

# Self-perceived orthodontic treatment need and culturally related differences among adolescents in Sweden

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**SUMMARY** The aim of this investigation was to compare Swedish and immigrant groups of 12- and 13-year-old boys and girls with respect to: (1) self-perceived need for and attitude to orthodontic treatment, (2) attitude to own teeth and general appearance, (3) behaviour pattern and psychosocial functioning, and (4) self-perceived need for orthodontic treatment in relation to psychosocial functioning.

The subjects comprised 508 students, aged 12 and 13 years, living in Sweden, who were grouped according to nationality: (A) both parents born in Sweden (139 girls and 131 boys); at least one parent born in: (B) eastern Europe (27 girls and 34 boys); (C) Asia (66 girls and 61 boys) and (D) other countries (23 girls and 27 boys). Each student answered a questionnaire in the classroom. The questions concerned demographic data, self-perceived treatment need, attitude to orthodontic treatment, own teeth and general appearance, behaviour pattern and psychosocial functioning.

The results showed that, on average, 20 per cent of the students had a self-perceived treatment need, more girls than boys, 24 per cent of Swedes (A), 12 per cent from eastern Europe (B), 18 per cent from Asia (C) and 14 per cent from other countries (D). Seventy-two per cent of the Swedish students were prepared to undergo fixed appliance therapy, compared with 58 per cent of immigrant students. Nine per cent of the Swedish students considered their general appearance to be less favourable compared with 7 per cent of their peers (not significant). While some differences in behaviour pattern were observed, these did not seem to influence the well-being of the subjects.

The conclusion is that perceived orthodontic treatment need is lower in immigrant students than in Swedish students.

## Introduction

During the last two decades there has been an influx of refugees and immigrants into Scandinavia, and this trend shows no signs of abating. Of the Scandinavian countries, Sweden receives the greatest number of asylum seekers. Data from the Swedish Central Bureau of Statistics show that in 2000 approximately 24 per cent of children and adolescents (0–17 years) were of non-Swedish origin (Statistiska centralbyrån, 2001). This far-reaching demographic change has raised many issues related to assimilation and integration into the community of refugees and immigrants from different cultural backgrounds.

As part of the publicly funded dental services provided for children and adolescents in Sweden, substantial economic and personnel resources are allocated to orthodontic treatment, which is free of charge to all, up to 20 years of age. Comprehensive orthodontic services were established over 20 years ago to minimize physical and psychological disturbances caused by malocclusion. Treatment priority is given to those children considered to have the greatest needs, i.e. when a malocclusion is associated with a high risk of tissue damage, functional disturbances or psychological

problems (Kurol, 1991). Orthodontic treatment is influenced by socio-economic, ethnic and cultural factors (Ahmed *et al.*, 2001) and is based on a mutual decision by the orthodontist as the key person, the dentist and the patient and his/her parents.

Recent research has highlighted the importance of the individual's self-perceived oral health status (Burke and Wilson, 1995). The mechanism most often invoked for explaining the association between appearance and psychological function is the theoretical construct body image, 'a mental picture of the body' (Schilder, 1950). People vary in their perceptions of their physical self and have emotional reactions to these perceptions (Pertschuk and Whitaker, 1982). In determining the potential benefits of orthodontic treatment for an individual, the relationship between physical appearance and perception of an aesthetic deviation and the impact of such a deviation on self-esteem and body image are important factors (Birkeland *et al.*, 2000). As orthodontic treatment improves facial appearance, it is assumed to increase intrinsic value. Consequently, assessment of the potential benefit of orthodontic treatment to the individual should include greater

awareness of the individual's psychosocial functioning and self-perceived treatment need—the patient's own perspective. This perspective often differs from the normative need, i.e. occlusal morphology (Tickle *et al.*, 1999; Ahmed *et al.*, 2001; Mandall *et al.*, 2001).

Although family cultural background and ethnic origins are acknowledged as highly influential in shaping children's attitudes, the perspectives of refugee and immigrant children and adolescents may be further modified as they adapt to life in a new country and are exposed to the cultural values of their Swedish peers. The extent to which the perspectives of refugee children and adolescents are modified by this exposure is not known. In this context, differences in perceived need and attitudes to dental appearance and orthodontic care among adolescents in Sweden are poorly documented. To date, there have been few studies of the implications of these issues for the provision of dental care for children, and particularly with respect to orthodontic treatment, which is generally undertaken during late childhood and adolescence.

The aim of this study was, therefore, to compare 12- and 13-year-old boys and girls of Swedish and immigrant backgrounds, with respect to the following: (1) self-perceived need for and attitude to orthodontic treatment, (2) attitude to own teeth and general appearance, (3) behaviour pattern and psychosocial functioning, and (4) self-perceived need for orthodontic treatment in relation to psychosocial functioning.

## Subjects

The study was conducted in two southern Swedish towns, Jönköping and Motala. Jönköping, with 120 000 inhabitants, is one of the 10 largest cities in Sweden. Motala is much smaller, with 40 000 inhabitants. Both cities have areas of mixed socio-economic structure and a relatively high proportion of immigrants and refugees. The base population for the study comprised 553 students: all the 12–13 year olds (born in 1988 and 1989), from six schools. In this population, the immigrant frequency (i.e. the child or at least one parent born outside Sweden) is about 40 per cent, which is greater than the national average (Statistiska centralbyrån, 2001). The reason for choosing these ages was two-fold: first, by this age, the permanent teeth have usually erupted, but major orthodontic treatment has not yet begun and, second, the respondents would be sufficiently mature to be able to express their own opinion (Helm and Seidler, 1974; Atkinson *et al.*, 1990; Mohlin *et al.*, 2002). On the days the questionnaire was to be answered, 37 subjects were absent from school due to illness and eight did not wish to participate. The remaining 508 students, 253 boys and 255 girls, comprised the study group. They were stratified into four groups, according to cultural background:

**Table 1** Distribution of the 12- and 13-year-old boys and girls related to cultural group.

Group	Girls (%)	Boys (%)	Number
A (Sweden)	51	49	270
B (eastern Europe)	44	56	61
C (Asia)	52	48	127
D (other)	46	54	50
Total	50	50	508

A. Both parents born in Sweden, 270 children. Two children were adopted and are included in this group.

Student or at least one parent born in:

- B. Eastern Europe (Albania, Bosnia-Herzegovina, Kosovo, Croatia, Hungary, Former Yugoslav Republic of Macedonia, Poland, Romania, Serbia), 61 children, 16 of whom were born in Sweden.
- C. Asia (Cambodia, China, Lebanon, India, Iran, Pakistan, Syria, Turkey, Vietnam), 127 children, of whom 88 were born in Sweden.
- D. Other countries (Africa, America, western Europe except Scandinavian countries), 50 children, 47 of whom were born in Sweden.

The distribution of boys and girls related to country/region is presented in Table 1.

Eight students who had both parents born abroad but in different areas (B, C, D) were grouped according to the mother's origin.

For 97 per cent of the subjects from eastern Europe, 92 per cent from Asia and 44 per cent from other countries, both parents were born outside Sweden. Of the 97 per cent from eastern Europe who had both parents born outside Sweden, 94 per cent of these subjects had both parents born in eastern Europe. In groups C and D the corresponding figures were 86 per cent in each group. In the eastern Europe group (B), no mothers and two fathers were born in Sweden. In the Asian group (C), seven of the mothers but no fathers were born in Sweden, and in the other group (D), 16 mothers and 12 fathers were born in Sweden.

## Method

A questionnaire study was conducted from March to November 2001. The questionnaires were answered in a standardized way in the classroom by the students attending the school that day. A participating orthodontist or a dental assistant was available on each occasion, to clarify any questions which might arise.

The questionnaire comprised 70 items, encompassing seven domains:

1. Demographic data (age, sex, culture).
2. Experience of orthodontic treatment (undergoing or have had orthodontic treatment, yes/no).
3. Self-perceived treatment need, attitude to orthodontic treatment (multiple choice, five-point ordinal scale) (Shaw, 1981).
4. Dissatisfaction with own teeth (five-point ordinal scale) (Shaw, 1981; Mandall *et al.*, 2000).
5. Body esteem and general appearance (five-point ordinal scale) (Secord and Jourard, 1953).
6. Behaviour pattern (five-point ordinal scale) (Shaw, 1981).
7. Psychosocial functioning (questions from the questionnaire about psychosocial functioning were pooled to an amalgamated index. Summary score 9–45. A low value indicates good psychosocial functioning) (Pertschuk and Whithaker, 1982).

The questions were designed with a mix of fixed statements, multiple choice, free answers and five-point scales (Appendix).

#### Reliability test

Reliability tests were performed on 25 12 year olds and 25 13 year olds, selected at random. They were presented with the same questionnaire after an interval of 4 weeks, under the same circumstances. For the analysis of reliability, the weighted Kappa statistic was used. Their initial answers were included in the study. Only questions with good and very good reliability (value 0.6–1.0) were retained for inclusion in the final questionnaire. Reliability was high for 28 questions or statements. These constituted the final questionnaire.

The study was approved by a Research Ethics Committee.

#### Statistical methods

The  $\chi^2$ , Kruskal–Wallis, Mann–Whitney U tests and ANOVA were used to determine statistical differences between the groups. Significance was set at  $P < 0.05$ .

#### Results

Of the 508 subjects, 15 per cent were currently undergoing orthodontic treatment and 13 per cent had previously undergone treatment, with no significant differences among groups A, B, C and D. Those with orthodontic experience were teased more often and thought that they needed treatment. They were also more content with their general appearance compared with those without orthodontic treatment.

**Table 2** Self-perceived orthodontic treatment need in groups A–D according to gender (percentage).

	Girls	Boys	<i>P</i>	Girls+boys
A+B+C+D	23	17	*	20
A	31	17		24
B	15	9	**	12
C	15	22		18
D	9	19		14

A, Sweden; B, eastern Europe; C, Asia; D, other.

\* $P < 0.05$ ; \*\* $P < 0.01$ .

The responses to the questionnaire showed only minor differences between students with experience of orthodontic treatment and those without. These two groups were therefore pooled.

#### Self-perceived orthodontic treatment need and attitude to orthodontic treatment

Twenty per cent of the subjects considered that they needed orthodontic treatment. There were significantly more girls than boys, 58 and 42 per cent, respectively ( $P = 0.012$ ). The highest self-perceived treatment need was found among the Swedish girls, 31 per cent, and 22 per cent were uncertain. The perceived need for orthodontic treatment in the different groups is presented in Table 2. In groups C and D, the percentage of self-perceived need for orthodontic treatment was greater among boys than girls, 22 and 19 per cent of boys compared with 15 and 9 per cent of girls. In the Swedish group, the corresponding figures were 17 per cent for boys and 31 per cent for girls, and in group B it was 9 per cent for boys and 15 per cent for girls. The differences among the groups were statistically significant ( $P = 0.001$ ) (Table 2).

Approximately 66 per cent of subjects answered that they would be prepared to undergo 2 years of fixed appliance therapy if it was recommended by the dentist, 72 per cent in group A, 63 per cent in group B, 54 per cent in group C and 61 per cent in group D (Table 3). Girls were generally more willing than boys to undergo treatment, 69 and 62 per cent, respectively. This difference was, however, not significant.

To the question 'Do you believe that orthodontic treatment with fixed appliance is painful?', half of the subjects answered 'Yes, somewhat' or 'Yes, a lot'. More girls than boys were concerned about treatment-related pain. More foreign girls (59 per cent, B+C+D) than Swedish girls (56 per cent) were concerned about pain. The highest percentage was found among the eastern European girls, 68 per cent, in comparison with the other groups ( $P = 0.008$ ).

Students with previous or ongoing treatment were more positive about treatment and were less concerned

**Table 3** Distribution of positive responses to the question 'Would you accept treatment with fixed appliances for 1.5–2 years if it was recommended by the dentist?', related to cultural group and gender (percentage).

	Girls	Boys	<i>P</i>	Girls+boys	<i>P</i>
A+B+C+D	69	62	ns	66	
A	75	67		72	
B	73	61	ns	63	ns
C	52	51		54	
D	71	50		61	

A, Sweden; B, eastern Europe; C, Asia; D, other.  
ns, not significant.

**Table 4** Distribution of positive responses to the statement 'My own teeth are worse or much worse than those of my peers', related to cultural group and gender (percentage) (question 7).

	Girls	Boys	<i>P</i>	Girls+boys	<i>P</i>
A+B+C+D	24	14	*	19	*
B+C+D	17	14	ns	15	
A	32	13		23	
B	8	9	**	9	*
C	19	15		17	
D	17	22		21	

A, Sweden; B, eastern Europe; C, Asia; D, other.  
ns, not significant; \* $P < 0.05$ ; \*\* $P < 0.01$ .

about pain associated with orthodontic treatment, 47 per cent compared with those without orthodontic experience, 52 per cent.

#### *Dissatisfaction with own teeth*

Swedish students were the least satisfied with their teeth and those from eastern Europe the most satisfied. In all, girls were significantly more dissatisfied than boys, 24 and 14 per cent, respectively ( $P = 0.012$ ). With respect to gender and origin, Swedish girls were the most dissatisfied, 32 per cent (Table 4).

Nineteen per cent of all individuals perceived their teeth to be better than those of their peers and 19 per cent perceived their teeth to be worse. In total, 1 per cent were teased every week or every day and 10 per cent had at some time been teased because of their teeth.

Students undergoing treatment were less satisfied with the appearance of their teeth.

#### *General appearance*

Girls were significantly more dissatisfied with their body height ( $P = 0.009$ ), weight ( $P = 0.005$ ) and facial

appearance ( $P = 0.002$ ) than boys. The Asian students (group C) were the most dissatisfied with their height and weight. In the foreign student groups (B+C+D), 7 per cent were dissatisfied with their hair compared with 4 per cent in the Swedish group ( $P = 0.152$ ).

More students from groups A and D considered their own appearance to be generally less attractive than that of their peers, 9 and 12 per cent, respectively. The Asian students were the least dissatisfied, 6 per cent ( $P = 0.012$ ). In terms of both origin and gender, the girls from other countries (group D) were the least satisfied with their own appearance (17 per cent). None of the eastern European girls was dissatisfied. Students undergoing treatment were generally more satisfied with their general appearance.

#### *Behaviour pattern*

Both boys and girls were more preoccupied with their hair than their teeth and looked at their hair in a mirror more frequently than at their teeth. The girls looked at their hair significantly more often than the boys. The frequency was highest for eastern European girls (74 per cent), and lowest for the Swedish girls (59 per cent) (Table 5).

Foreign students (groups B+C+D), both girls and boys, looked at their teeth in a mirror more frequently than Swedish girls and boys ( $P = 0.030$ ). The frequency was highest for the girls in group D, 35 per cent, and for the boys in group C, 29 per cent (Table 5).

#### *Psychosocial functioning*

Among all students (A+B+C+D), the psychosocial index had a mean value of 21 [range 11–31, standard deviation (SD) = 3]. The eastern European students showed a low value, mean 20 (SD = 2.8), and the other groups (A, C and D), mean 21 (SD = 2.8). Girls (A+B+C+D) had a significantly lower index value, 20 (SD = 3.0), than boys, 21 (SD = 2.9);  $P = 0.007$ .

The index value for those students with a self-perceived orthodontic treatment need was 21.5, half a unit higher than the mean value for all groups. This difference between students with and without a self-perceived treatment need was not significant. In all, the intergroup differences were negligible.

#### **Discussion**

The subjects consisted of all 12- and 13-year-old children from six schools. At this age, however, there are great individual variations, not only in dental age and occlusal development, but also in psychological maturity. This must be taken into consideration, especially as this study group is on the threshold of adolescence. Individual variations might have influenced



**Table 5** Preoccupation with 'hair' or 'teeth' in relation to cultural group and gender (percentage).

		A	P	B	P	C	P	D	P	B+C+D	P	A+B+C+D	P
'I look at my hair in a mirror more than twice a day'	Girls	59		74		70		57		67		63	
	Boys	25	***	26	***	28	***	19	***	22	***	25	***
'I look at my teeth in a mirror more than twice a day'	Girls	19		26		34		35		29		25	
	Boys	16	ns	22	*	29	ns	22	ns	28	*	21	**

A, Sweden; B, eastern Europe; C, Asia; D, other.  
ns, not significant; \* $P < 0.05$ ; \*\* $P < 0.01$ ; \*\*\* $P < 0.001$ .

the results. Despite this disadvantage, 12–13 year olds were selected for the study because this is typically the age at which a decision about the need for orthodontic treatment is made.

In groups A–D, the experience of orthodontic treatment, previous or ongoing, was the same. It can be assumed that the provision and extent of orthodontic care were similar in both towns, i.e. simple orthodontic anomalies were treated with removable appliances by general practitioners under the supervision of an orthodontist and more severe anomalies with fixed appliances by an orthodontist.

The two towns used in the study have similar numbers of immigrants and refugees. With a few exceptions, this is comparable with other towns in Sweden. These two towns were chosen because they represent one small and one large town.

The countries of origin were grouped primarily according to common background factors. In group B, the countries had previously belonged to the Eastern Bloc and more than half of the students were from the former Yugoslavia. Group C was formed merely according to the geographical location of the countries. There were only 18 students from China, Pakistan, Vietnam and India in this study, but all the students in this group experienced similar immigrant problems in Sweden. Group D was a mix of mainly western Europeans and more than half of the students in this group had one parent born in Sweden.

Eighty-nine per cent of the questions in this study have been used previously in other questionnaires (Secord and Jourard, 1953; Shaw, 1981; Pertschuk and Whitaker, 1982; Mandall *et al.*, 2000). Initially, the questionnaire included a larger number of questions and statements. Some of these were inappropriate for this investigation, showed a low value for reliability and were therefore excluded. In this study, there was a high participation rate and high reliability when tested.

Twenty per cent of the students had a perceived orthodontic treatment need, highest among Swedes and least among eastern Europeans. In general, the

percentage of perceived need was higher among girls than boys (Table 2). This is in agreement with O'Brien *et al.* (1996). The girls in the Swedish group exceeded those of the other groups. Students undergoing treatment had a greater perceived treatment need than their peers. In a Swedish study of 9-year-old immigrant children, Hosseini *et al.* (1999) reported a similar subjective treatment need, 22 per cent.

Despite the different subjective need for orthodontic treatment in the four groups, the percentage outcome of treatment was the same in the various groups. This indicates that the orthodontists authorised treatment on the basis of objective need for treatment.

In studying the influence of culture/ethnicity on the self-perceived need for orthodontic treatment, socio-economic factors must be considered. In this questionnaire survey, the aim was to register socio-economic level based on the parents' level of education and employment. However, the subjects were too immature for such questions and this method was not appropriate for collecting such data. With respect to perceived treatment need, Mandall *et al.* (2000) failed to find a correlation with ethnic origin and social class in northern England. Similarly, Soh and Lew (1992) found no correlation with race and income in an Asian community in Singapore. Thus, the results of the present study in a Swedish community should be interpreted with caution.

Swedish girls were more willing than others to undergo 2 years of fixed appliance therapy. This can probably be explained by the greater self-perceived treatment need in this group. Fear of pain associated with fixed appliance therapy was greater among girls than boys. This is in agreement with other studies (Bergius *et al.*, 2002). The highest frequency of fear of treatment-related pain was found among girls from eastern Europe. This fact might explain the lower self-perceived treatment need in this group. In this context, Ekman (1991), in a study of the dental health status of immigrant children in Sweden, reported a correlation between migration and an increased incidence of physical and psychological illness.

The complex interrelationship of body image and self-concept has been investigated previously (Lerner and Karabenick, 1974). It has also been shown that young adolescents may experience a disturbance in self-image (Simmons *et al.*, 1973). With respect to body image and appearance, girls in the present study were in general more dissatisfied than boys. Girls in groups A and D were the most dissatisfied with their general appearance. A similar finding has been reported by Stowers and Durm (1996). In general, the girls in groups A and D thought that their own appearance was much worse than their peers. The foreign girls in groups B and C were less concerned. This might be attributable to the fact that foreign girls are preoccupied with other, more immediate, problems related to their life situation in a new country.

All students in the study were more preoccupied with their hair than with their teeth. It is surprising that despite higher self-perceived orthodontic treatment need in Swedish girls, they were less preoccupied than immigrant girls with looking at their teeth in a mirror. There appears to be no obvious explanation.

The study showed no difference in self-perceived psychosocial functioning between Swedish and foreign students, but a gender difference was observed. In contrast, Crijnen *et al.* (1997), in a cross-cultural study of parent-reported problems of children and adolescents, found the lowest incidence of problems in the Swedish sample and cross-culturally consistent age and gender variations. Another investigation, by Verhulst *et al.* (1993), comparing American and Dutch adolescents, showed a much greater incidence of problems among the Americans. It was suggested that this might be attributable to cultural factors. The different designs of these studies preclude comparison of the results and no definite conclusions should be drawn. In fact, the self-perceived psychosocial functioning of the subjects in the present study was on the more positive part of the scale. Subjects with a self-perceived orthodontic treatment need had a less favourable index for psychosocial functioning than those without. The difference was, however, too small to draw any conclusions. With respect to psychosocial function, integration seems to have worked well. Most orthodontic treatment is undertaken on aesthetic indications. Therefore, when planning future orthodontic services, it is possible that with improved integration of immigrants over time, the difference in perceived treatment need between cultural groups will diminish.

## Conclusion

Swedish girls seem to be the least satisfied with their dental appearance, have the highest self-perceived treatment need and are also the most positive to orthodontic treatment, while foreign girls are most

concerned that fixed appliance therapy will be painful. While some differences in behaviour pattern related to dental appearance were noted, these do not seem to influence the well-being of the subjects. These results indicate that immigrant students have a lower perceived orthodontic treatment need than Swedes. As there is no obvious explanation for this difference, a further investigation is warranted. A comparative study of normative and self-perceived orthodontic need in these groups is currently being undertaken.

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## Acknowledgements

This study was supported by Public Dental Health, Östergötland County Council and Health Research Council in the south east of Sweden (FORSS). Our thanks to Elisabeth Wilhelm for help with the statistical analysis.

## References

- Ahmed B, Gilthorpe M S, Bedi R 2001 Agreement between normative and perceived orthodontic need amongst deprived multiethnic school children in London. *Clinical Orthodontics and Research* 4: 65–71
- Atkinson R L, Atkinson R C, Smith E E, Bem D J, Hilgard E R 1990 *Introduction to psychology*. Harcourt Brace Jovanovich, Orlando, pp. 80–86
- Bergius M, Berggren U, Kiliaridis S 2002 Experience of pain during an orthodontic procedure. *European Journal of Oral Science* 110: 92–98
- Birkeland K, Bøe O, Wisth P J 2000 Relationship between occlusion and satisfaction with dental appearance in orthodontically treated and untreated groups. A longitudinal study. *European Journal of Orthodontics* 22: 509–518
- Burke F, Wilson N 1995 Measuring oral health: an historical view and details of a contemporary oral health index (OHX). *International Dental Journal* 45: 358–370
- Crijnen A A, Achenbach T M, Verhulst F C 1997 Comparisons of problems reported by parents of children in 12 cultures: total problems, externalizing, and internalizing. *Journal of the American Academy of Child and Adolescent Psychiatry* 36: 1269–1277
- Ekman A 1991 Tandhälsotillståndet hos invandrarbarn. In: Hugosson A, Koch G, Svensson G (eds) *Consensus: Tandhälsotillståndet hos olika befolkningsgrupper i Sverige*. Invest-Odont, LIC-förlag, Karlshamn, pp. 76–89
- Helm S, Seidler B 1974 Timing of permanent tooth emergence in Danish children. *Community Dentistry and Oral Epidemiology* 2: 122–129

- Hosseini K R, Dahlström A, Huggare J 1999 Malocclusion and the need for orthodontic treatment in 9-year old immigrant children in Stockholm, Sweden. *Swedish Dental Journal* 23: 209–216
- Kurol J 1991 Bettavvikelser. In: Hugosson A, Koch G, Svensson G (eds) *Consensus: Tandhälsotillståndet hos olika befolkningsgrupper i Sverige*. Invest-Odont, LIC-förlag, Karlshamn, pp. 29–47
- Lerner R M, Karabenick S A 1974 Physical attractiveness, body attitudes and self-concept in late adolescents. *Journal of Youth and Adolescence* 3: 307–316
- Mandall N A, McCord J F, Blinkhorn A S, Worthington H V, O'Brien K D 2000 Perceived aesthetic impact of malocclusion and oral self-perceptions in 14–15-year-old Asian and Caucasian children in Greater Manchester. *European Journal of Orthodontics* 22: 175–183
- Mandall N A, Wright J, Conboy F M, O'Brien K D 2001 The relationship between normative orthodontic treatment need and measures of consumer perception. *Community Dental Health* 18: 3–6
- Mohlin B, Al-Saadi E, Andrup L, Ekblom K 2002 Orthodontics in 12-year old children. Demand, treatment motivating factors and treatment decisions. *Swedish Dental Journal* 26: 89–98
- O'Brien K, McComb J L, Fox N, Wright J 1996 Factors influencing the uptake of orthodontic treatment. *British Journal of Orthodontics* 23: 331–334
- Pertschuk M J, Whitaker L A 1982 Social and psychological effects of craniofacial deformity and surgical reconstruction. *Clinics in Plastic Surgery* 9: 297–306
- Schilder P 1950 The image and appearance of the human body. International University, New York, pp. 11–16
- Secord P F, Jourard S M 1953 The appraisal of body cathexis: body cathexis and the self. *Journal of Consulting Psychology* 17: 343–347
- Shaw W C 1981 Factors influencing the desire for orthodontic treatment. *European Journal of Orthodontics* 3: 151–162
- Simmons R G, Rosenberg F, Rosenberg M 1973 Disturbance in the self-image at adolescence. *American Sociological Review* 38: 553–568
- Soh G, Lew K K 1992 Assessment of orthodontic treatment needs by teenagers in an Asian community in Singapore. *Community Dental Health* 9: 57–62
- Statistiska centralbyrån 2001 Statistisk årsbok för Sverige. Publikationstjänsten, SCB, Stockholm
- Stowers D A, Durm M W 1996 Does self-concept depend on body image? A gender analysis. *Psychological Report* 78: 643–646
- Tickle M, Kay E J, Bearn D 1999 Socio-economic status and orthodontic treatment need. *Community Dentistry and Oral Epidemiology* 27: 413–418
- Verhulst F C, Achenbach T M, Ferdinand R F, Kasius M C 1993 Epidemiological comparisons of American and Dutch adolescents' self-reports. *Journal of the American Academy of Child and Adolescent Psychiatry* 32: 1135–1144

## Appendix

### Questionnaire

1. **You are**  
 Girl                      Boy
2. **You were born in** (which country)
3. **Your parents were born in** (mother's country) (father's country)
4. **The year when you came to Sweden** (answer if you were not born in Sweden)
5. **Have you ever worn an orthodontic appliance?**  
 Yes                      No
6. **If yes, when?**  
 Now                      When I was younger
7. **Do you think your teeth look better or worse than your peers'?**  
 Much better      Better              Equal              Somewhat worse      Much worse
8. **How often are you teased because of your teeth?**  
 Never              Seldom              Every month      Every week              Every day
9. **Do you think that you need a brace today?**  
 Yes                      Uncertain              No
10. **Would you accept treatment with fixed appliances for 1.5–2 years if it was recommended by the dentist?**  
 Definitely yes      Probably yes      Not sure              Probably no              Definitely no
11. **Do you believe that orthodontic treatment with fixed appliances is painful?**  
 No, not at all      No, hardly              Yes, somewhat      Yes, a lot
12. **What is your opinion about yourself?**  

	Very satisfied	Satisfied	Have no particular feelings one way or the other	Dissatisfied	Very dissatisfied
Body height					
Body weight					
Hair					
Teeth					
Face					
13. **How often do you check your hair in the mirror?**  
 Never              1–2 times/day      3–4 times/day      5 times/day              More often  
  
**How often do you check your teeth in the mirror?**  
 Never              1–2 times/day      3–4 times/day      5 times/day              More often
14. **How is your general appearance compared with your peers?**  
 Much better      Better              Same              Worse              Much worse
15.  

	Never	Hardly ever	Sometimes	Often	Very often
I go to parties					
I get into fights					
People make fun of me when I'm not there					
I go round with people that live near me					
After school I spend most of my time watching TV					
I try to hide from people					
People feel sorry for me					
I go shopping with my family					
I organize games and activities for friends and classmates					



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