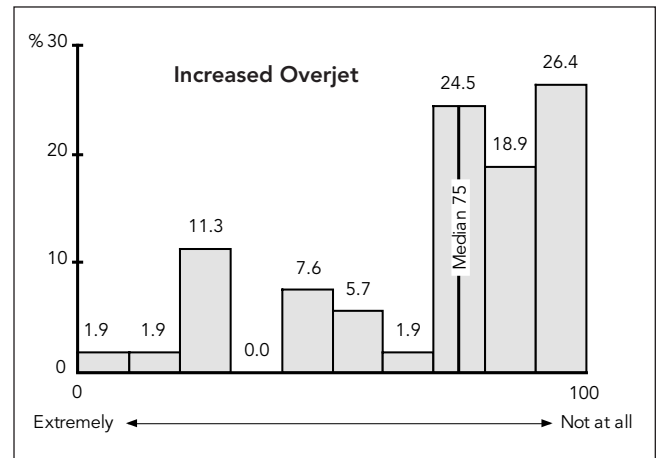


Fig. 4 For those who answered "yes" to the question: "Do your upper front teeth (incisors) stand out too far?" (n=53), response to the question: "Does the position of your upper front teeth (incisors) bother you?"

Twenty-six per cent of the men answered that they had spaces between their teeth (question 2). Very few of these men found the spacing to be disturbing (Fig. 2). More than 80 per cent were included in the upper three tenths of the scale, implying no or little concern. Twenty-three per cent of the men found their teeth to be crowded (question 3). Almost 60 per cent of these men (upper three tenths of the scale) found the crowding to be of no or little concern (Fig. 3).

A contact point displacement is recorded in the IOTN for spacing or crowding of more than 1 mm. At the clinical examination, 336 men were found to have contact point displacements. Forty-seven per cent of these men answered "yes" to one or both of the questions 2 (spacing) or 3 (crowding). Seventy-one men had contact point displacements greater than 2 mm. Fifty-one per cent of these men answered "yes" to one or both of the questions 2 and 3.

Eighty-two per cent of the men answered that their upper incisors were biting in front of the lower incisors (question 4) and 13.3 per cent (55 individuals) that the upper incisors were too

protrusive (question 5). Seventy per cent of the men who answered that their upper incisors were too protrusive found this to be of little or no concern (upper three tenths of the scale) while 15 per cent (8 individuals) found it to be disturbing (lower three tenths of the scale, Fig. 4). Clinically, according to the IOTN, 73 men had an increased overjet ranging from more than 3.5 mm to more than 9 mm. Thirty per cent of these men (22 individuals) answered that their upper incisors were too protrusive (question 5). Fifteen of these 22 men, who objectively had an increased overjet, found it to be of little or no concern (upper three tenths of scale) and 4 individuals found it to be disturbing (lower three tenths of the scale).

Only 7 men answered that their upper incisors were biting behind the lower incisors (question 6). Four of these 7 men reported that this did not bother them.

Sixteen per cent of the men (64 individuals) answered that the upper incisors covered too much of the lower incisors (question 7). For the majority of these men, this was of no great concern (70 per cent of the men marking in the upper three tenths of the scale, Fig. 5). By the IOTN recording, 103 men had a deep bite (overbite 3.5 mm or more). Thirty-one per cent of these men (32 individuals), answered "yes" to question 7. For 21 of these men this was of no great concern (upper three tenths of the scale).

Question 8 "Do your upper incisors cover your lower incisors?" was constructed in order to reveal the awareness of open bite. Fifty-six per cent of the men answered no. This is much more than the prevalence of open bite among the men which was 1.4 per cent. The question must therefore have been misunderstood due to an unfortunate construction or wording.

The attitude of the men to the appearance of their occlusion (question 16) and face (question 17) is shown in Figs. 6 and 7. Most of the men were relatively satisfied with their appearance. Only 7 and 3 per cent of the men (lower three tenths of the scale) were dissatisfied with the appearance of their occlusion or face, respectively. Only few men found their occlusion to be a drawback in their professional (question 18) or social (question 19) lives. Eighty-six and 75 per cent (upper tenth of the scale) of the men, respectively, did not think that their occlusion was a drawback in their lives. The median response to questions 18 and 19 was 100 and 98 respectively.

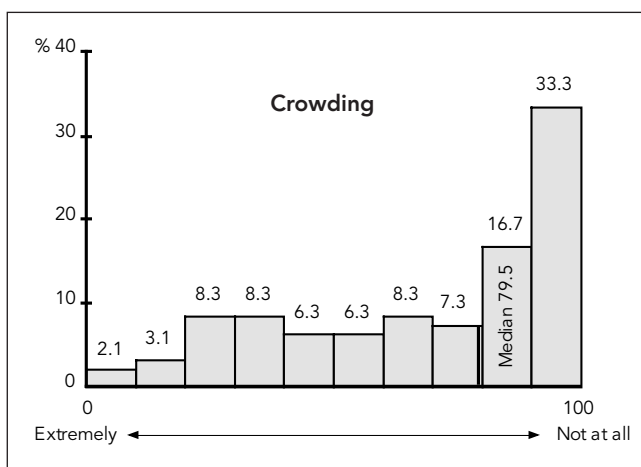


Fig. 3 For those who answered "yes" to the question: "Are your teeth crowded?" (n=96), response to the question: "How disturbing is the crowding of your teeth?"

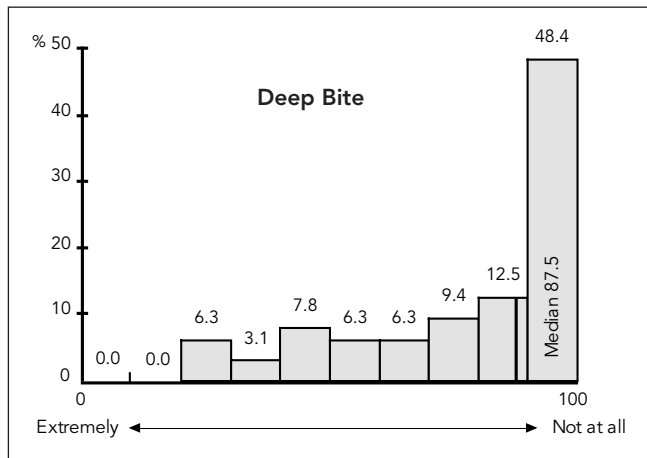


Fig. 5 For those who answered "yes" to the question: "Do your upper front teeth (incisors) cover too much of the lower front teeth (incisors)?" (n=64), response to the question: "How disturbing is it?"

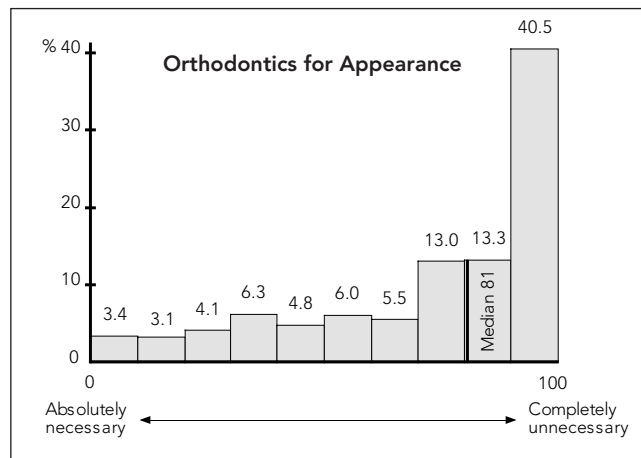


Fig. 8 Response to the statement: "For my appearance a correction of my teeth is" (n=415).

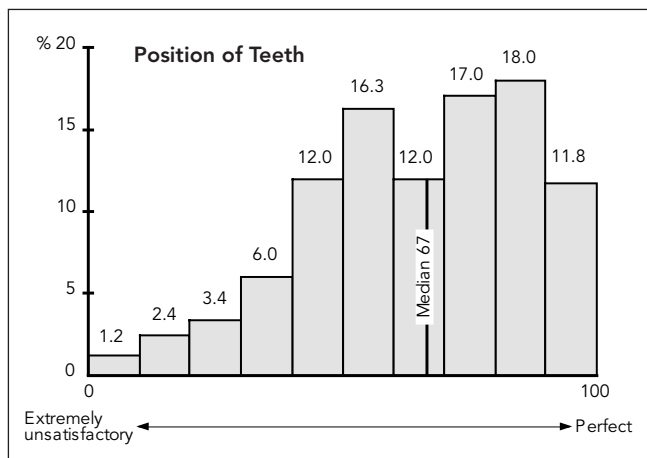


Fig. 6 Response to the statement: "The position of my teeth is" (n=417).

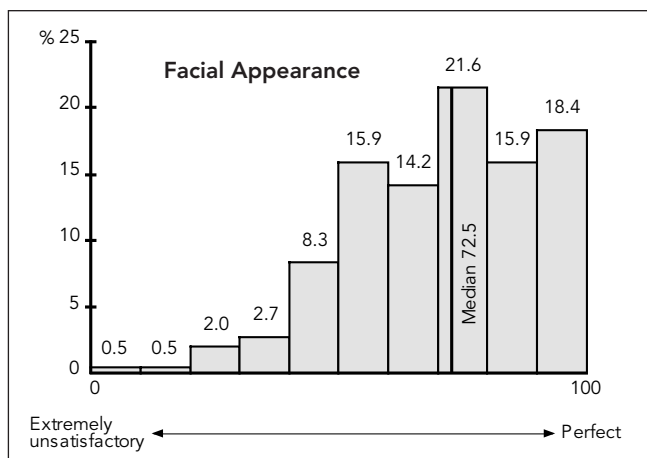


Fig. 7 Response to the statement: "The appearance of my face is" (n=408).

Two thirds of the men (upper three tenths of the scale) thought that orthodontic treatment of their occlusion was unnecessary (question 20, Fig. 8) while 10 per cent thought it to be necessary (lower three tenths of the scale).

Correlations

The answers to the questions about the position of the teeth (question 16), facial appearance (question 17), the impact of the occlusion on the professional and social life (questions 18 and 19), and the necessity of orthodontic treatment (question 20) were correlated with the need of treatment according to the IOTN. The DHC of the IOTN has five grades (5-1), where grade 5 implies the highest need for treatment. The AC of the IOTN has 10 grades (10-1) with grade 10 implying the highest need for treatment. The coefficients of correlation are given in Table I. As can be seen in Table I, only non-significant or weak correlations were found. The highest correlation was that between the opinion on the position of the teeth (occlusion) and the need for treatment according to the AC. Men with a high aesthetic need for treatment tended to judge the position of their teeth as less satisfactory.

The answer to question 20 about the necessity of orthodontic treatment was correlated with the answers to the questions 16-19. The coefficients of correlation (Table II) were all positive and significant (p<0.001) but only indicated a weak relationship. The answers to the questions 16 and 17 ("The position of my teeth is: ..." and "The appearance of my face is: ...", respectively) were positively correlated (Rho=0.27, p<0.001).

Discussion

The men participating in the study were mainly (99 per cent) from the German (56 per cent) and from the French (43 per cent) speaking regions of Switzerland with only few or single recruits from the Italian or Raeto-Romanic speaking parts. Compared to the total Swiss population the German and Italian speaking parts were underrepresented and the French speaking part over-represented. There was, however, no difference in the prevalence of malocclusion between the men from the German and French speaking parts (INGERVALL et al. 1998). The men had a relatively high level of education and because of the character of the sample, only men without handicapping physical and

Table I Coefficients of correlation between the need for treatment according to the DHC and AC of the IOTN and answers to selected questions

Question	DHC	AC
"The position of my teeth is: extremely unsatisfactory – perfect"	-0.23***	-0.42***
"The appearance of my face is: extremely unsatisfactory – perfect"	0.06	0.05
"My teeth hinder me in my professional life: extremely – not at all"	-0.05	-0.06
"My teeth are a drawback in my social life: extremely – not at all"	-0.02	-0.13*
"For my appearance a correction of my teeth is: absolutely necessary – completely unnecessary"	-0.04	-0.15 **

* = 0.01 < p < 0.05, ** = 0.001 < p < 0.01, *** = p < 0.001

Table II Coefficients of correlation between answers to question 20 ("For my appearance a correction of my teeth is: absolutely necessary – completely unnecessary") and answers to other questions

Question	Rho
"The position of my teeth is: extremely unsatisfactory – perfect"	0.37
"The appearance of my face is: extremely unsatisfactory – perfect"	0.19
"My teeth hinder me in my professional life: extremely – not at all"	0.34
"My teeth are a drawback in my social life: extremely – not at all"	0.42

mental disabilities were represented. Further, the narrow age range of the subject also limits the general applicability of the results.

In this study the perception of malocclusion was measured with analogue scales. While a visual analogue scale is a generally applicable instrument for measuring feelings and perceptions, other investigators have used multiple point scales to measure satisfaction with treatment and facial attractiveness (AITKEN 1969, KIYAK et al. 1985, VAN STEENBERGEN et al. 1996). There is no evidence that one method is superior to the other in assessing personal feelings.

In the present study the men were generally unaware of their malocclusions i.e., spacing, crowding, increased or reversed overjet and increased overbite. If they were aware of their malocclusion it was generally of little concern to them. The objective measures of need for treatment were significantly but only weakly correlated with the men's demand for treatment. These results confirm the results of other studies of the awareness of malocclusion and need and demand for treatment.

In a Swedish study most recruits were not aware of their malocclusion and the demand for treatment was very small although more than 50 per cent of the men had a malocclusion (INGERVALL & HEDEGAARD 1974). The perception of different types of malocclusion varies. In a previous study of Swiss recruits, based on the epidemiologic study undertaken in 1985, the awareness of crowding and increased overjet was high (INGERVALL et al. 1987). In the previously mentioned study of Swedish recruits,

however, the awareness of increased overjet was low but with a high awareness of reverse overjet (INGERVALL & HEDEGAARD 1974). Such discrepancies may reflect a varying perception in different populations but may also be a consequence of methodological differences. The perception is usually evaluated with a questionnaire with the results probably being influenced by the construction and wording of the questions.

In the present study, many men reported that they had received orthodontic treatment. Most of them were satisfied with the treatment but 10 per cent were completely dissatisfied and one fourth were completely dissatisfied or less satisfied. Although these men were significantly more inclined to consider orthodontic treatment to improve their present facial appearance than the recruits without previous orthodontic therapy, the absolute difference between the median scores was so small that it is unlikely to be of clinical significance. Nothing is known about the extent of the orthodontic treatment these recruits had received and which probably had included the whole range of possibilities from extraction of teeth without the use of appliances to comprehensive treatment with multibanded appliances. It is unlikely that as many as 44 per cent should have received comprehensive treatment. It is more likely that the sample included many men treated only with simple methods for achieving limited orthodontic goals.

Almost equal numbers of recruits reported that they had either spacing or crowding. Their concern over these malocclusions was mostly small, especially for spacing; crowding seemed to arouse somewhat more concern than spacing. This is in line with the results of earlier studies in recruits (INGERVALL & HEDEGAARD 1974, INGERVALL et al. 1987), middle aged men (INGERVALL et al. 1978), and in a mixed sample of adults (HELM et al. 1985). Only about half of the men who, from the clinical examination, were known to have displacements were aware of their malocclusions i.e., answered "yes" to the questions on spacing and crowding. The same proportions held true even for those men with a substantial displacement. This again underlines the lack of concern associated with these types of malocclusion.

The awareness of an increased overjet was low, only 30 per cent of the men with increased overjet being aware of their malocclusion; only a few of these found the malocclusion disturbing. The low awareness of increased overjet is in accordance with previous results in recruits (INGERVALL & HEDEGAARD 1974). HELM et al. (1985), on the other hand, reported that dissatisfaction with the teeth was expressed particularly by individuals with an extreme maxillary overjet (overjet greater than 9 mm). Only single individuals of the present sample had an anomaly of this size. The same was true for deep bite. HELM et al. (1985) found that individuals with an overbite greater than 7 mm were particularly dissatisfied with their teeth. In the present sample only 18 men had a complete overbite (INGERVALL et al. 1998). Most of the deep bites were less severe and the awareness in cases with an actual deep bite was the same as for increased overjet and with the same modest level of concern.

The men's satisfaction with the general position of their teeth (question 16) and with their facial appearance was about the same. Only few men were dissatisfied. This is in line with the results of ESPELAND & STENVIK (1991) who found no influence of moderate malocclusion on the attitude of young adults to the importance of the alignment of the teeth for overall facial appearance. On the other hand, in the present sample a positive correlation, although weak, was found between the answers to the questions regarding satisfaction with the position of the teeth and the appearance of the face.

In spite of the fact that 27 and 13 per cent, respectively, were found to have a borderline need for treatment according to the DHC and AC of the IOTN and 14 and 3 per cent had a definite need, practically none of the men reported any influence of the teeth on their professional or social lives. The position of the teeth were not found to be a drawback in the lives of the men. The same result was reported by HELM et al. (1985) in a sample of adults studied at the age of around 30 years. Several investigators have reported no association between malocclusion and socio-economic achievement (RUTZEN 1973, HELM et al. 1985). It is therefore not surprising that only few men found orthodontic treatment of their malocclusion to be necessary. Positive but weak correlations were, however, found between the question regarding the necessity of orthodontic treatment and the questions regarding position of the teeth, facial appearance and the influence on professional and social lives.

No correlation was found between the DHC, that is the objectively determined need for treatment and the answers to the questions about the necessity of orthodontic treatment, on facial appearance and on the influence of the teeth on the professional and social lives. Only the recruits' general evaluation of the position of the teeth was weakly correlated with the DHC. The Aesthetic Component of the IOTN showed more correlations with the judgements of the individuals. This demonstrates the strength of the IOTN index. The AC of the index is an aspect which is not included in most other indices of orthodontic treatment need.

The low impact of the position of the teeth on the professional and social lives of the men, according to their own view, may possibly be due to the low age of this sample of young adults. Older men would possibly have ranked a good dental appearance as more important.

The applicability of the results of this study to Swiss women should be viewed with caution. In a study by STENVIK et al. (1996b) more women than men thought that a good occlusion was of importance for the appearance of the face. On the other hand, HELM et al. (1985) found in 30-year old adults that the women were predominantly concerned over the appearance of their skin, body build and legs for their body image. The importance of the teeth was ranked the same by men and women. In the study by BIRKELAND et al. (1997) less women than men found a) that their teeth looked worse than those of their peers, and b) that their dental appearance was below average compared to other facial features. This again indicates that women may be more critical than men over facial traits other than their teeth.

In summary, this study has shown that in healthy young adult males the awareness of malocclusion is low. The importance of the teeth for facial appearance and the impact of the teeth on professional and social lives is ranked low. The same is true for the judgement of the necessity of orthodontic treatment. These results apply to a sample of young men in the socio-cultural setting of the population studied. It is possible that a similar study of women would have yielded different results.

Zusammenfassung

Das Bewusstsein für die eigene Malokklusion und der subjektive kieferorthopädische Behandlungsbedarf wurde aus der Sicht von 421 Rekruten der Schweizer Armee mit Hilfe eines Fragebogens studiert. Gleichzeitig wurde das Vorkommen von Malokklusionen und der objektive Behandlungsbedarf mit Hilfe des Index of Orthodontic Treatment Need (IOTN) bestimmt. Die Fragen des Fragebogens mussten mit Ja oder Nein oder

mit Hilfe von vorgegebenen Analogskalen beantwortet werden. Etwa die Hälfte der Männer mit Eng- oder Weitstand waren sich ihrer Malokklusion bewusst. Die meisten kümmerte dies wenig oder überhaupt nicht. Nur etwa 30% der Männer mit vergrössertem Overjet oder Tiefbiss waren sich der Malokklusion bewusst, während 70% sich nicht gross darum sorgten. Die Mehrzahl der Männer waren zufrieden mit der Position ihrer Zähne und ihrem Aussehen. Nur 7% beziehungsweise 3% waren unzufrieden. Sehr wenige sahen in ihrer Okklusion einen Grund für Nachteile in ihrem beruflichen oder gesellschaftlichen Leben. Nur 10% erachteten Kieferorthopädie notwendig für eine Verbesserung ihres Aussehens.

Es gab keine signifikanten und nur schwache Korrelationen zwischen dem objektiven Behandlungsbedarf gemäss IOTN und der Meinung der Männer über ihre Zahnstellung, ihrem Aussehen, der Bedeutung der Okklusion für das berufliche und gesellschaftliche Leben und dem kieferorthopädischen Behandlungsbedarf.

Résumé

La perception de la malocclusion et la demande de traitement orthodontique ont été étudiées, à l'aide d'un questionnaire, auprès d'un échantillon de 421 recrues de l'armée suisse. La prévalence de malocclusion et le besoin objectif d'un traitement ont été évalués au moyen de l'Index of Orthodontic Treatment Need (IOTN). Le questionnaire comprenait des questions à répondre par oui ou par non ainsi que des questions ou appréciations à reporter sur une échelle analogique.

La moitié environ des sujets qui présentaient un encombrement ou un espacement dentaire étaient conscients de leur malocclusion. La plupart d'entre eux jugeaient leur malocclusion peu ou pas préoccupante. Parmi ceux qui présentaient une augmentation objective du surplomb ou une supraclusion, seuls 30% étaient conscients de leur malocclusion mais, pour environ 70% d'entre eux, cela ne représentait pas un problème.

La grande majorité des individus étaient satisfaits de la position de leurs dents et de leur apparence faciale. Seuls 7% d'entre eux n'étaient pas satisfaits de la première et 3% de la deuxième. Très peu de sujets trouvaient que leur occlusion dentaire avait une influence négative sur leur vie professionnelle ou sociale et 10% seulement d'entre eux pensaient qu'un traitement orthodontique visant à améliorer leur apparence était nécessaire.

On n'a trouvé aucune ou que de faibles corrélations entre le besoin objectif de traitement selon l'Index IOTN et l'opinion des sujets en ce qui concerne la position de leurs dents, leur apparence faciale, l'influence de leur occlusion dentaire sur leur vie professionnelle et sociale et la nécessité de suivre un traitement orthodontique.

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