# Seeking children's perspectives in the management of visible enamel defects

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**Aim.** To undertake a child-centred evaluation of treatment provision for visible enamel defects.

**Design.** Postal questionnaires, developed with children, were sent to 88 patients, aged 7–16 years, with visible enamel defects of permanent incisors and who had received microabrasion, with/without additional composite restoration at Sheffield Dental Hospital, UK. The questionnaires sought children's perceptions about their teeth before and after the intervention, as well as their evaluation of how they had been treated. Anonymised responses were graded using a 10 cm visual analogue scale (VAS) where a score of 10 indicated the most negative response, and zero the most positive response.

Introduction

Enamel defects are commonly seen in children throughout the world. In the UK, 34% of 12year-olds were recently found to have enamel defects affecting one or more of their permanent incisors<sup>1</sup>; however, in countries with fluoridated water programmes, up to 70% of young people may have enamel opacities<sup>2</sup>. Disturbance to enamel formation may stem from a variety of inherited or acquired conditions, which in turn, have a diversity of clinical presentations. Visible differences broadly include changes to enamel colour (brown/cream/ yellow/white opacities) or enamel structure (pits/grooves/post-eruptive breakdown). The most prevalent conditions seen in paediatric dentistry practice are molar incisor hypomineralisation, amelogenesis imperfecta, dental

Results. Sixty three questionnaires were returned (72% response). Prior to treatment, children reported high levels of worry (VAS = 6.8), embarrassment (VAS = 6.9) and a perception that their teeth looked yellow and discoloured (VAS = 7.3). Following treatment, children thought their teeth looked much better (VAS = 1.6), felt happier (VAS = 2.2) and more confident (VAS = 1.6). They also felt very positive about their clinical experiences, rating the staff as extremely friendly and kind (VAS = 0.4) and reporting that procedures were clearly explained (VAS = 0.6). Conclusions. Simple non-invasive dental treatment can have a positive effect on appearancerelated satisfaction. The use of child-centred approaches offers an invaluable insight into

fluorosis or localised defects arising from previous trauma or infection.

patient perspectives.

These visible differences to normal dental appearance may have a negative impact on the individual's self-worth and social interactions. Coffield and co-workers explored the psychosocial impact of amelogenesis imperfecta and found high levels of social avoidance and distress, particularly amongst adolescents<sup>3</sup>. There is now a wealth of evidence to support the association between a child's perception of their own attractiveness and global self-esteem<sup>4</sup>. Furthermore, a number of studies have shown that people with disturbances to tooth colour may actually be judged more negatively by their peers than those with a 'normal' dentition<sup>5,6</sup>.

A variety of treatment options have been described for the management of enamel defects in children and young people<sup>7–10</sup>. In this young patient group, the demand for cosmetic improvement has to be carefully balanced against the need for a minimally invasive and acceptable approach. To this end, the microabrasion technique, with or without

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additional composite restoration, has become universally recognised<sup>11</sup>. A small number of both qualitative and quantitative studies have confirmed the improvement in incisor aesthetics that can be achieved following microabrasion<sup>12,13</sup>; however, the views of the patients themselves have been largely overlooked.

The value of seeking children's opinions about their treatment experiences and outcomes is gaining increasing momentum in health care<sup>14</sup>. There is wider recognition that, as it is the child who receives treatment and lives with the consequences, their opinions are credible<sup>15</sup>. Indeed, there is now an expectation that health care services should actively listen to children, respect their views. and involve them in decision making and service evaluation<sup>16</sup>. Traditionally, dental satisfaction and service evaluation studies have either been limited to adult populations or have predominantly sought children's views via a proxy, which is usually a parent $^{17-21}$ . Furthermore, the instruments which have been most commonly used in dental satisfaction studies, namely the Dental Visit Satisfaction Scale<sup>22</sup> and the Dental Satisfaction Questionnaire<sup>23</sup> have only been validated for use with adult populations. There is therefore both the opportunity and need for dental professionals to employ child-centred approaches to gain more meaningful insights into their young patients' experiences and evaluation of treatment. With this in mind, this study aimed to seek children's opinions about their discoloured permanent incisors, before and following cosmetic improvement. In addition, the study sought to measure children's satisfaction of the overall treatment experience.

# Material and methods

# Development of the questionnaire

The first step was to involve children in developing a specific questionnaire for the purposes of the study. An open-ended questionnaire was posted to 50 children, aged 7–16 years, who had previously received microabrasion treatment, with/without additional composite restorations, at the Charles Clifford Dental Hospital, Sheffield, UK. The questionnaire simply asked children to describe: (i) how they felt about their teeth before treatment; (ii) how they felt about their teeth after the treatment; (iii) what were the best things about the clinic, staff or treatment, and (iv) how their treatment or visit could have been improved?

Thirty-four replies were received, giving a response rate of 68%. Comments were collated and analysed to determine common themes. Prior to treatment, children most frequently reported being worried, embarrassed, teased at school and feeling that their teeth looked 'yellow.' The most commonly used words describe to children's feelings post-treatment included: being happy, more confident, and feeling that their teeth looked 'better'. The two main issues to emerge about treatment experience were the friendliness of the staff and how well things were explained. These child-generated words and views were then incorporated into a 10-item questionnaire. Simple written instructions invited respondents to rate their responses using a visual analogue scale. They did this by making a mark on a 10 cm line where 0 cm indicated the most positive score possible and 10 cm the most negative score. Participants were also asked to indicate their gender and age and to write any other comments about their teeth or overall treatment experience.

# Main study

The study constituted a service evaluation, thus approval was obtained from the Clinical Effectiveness Unit of the Sheffield Teaching Hospitals NHS Foundation Trust. In April 2008, the anonymous self-completion questionnaire was posted to a further 88 children who had undergone microabrasion with/ without composite restoration of their discoloured incisors in the paediatric dentistry clinic within the previous 12 months (Fig. 1). Patients were identified using a computerised hospital patient attendance database and were all aged between 7 and 16 years. A stamped self-addressed envelope was provided for the return of the completed questionnaire. A further questionnaire was sent to participants who did not respond within 2 months. One



Fig. 1. Localised enamel opacity upper left permanent central incisor before, and after, treatment.

investigator carried out all VAS measurements using a 10 cm ruler.

### Analysis

Data were entered into an electronic database (Statistical Package for Social Sciences, v14) and preliminary analysis revealed that VAS data were normally distributed. Therefore an independent *t*-test was used to determine whether there were any significant differences in mean VAS according to gender, where the significance level was set at P < 0.05.

Any additional comments made by the children were extracted and explored using a framework approach to the analysis of qualitative data. After initial familiarisation with the data, comments were grouped into themes, which provided insights into children's perspectives of their discoloured teeth and related treatment. Anonymous quotes were used to illustrate the key themes.

# Results

# Participants

A total of 63 completed questionnaires were returned, giving a response rate of 72%.

Participants had a mean age of 11.9 years (SD = 2.45, range = 7-16 years) and there were more girls (n = 36, 58%) than boys (n = 26, 42%). Just over half of the participants had received microabrasion prior to a composite restoration (n = 33, 53%), with fewer undergoing microabrasion alone (n =20, 32%) or a composite alone (n = 9, 15%). Children had received treatment to one or more of their upper and/or lower incisors for a variety of enamel defects including: molar incisor hypomineralisation (n = 30, n = 30)48%); amelogenesis imperfecta (n = 11, 18%); fluorosis (n = 4, 7%) and localised incisor opacities of uncertain aetiology (n = 17, n)27%).

# Quantitative data

Figure 2 provides the results for the VAS data. Before treatment, children reported being very worried about their teeth with a mean VAS of 6.8 (SD = 3.3, range = 0–10). They were found to have similarly high levels of embarrassment (mean VAS = 6.9, SD = 3.2, range = 0–10) and a strong belief that their teeth looked yellow or discoloured (mean VAS = 7.3, SD = 2.8, range = 0.1–10). Just over half of the participants (n = 35, 56%) stated that they had been unhappy because of things other children had said about their teeth.

Following treatment, children were generally much more positive as evidenced by the low VAS scores. They assessed their teeth as looking much better (mean VAS = 1.6, SD = 1.5, range = 0-5.7). They also reported feeling happier (mean VAS = 2.2, SD = 2.4, range = 0-9.9) and more confident (mean VAS = 1.6, SD = 2.1, range = 0-7.6).

Feedback about the clinic and treatment received was particularly encouraging. Children rated the clinical environment as very friendly (mean VAS = 0.4, SD = 0.9, range = 0-5.5) and felt that staff had explained everything clearly to them (mean VAS = 0.6, SD = 1.1, range = 0-5.8).

The only significant difference between male and female participants related to the rating of how worried children were about their teeth, prior to treatment: girls were



**Fig. 2.** Mean scores from postal questionnaires (n = 63) using a visual analogue scale (VAS).

found to be significantly more worried than boys (P = 0.01, independent *t*-test).

## Qualitative data

Additional comments were provided by 43 (68%) of the participants. Careful review of all statements revealed three common themes: contribution to well-being; expectations, and communication between clinician and child.

*Well-being.* One of the themes was the perception that children may benefit from treatment in terms improvements in how they felt about themselves and how other people reacted to them.

'I cannot fault my treatment which has made me gain some confidence, which has helped me in this difficult year of exams' (girl, aged 16) 'I am a lot happier now, people don't pick on me' (girl, aged 10)

'After the treatment I now feel as if I can smile again' (boy, aged 16)

*Expectations*. A range of responses was described by patients of their expectations of treatment. Some children felt these had been adequately met whereas others felt their treatment had not produced the outcome they had anticipated. Children for whom their expectations were unmet, seemed to have been under the impression that their teeth would be 'perfect' after the interventions.

'I was looking forward for seeing my teeth completely white but they were not completely white. It looked better than it was but they should have said that it wasn't going to do all my teeth white' (boy, aged 14)

Interestingly, some children did demonstrate gratitude that an attempt had been made to improve their incisor aesthetics, despite it falling short of their expectations.

'The initial effect was very encouraging but over the months since my treatment the staining is returning and I am not as confident about the long term as I was last year. Thanks for trying though' (girl, aged 16)

*Communication between clinician and child.* A third theme was the way in which children were spoken to and involved in treatment decisions, by the dental team. There was a consensus that children valued this involvement.

'Everyone, especially (name) were very kind and willing to listen to my own opinion, which was much appreciated. I do not like going to the dentist that much but I was made to feel at ease' (girl, aged 16)

'The professor explained things well and was clear about what work would be done' (boy, aged 16) An appropriate level of communication was, however not always achieved.

'She said things in too much grown up language' (boy. Aged 10)

# Discussion

The key finding to emerge from this study was the negative psychosocial impact reported by some children with untreated visible enamel defects who were seen at the Dental Hospital. Over half of the children stated that they had been subject to unkind remarks about their teeth by their peers. A number of children described a reluctance to smile or a lack of confidence. In addition, it would appear that many children were actually 'worried' about the status of their teeth. To some extent this was not an unexpected finding: a previous study involving young people and adults with amelogenesis imperfecta was the first to describe negative impacts of an inherited dental condition on social interaction, anxiety, self-image, selfesteem and quality of life<sup>3</sup>. The same study also found that 93% of patients had experienced teasing about their teeth. Conversely, in populations with a high prevalence of mild enamel defects, such as dental fluorosis, there may be low social and psychological impacts<sup>2,24</sup>.

A 'nice' smile is highly valued in Western Society, with increasing public pursuit of well-aligned and white teeth. The provision of orthodontic treatment and 'cosmetic' dental therapies has to be justified however within a resource-limited public health service. To date, few studies have attempted to measure the benefit of aesthetic dental treatment, such as bleaching or veneers in terms of improving overall well-being<sup>25</sup>. There is, therefore, considerable need for innovative and robust research to support the wider benefits of these treatments. Furthermore, it is argued that such research should focus on children and adolescents, in view of the known impact of appearance-related concerns on social interactions and development in young populations<sup>4,26</sup>. Although, preliminary, this study has provided some indication that simple improvement in incisor aesthetics can have a positive effect on self-reported attributes such as confidence and happiness. Future research could involve administering measures of oral health related quality of life pre- and post-treatment to provide more conclusive evidence for the benefits of this treatment approach.

User-evaluation of health service performance is fundamental to a holistic assessment of quality of care. Managers and commissioners of health services are fully entitled to ask providers for evidence of effective service evaluation. In addition, it is well recognised that patient satisfaction is closely associated with increased treatment compliance and improved outcomes<sup>27</sup>. Unfortunately, there is a paucity of published satisfaction studies relating to children's dental services. Furthermore, these surveys have predominantly sought the opinions of parents/carers rather than those of children themselves<sup>17–20</sup>. One barrier to engaging children may be the lack of validated instruments to measure satisfaction. This study sought to involve children in determining which aspects of their treatment experience were important to them. There was a general consensus that kindness and friendliness of staff, and good communication were highly valued by participants. It was extremely gratifying to discover how positively these aspects were rated in this study. The high quality of care provided by a hospital paediatric dental service has thus been demonstrated by the present survey.

Although the study adopted a quantitative approach, using a structured questionnaire, there was scope for children to include additional comments. The results from the analysis of the qualitative date triangulated well with that of the quantitative data, particularly regarding the importance of characteristics of the clinician and their communication with patients. In addition, the comments also provided a valuable further insight in terms of expectations of treatment. It would appear that some children expected their teeth to be 'perfect' following microabrasion or composite restoration. This may not actually be attainable in young patients, where clinicians strive to avoid excessive enamel removal or the use of porcelain veneers. This limitation, however may not have been clearly relayed to the patients prior to treatment. Furthermore, it is possible that children may not feel confident enough to express disappointment with treatment results in the dental setting. In light of this important finding, clinicians may consider the use of photographs to show children the type of improvement that can be achieved for enamel defects, as well as inviting feedback after treatment and exploring further treatment options. Thus all parties would be clearer about expectations and what can realistically be achieved.

It is acknowledged that the young patients who took part in this service evaluation may not be representative of children with enamel defects. These patients were all referred specifically to a dental hospital for management of their discoloured incisors. Thus they may have a greater level of worry about their teeth, and a higher demand for treatment. Further research, involving qualitative approaches, such as focus groups or interviews, would allow for a deeper understanding of children's experiences of the management of enamel defects in both general dental practice and specialist settings. It is becoming increasingly important that treatments are justified in terms of patient benefit, and thus paediatric dentists should be more proactive in seeking feedback from children to safeguard and develop services.

# Conclusion

Visible enamel defects can have negative psychosocial impacts in some children; however simple treatment, using a combination of microabrasion and composite, can achieve positive self-assessment of confidence and happiness. Seeking the opinions of children and young people, using child-centred approaches, offers an invaluable and meaningful insight into their perspective of dental conditions and related treatments.

#### What this paper adds

- This paper provides a new insight into how visible enamel defects can affect children.
- It provides evidence for the psychosocial benefit of simple and non-invasive aesthetic treatments in the management of incisor opacities.
- The need for both quantitative and qualitative approaches for evaluation of patient satisfaction is demonstrated.

#### Why this paper is important to paediatric dentists

- It highlights the value of using child-centred instruments in everyday clinical practice to gain a more meaningful insight into young people's experiences of dental conditions and related treatment.
- It reinforces the importance of good communication, particularly in terms of expected treatment outcomes, when providing cosmetic dental treatment for young people.

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