Title: Parents' perceptions of outcomes of orthodontic treatment in adolescent patients: a qualitative study

Short running title: Parental perspectives of outcomes of treatment

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SUMMARY

Background/Objectives: Recent years have seen increased research investigating treatment outcomes from a patient perspective. However, parental perceptions are also important, as parents provide useful feedback. There is general acceptance that patients, and their parents, seek treatment for reasons including improvements in aesthetics, function and quality of life. However, there is still little high quality evidence regarding how these are affected by treatment. This qualitative study explored parental perceptions of treatment outcomes.

Subjects and Methods: One-to-one semi-structured in-depth interviews were undertaken with parents of adolescent patients who had completed a course of fixed appliance treatment in order to ascertain how they felt about the outcomes of their child's treatment. Interviews were digitally recorded, transcribed verbatim and analysed using thematic analysis, through a framework method approach. A number of the parents interviewed were "paired" with the patients included in Part 1 of this study, thus allowing paired data to be considered. Due to the qualitative nature of this study, no statistical testing was undertaken.

Results: Twenty-two parents were interviewed. Thematic analysis identified 3 main themes, and associated subthemes, relating to outcomes of treatment: health-related behavioural change, dental health and psychosocial influences. The majority of parents discussed health-related behavioural changes, suggesting potential long-term benefits of treatment.

Limitations: Whilst the study involved a typical cohort of parents for the hospital where the study was undertaken, the results may not be generalisable to all orthodontic parents/patients.

Conclusions/Implications: Parents reported three key themes related to benefits of their child's orthodontic treatment and these provide valuable evidence for orthodontic treatment benefits.

INTRODUCTION

Recent years have seen an increase in research looking at treatment outcomes from the perspective of patients and their carers. There is general acceptance that patients, and their parents, are motivated to seek orthodontic treatment for reasons including improvements in aesthetics, function and quality of life (1-3). However, there is less evidence regarding the benefits of treatment and this is almost certainly due to the complexities of assessing these outcomes in a quantitative manner.

Psychosocial and quality of life outcomes have received significant interest in the literature (4-6), although the quality of published studies varies considerably with few high quality studies. Other potential outcomes have received less interest however. It is important to have a full understanding of the potential outcomes associated with treatment, and be able to provide evidence of all potential benefits and risks when discussing treatment options with patients and their parents.

Qualitative research methods are a relatively new concept in orthodontics. They allow a more in-depth investigation, and are ideally placed to obtain information that cannot always be answered using quantitative methods alone. Although there has been a drive to publish more patient centred research, assessing the parental perspective is also important as they provide feedback during and after treatment and play an important part in seeing those benefits which may occur. Within dentistry, parental perceptions of outcomes have been considered for several treatment modalities, including orthodontic treatment (7,8), orthognathic treatment (9), paediatric dentistry (10-12) and management of patients with fluorosis (13,14). However, most of the studies evaluating parental perceptions in the orthodontic literature have assessed perceptions during treatment rather than perceptions of the outcomes of treatment.

The aim of this qualitative study was therefore to investigate the outcomes associated with orthodontic treatment from the perspective of adolescent patients' parents/guardians. This study ran alongside a parallel study investigating orthodontic treatment outcomes from the

patient perspective (described in Part 1 (15)). It is hoped such a study will provide valuable information and a greater understanding of treatment outcomes, enabling clinicians to offer appropriate informed consent and provide patients and their parents with more realistic expectations prior to commencing treatment.

SUBJECTS AND METHODS

Research and development approval was obtained from the Research and Development Directorate from the Joint Research Office, UCLH Foundation Trust and ethical approval was obtained from London – Camden prior to commencing study recruitment. All participants completed written consent.

As described in Part 1 this was a qualitative study involving one-to-one, semi-structured in-depth interviews with parents/guardians of patients who had completed orthodontic treatment at the Eastman Dental Hospital, UCLH NHS Foundation Trust. The main principles behind qualitative research methodology, specifically with respect to sample size selection and analysis, are covered in detail in Part 1 of the paper and should be referred to for further details.

Parents were included in the study if they had a child aged 13-18 years (inclusive) who had completed fixed appliance orthodontic treatment. All of the patients were eligible for treatment under the National Health Service, based on the Index of Orthodontic Treatment Need (IOTN). Parents of children with craniofacial syndromes, malocclusions due to trauma or pathology and those with significant restorative implications were excluded. Participants were selected using a purposive sampling technique based on age, gender and ethnicity of the patient, the patient's malocclusion, duration after removal of orthodontic appliance and also the gender of the parent being interviewed. This technique ensured that participants were selected to represent key characteristics of interest to the study and enhanced the generalisability of the results, whilst acknowledging there is debate surrounding generalisability of qualitative data.

All interviews were undertaken by two members of the research team (NAQ and RS) in a private area away from the clinic. The interviews followed a topic guide which was developed specifically for this study, and was updated as new topics arose during the interviews. In keeping with qualitative methodology, no sample size calculation was undertaken and no statistical testing was undertaken. Interviews were conducted until no new themes were arising, a point at which “theoretical saturation” is sometimes said to have been achieved. It is important to note that qualitative samples are frequently small in size and this does not detract from the quality of the data obtained, an opinion needs to appear only once for it to be an important finding.

Interviews were digitally recorded and transcribed verbatim immediately afterwards. Data was then analysed using a content thematic analysis using a framework approach (16) and was undertaken by all three researchers (NAQ, RS and SJC) to ensure consistency. Major themes and subthemes were identified and this classification was agreed by all members of the research team.

Unfortunately the practicalities of the interviews meant it was not feasible for all patient/parent data to be paired but where paired patients/parents were interviewed, they were interviewed individually rather than together in order to reduce the risk of bias.

RESULTS

There were 22 parent participants in this study, three fathers and nineteen mothers. Of these, eleven were paired with patients who also underwent interviews (as described in Part 1 (15)). The majority of the patients were Caucasian (19 out of 22); 9 patients were male and 13 were female. The patients had a variety of malocclusions, with all skeletal classifications represented, and also hypodontia and impacted canines. The range of time post-debond was from one week to 20 months, a broad time period which was selected deliberately in order to provide subjective opinions over the typical post-debond follow-up period in the department. It

is difficult to know at exactly what stage parents identify the benefits of their child's treatment. The majority of parents in this study were interviewed at least three months after their child's appliances were removed, but a small number of participants were interviewed earlier or later in the process in order to avoid potentially missing any useful information. The interviews lasted up to 33 minutes in duration.

Three main themes were identified relating to outcomes of orthodontic treatment. These were the same as the themes in Part 1 of the study, although the subthemes varied. The three themes were: health-related behavioural change, dental health and psychosocial influences (Table 1).

[Insert table 1 here]

The themes and subthemes are discussed using examples of direct quotes from the transcripts, with participant numbers, parent gender and line numbers from the transcripts written alongside each quote. In keeping with the reporting of qualitative data, where a comment needs to occur only once to be an important part of the findings, numbers of respondents who made specific comments are not included.

Theme 1: Health-related behavioural change

Improved focus on oral hygiene

The majority of parents discussed their child having an improved focus on their oral hygiene as a result of orthodontic treatment. Participants described how they felt that the orthodontic treatment had improved their child's dental health awareness generally and an enhanced focus on oral hygiene was discussed in detail.

> *"The other major benefit is her better oral hygiene and that should be long-term as well"*
> **(P9, father; 391-392)**

Improved diet

As well as an improved focus on oral hygiene, participants discussed improved dietary habits following completion of treatment, including a reduction in intake of sweets, chocolates and fizzy drinks. Parents also described an improved awareness of the impact of diet on oral health.

> *"I think he's more aware of what he can eat, what is good for him and what is not good for him"* (**P2, mother; 124-125)**

Habit cessation

One parent discussed habit cessation as one of the important things their child had gained from treatment, this included cessation of thumb sucking as well as nail biting.

> *"Before...he used to suck his thumb so a lady here stopped him from sucking his thumb...he used to bite his nails as well, so she stopped all that"*
>
> **(P5 mother; 330-332)**

Theme 2: Dental health

Improved aesthetics

Several parents commented on their child's improved dental appearance following completion of treatment and this generally included comments about improved alignment of the teeth.

> *"Her teeth look great and the alignment looks good, they look as though they're in the right position"* **(P9, father; 197-198)**

Improved function

Some parents commented on their child's improved ability to eat and chew food, including one parent who thought that correcting the overbite had helped with this.

> *"As a parent I think it's important because chewing food properly is very important…the first digestion is in the mouth, so it's important, teeth are important first of all for that. Treatment has helped with that"*
>
> **(P12, mother; 282-285)**

Reduced risk of trauma

A number of parents whose children initially presented with Class II division 1 malocclusions said they had sought treatment due to concerns regarding an increased risk of trauma; these parents also discussed how they felt this risk had reduced following the completion of orthodontic treatment.

> *"The teeth are safely inside…they were sticking out at an angle before which...it would be easy to catch it"* **(P8, mother; 249-250)**

Avoidance of more complex treatment

A small number of parents discussed the avoidance of more complex dental treatment as a positive outcome. This included alignment of an impacted canine, possible avoidance of orthognathic surgery in a Class III patient who underwent camouflage treatment and closure of hypodontia spaces avoiding the need for future prosthetic replacement.

> *"The intervention seems to have meant that she doesn't have to consider the [orthognathic] surgery"* **(P9, father; 255-256)**

Future dental health benefits

This was a subtheme which received a large amount of discussion and some of the future dental health benefits which were discussed included management of ectopic canines and correction of dental crowding.

> *"…to get that tooth corrected because if we left it there they told us it could have damaged the roots of the other teeth, that was not an option"* **(P12, mother; 171-173)**

Making adjunctive treatment possible

One parent discussed how orthodontic treatment had enabled future prosthetic replacement of a lower incisor that was previously avulsed where the position of the teeth previously had precluded that.

> *"I'm not sure because the gap was a lot wider, so I don't know if that would have been possible if they hadn't straightened it and, at the same time, closing up some of the gap"* **(P2, mother; 194-96)**

Theme 3: Psychosocial influences

Self-image and perceptions of self

Parents discussed the value of having nice teeth and how this was considered to be important in how their child perceived themselves. With regard to self-image, three broad areas were identified: smiling more following treatment, smiling when having photographs taken and looking at their teeth/smile in the mirror. Parents reported that their children smiled more after treatment and the parents appeared to associate this with increased happiness.

> *"Now she smiles naturally, she just smiles, you know, and before I could feel some hesitation when the camera was on her"* **(P3, father; 126-127)**

Self-confidence

All but one parent discussed their child's improved self-confidence as a positive outcome of orthodontic treatment. This was related to various aspects of life including confidence when smiling, appearance and social interactions, confidence at school, and confidence for the future in situations such as interviews for higher education and as part of working life.

> *"Probably confidence more in her appearance and everything like that and yeah, probably it's built her confidence up I would say"* **(P8, mother; 197-198)**

Social and personal interactions

Several parents observed that socialising appeared to have become easier as a result of treatment, whether that be with peers or family and friends. Many parents also discussed how

first impressions were important, and they felt that the results of the orthodontic treatment would have a positive impact in terms of their child meeting new people, going to college/university and job interviews.

> *"In the whole sort of wider circle like socially, obviously the way we come across in our appearance influences how people take you as it were, so hopefully that will help her in the long run"* **(P17, mother; 297-299)**

Social norms and acceptance

Participants discussed the importance of appearing "normal" and being accepted in society, and how they felt that their child having attractive straight teeth would help with this.

> ***"****It all boils down to acceptance, being accepted as part of a group"* **(P17, mother; 388-389)**

Cessation of teasing/bullying

A small number of parents discussed teasing/bullying as a pre-treatment concern and a reason for seeking treatment. After treatment, these parents all reported cessation of the teasing/bullying and perceived that as an extremely important outcome.

> *"No, no, it hasn't continued"* (when asked if the teasing comments had continued after completion of treatment) **(P19, mother; 362)**

Potential prevention of future psychological problems

Parents discussed that correction of their child's malocclusion was carried out at a crucial age and this may have prevented future psychosocial problems such as self-consciousness associated with their teeth.

> *"I know she got it sorted at a crucial time but just in time before those things might have set in and become a problem and might have turned into some sort of mental health or issues"* **(P8, mother; 262-264)**

Results for paired patients-parents

Eleven sets of paired patient/ parent data were obtained; this generated vast amounts of data, hence the decision to present results for 4 patient/ parent pairings only (Table 2). In general, many similarities were noted between those aspects which the patients and parents discussed during the interviews. However, some important differences were also noted. For example for Patient/Parent Pair 2, the parent had an in-depth discussion regarding the benefits of enhanced oral hygiene and diet but the patient did not consider these areas. For Pair 2 in the dental health theme, the patient discussed how attending for orthodontic treatment had resolved her fear of dentists but this was not raised in the parent interview, so may have been something the child had not actually discussed with the parent.

For the psychosocial theme, all patients and parents discussed positive psychosocial impacts but there were some subtle differences between parents and patients, for example in Pair 4 the parent discussed the importance of “fitting in” but this was not raised at all in the patient interview. The complementary nature of these comments will be discussed further in the next section.

[Insert table 2 here]

DISCUSSION

This study has a number of strengths. Two researchers performed all of the interviews, ensuring consistency throughout the process, and all interviews were undertaken in a private room away from the clinical area which prevented disturbance during the interview process and put participants at ease. The cohort of parents involved also had children with a range of ages and malocclusions, and were felt to be a good representation of the diverse nature of the patients seen in the Orthodontic Department at the Eastman Dental Hospital, UCLH NHS Foundation Trust. However, the issues of external validity and generalisability in qualitative research do mean that the results of this study may only be applicable to the cohort with whom

the research was undertaken. There is debate regarding generalisation in qualitative research and whether wider inferences can be drawn, but the results of this study do provide an important basis from which to undertake further work in this area.

The analysis used in this study was a thematic framework approach which resulted in three main themes. A key strength of the study is that the classification of themes was by all three members of the research team and therefore has enhanced strength. Initially there were no questions related to changes in oral hygiene behaviour and changes in diet in the topic guide, however this topic was discussed in detail during the first interview and was therefore added to the topic guide and was a recurring theme thereafter. It was an area which parents felt strongly about and they clearly believed that this was a major benefit of treatment, both in the short term and longer term. The fact that this study highlights the perceived health benefits in this regard is important for the orthodontic profession, particularly when there is currently a low level of evidence for the health benefits of orthodontic treatment (5). A small number of previous studies have found that oral hygiene improved after orthodontic treatment (17), which is in agreement with the findings of this study. It is, however, important to highlight that whilst the majority of parents felt their child had improved oral hygiene as a result of treatment, this does not necessarily equate to better clinical outcomes. This would however be an interesting area to explore in future longitudinal research.

It is important for health professionals to provide accurate and evidence-based information about both the risks and benefits of treatment (18,19). In light of the findings in this study, it would seem reasonable to consider discussing the improved focus on oral hygiene, diet and general dental health awareness with patients/parents as potential benefits of orthodontic treatment.

The dental health theme highlighted some outcomes which have previously been discussed in the literature, such as improved dental appearance. However, other dental health benefits

which parents felt were important, including improved mastication, reducing the risk of trauma and avoidance of more complex dental treatment in the future, have perhaps not been discussed to a great extent. The current findings provide evidence that parents value these potential dental health improvements.

The results also demonstrated that, from the perspective of parents, orthodontic treatment has positive psychosocial benefits, including an improvement in self-confidence, and this was discussed by all but one of the parents. A previous qualitative study similarly reported improved appearance and self-confidence as benefits of treatment (20). In light of this, clinicians should consider discussing improved self-confidence as a potential benefit of treatment.

Parents considered that having straight teeth and a nice smile were important in terms of first impressions, particularly for their child's future, for example at university and job interviews. The literature reports that individuals do make judgements about social and intellectual ability based on facial appearance and attractiveness, including the appearance of the mouth and teeth (21,22). There is also research to show that attractive children are judged, and subsequently treated more positively, than less attractive children (23). This may be another reason why parents felt this was an important aspect of treatment outcome.

Several parents discussed the importance of treatment outcomes being long-term and it was even described as a "*life investment*". Again, this has not been discussed to any great extent in the orthodontic literature, however some benefits such as improved dental appearance and ease of maintaining oral hygiene have been described as being long-term (5,17). These potential advantages may therefore be discussed with patients and parents prior to them embarking on a course of treatment.

Two of the three themes (dental health and psychosocial health) that emerged from this research fit well with the quality of life model (24). These findings therefore also support the quality of life benefits of orthodontic treatment.

For the paired datasets, it was interesting to assess the similarities and differences between what patients and parents said regarding the outcomes of orthodontic treatment. There were many similarities between the patient and parent interviews and they often reinforced what one another had said, despite not being together when being interviewed. However, there were some areas where either patient or parent made a comment but the other did not; this may be because of genuine differences in opinions, the patient or the parent may have greater insight, or there may be genuine differences in recall potential. Although 11 paired datasets is a small sample, it was still possible to identify subtle differences between patient and parent interviews and therefore to see the benefits of including both patient and parent opinions in a study of this type.

There has been a concerted move in recent years to include patient centred outcomes in dental research but this research data has demonstrated that parents can also provide valuable information and may provide a complementary view to what patients say. There are several possible reasons for this. The child may not have the vocabulary or ability to express their views, or they may not have the insight to see the impact of their treatment at that particular timepoint. A previous study reported that children aged six years have the language capability to be interviewed (25), however, it is important to recognise that this does not necessarily mean the child would feel comfortable in such an environment and therefore may not discuss certain issues that a parent might raise, for example teasing/bullying or something else of a more personal nature. Although not in the remit of this current study, it would be interesting to investigate whether there are differences in reporting outcomes if both patients and parents are interviewed together. This is perhaps something that could be considered in the future.

It is important to highlight that the patients in this study were aged between 13 and 18 years (inclusive) and it is impossible to know whether some of the outcomes of treatment, in particular those related to improved self-confidence, social interactions and health-related behavioural changes, were as a result of the orthodontic treatment, were due to patient maturation or were perhaps a combination of the two. This should be borne in mind when considering the findings. The interaction between the patient, the parent and the whole orthodontic team may also have a positive influence in terms of how the patient perceives healthcare intervention and this could impact on the outcomes of treatment, as well as the actual treatment itself.

CONCLUSIONS

Parents in this study reported three main benefits of their child's orthodontic treatment: health-related behavioural change, dental health and psychosocial influences. This supported the themes derived from the patient interviews.

The theme associated with health-related behavioural change was discussed by almost all of the parents, indicating the potential importance of this outcome in both the short and longer term. The majority of parents also reported improved psychosocial outcomes including improved self-confidence, social and personal interactions, and the implications for this on future career prospects.

Comparison of the paired patient-parent data demonstrated that parents of adolescent patients who have completed orthodontic treatment provided valuable information regarding the outcomes of treatment. Whilst patients and parents reported similar outcomes, some differences were also noted. Therefore, there appears to be a benefit to interviewing both patients and parents in this regard.

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CONFLICT OF INTEREST STATEMENT

There are no conflicts of interest.

REFERENCES

1. Fleming, P.S., Proczek, K. and DiBiase, A.T. (2008) I want braces: factors motivating patients and their parents to seek orthodontic treatment. *Community Dental Health*, 25, 166–169.
2. Samsonyanová, L. and Broukal, Z. (2014) A systematic review of individual motivational factors in orthodontic treatment: facial attractiveness as the main motivational factor in orthodontic treatment. *International Journal of Dentistry*, 2014, 938274.
3. Davis, B.B., Bayirli, B., Ramsay, D.S., Turpin, D.L., Paige, A. and Riedy, C.A. (2015) “Why do you want your child to have braces?” Investigating the motivations of Hispanic/Latino and white parents. *American Journal of Orthodontics and Dentofacial Orthopedics*, 148, 771-781.
4. Kenealy, P.M., Kingdon, A., Richmond, S. and Shaw, W.C. (2007) The Cardiff dental study: a 20-year critical evaluation of the psychological health gain from orthodontic treatment. *British Journal of Health Psychology*, 12, 17-49.
5. Benson, P.E., Javidi, H. and DiBiase, A.T. (2015) What is the value of orthodontic treatment? *British Dental Journal*, 218, 185-190.
6. Javidi, H., Vettore, M. and Benson, P.E. (2017) Does orthodontic treatment before the age of 18 years improve oral health-related quality of life? A systematic review and

meta-analysis. *American Journal of Orthodontics and Dentofacial Orthopedics*, 151, 644-655.

7. Maxfield, B.J., Hamdan, A.M., Tüfekçi, E., Shroff, B., Best, A.M. and Lindauer, S.J. (2012) Development of white spot lesions during orthodontic treatment: perceptions of patients, parents, orthodontists, and general dentists. *American Journal of Orthodontics and Dentofacial Orthopedics*, 141, 337-344.
8. Abreu, L.G., Melgaço, C.A., Abreu, M.H., Lages, E.M. and Paiva, S.M. (2015) Agreement between adolescents and parents or caregivers in rating adolescents' quality of life during orthodontic treatment. *American Journal of Orthodontics and Dentofacial Orthopedics*, 148, 1036-1042.
9. Derwent, S.K., Hunt, N.P. and Cunningham, S.J. (2001) A comparison of parents' and patients' views of orthognathic treatment. *International Journal of Adult Orthodontics and Orthognathic Surgery*, 16, 171-178.
10. White, H., Lee, J.Y. and Vann, W.F. Jr. (2003) Parental evaluation of quality of life measures following pediatric dental treatment using general anesthesia. *Anesthesia Progress*, 50, 105-110.
11. Amin, M.S., Harrison, R.L. and Weinstein, P. (2006) A qualitative look at parents' experience of their child's dental general anaesthesia. *International Journal of Paediatric Dentistry*, 16, 309-319.
12. Tellez, M. and Kaur, S. (2013) Caregivers' satisfaction with pediatric dental care in a university clinical setting in North Philadelphia. *Journal of Dental Education*, 77, 1515-1520.
13. Shulman, J.D., Maupome, G., Clark, D.C. and Levy, S.M. (2004) Perceptions of desirable tooth color among parents, dentists and children. *Journal of the American Dental Association*, 135, 595-604.
14. Cannon, H.M., Broffitt, B., Levy, S.M. and Warren, J.J. (2010) Longitudinal changes in parental satisfaction: mixed dentition esthetics. *Journal of Dentistry for Children*, 77, 166-173.

15. AlQuraini, N., Shah, R., Cunningham, S.J. (2018) Perceptions of outcomes of orthodontic treatment in adolescent patients: a qualitative study. *European Journal of Orthodontics, _____*.
16. Ritchie, J., Spencer, L. (1994) Qualitative data analysis for applied policy research. *In: Analysing qualitative data. London: Routledge. (Editors: Bryman, A., Burgess, R.G.).*
17. Feliu, J.L. (1982) Long-term benefits of orthodontic treatment on oral hygiene. *American Journal of Orthodontics and Dentofacial Orthopedics*, 82, 473-477.
18. Mouradian, W.E., Omnell, M.L. and Williams, B. (1999) Ethics for orthodontists. *Angle Orthodontist*, 69, 295-299.
19. Burden, D.J. (2007) Oral health-related benefits of orthodontic treatment. *Seminars in Orthodontics*, 13, 76-80.
20. McNair, A., Gardiner, P., Sandy, J.R. and Williams, A.C. (2006) A qualitative study to develop a tool to examine patients' perceptions of NHS orthodontic treatment. *Journal of Orthodontics*, 33, 97-106.
21. Eagly, A.H. (1991) What is beautiful is good, but . . . : A meta-analytic review of research on the physical attractiveness stereotype. *Psychological Bulletin*, 110, 109–128.
22. Newton, J.T., Prabhu, N. and Robinson, P.G. (2003) The impact of dental appearance on the appraisal of personal characteristics. *International Journal of Prosthodontics*, 16, 429-434.
23. Langlois, J.H., Kalakanis, L., Rubenstein, A.J., Larson, A., Hallam, M. and Smoot, M. (2000) Maxims or myths of beauty? A meta-analytic and theoretical review. *Psychological Bulletin*, 126, 390-423.
24. Inglehart, M.R. and Bagramian, R.A. (2002) Oral health-related quality of life. *Chicago: Quintessence Publishing.*
25. Docherty, S. and Sandelowski, M. (1999) Interviewing children. *Research in Nursing and Health*, 22, 177-185.

TABLE LEGENDS

Table 1: Main themes and subthemes generated from the parent interviews

Table 2: Summary of the results from 4 paired patient/parent datasets

Main themes	Subthemes					
Health-related behavioural change	Improved focus on oral hygiene	Improved diet	Habit cessation			
Dental health	Improved aesthetics	Improved function	Reduced risk of trauma	Avoidance of more complex treatment	Future dental health benefits	Making adjunctive treatment possible
Psychosocial influences	Self-image and perceptions of self	Self-confidence	Social and personal interactions	Social norms and acceptance	Cessation of teasing/ bullying	Potential prevention of future psychological problems

Table 1: Main themes and subthemes generated from the parent interviews

	Main themes		
	Health-related behavioural change	**Dental health**	**Psychosocial influences**
Pair 1	**Patient and parent:** both discussed an improved focus on toothbrushing following completion of treatment.	**Patient and parent**: both reported a significant improvement in dental appearance.	**Patient and parent:** commented on the positive psychosocial impact of treatment, improved self-confidence related to smiling/social interactions, as well as acceptance in society. **Parent:** specifically discussed potential psychological impact if treatment had not been undertaken which the patient did not discuss in depth.
Pair 2	**Patient:** did not mention any health-related behavioural changes as a result of treatment, **Parent:** discussed that the patient was now meticulous with oral hygiene and diet.	**Patient and parent:** discussed that they were very satisfied with the result of the treatment in terms of dental aesthetics/ smile. **Patient:** discussed that attending regular appointments with the orthodontist had taken away her fear of the dentist. This was not discussed in the parent interview. **Parent:** The parent discussed avoiding the risks associated with leaving impacted canines, something not included in the patient interview.	**Patient and parent:** reported positive comments related to self-image and perceptions of self, improved self-confidence and the importance of this going into adulthood. **Parent:** reported that the patient's brother used to call her 'goofy' and thought that perhaps this did impact on her. The patient did not report any teasing or name calling pre-treatment.
Pair 3	**Patient and parent:** both noted that the patient was more conscious of maintaining good oral hygiene. **Parent**: felt the improvement was mainly due to regular reinforcement during treatment. **Patient**: thought that the increased awareness was partly due to regular reinforcement but also due to improved dental aesthetics post-treatment, which had increased their motivation.	**Parent:** in-depth discussion about the improvement in aesthetics and also functional improvements (better chewing). **Patient:** did discuss aesthetic changes but primarily related to the psychosocial effects of improved aesthetics, e.g. enhanced self-confidence. The patient did not report any functional changes.	**Patient and parent:** discussed positive psychosocial changes, including improved self-image, self-confidence and social interactions. **Parent:** discussed achieving "normality" post treatment, and although the patient mentioned that this had been one of their aims of treatment, they did not discuss whether it had been achieved.
Pair 4	**Patient:** discussed a significant improvement in oral hygiene awareness and felt more motivated due to the long course of treatment they had undergone, regular reinforcement/ monitoring, and better dental education. This was not discussed in the parent interview.	**Patient and parent**: both discussed improved aesthetics. The patient was enthusiastic regarding the aesthetic results, despite still awaiting prosthetic replacement of the upper lateral incisors. The parent was happy but also still concerned regarding the prosthetic replacements and the space created. The avoidance of complex restorative treatment after closure of lower hypodontia spaces was also felt to be a positive outcome for both interviewees. **Parent:** discussed an improvement in the bite but this was not reported by the patient.	**Patient and parent:** reported an improvement in self-image, which was closely linked to improved self-confidence and social interactions. **Patient**: felt that the improved aesthetics had helped them "fit in" in to their desired future career path. Her parent however, felt that this would improve more once prosthodontic treatment was complete.

Table 2: Summary of the results from 4 paired patient/parent datasets