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SCIENTIFIC SECTION

A qualitative study to develop a tool to examine patients' perceptions of NHS orthodontic treatment

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Objective: To identify issues of importance to adolescent patients surrounding the delivery of orthodontic treatment under the National Health Service (NHS), which can form the basis of a tool to examine patients' perceptions of NHS orthodontic treatment.

Design: Study using qualitative research methods.

Setting: Patients were recruited from the orthodontic departments at Derriford Hospital and Bristol Dental Hospital, and from Specialist Orthodontic Practices in Plymouth and Solihull.

Subjects: A rolling sample of patients from a list of orthodontic patients under treatment at each site was selected. Twenty-six patients took part in five focus group meetings. Three patients took part in semi-structured telephone interviews.

Methods: Participants were invited to participate in either a focus group meeting or a telephone interview. The transcripts of these meetings were analysed by two researchers working independently. Issues of importance to patients regarding the delivery of orthodontic treatment under the NHS were identified.

Results: The issues identified included being treated with respect by the clinician and being included in discussions about treatment. Participants tended to rely on their peers for advice about what to expect from treatment. The patients also discussed the benefits to them of undergoing orthodontic treatment. These included an improved appearance and increased self-confidence.

Conclusion: This qualitative research has identified issues that are important to adolescent orthodontic patients. These issues will be used to form the basis of a patient-centred measure for auditing patients' perceptions of orthodontic treatment under the NHS.

Key words: Orthodontics, delivery of treatment, patient satisfaction, qualitative research

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Introduction

There is currently a drive in the NHS (National Health Service in the UK) to make the delivery of care more responsive to patients' needs. The National Plan for the NHS[1] expects both primary and secondary care providers to determine patients' and carers' views on the quality of service provided and to report their findings annually. This information is considered to be useful because it can help healthcare providers and planners to improve the quality of the service that they deliver.

It is now recognized that, to be of value, a measure of satisfaction needs to be patient-centred. It is only relatively recently that health service providers have developed a view that patients can provide reliable

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judgements of their experiences of health care.[2] In the past, the majority of measures of patient satisfaction have been based on issues considered to be important by clinicians. This is now recognized as erroneous as it has been demonstrated[3] that there is a clear mismatch between what general dental practitioners and patients consider important with regards to the delivery of treatment.

Orthodontics is unusual because the demand for treatment is mainly driven by patients and their parents and the demand for treatment is increasing in all age groups.[4] Orthodontics is a speciality that relies heavily on patient cooperation for a successful end result; therefore it is important that treatment is delivered to meet patients' perceived needs and expectations, wherever possible.

The literature currently available about patient satisfaction with orthodontic treatment is sparse and previous studies have focused on issues of concern to parents. Only four studies[5–8] have focused on patients' opinions of the delivery of orthodontic treatment. O'Connor[6] found that during treatment, patients' concerns centred on the appearance of their appliances and pain, together with diet restrictions and waiting room delays. At the end of treatment, patients recommended more accurate treatment-timing estimates and discussion throughout treatment. Bennett and Tulloch[7] also examined patients' views at the end of treatment. They found that patients were generally satisfied with their treatment outcomes, but all expressed dissatisfaction with some aspect of the treatment process.

Although it is now generally recognized that patient satisfaction studies need to be based on issues of importance to patients, only one[7] of the latter studies used qualitative research methods to examine patients' views. This study involved orthodontic patients who had been treated in the United States where the delivery of healthcare is very different from the United Kingdom (UK); therefore the results are unlikely to be generalisable to this country. At present there is no commonly agreed measure for auditing the process of orthodontic treatment from the patients' perspective in the UK. Most recently, Travess *et al.*[9] have designed a patient-centred measure, through qualitative research, to examine the issues surrounding the process of delivery of orthognathic care. Orthognathic patients however, may not have the same expectations or perceptions of orthodontic treatment as non-surgical orthodontic patients.

There is then, a clear need to identify the issues of importance to young patients with regards to the delivery of orthodontic treatment within the NHS. These issues can then be used to form the basis of a patient-centred measure, which can ultimately be used to audit patient perceptions of the delivery of orthodontic care. The aim of this study was to use qualitative research methods as a first step in the development of a tool to examine adolescent patients' experiences of orthodontic treatment.

Method

Ethical approval for the study was obtained from the United Bristol Healthcare Trust, Plymouth and Solihull Local Research Ethics Committees.

Participants were initially selected for the study from clinic lists of patients who were under active treatment at the orthodontic departments at Derriford Hospital and Bristol Dental Hospital. The names were taken from the lists consecutively to provide a rolling sample of patients undergoing a range of orthodontic treatments with different clinicians. Patients aged 12 to 18 years of age were included in this study. Cleft or syndromic patients were excluded, together with orthognathic cases.

A series of focus group meetings were arranged. The study protocol was to hold meetings on a weekday evening at a time that would be convienient to participants. Patients were recruited by the orthodontist providing their treatment. Subjects were given a letter of invitation for them and a friend to attend a focus group meeting – a 'buddy' system. They were also given an information sheet about the study. A letter explaining the purpose of the study was given to the patients' parents/guardians. The 'buddy' system[10] was used to encourage participation in the study. It was hoped that this would put participants at their ease, so that they would be more likely to contribute to the discussion. If the friend had any experience of orthodontic treatment then they would also be encouraged to join the discussion. Additional invitation letters and information sheets were also provided for the patient to give to their friend. The participants were advised that the information collected was confidential and would not affect their future care. It was also important to ensure that the participants were aware that they were free to leave the study at any time. Written consent was obtained from the patient and their friend. Their parents/guardians also gave written assent before commencing the focus group, using forms designed for the study.

Each focus group was held in a non-clinical environment and refreshments were provided. The researchers chose locations that were easily accessible by public and

private transport. The participants' travel expenses were reimbursed.

The focus groups were led by a trained facilitator. At the start of each meeting a broad outline was given on the purpose of the study by the facilitator and the areas to be covered were defined. A topic guide had been previously developed through analysis of questionaires already developed to measure patient satisfaction[5–8] by the researchers. This provided a framework for the discussions, but the discussions were flexible according to the experiences of the participants, allowing them to expand on any areas of interest that arose. The meetings were tape-recorded, with the participants' permission, and a researcher took field notes.

At the beginning of each meeting, participants were asked to introduce themselves and talk briefly about their hobbies. This, together with the field notes, was used to help the transcriber identify when each participant was talking. Each focus group lasted between one and two hours. At the end of each focus group the tape recordings were transcribed by an independent transcriber into Microsoft Word© documents. The transcripts were compared with the field notes to confirm the topics of discussion. The topic guide was adapted to reflect the analysis of the focus groups as the study progressed.

Change to the Study Protocol

The research team were unable to recruit any patients from Bristol Dental Hospital and there was also a poor response from patients at Derriford Hospital. It was therefore decided to amend the study protocol to include patients under treatment in Specialist Orthodontic Practices in Plymouth and Solihull. In addition, a telephone interview was offered to potential subjects, as an alternative to attending a focus group. These amendments were approved by the Local Research Ethics Committees in Plymouth, Bristol and Solihull.

The focus groups involving patients under treatment in specialist practice were held immediately after the patients had attended for the removal of their fixed appliances, whilst waiting for their retainers to be fitted. These arrangements were made to improve attendance as it was felt that there would be less inconvenience. Since these focus groups took place during the practices' normal opening hours, the 'buddy system' was not used because it was considered unreasonable to invite a friend to attend during school hours.

Methods for the telephone interviews

A fully trained, independent interviewer was employed to undertake the semi-structured telephone interviews. The interviewer had no particular knowledge of the issues surrounding the delivery of orthodontics in the UK. The researcher contacted patients who had agreed to take part in a telephone interview together with their parents and arranged a convenient time for the interview to take place, usually a weekday evening. Written consent and assent were obtained as described previously. Similarly to the focus group meetings, the interviewer used the topic guide described previously to form the basis of a semi-structured interview with each participant; however, the participants were allowed to expand on other issues of importance to them. The telephone interviews lasted approximately thirty to forty minutes each. Each telephone interview was tape recorded with the participants' permission and then transcribed into a Microsoft Word© document for analysis.

Data Analysis

The tape-recordings of the focus group meetings and telephone interviews were transcribed verbatim. The participants' names were changed to preserve their anonymity. Each transcript was analysed by two researchers working independently to reduce bias. Thematic analysis of the data was performed by hand to identify the key issues surrounding the delivery of treatment.[11]

For the analysis, the transcripts were divided into 'units of speech'. A unit of speech was defined as 'a continuous period of speech by an individual'. Each unit of speech was examined separately and themes concerning the delivery of orthodontic treatment were identified. Codes were then assigned to the identified themes that emerged from the data. Each unit of speech could reveal several different themes concerning the delivery of orthodontic treatment.[11]

After analysing each transcript the researchers compared the themes that they had identified and a common set of themes were created. The researchers then examined the transcripts again using the new set of themes and rated the frequency of occurrence of each theme for each transcript. At the end of the study the overall frequency of each issue was calculated to give an indication of the relative importance of each issue.

The stages of this study are summarized in Figure 1, including the future stage of development of a patient-centred measure of satisfaction of orthodontic treatment under the NHS.

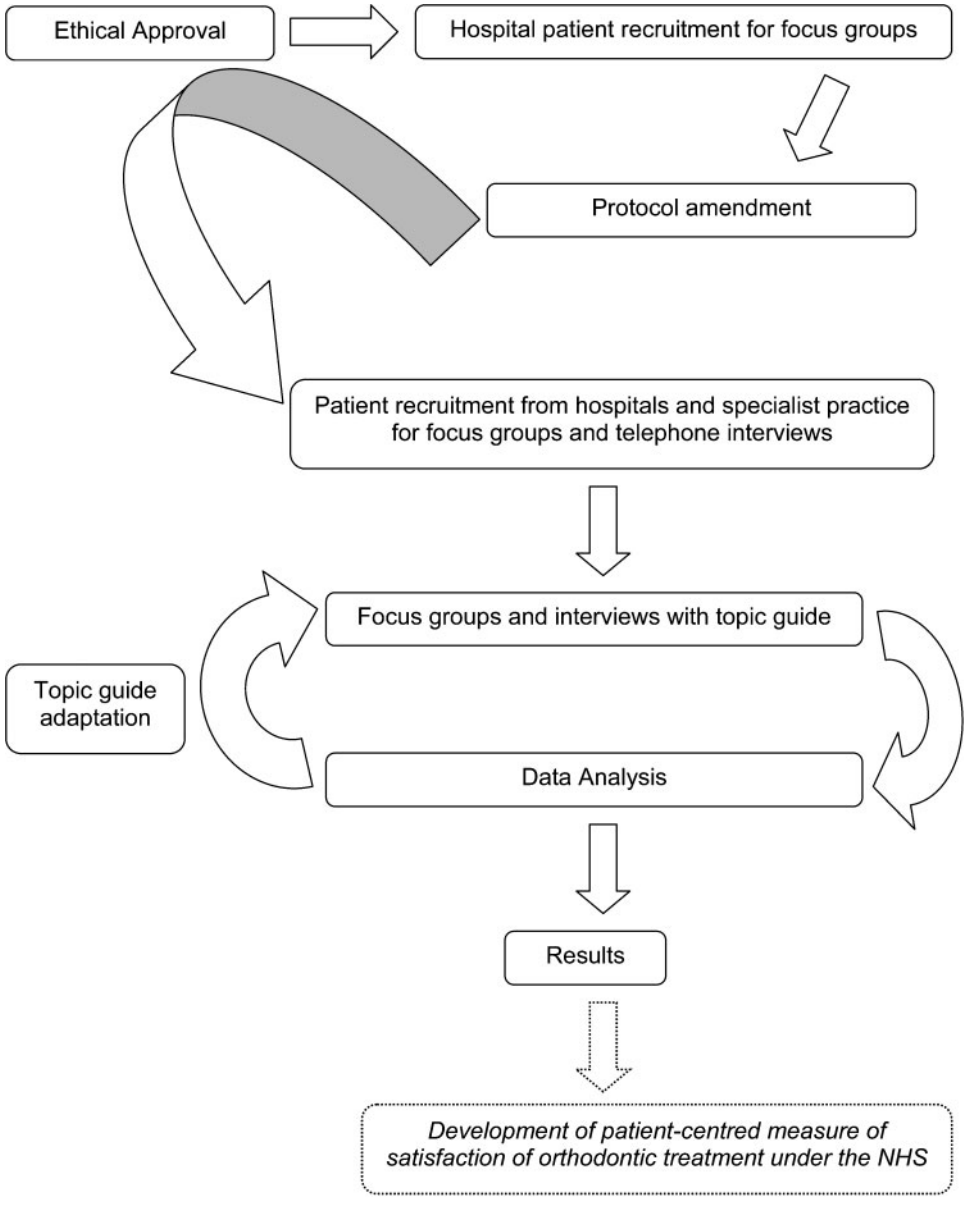

Figure 1 Summary of the stages of this study

Results

The number of subjects identified for focus groups and number who attended, including friends, by location of treatment centre are shown in Table 1. The number of subjects identified for interviews and number who attended, by location of treatment centre are shown in Table 2. Five focus groups and three interviews were held over a nine-month period. Only twenty nine patients and two friends were recruited to this study over a nine month period. This period included a protocol amendment and may reflect adolescent patients' lack of interest in participation in research. This is a small sample size; however participants for qualitative research are chosen to provide rich data and to show the range of views that exist within a population, rather than to be representative of it.[15]

The participants of the focus groups and interviews identified a number of themes surrounding the delivery of orthodontic treatment (Table 3) and these were grouped under three main headings during data analysis. These headings are reasons for undergoing treatment; experiences of wearing braces and benefits of treatment. The category of most importance in this study is the patients' experiences of wearing braces and

Table 1 Number of subjects identified for focus groups and number who attended including friends, by location of treatment centre

Focus groups	Number contacted	Number of patients attended	Number of friends attended
Bristol Dental Hospital	40	0	0
Derriford Hospital	48	2	2
Crescent Specialist Dental Centre	20	13	0
Quality Orthodontics Centre	36	11	0
Total	144	26	2

Table 2 Number of subjects identified for telephone interviews and number who attended, by location of treatment centre

Interviews	Number contacted	Number attended
Bristol Dental Hospital	10	1
Derriford Hospital	2	2
Total	12	3

this was further subdivided into categories on clinical surroundings, appointment times and living with braces.

1. Reasons for treatment

The participants identified several reasons for having treatment. Most frequently the General Dental Practitioner suggested the referral however, most of

Table 3 Coding tree: themes and subthemes identified from focus groups and interviews

Reasons for undergoing treatment	Experiences of wearing braces	Benefits of treatment
Referral initiated by	**Clinical surroundings**	**Appearance**
• GDP	• waiting room	**Self confidence**
• Parents	• clinic	**Oral health**
• Patients	• waiting times	
Perceived benefits of treatment	**Appointment times**	
• appearance	**Parents attending appointments**	
• oral health	**Clinician factors**	
	• respect for patient	
	• discussion with patient	
	• good/bad	
	Information	
	• from peers	
	• on diet/oral hygiene	
	• on braces	
	• on length of treatment	
	• on retainers	
	Compliance	
	• with diet/oral hygiene	
	• with brace/elastics/headgear	
	Experiences of braces	
	• pain/breakages	
	• length of treatment	
	• musical instruments	
	• cost of OH aids	
	Peers	
	• reason for treatment	
	• socially acceptable	
	• media	
	Views on living with braces	
	• appearance	
	• socially acceptable	

the patients were happy to undergo treatment. The patients suggested that treatment would improve their appearance and prevent them being teased about their teeth.

'I just wanted straight teeth.'
Participant in focus group 4
Coded 1.6 reason/appearance

'I was worried that lots of people would tease me about my teeth.'
Interview participant 2
Coded 11.12 outcome/teased if no treatment

2. Experiences of wearing braces

This category includes a number of sub-themes, which are related to the patients' experiences of orthodontic treatment.

a. Clinical surroundings

Within this category the sub-theme on surroundings included observations about the decoration of the waiting room and the number of seats available.

'It's good as they have pictures of people that have had treatment on the wall so you know what yours is going to look like and they look really happy and smile.'
Participant in focus group 4
Coded 9.3.2 waiting room/pictures

'More seats sometimes, especially at busy times.'
Participant in focus group 3
Coded 9.2.3 waiting room improvements/seats

b. Appointment times

The participants in this study had a wide variety of opinions regarding missing school for orthodontic appointments. Some patients were concerned about missing classes whilst other patients relished having the time off.

'I used to have mine in the afternoon because I used to be at a different school but a couple of months ago I changed and I started having them at lunchtime because they don't like you having them in lessons.'
Participant in focus group 4
Coded 3.8 patient/missing school

c. Parents attending appointments

Some of the participants stated that they liked to be able to have the choice to have their parents attend the appointment with them, especially during the initial parts of treatment.

'If someone was having anything big done, like when I got it on I obviously wanted her with me but I wasn't always bothered when I was just getting it tightened.'
Participant in focus group 3
Coded 4.3.3 parent/into clinic for fit
Coded 4.3.4 parent/not concerned if attends

d. Clinician factors

The participants remarked that the clinicians and nurses treating them were kind and supportive. The participants also appreciated being treated with respect.

'They were very friendly and they sort of talked to me, rather than talking to my mum about me... so it made me feel at ease… Treating me with respect, which was good.'
Participant in focus group 1
Coded 2.3 orthodontist/good
Coded 2.10.1 orthodontist/discusses treatment with patient

'Cause it's a two-way process cause if you don't explain then people may think I'm not gonna wear my bands.'
Particpant in focus group 3
Coded 2.1.1 explain/information on treatment

e. Information on braces

The analysis revealed that there are a variety of different methods available to pass on information to patients about orthodontic treatment. Most orthodontists discuss length of treatment and diet advice with their patients. Some participants were able to watch a video at the surgery whilst others where shown photographs or were given leaflets to take home with them.

'I had to watch a video... it was just all about braces and cleaning your teeth.'
Participant in focus group 5
Coded 2.1.5 explain/video

'I had a sheet telling when I had the brace which was definitely going in the bin.'
Participant in focus group 5
Coded 2.1.2 explain/leaflet

f. Compliance

Through the discussions during the focus groups and interviews it was clear that the patients understood the reasoning behind the oral hygiene instruction and diet

advice but on the whole chose to ignore the clinician's recommendations.

'I didn't want to do it in school because the tap water's a bit dodgy sometimes so I did it when I got home. It's embarrassing as well cause you are brushing your teeth in front of all these people so… oh god…'
Participant in focus group 4
Coded 3.2.2 compliance/oral hygiene
Coded 3.4.1 feelings/embarrassed

'I drank fizzy drinks; he said that you're not really meant to but still drank it.'
Participant in focus group 4
Coded 3.2.3 compliance/diet advice

'You're supposed to brush your teeth three times a day. I did it three times a day the first six weeks then I just couldn't be bothered. You're supposed to use mouthwash as well. She gave me a free bottle and then I bought another bottle after that and then just didn't bother doing it. It didn't make any difference when you did use it– no-one really noticed!'
Participant in focus group 1
Coded 3.2.2 compliance/oral hygiene

g. Experiences of braces

This category included a number of sub-themes, which were related to the patients' experiences of orthodontic treatment including pain during treatment and breakages of the orthodontic appliance.

'I play the trumpet. Occasionally if I play it for too long it might make a small indentation on my inner lip thing and that hurts but the only problems I find with it are the trumpet and eating cause sometimes stuff gets stuck in there and it's hard to get it out and that hurts occasionally.'
Interview participant 1
Coded 6.3.5 treatment/musical instrument
Coded 6.4.2 fixed appliance/pain

h. Influence of Peers

This category related to the information received from peers and included comments regarding information on pain and ulcers. The participants concluded that this information could be helpful, but could also be unreliable, and that it may be best for patients to make their own judgement.

'They use to seem like a bad thing cause not so many people use to have them but now they're not really taken notice of anymore, everybody's got them.'
Participant in focus group 1
Coded 5.2 peers/socially acceptable

'I'd spoken to friends that had braces on and some people said it hurt and I'd had different views really so didn't know what to think until I had it on and actually experienced it.'
Participant in focus group 4
Coded 5.1 peers/information to patient

i. Views on living with braces

Patients were most concerned about the appearance of the appliances, especially initially, but admitted that they did get used them.

'It was fine really.. At first it seemed really strange but I wasn't too self-conscious actually I sort of just got used to it.'
Interview participant 1
Coded 6.4.1 treatment/fixed appliance/appearance
Coded 6.4.5 treatment/fixed appliance/got use to it

'With the elastics bands, they came off really easily so you'd be sitting eating in a restaurant and you would have to re-attach it and you don't want everyone to watch you do it so sometimes I just use to leave it.'
Participant in focus group 4
Coded 6.4.8 treatment/fixed appliance/elastics
Coded 3.4.1 feelings/embarrassed

3 Benefits of orthodontic treatment

This final theme was associated with the patients' perceptions of the outcomes of orthodontic treatment. Most of the participants of this stage of the research had just had their appliances removed and, not surprisingly, most felt the treatment had been a positive experience. The perceived benefits of treatment were related to the patients' reasons for undergoing orthodontic treatment and included improved appearance and self-confidence.

'I think it's a good thing cause you get a better smile and your teeth will be straighter but I think it's a bad thing as well cause you go through a lot of pain and you can't eat the food that you like.'
Participant in focus group 1
Coded 11.2 outcome/appearance
Coded 6.4.2 fixed appliance/pain

'I'm more confident now I can smile. Before I had any treatment done they were very out like that and there's a picture of me at home and I'm smiling and it kind of ruins the picture cause you see these two little white bits sticking over my lip and it looks really bad.'
Participant in focus group 4
Coded 11.4 outcome/self confidence
Coded 11.2 outcome/appearance

Discussion

This study has shown that the issues of importance to young patients undergoing orthodontic treatment under the NHS include the surroundings in which care is delivered, the manner in which the clinician communicates with them (including whether they are given the option for a parent to accompany them into the surgery) and the timing of appointments. The participants also discussed the information about treatment they received from their friends and family. Several admitted that they did not comply with advice given to them by their orthodontist on caring for their appliances. Bennett and Tulloch[7] gained similar information on poor compliance with diet restrictions and oral hygiene instructions.

This study has also shown that most patients undergo orthodontic treatment after a referral from their General Dental Practitioner. Other reasons given for undergoing treatment included wishing to improve their appearance and oral health and to stop being teased by their peers. These results are similar to those reported by Bennett and Tulloch.[7] However, they also concluded that parental influence was an important factor in encouraging patients to undergo treatment, along with the patient's own desire for straight teeth.

The participants in this study also discussed their experiences of living with braces. These findings are similar to those of O'Connor.[6] By contrast, participants in the study by Bennett and Tulloch[7] found their retainers more inconvenient than their braces. Problems with retainers were not discussed in our study because most of the subjects were under active treatment or had just had their braces removed.

The majority of participants in this study were satisfied with the outcome of their treatment, which is similar to the results of the Bennett *et al.*[12] and Bennett and Tulloch[7] studies. Some participants in the latter study complained about how they were treated as a person by their clinician and this issue was also identified in the study reported here. Bennett *et al.*[12] found that the parents also discussed the information received about treatment and their child's progress and the manner in which they were treated by the staff. In O'Connor's[6] study, the patients' recommendations at the end of treatment were for more accurate treatment timing estimates and discussion throughout treatment. The participants in our study felt that these were also important issues during orthodontic treatment.

The parents in the Bennett *et al.*[12] study suggested that at the end of treatment their children would have improved self-esteem, attractiveness and academic performance. From our qualitative research it is evident that patients also believe that the benefits of treatment will include improved appearance and self-confidence. Bennett *et al.*[12] concluded that parents were satisfied with the result of their child's orthodontic treatment but felt that the costs were too high. The issue of the cost of treatment was not discussed in our study, as all the patients included in the study were treated on the NHS. The participants in this study however, did discuss the high cost of oral hygiene aids.

Davies and Ware[16] suggested several attributes of healthcare that should be included within a satisfaction instrument. These attributes include: choice and continuity; communication; interpersonal aspects and technical quality of care. This qualitative study has identified issues of importance to orthodontic patients that can be categorized into the aforementioned attributes before the development of a patient-centred satisfaction survey.

Limitations of the study

The initial recruitment of participants to this study was disappointing and necessitated a change in the study protocol. Low recruitment rates are a well reported disadvantage of qualitative research[13] and may have arisen, in part, because the research team were not directly involved in the recruitment. In addition, there are significant pressures of schoolwork on adolescents, which may have affected recruitment to meetings arranged in the evenings.

To reduce the time required to participate in the study researchers arranged focus group meetings to be held after de-bond clinics and telephone interviews. The timing of these focus group meetings may however, have influenced the patients' level of satisfaction with the outcome of treatment. It is probable that the participants included in the latter focus group meetings would be more positive about their experiences of treatment as their appliances had just been removed than those surveyed mid-way through treatment.

For a patient to be interested in taking part in this research project they have to be prepared to devote their time to the study. Commonly, participants in qualitative research are either very happy or unhappy with their treatment and give polarized views. It is important to appreciate however, that the aim of qualitative research is to identify the full range of issues to participants. These should then be incorporated into a measure that can then be used to survey a larger and more representative sample.

Another potential source of bias in qualitative research is the interviewer. This was reduced by using a facilitator, who was not involved in the treatment of

the patients included in the study. To further reduce bias, the transcripts of the focus groups and interviews were independently analysed by two researchers, one of whom was non-clinical.

Strengths of the study

The appeal of qualitative research is that new, previously unidentified issues may be identified, allowing new theories to be formulated and tested. Using two data collection methods, interviews and focus groups, simultaneously allows researchers to triangulate the methods of data collection.[14] This is a widely adopted practice among qualitative researchers and implies that the results achieved will be of high quality.

Context of the study

In the UK orthodontic treatment under the NHS is provided in primary and secondary care settings. If the process and outcome of orthodontic treatment is related to the clinician providing the treatment then researchers need to be evaluating the perceptions of patients from both settings. There is some evidence that improving patient satisfaction may positively affect the outcome of their healthcare. Zimmerman[17] found that patient satisfaction influences both compliance and treatment quality. In orthodontics patient satisfaction is likely to be particularly important because their compliance is essential if treatment is to be completed successfully. There is also good evidence that patient satisfaction is important when practice-building.[12,18] The investigation of patients' views of their treatment has recently become very popular. Regardless of this there has been little attention paid to the development of tools which measure patients' perceptions of their orthodontic care in the UK.

Implications of the study

This study has identified the issues of importance to young patients undergoing orthodontic treatment under the NHS. This information can now be used to develop a patient-based measure to evaluate patient perceptions of the process of NHS orthodontic treatment. This questionnaire should then be piloted before such an audit or assessment is carried out. It is intended that this questionnaire should help clinicians improve their orthodontic patients' satisfaction with treatment.

Conclusion

- This qualitative research has identified issues that are important to adolescent orthodontic patients.
- These issues will be used to form the basis of a patient satisfaction questionnaire, which can be used to audit patients' perceptions of orthodontic treatment under the NHS.

Contributors

This work was supported funding from the British Orthodontic Society's Practitioner Group and the Orthodontic Specialist Group. Annalise McNair was responsible for study design, obtaining funding, recruitment of participants and data collection; analysis and interpretation; drafting and critical revision. Penny Gardiner was responsible for data analysis and interpretation and technical support. Alison Williams was responsible for study design, obtaining funding; logistic, administrative, and technical support and data interpretation; drafting, critical revision and final approval of the article. Jonathan Sandy was responsible for critical revision and final approval of the article. Sarah Ransome, Karen Drage, Amanda Smith, Jeremy Peak, Mark Forty, Peter Huntley and the Specialist Registrars in Orthodontics at Bristol Dental Hospital were responsible for recruitment of participants and data collection. Annalise McNair is the guarantor.

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