

Orthodontic care from the patients' perspective: perceptions of 27-year-olds

Kurt Bergström^{*,****}, Arne Halling^{**} and Bodil Wilde^{***}

^{*}Departments of Orthodontics & Pediatric Dentistry, School of Dentistry, Karolinska Institute, Huddinge, ^{**}Centre for Public Health Sciences, University of Linköping, Linköping, ^{***}Centre for Public Health Research, Värmland County Council, Karlstad and ^{****}Orthodontic Department of the Public Dental Health Service, Växjö, Sweden

SUMMARY The aim was to analyse 27-year-olds' perceptions of their own dental arrangement and any orthodontic care they may have received as a child or adolescent. All of the individuals in a sample of young adults in Kronoberg County, Sweden, who had received orthodontic care during childhood or adolescence ($n = 121$) were selected to participate in the study. In addition, 76 orthodontically untreated individuals were randomly selected from the same sample. All participants, both those who had previously had orthodontic treatment and those who had not, were sent a questionnaire.

Most of the respondents were satisfied with their earlier decision, whether to choose orthodontic treatment or not. Dental professionals were considered to have had the greatest influence on this decision. This means that the desire for treatment may be guided by the orthodontist. Three out of four individuals considered orthodontic treatment important, even when irregularities of the teeth were minor. A majority of the individuals thought that they would have been able to wear visible braces if needed, even in adulthood. Individuals treated by specialists were more contented than individuals treated by general practitioners. Individuals with malocclusions and treatment need, but who had refused offered treatment, were in general more discontented with their dental arrangement; more than half of them now regretted their decision. They also felt it more difficult to communicate questions, thoughts, and opinions on their own desire for treatment. An increased level of information, especially to these individuals, would have been desirable.

Introduction

The overall aim of orthodontic care should be good treatment results and satisfied patients, at a reasonable cost. This can be achieved by a functioning orthodontic system, including screening, information, and treatment when indicated. The system for management must be efficient, with the interventions made at the right time, by the right person, and in the right way to the different target groups. To reach this goal, it is important that the quality of care is continuously and systematically evaluated, and documented by means

of professional clinical assessments and patient questionnaires or interviews.

Interest in the patient's perception of quality of care and quality assurance has been more focused in recent years (Wilde, 1994). Patient satisfaction with dental care has been explored and compared with other medical fields of care (Williams and Calnan, 1991). High levels of general satisfaction are usually found, and greater dissatisfaction is usually expressed in response to questions of a more detailed and specific nature. Davies and Ware (1981) found that patients are usually more satisfied with most

aspects of dental care than of medical care. Kress (1987, 1988) concluded that identifying and responding to patients' needs can be an effective means of lowering barriers to care. This, in turn, is rewarded by a greater degree of satisfaction among the patients and the staff members. There are few studies investigating the level of satisfaction with orthodontic care. Only sporadic reports can be found in the literature (Oliver and Knapman, 1985).

Orthodontic care in three Swedish counties has been professionally evaluated (Bergström and Halling, 1996a,b; Bergström *et al.*, 1997) in a series of studies of young adults. Among other things, it was found that the outcome measures in general were more favourable for specialist treatments than for treatments provided by general practitioners, in spite of the fact that the specialist treatments on average were classified as more difficult than those provided by general practitioners. This paper is a complement to those studies, presenting the quality of care from the patient's perspective.

The aim was to select a group of 27-year-olds, some who had previously undergone orthodontic treatment and some who had not, and to analyse, approximately a decade after treatment, their perceptions of their own dental arrangement and the orthodontic care they had received.

Subjects

In 1987, a sample of 302 young adults (mean age 18.8 years, SD 0.44) in Kronoberg County were examined concerning malocclusions and orthodontic treatment provided by general practitioners or by specialists (Bergström and Halling, 1996a,b). Eight years later (1995) questionnaires were sent to all individuals who had received orthodontic treatment during childhood or adolescence and whose addresses were known ($n = 121$). Seventy-six of the orthodontically untreated individuals with known addresses were randomly selected (Figure 1) and also sent a questionnaire.

A total of 160 questionnaires were returned, giving an overall response rate of 81 per cent. The participants were divided into four groups according to their treatment history. The

response rates within these groups are listed below:

Treatment with appliances ($n = 67$)	86%
Treatment without appliances ($n = 36$)	84%
No treatment/treatment need (Indication Index ≥ 001) ($n = 26$)	72%
No treatment/no treatment need ($n = 31$)	78%

The respondents were divided into groups according to gender, residence (rural/urban areas), operator (general practitioner/specialist), and history of orthodontic treatment during childhood or adolescence. The patients' and the parents' highest achieved level of education was registered as low (less than 10 years of schooling), medium (10–12 years of schooling), or high (more than 12 years of schooling).

No statistically significant differences between non-respondents and respondents were detected according to gender, residence, or operator, except that 28 per cent of the non-respondents in rural areas were males and 11 per cent females ($P < 0.05$).

Methods

The collection of data was partly carried out by means of the questionnaire 'QPP-Orthodontics', a modification of the questionnaire 'Quality from Patient's Perspective—QPP' (Wilde *et al.*, 1994). This is based on a theoretical model presented by Wilde *et al.* (1993), who studied quality of care from a patient perspective. The model stipulates that patients' perceptions of what constitutes quality of care are formed by their encounter with an existing care structure, and by their system of norms, expectations, and experiences. Quality of care can be understood in the light of two conditions: the resource structure of the care organization and the patients' preferences. The resource structure of the care organization consists of person-related, as well as physical and administrative environmental qualities. The patient's preferences have a rational and a human aspect. Within this framework, patients' perceptions of quality of care may be

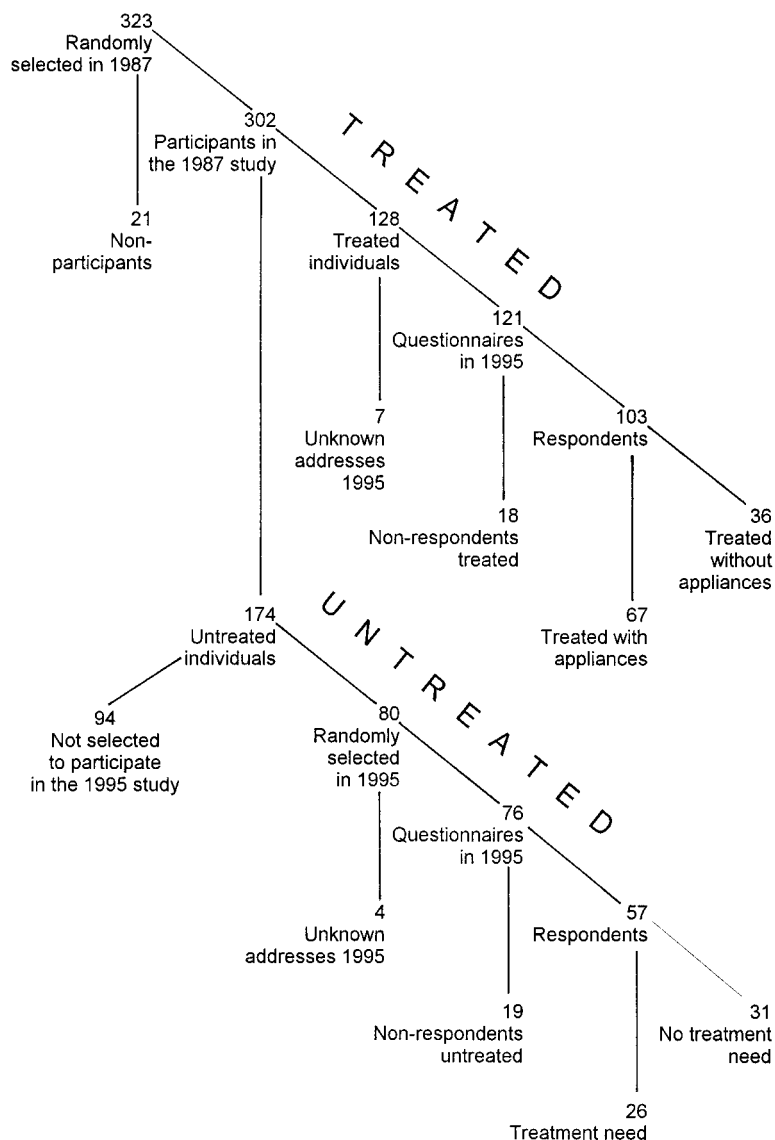


Figure 1 Flow diagram of the subjects involved in the studies.

considered from four dimensions: the medical-technical competence of the care-givers, the physical-technical conditions of the care organization, the degree of identity-orientation in the attitudes and actions of the care-givers, and the sociocultural atmosphere of the care organization.

The QPP-Orthodontics items reflect the four dimensions of Wilde's theoretical model. Each item was evaluated in two ways by the respondents. The first was intended to reflect the individual's actual feelings about a certain aspect of the orthodontic care received, i.e. a measure of perceived reality. The other was intended to

Table 1 Example of a question in the present study (questionnaire QPP-Orthodontics) with four-grade scales for perceived reality and subjective importance of the question.

Question	Perceived reality		Subjective importance	
I felt it easy to communicate my questions, thoughts, opinions, and desire for probable orthodontic treatment	Totally agree	4	Of the greatest possible importance	4
	Partly agree	3	Of great importance	3
	Partly disagree	2	Of little importance	2
	Totally disagree	1	Of no importance at all	1
	Not suitable	x		
	Don't remember	0		

reflect how important the substance of the question was for the individual, i.e. a measure of subjective importance.

Four-grade scales were used in the evaluation (Table 1). Two other alternatives were given: 'Not suitable' (for those individuals without mal-occlusions who were included in the study), and 'Don't remember'.

From the two answers about perceived reality and subjective importance, an index of quality was calculated for every question using the following formula:

$$\begin{aligned} & \text{Subjective importance score} \times \\ & (2 \times \text{perceived reality score} \\ & - \text{subjective importance score}) \end{aligned}$$

(Wilde *et al.*, 1994). The index can vary between -8 (lowest quality) and 16 (highest quality).

Cronbach's coefficient alpha for the quality index scales was in total 0.93 (10 items), for the orthodontic-technical competence 0.92 (two items), for the physical-technical conditions no value (only one item), for the identity-orientated approach 0.85 (five items), and for the socio-cultural atmosphere 0.87 (two items).

In addition, the participants were asked to answer questions about other aspects of the quality of care and about their own and their parents' levels of education. These were multiple choice and each had space for additional comments.

The collected data were arranged to shed light upon the following areas:

1. The *quality of the orthodontic care* according to the four dimensions (10 items) and satisfaction with their own dental arrangement (one item).

2. The frequency of individuals who felt that the *treatment decision* was correct; and who they felt had the greatest influence on the treatment decision (three items).
3. The views of the respondents concerning the *importance of orthodontic treatment* (two items).
4. The frequency of individuals being able to wear *visible braces* if needed (two items).

Probable differences according to subgroups were surveyed.

Statistics

Statistically significant differences between means and frequencies were evaluated and *P* values calculated. Differences between groups were evaluated by the chi-squared test, and differences between means were evaluated by the Mann-Whitney *U*-test. A probability at the 5 per cent level or less was considered statistically significant.

Results

Quality of orthodontic care

In Table 2 the mean values of quality indices are displayed. The four quality dimensions according to Wilde (1994) are marked as headings for the different items. Under 'Other aspects' the individual's level of satisfaction with their own dental arrangement is displayed. The individuals were divided into four groups according to history of treatment at the age of 19 years. The group 'No treatment/treatment need' had the lowest quality index of the four groups in nearly all items.

Table 2 Mean values of quality indices in individuals treated with or without appliances, and in untreated individuals with or without treatment need (Indication Index ≥ 001), and percentage of individuals answering 'Don't remember'. The questions are divided into the four quality dimensions according to Wilde (1994). *P* values have been calculated for comparison between the groups in italics. The two groups of treated patients are in some items pooled and marked as 'All treated'.

Questions	Treatment		No treatment		Totals	
	With appliances (<i>n</i> = 67)	Without appliances (<i>n</i> = 36)	With treatment (<i>n</i> = 26)	Without treatment (<i>n</i> = 31)	(<i>n</i> = 160)	Don't remember (%)
Orthodontic-technical competence						
I had the best possible examination and assessment of my set of teeth/malocclusion.	11.47	9.45 <i>All treated</i>	5.38 <i>P</i> < 0.001	10.86	9.95	11
I had the best possible treatment of my malocclusion.	10.20	9.21			9.89	13
Physical-technical conditions						
I got the impression that the clinic had access to all technical dental care equipment necessary for my orthodontic treatment.	12.16	11.44	10.47	11.09	11.64	21
Identity-orientated approach						
I felt I was treated kindly by the dentist/assistant treating me.	12.92	10.90	9.62 <i>P</i> < 0.05	9.74	11.39	8
I got appropriate information about my malocclusion before treatment, and it was explained to me what should be done.	10.45	9.38 <i>All treated</i>	5.42 <i>P</i> < 0.05	10.00	9.53	21
I felt it was easy to communicate my questions, thoughts, opinions, and desire for probable orthodontic treatment.	9.34	6.05 <i>All treated</i>	4.07 <i>P</i> < 0.01	8.45	7.73	29
I was involved in the decision of probable orthodontic treatment.	5.07	5.32	4.89	6.50	5.22	28
I got appropriate information during the course of treatment, and it was explained to me what was done and what I myself had to do.	11.03				11.03	13
Sociocultural atmosphere						
I felt there was a positive atmosphere in the treatment room.	11.04	6.54 <i>P</i> < 0.01	7.67	10.17	9.36	16
I felt that my desire and need—not the routines of the care-givers—were primary.	7.02	4.35	3.58	8.40 <i>P</i> < 0.01	6.13	33
Other aspects						
I feel that my teeth are straight.	7.86	7.18 <i>All treated</i>	2.38 <i>P</i> < 0.01	11.38 <i>P</i> < 0.01	7.59	

Treatment decision

Question: 'Do you feel that you were properly treated when, during your school years, you received/did not receive orthodontic treatment?'

Of those individuals who had received treatment, 69 per cent felt that they had received just enough, 21 per cent would have had more, and 1 per cent would have had less. Nine per cent of

the individuals had no idea. There were no statistically significant differences between the four groups of treated and untreated individuals. Among individuals treated with appliances, however, the proportion of individuals treated by general practitioners who felt that they should have had more treatment was 41 per cent, compared with 16 per cent for individuals treated by specialists (*P* < 0.05).

Question: *'Who do you consider had the greatest influence on your decision to go through/not go through orthodontic treatment?'*

The dental professionals had the greatest influence on 54 per cent of the respondents, while 14 per cent felt 'You, yourself' had the greatest influence, and 6 per cent their mother or father. In 11 per cent the question was not suitable and 14 per cent of the respondents did not remember. The highest frequency of 'You, yourself' (27 per cent), was in the group 'No treatment/treatment need'; even higher, though, was the frequency of the answer 'dental professionals' (46 per cent).

Question: *'Do you regret that orthodontic treatment was performed/was not performed?'*

Of all respondents, 13 per cent answered 'Yes', 72 per cent 'No', and 15 per cent 'Not suitable'. Among treated individuals, 5 per cent regretted their decision of treatment compared with 58 per cent in the group 'No treatment/treatment need' ($P < 0.001$).

Importance of orthodontic treatment

Question: *'Would you recommend orthodontic treatment to someone asking for advice?'*

Of all the respondents, 80 per cent answered 'Yes, definitely' or 'Yes, probably', and 3 per cent 'No, probably not' or 'No, definitely not', while 18 per cent did not know or did not answer. There were no statistically significant differences between the four groups.

Question: *'Do you think it is important that even children with small irregularities of the teeth should get treatment?'*

Of all the respondents, 77 per cent answered 'Very important' or 'Fairly important', while 15 per cent answered 'Not so important' or 'Not at all important'. Eighty-three per cent of treated individuals considered treatment important, while only 67 per cent of the untreated individuals considered treatment important ($P < 0.05$).

Visible braces

Question: *'Did you wear or would you have been able to wear visible braces during adolescence if needed?'*

Of all the respondents, 84 per cent answered 'Yes, definitely' or 'Yes, probably'. There were no statistically significant differences between the four groups; among individuals treated with appliances, however, 67 per cent of those treated by specialists had worn or felt that they could have accepted visible braces, compared with 32 per cent of those treated by general practitioners ($P < 0.01$).

Question: *'Would you have been able to wear visible braces as an adult if needed?'*

Of all the respondents, 67 per cent answered 'Yes, definitely' or 'Yes, probably'. The percentage for treated individuals was 60, compared with 77 for untreated individuals ($P < 0.05$).

Differences according to subgroups

The level of education of the parents was high in 40 per cent of the individuals in the group 'No treatment/treatment need', compared with 14 per cent in the other groups ($P < 0.001$). In both groups of untreated individuals, the level of education of the parents was high for 40 per cent of those living in urban areas and 12 per cent of those living in rural areas ($P < 0.001$).

Statistically significant differences were found for some of the items in Table 2 according to the following variables:

Gender. For the question 'I got appropriate information about my malocclusion before treatment, and it was explained to me what should be done', the mean quality index for females was 12.23 and for males 9.22 ($P < 0.05$). For the question 'I felt it was a positive atmosphere in the treatment room', the mean quality index for females was 10.28 and for males 8.14 ($P < 0.05$).

Residence. For the question 'I was involved in the decision of probable orthodontic treatment', the mean quality index for individuals living in rural areas was 6.84 compared with 3.69 for individuals living in urban areas ($P < 0.05$).

Mean values of quality indices for individuals treated with appliances by a specialist or by a general practitioner are displayed in Table 3. The quality indices were consistently higher for specialist-treated individuals than for individuals treated by general practitioners.

Table 3 Mean values of quality indices in individuals treated with orthodontic appliances by specialist or by general practitioner. The questions are divided into the four quality dimensions according to Wilde (1994). *P* values have been calculated for comparison between the groups.

	Specialist (<i>n</i> = 45)	General practitioner (<i>n</i> = 22)	Statistical significance
Orthodontic-technical competence			
I had the best possible examination and assessment of my set of teeth/malocclusion.	12.17	9.60	<i>P</i> < 0.05
I had the best possible treatment of my malocclusion.	11.76	8.17	<i>P</i> < 0.05
Physical-technical conditions			
I got the impression that the clinic had access to all technical dental care equipment necessary for my orthodontic treatment.	12.50	11.34	NS
Identity-orientated approach			
I felt I was treated kindly by the dentist/assistant treating me.	13.73	10.89	<i>P</i> < 0.05
I got appropriate information about my malocclusion before treatment, and it was explained to me what should be done.	11.85	8.45	<i>P</i> < 0.05
I felt it was easy to communicate my questions, thoughts, opinions, and desire for probable orthodontic treatment.	9.46	6.90	NS
I was involved in the decision of probable orthodontic treatment.	6.81	3.59	<i>P</i> < 0.05
I got appropriate information during the course of treatment, and it was explained to me what was done and what I myself had to do.	12.28	8.28	<i>P</i> < 0.01
Sociocultural atmosphere			
I felt there was a positive atmosphere in the treatment room.	11.02	8.18	NS
I felt that my desire and need—not the routines of the care-givers—were primary.	8.53	3.74	<i>P</i> < 0.01
Other aspects			
I feel that my teeth are straight.	9.82	5.81	<i>P</i> < 0.01

Discussion

In general, the individuals thought that the physical-technical conditions of the orthodontic care they received were satisfactory and they felt that they had been met with kindness by the care-givers. The item concerning ease of communications yielded lower values and the individuals thought that they had been involved in the decision of treatment to a lesser extent. The sociocultural atmosphere of the orthodontic care was felt to be positive; and the confidence in the orthodontic-technical competence of the care-givers was high, although in this respect, as in several others, the group 'No treatment/treatment need' was more discontented. For instance,

they felt it more difficult to communicate questions, thoughts, and opinions on their own desire for orthodontic treatment. Neither did they feel that they had received appropriate information about their malocclusion and what should be done. Furthermore, the examination and assessment of malocclusion, and the treatment provided by the dentist/assistant was given a lower index of quality by the orthodontically untreated individuals with treatment need than by the other groups.

Parents' motivation, especially that of the mother, has been shown to be the most important factor in initiating orthodontic treatment (Cohen and Horowitz, 1970; Dorsey and Korabik, 1977), and treatment is considered to be more

important by the parents than by the child (Dorsey and Korabik, 1977). According to several studies, demand for orthodontic care is dictated largely by aesthetics (Dorsey and Korabik, 1977; Tulloch *et al.*, 1984; Pietilä and Pietilä, 1994; Tuominen *et al.*, 1994; Sheats *et al.*, 1995), even though general dental practitioners have been found to exert appreciable influence on a patient's acceptance of treatment (Gosney, 1986). In Scandinavian countries with free dental care for children, on the other hand, it has been assumed that the initiative for orthodontic treatment usually comes from professional personnel (Helm, 1990). Accordingly, the opinion of the majority of the respondents in this study was that 'dental professionals' had the largest influence on their treatment decision. The highest percentage of those who answered 'You, yourself' was found in the group 'No treatment/treatment need' (27 per cent), but even here 46 per cent felt that professional personnel had the greatest influence on their treatment decision. This means that the desire for treatment to a high extent may be guided by the orthodontist.

Although most of the individuals were satisfied with their earlier treatment decision, as many as 58 per cent of the untreated individuals with treatment need stated that they regretted their decision. This probably does not mean that they now were ready to undergo orthodontic treatment. Rather, it could be interpreted as an expression of discontent. During adolescence, none of these 26 individuals accepted the proposed orthodontic treatment, free of charge for the patient/parents. At the age of 19, only one of them accepted the proposed treatment (which was performed). This is a dilemma. Knowing that young individuals with malocclusions who refuse offered orthodontic treatment are likely to regret their decision later in life, and knowing that no treatment should be started where there is no desire for treatment (Bergström *et al.*, 1995), what is the dental professional to do? Objective and correct information to patient and parents (Jerrold, 1988) concerning possible disadvantages of malocclusions, and risks and benefits of orthodontic treatment would hopefully increase the possibilities of the patient to arrive at the right

decision. The art of careful probing and listening to the patient as part of the treatment planning process is an essential skill (Ackerman and Proffit, 1995).

Orthodontic treatment was considered important by three out of four individuals, even in cases where irregularities of the teeth were small. This may be interpreted as an expression of the great importance that young people today in general attach to straight teeth (Espeland and Stenvik, 1991; Tuominen *et al.*, 1994).

As expected, treated individuals to a higher extent felt that their teeth today were straighter than untreated individuals with treatment need. Untreated individuals without treatment need were more satisfied with the straightness of their teeth today than treated individuals (Table 2). This is a reflection of the true situation, as some of the treated individuals were left with residual treatment need (Bergström and Halling, 1996b), and relapse might also have occurred.

Treatment has been found to be less acceptable to those living in a region where orthodontic appliance therapy is rare (Gravely, 1990). Familiarity with orthodontic appliances among a subject's peer group has a greater influence on the uptake of orthodontic treatment than has the subject's social class or gender (Burden, 1995). Most of the individuals in this study thought they would have been able to wear visible braces during adolescence if needed and two out of three even in adult age. In an area where some form of treatment has been provided to 42 per cent of the individuals, the wearing of visible braces does not seem to be a great barrier to treatment.

The level of education of the parents was higher in the group of discontent, 'No treatment/treatment need'. This is contrary to the findings of Searcy and Chisick (1994), who in the United States found that a high level of education was strongly associated with high treatment frequency. A high level of education may, however, be combined with high family income (Linn, 1966), which may greatly influence the treatment frequency in the US (Stricker *et al.*, 1979). No differences according to socio-economic status could be found in the treatment frequency of Danish children (Röbling, 1982) nor by Kenealy

et al. (1989) among Welsh children with substantial visible irregularities. The latter, however, found that a higher number of middle-class children with a low objective need for treatment had received orthodontic treatment than working-class children.

Females felt to a higher extent than males that they had received appropriate information during the course of treatment and that there had been a positive atmosphere in the treatment room. Although this could be attributed to a few female operators who received very high quality indices, there were otherwise no statistically significant differences according to gender of operator.

The specialist-treated individuals were, in general, more satisfied and gave higher quality indices than did the individuals treated by general practitioners. The specialist-treated individuals were more satisfied with information before and during treatment, and also with examination and treatment. They also felt more involved in the treatment decision, and that their desires and needs, and not those of the care-givers, had been taken into consideration more than the individuals treated by general practitioners. The differences in satisfaction between specialist-treated individuals and individuals treated by general practitioners are based on realistic perceptions. The treatments were previously estimated professionally (Bergström *et al.*, 1998), and the treatment outcomes in general were found to be more favourable for specialist treatments than for treatments provided by general practitioners, despite the fact that specialist treatments on average were classified as more difficult than those provided by general practitioners.

Methodological aspects

In most studies dealing with the patient's opinion on delivered care, the evaluations were made soon after the end of treatment (Wilde, 1994). It might, however, be advantageous to evaluate care in a long-term perspective, especially in orthodontics where patients are often treated at a young age. These patients may today be parents, and thus be a deciding influence on their own children and their decision on orthodontic

treatment. Another advantage of the subjects chosen to participate in this study may be that they all had been professionally evaluated at the age of 19 according to treatment need and provided orthodontic care. This implies that the questionnaires can be analysed in the light of these professional evaluations.

That the non-respondents in the rural areas were to a greater extent male may have biased the results towards higher quality indices, especially in some questions where sex differences were detected. Females generally had higher quality indices than males.

The internal consistency reliability (Cronbach's alpha) of the items in the sum scales was high, and the reliability may thus be considered satisfactory.

The questionnaire 'QPP-Orthodontics' has not been used earlier, and there are no other studies to compare whether or not the quality indices in general are satisfactory. To evaluate the four quality dimensions according to Wilde (1994), it would have been desirable to have more items in the different dimensions. A disadvantage may also be the long time which had passed since the treatment was discussed. In some items concerning conditions a long time ago, the alternative 'Don't remember' was used to a great extent (Table 2), and the answers there should be interpreted with caution. Other items, concerning, for example, technical competence and how the individuals felt when being treated, were better remembered, and the group 'Treatment with appliances' in general remembered better than the other groups. Items concerning how the patient's encounter with an existing care structure corresponded to his/her expectations should, however, preferably be asked closer to the time of treatment.

Conclusions

The results may be summarized as follows:

1. Most of the individuals were satisfied with their earlier treatment decision, whether to undergo orthodontic treatment or not.
2. Dental professionals were considered to have the greatest influence on the patient's decision,

which means that the desire for treatment may be guided by the orthodontist.

3. Orthodontic treatment was considered important by three out of four individuals, even in cases where irregularities of the teeth were small.
4. A majority of the individuals thought that they would have been able to wear visible braces if needed, even in adulthood.
5. Individuals treated by specialists were more contented than individuals treated by general practitioners.
6. Individuals with malocclusions and treatment need who had refused proposed orthodontic treatment were, in general, more discontented with their dental arrangement than other respondents and a majority of them regretted their decision.
7. Objective and correct information to the patient and parents about the possible disadvantages of malocclusions and the risks and benefits of orthodontic treatment is essential in orthodontic care to increase the possibilities of the patient making the correct decision about treatment.

Address for correspondence

Kurt Bergström
Orthodontic Department of the Public Dental
Health Service
Klostergatan 16 B5
352 31 Växjö
Sweden

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