

SCIENTIFIC
SECTION

Patients' expectations of orthodontic treatment: Part 2—findings from a questionnaire survey

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Objective: To describe patients' and their parents' expectations of orthodontic treatment.

Design: A questionnaire survey of 100 patients and their primary care-givers attending a new patient orthodontic consultant clinic, at a teaching hospital.

Setting: GKT Orthodontic Department, King's College Dental Hospital, London, UK.

Subjects: The sample consisted of 100 participants who completed the questionnaire, including 50 patients aged 12–14 years who had been referred to the orthodontic department for treatment. One parent of each patient was also invited to participate.

Materials and methods: Participants completed a valid questionnaire measure of orthodontic expectations that was tested for reliability and validity. Descriptive analysis of the responses was undertaken, and comparisons of children's and parents' expectations, in addition to ethnicity, were made.

Results: Patients and parents have similar expectations of treatment, with the exception of expectations of duration of orthodontic treatment ($P < 0.01$), having a brace fitted at the initial visit ($P < 0.05$), and restrictions with regard to what one can eat and drink as a result of orthodontic treatment ($P < 0.05$). Among the patient participants, different ethnic groups displayed different expectations of the initial orthodontic assessment visit, the likelihood of wearing headgear, the impact of orthodontic treatment on diet, and the reaction of peers to treatment ($P < 0.05$). For patients, ethnic group differences were reported for expectations regarding the initial visit, headgear and dietary restrictions ($P < 0.05$).

Conclusions: Patients and their parents share similar expectations of orthodontic treatment for most aspects of care, although parents are more realistic in their estimation of the duration of treatment and the initial visit. The expectations of patients differ from those of their parents with regard to dietary and drink restrictions in relation to orthodontic treatment. Ethnicity significantly influences expectations of orthodontic treatment, and this may relate to differences in the patients' and their parents' assessed outcome of care.

Key words: Patient expectations, orthodontics, questionnaire, measure

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Introduction

There are few studies that have examined patients' expectations of orthodontic treatment in the UK.

Studies have focused on parents' expectations of orthodontic treatment, and have not directly measured patients' expectations.^{1,2} The questionnaires used to measure patients' and parents' expectations require further psychometric validation (reliability and validity tests).^{2,3} In one study, an adaptation of a questionnaire to measure patients' expectations of orthognathic

surgery was used to measure patients' expectations of orthodontic treatment.⁴

Other studies have measured patients' and parents' expectations during orthodontic treatment, which introduces bias into the results.^{3,4} Another study measured patients' expectations of pain resulting from wearing fixed orthodontic appliances, while the general expectations of orthodontic treatment were not investigated.⁵

There are few studies that have explored the relationship between orthodontic expectations and ethnicity. One author states that the social and cultural

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expectations with regard to dental appearance have changed with time in the USA. Social and cultural expectations and pressures produce a culturally valid need for orthodontic treatment, and social and cultural expectations condition peer and adult expectations.⁶

The orthodontic expectations of White Caucasians and Pakistani Muslim patients and their parents were investigated through semi-structured qualitative interviews.⁷ The authors explored the relationship between culture, language and inappropriate orthodontic expectations.

The aim of this article is to report patients' and their parents' expectations of orthodontic treatment when measured using a questionnaire that was psychometrically validated, and the relationship of ethnicity to patients' and parents' expectations of orthodontic treatment.

Materials and methods

Ethical approval was granted by King's College Hospital Research Ethics Committee (LREC 02-123) and King's College Research and Development Committee.

A questionnaire was used to measure patients' and their parents' expectations of orthodontic treatment (see Appendix 1). A visual analogue scale (VAS) marked at 10-mm intervals was used as the Likert response format for all questions except questions 8 and 9. Inclusion criteria for participation in the study were:

- new patients and their parents presenting to the orthodontic consultant clinic;
- patients aged 12–14 years;
- patients with no previous history of orthodontic treatment;
- consent obtained from both the child and the parent.

One hundred and seventy-four subjects were invited to participate in the study before attending their new-patient orthodontic consultation. They consisted of 87 patients and their 87 parents. An information sheet was given to both the patient and parent before written consent was obtained from both the child and their parent. Patients completed their questionnaires separately from the accompanying parent.

Comparisons of child and parent expectations, as well as expectations reported by different ethnic group, were made using statistical tests. However, no sample size calculations were made *a priori*, because this was a new questionnaire measure with no available data to make an estimate.

Results

Characteristics of the sample

A total of 100 subjects completed the questionnaire during the period December 2002–April 2003. They consisted of 50 patient participants aged between 12 and 14 years, and 50 of their parents (mean age 41 years). Sixty-three per cent of patient participants were female, and 68% of parent participants were female. The findings from the questionnaire were analysed using SPSS Version 10.0 (SPSS Corporation, Chicago, USA).

Comparison of child and parent participants

Responses from parent and child participants were compared. No statistically significant difference was seen between children's and parents' responses, except for questions 1a, 6 and 8 (Tables 1 and 2).

Responses to question 1 revealed that children and their parents had low expectations with regard to an orthodontic appliance being fitted on the initial visit. However, parent participants had significantly lower expectations compared to child participants ($P < 0.05$).

Table 1 Comparison of parent and child data ($n=100$).

Question	Mean (adult)	Mean (child)	$P < 0.05$
1a	22.9	35.5	*
1b	77.9	71.5	NS
1c	83.0	77.7	NS
1d	61.7	54.7	NS
1e	50.0	47.5	NS
1f	67.9	59.8	NS
2a	58.1	61.5	NS
2b	52.4	51.8	NS
2c	44.6	45.0	NS
2d	21.2	16.4	NS
2e	24.0	19.4	NS
3	37.9	36.5	NS
4	44.0	43.8	NS
5	47.3	52.5	NS
6	47.5	58.1	*
7	49.7	49.0	NS
10a	80.9	76.5	NS
10b	65.1	61.5	NS
10c	45.6	41.3	NS
10d	39.8	37.2	NS
10e	54.2	49.9	NS
10f	45.6	35.5	NS
10g	67.8	55.5	NS

*Statistical significance is set at $P < 0.05$

NS, not significant

For details of questions, see Appendix 1

Responses to question 6 revealed that child participants had greater expectations of restrictions with regard to what they could eat or drink as a result of orthodontic treatment, compared to parent participants ($P<0.05$).

Question 8 showed statistically significant differences between child and parent participants' responses ($P<0.01$). Table 2 shows that nearly 50% of child participants did not know how long orthodontic treatment would take. Twice as many child participants as parents expected orthodontic treatment to be completed within 1 year (Table 2).

Ethnicity

Ethnic classification was carried out according the UK census guidelines. Sixty-three per cent of participants classified themselves as British, and 10% as Caribbean; the other categories had smaller numbers of participants (Table 3). In order to analyse the data, two larger groups were constructed by combining groups A, B and C (White British, White Irish and other White backgrounds) to form group 1, and the remaining groups to form group 2.

Different responses were found between the two ethnic groups of child participants, and these were statistically significant (see Table 4). Expectations differed with regard to their initial visit, anticipation of headgear wear, pain associated with treatment, dietary restrictions, reaction of their peers to orthodontic treatment, and speech improvement.

Table 4 Relationship between ethnic origin and child participants' responses ($n=50$).

Question	Mean: ethnic group 1	Mean: ethnic group 2	P value
1a	27.1	62.0	0.01*
1b	77.9	49.6	0.01*
1c	79.1	73.1	0.61
1d	51.8	63.8	0.22
1e	48.7	43.7	0.62
1f	61.5	54.2	0.46
2a	58.7	70.2	0.24
2b	51.3	53.5	0.81
2c	43.9	49.2	0.54
2d	13.3	28.6	0.02*
2e	15.2	34.0	0.29
3	37.0	34.8	0.67
4	37.9	62.5	0.02*
5	50.7	58.3	0.46
6	52.0	77.5	0.02*
7	43.8	65.7	0.01*
10a	73.4	86.0	0.09
10b	59.0	68.8	0.31
10c	38.7	49.3	0.34
10d	31.5	54.8	0.03*
10e	46.1	61.8	0.19
10f	30.9	49.9	0.09
10g	52.6	64.0	0.17

*Statistical significance is set at $P<0.05$
For details of questions, see Appendix 1

Table 2 Duration of orthodontic treatment (question 8).

Duration of treatment	Child participant ($n=50$)	Parent participant ($n=50$)	Total number of participants ($n=100$)
<1 year	7	3	10
1–1.5 years	7	15	22
1.6–2 years	6	8	14
>2–3 years	3	10	13
>3 years	4	2	6
Don't know	23	12	35

Chi-square test shows statistical significance ($P<0.01$)

Table 3 Ethnic origin of participants ($n=100$).

	A	B	C	D	J	M	N	R	
Ethnic origin	British	Irish	Other White	White and Black Caribbean	Pakistani	Caribbean	African	Chinese	Not reported
Child participant	33	2	2	1	1	5	3	1	2
Parent participant	30	4	2		1	5	5	1	2
Total	63	6	4	1	2	10	8	2	4

The two ethnic groups of parent participants showed statistically significant differences in response with regard to their expectations of their child's initial visit, headgear wear and dietary restrictions (see Table 5).

Discussion

Child and parent participants have similar expectations of orthodontic treatment, as shown in a previous study.³ The majority of patients and parents had no expected experiences of orthodontic treatment. The expectation of an orthodontic appliance being fitted at the initial visit was significantly lower in parent participants than in children. However, expectations of pain, discomfort, problems with eating, speaking and cleaning teeth, and embarrassment with wearing fixed orthodontic appliances, were anticipated. Similar findings were reported by Bennett *et al.*²

Both child and parent participants revealed low expectations of orthodontic treatment involving headgear, surgery or dental extractions. This may be one reason for poor compliance with headgear wear. It is also interesting to see that participants leaned towards

non-extraction orthodontic treatment. Children and their parents did not expect pain and masticatory difficulties to be associated with orthodontic treatment. Firestone *et al.*⁵ reported that participants underestimated the changes that they need to make in their diet as a result of pain associated with orthodontic treatment. Child participants expected significantly greater restrictions with regard to the types of food and drink that they could consume during orthodontic treatment, in comparison to parent participants. This may be because children are more aware of the need for a low-sugar and low-acid diet, as a result of talking to their peers who may have undergone orthodontic treatment.

No negative reaction from the public was expected by child and parent participants with regard to the wearing of fixed orthodontic appliances. This probably reflects the normalization of orthodontic treatment in the Western world.⁶

Parents seemed to be more informed about the duration of orthodontic treatment than their children. As more children are wearing fixed orthodontic appliances, it would have been expected that this information would have been passed on in peer conversation. The duration of orthodontic treatment has been shown to be poorly understood in some ethnic minorities.⁷

Patients and their parents have high expectations that orthodontic treatment will produce straight teeth and a better smile. However, expectations are higher with regard to straight teeth compared to a better smile. Parents expected a higher increase in social confidence as a result of orthodontic treatment than their children, as shown by Tung and Kiyak.⁴

Participants felt that orthodontic treatment was unlikely to improve mastication, speaking or career prospects. Shaw *et al.*³ stated that patients and parents expected orthodontic treatment to improve mastication, speech, and success in future occupations.

Responses from the child participants revealed significant differences between the two ethnic groups. Non-White participants had greater expectations of orthodontic braces being fitted at their initial visit than White participants. Participants who identified themselves as White had greater expectations of a check-up and diagnosis and more realistic expectations of their initial visit than non-White participants.

With regard to orthodontic treatment, there were greater expectations of having to wear headgear in the non-White group than among White participants. It seemed that expectations of orthodontic treatment were more negative in the non-White group because they anticipated more pain and dietary restrictions than White participants.

Table 5 Relationship between ethnic origin and parent participants' responses ($n=50$).

Question	Mean: ethnic group 1	Mean: ethnic group 2	P value
1a	17.1	38.1	0.05
1b	81.0	69.5	0.02*
1c	84.7	79.6	0.41
1d	62.3	60.0	0.95
1e	49.1	52.6	0.77
1f	69.3	64.6	0.42
2a	61.4	50.6	0.27
2b	51.6	54.3	0.48
2c	46.6	39.2	0.40
2d	17.3	31.8	0.03*
2e	19.2	37.0	0.06
3	37.1	40.5	1.0
4	43.3	45.7	0.74
5	47.0	47.9	0.92
6	40.5	65.0	0.002**
7	45.6	60.5	0.08
10a	79.3	85.5	0.17
10b	61.4	74.3	0.14
10c	41.2	56.7	0.09
10d	36.5	48.0	0.18
10e	48.6	68.4	0.06
10f	44.1	49.7	0.55
10g	68.1	66.9	0.63

*Statistical significance is set at $P<0.05$

**Statistical significance is set at $P<0.01$

For details of questions, see Appendix 1

Children who indicated that their ethnicity was non-White expected a more positive reaction from people with regard to their fixed orthodontic appliances. This reflects the different social-cultural expectations with regard to perfectly occluding teeth and a beautiful dentition.⁶

Differences in the benefits of orthodontic treatment were seen between the two child ethnic groups, as non-White children expected greater speech improvements. This may be because these children anticipated greater functional benefits of orthodontic treatment.

Parents who identified their ethnicity as White had a more realistic anticipation of their child's initial visit, because they expected the first visit to be a check-up and diagnosis. This may be because they were better informed. Khan and Williams⁷ showed that there were expectation differences between White Caucasians and Pakistani Muslims with regard to orthodontic treatment. The authors state that Pakistani parents failed to understand what was involved and the duration of orthodontic treatment; this was largely due to language and cultural barriers.

Non-White parents expected headgear wear and more dietary and drink restrictions. White parents may not have anticipated changes to their child's diet in the same way, because they viewed orthodontic treatment as a normal, unrestrictive procedure.⁶ This seems to be in disagreement with the study that showed that Pakistani parents failed to understand the dietary requirements involved in orthodontic treatment.⁷

Weaknesses of the study

The sample size limited full differentiation between all ethnic groups. Therefore, the groups were combined into two larger groups for analysis. Group 1 consisted of the White ethnic groups, and group 2 consisted of the other ethnic groups; this was similar to the method used by Tung and Kiyak.⁴ However, a larger sample size is required to analyse the effect that ethnicity has on orthodontic expectations for each ethnic group.

The effect of occupation on parents' expectations of orthodontic treatment could not be analysed, because the sample size limited full differentiation into occupational groups. However, studies have shown that professional parents anticipate that straight teeth will aid future occupational success,³ and educated fathers and parents with higher incomes have increased expectations of the benefits of orthodontic treatment.² A larger sample is needed to explore the relationship between parents' occupation and their expectations with regard to orthodontic treatment.

The results from the questionnaire are threatened by biases and errors.⁸ Biases could have resulted from mood bias (people in low spirits may underestimate their health status), non-response bias (patients not completing all the questions), and response style bias (participants responding to questions in the same manner regardless of the question). Random measurement error could occur when a respondent guesses or gives an unpredictable response. Selection bias is included, as only 12 to 14-year-old patients were investigated. Uninformed or equivocal expectations shown by patients and their parents may reflect a person's inability or unwillingness to communicate their expectations.⁹ This could represent social desirability bias, which leads to a response set where participants wish to give a preferred image.⁹

Strengths of the study

Patients' and their parents' expectations of orthodontic treatment were measured using a psychometrically validated questionnaire based on a UK population, and not a modified questionnaire.⁸

Information was collected before the pre-treatment consultation, which reduced bias in responses. Other authorities have stated that orthodontists should ask patients about their expectations before treatment.¹⁰

The study collected data on patients' and their parents' expectations of their initial visit, type of treatment expected, problems associated with orthodontic treatment, duration and frequency of attendance, and the expected benefits of treatment.

The relationship between ethnicity and patients' and their parents' expectations was examined. This has not been widely explored in the published literature.

Clinical practice

The questionnaire could be used to assess unrealistic expectations and aid the consent and treatment-planning process. As a result of understanding patients' anticipations, this measure may be used to reduce failed appointments, avoid premature termination of treatment, and increase patient compliance. These factors help to improve the quality of orthodontic treatment provided to the patient.

Conclusions

Information collected from 12 to 14-year-old patients and their parents with regard to orthodontic expectations reveals the following:

- Patients and their parents have similar expectations.

- Significant differences in orthodontic expectations were seen between patients and their parents with regard to their initial visit, and dietary and drinking restrictions, in addition to duration of treatment. Parents had lower expectations of orthodontic appliances being fitted at their child's initial appointment than child participants ($P<0.05$). Children had greater expectations of dietary and drinking restrictions in relation to orthodontic treatment than parent participants ($P<0.05$). Parents had a more realistic expectation of the duration of orthodontic treatment ($P<0.01$).
- Ethnicity significantly influences children's and parents' expectations of orthodontic treatment ($P<0.05$). The extent of its influence requires further investigation.

Contributors

Mark Sayers was responsible for the recruitment of the participants, data collection, content analysis, designing the questionnaire and drafting the article. Tim Newton was responsible for study design, content analysis, statistical data analysis, critical revision, expert advice and final approval of the article. Professor Fraser McDonald helped in critical appraisal and advice. In addition, Liz O'Higgins, Shruti Patel and Mr Powell allowed access to recruitment of patients referred to their consultant clinics. Tim Newton is the guarantor.

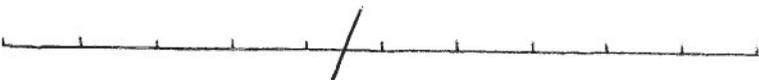
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Appendix 1**QUESTIONNAIRE TO MEASURE PATIENTS'
EXPECTATIONS OF ORTHODONTIC TREATMENT**

This questionnaire is to help you tell the orthodontists about your expectations regarding your forthcoming treatment. Read each question, and answer each question by placing a mark on the line nearest your expectation.

For example:

Extremely Unlikely  Extremely Likely

All information obtained is strictly confidential.

If you have already received orthodontic treatment, and are not aged between 12-14 years; you do not need to complete the questionnaire. Please return it to the researcher or the orthodontic receptionist.

Name:

Surname:

Date of birth:

Gender (please delete): Male:Female

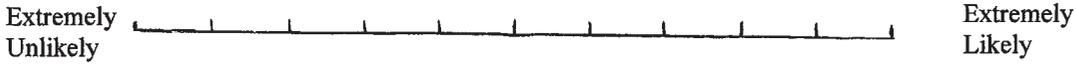
Address:

Post code:

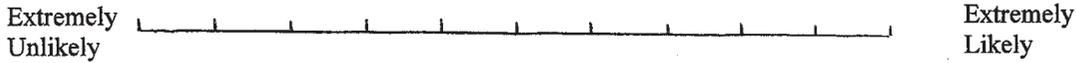
Ethnic origin:

1. At your initial appointment do you expect to:

a. Have a brace fitted?



b. Have a check-up and diagnosis?



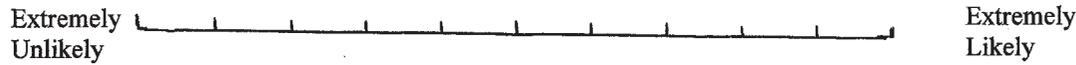
c. Have a discussion about treatment?



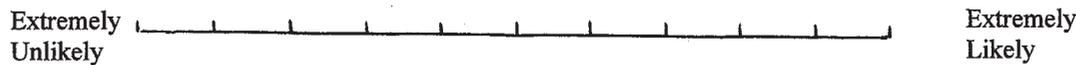
d. Have X-rays?



e. Have impressions?

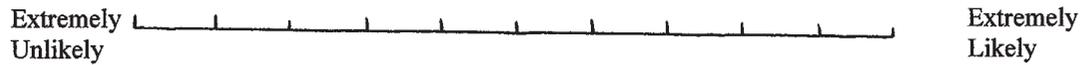


f. Have oral hygiene checked?



2. What type of orthodontic treatment do you expect?

a. Braces, don't know what type?



b. Train track braces?



c. Teeth extracted?

Extremely Unlikely	-----	Extremely Likely
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d. Head brace?

Extremely Unlikely	-----	Extremely Likely
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e. Jaw surgery?

Extremely Unlikely	-----	Extremely Likely
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3. Do you think orthodontic treatment will give you any problems?

Extremely Unlikely	-----	Extremely Likely
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4. Do you think wearing a brace will be painful?

Extremely Unlikely	-----	Extremely Likely
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5. Do you think orthodontic treatment will produce problems with eating?

Extremely Unlikely	-----	Extremely Likely
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6. Do you expect orthodontic treatment to restrict what you can eat or drink?

Extremely Unlikely	-----	Extremely Likely
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7. How do you think people will react to you wearing a brace?

Negative Reaction	-----	positive reaction
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8. **How long do you expect orthodontic treatment to take?** (Please tick the appropriate box)

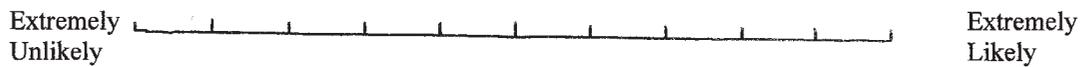
4 years	<input type="checkbox"/>
3.5 years	<input type="checkbox"/>
3 years	<input type="checkbox"/>
2.5 years	<input type="checkbox"/>
2 years	<input type="checkbox"/>
1.5 years	<input type="checkbox"/>
1 year	<input type="checkbox"/>
6 months	<input type="checkbox"/>
3 months	<input type="checkbox"/>
1 month	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

9. **How often do you think you will need to attend for check up?**(please tick the appropriate box)

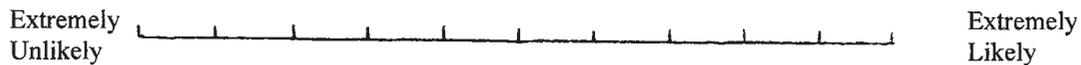
Every 8 months	<input type="checkbox"/>
Every 6 months	<input type="checkbox"/>
Every 3 months	<input type="checkbox"/>
Every 2 months	<input type="checkbox"/>
Every 6 weeks	<input type="checkbox"/>
Every 4 weeks	<input type="checkbox"/>
Every 2 weeks	<input type="checkbox"/>
Once a week	<input type="checkbox"/>
Twice a week	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

10. **Do you expect orthodontic treatment to:**

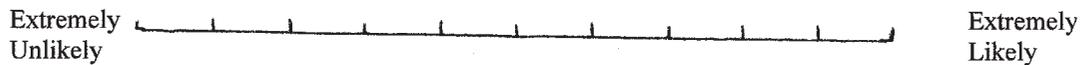
a. **Straighten your teeth?**



b. **Produce a better smile?**



c. **Make it easier to eat?**



d. **Make it easier to speak?**



e. Make it easier to keep my teeth clean?

Extremely Unlikely  Extremely Likely

f. Improve my chances of a good career?

Extremely Unlikely  Extremely Likely

g. Give you confidence socially?

Extremely Unlikely  Extremely Likely

Thank you for completing the questionnaire.