Perceptions of White Spot Lesions and the Impact on young people: a mixed-methods study protocol

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Abstract

Background: White spot lesions (WSLs) are white marks that can form on teeth during orthodontic treatment with fixed appliances (FA) and become apparent once they are removed. About half of people who have FA treatment get WSLs. They are usually caused by poor tooth-brushing around the brace.
Several studies explore the prevention and/or treatment of WSL. However, there remain uncertainties about what young people and their parents/guardians know or feel about WSL. A Cochrane review concluded that patient-reported outcomes have been overlooked in WSL prevention studies.

Methods: This protocol describes a mixed-methods study that aims to explore young people's and their parents/ guardians' perceptions, attitudes, and feelings towards WSLs. Participants will be recruited from children aged 11-15, undergoing orthodontic treatment at Liverpool University Dental Hospital and their parents/guardians. Part 1 (quantitative) will use a questionnaire and images of pre-treatment malocclusions and post-orthodontic WSLs of varying severity (mild, moderate, severe). Part 2 (qualitative) will involve one-to-one, semi-structured interviews, using open-ended questions with young people and their parents/ guardians.
A sample size of 200 survey respondents for Part 1 and 30 interviewees for Part 2 will be undertaken. The responses for the questionnaire use a Likert scale with the option of free text comments. The qualitative research will be analysed using a modified framework analysis approach; the outcomes will be presented as themes.
Discussion: WSLs can be highly visible when smiling or speaking. Aesthetic defects, caused by WSLs, may expose young people to oral health related stigma and discrimination e.g., bullying or teasing and impact on self-esteem. WSLs may also have cost consequences for patients and NHS dental services, for example, the costs of professionally applied fluoride, restorations, and their maintenance. This study is important for understanding the impact WSLs have on oral health-related quality of life and the decision making of young people and their parents/ guardians.

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Keywords: Orthodontics, White Spot Lesions, Fixed appliances, mixed-methods, protocol

Background

White spot lesions (WSL) are enamel defects that commonly appear as opaque, white, matt, chalky or brown spots on teeth and can form around fixed orthodontic appliances (FA) Approximately half of patients undergoing orthodontic treatment with FA will experience WSL (1). WSL are caused by the combination of poor tooth-brushing around the brackets of fixed appliances and frequent sugar/acidic attacks. A susceptible tooth surface exposed to bacterial plaque accumulation and fermentable carbohydrates over a sufficient period of time, will suffer demineralisation and potentially develop WSL (2).

WSL can reduce the quality and amount of enamel, leaving teeth vulnerable to damage by dental caries, thereby diminishing their lifetime prognosis (3). Anterior surfaces on maxillary teeth are frequently affected (36%), thus WSL may be highly visible when smiling or speaking (4).

Aesthetic defects, caused by WSL, may expose young people to oral health related stigma and discrimination e.g., bullying or teasing and impacts to self-esteem (5). Low self-esteem is associated with lower grades at school, depression, and impaired social interaction with others (5). Visible differences in dento-facial features such as tooth shape or colour have been implicated as a driver for self-harm in teenagers (6). Therefore, not only is this study important for preventing WSL, but for understanding the impact of WSL on oral health-related quality of life of young people.

There is evidence to suggest that fluoride can prevent and reduce WSL by enhancing remineralization. Fluoride can be applied using various vehicles e.g., toothpaste, mouthwash, fluoride varnish and Casein Phosphopeptides-Amorphous Calcium Phosphate.

At the time of writing, there is insufficient evidence to recommend the professional application of fluoride varnish (7700 or 10,000 parts per million (ppm)) for the prevention of WSL (7). High strength fluoride toothpaste (5000ppm) may be advantageous for preventing WSL when compared with standard concentrations of fluoride toothpaste; however, these prescription-only toothpastes are available from the age of 16 and many patients who have orthodontic treatment with FA are often below this age (7).

Nonetheless, the most crucial aspect of WSL management is motivating patients to adhere to effective oral hygiene measures and non-cariogenic dietary advice (8). Clinicians believe the responsibility for preventing WSL lies with the patient and that their post-orthodontic outcomes are determined by their willingness to engage with the oral hygiene advice discussed at the commencement of treatment (9). However, half of patients do not follow oral hygiene advice (10). Visual aids have been found to be helpful to demonstrate the risks of WSL and to motivate young people to maintain their oral hygiene (11). A further challenge is presented by parents who are reluctant to assume responsibility for their child's oral hygiene practices (10).

Patient-reported outcomes have been overlooked in all studies exploring the efficacy of different interventions to prevent WSL in patients undergoing fixed orthodontic treatment (7). Patient perceptions of WSL can provide insights into motivators and barriers to maintaining good oral health during orthodontic treatment. Additionally, WSL may also have cost consequences for patient and NHS dental services. For example, the costs of professionally applied fluoride, cosmetic restorations, and their long-term maintenance.

WSL pose an important risk for patients when considering whether to opt for orthodontic treatment. At present, clinicians are negotiating these conversations without full evidence-based understanding of patient perceptions towards WSL.

What remains unknown, and is the focus of our proposed study, is patients' and parents'

perceptions of WSL including the impact of WSL on the acceptability of orthodontic outcomes (7). Therefore, this study offers the opportunity for researchers to identify ways to communicate WSL risk to patients and their parents and to understand how best to motivate good oral hygiene and dietary practices during orthodontic treatment with FA.

Reporting

Due to the absence of a well-recognised mixed methods reporting tool we have chosen to use a combination of the Strengthening the Reporting of Observational Studies in Epidemiology (12), and Standards for Reporting Qualitative Research (13). Using these two tools in combination, enables transparent and consistent reporting of each aspect of the study.

Aims

The aim of this study is to explore young people's and parents/guardians' perceptions of and attitudes towards WSL.

Objectives

- To create and use a questionnaire that assesses the perceptions and impact of WSL on young people undergoing treatment with fixed orthodontic appliance and their parents/guardians. See Appendix 1.
- To investigate the impact of WSL formation on young people undergoing fixed brace treatment and their parents/guardians. One-to-one interviews and visual images of malocclusions and WSL of varying severity will be used to address this objective. See Appendix 2.

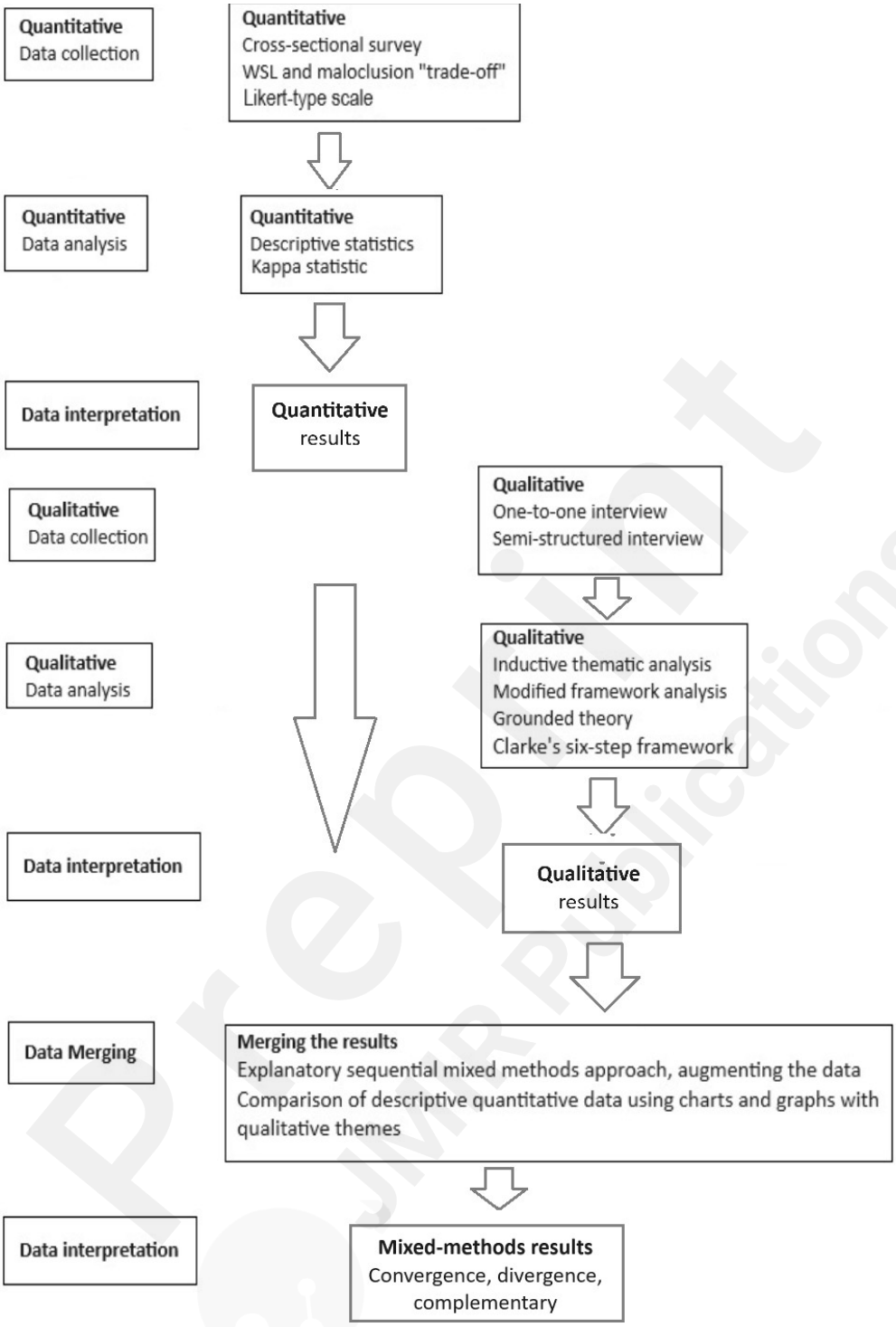
Study Design

Ethical approval will be sought via the Integrated Research Approval System (number). Sponsorship will be sort from Liverpool University Hospitals NHS Foundation Trust (number). Ethical and Sponsor approvals will be obtained prior to study commencement.

The study authors worked alongside a Patient and Public involvement (PPI) group to develop the research question, study protocol and participant resources.

The purpose of the mixed-methods study design is to provide enriched data by augmenting the quantitative findings with qualitative interviews. An explanatory sequential mixed methods approach will be used, whereby the qualitative data will expand on the understanding gained from the questionnaire. (14). The diagram below (Figure 1) illustrates the different parts of the study and at what point the mixing of the data will occur. The quantitative and qualitative parts of the research will be analysed, for convergent and divergent data interpretation of the mixed-methods research that compares both datasets.

Figure 1. Flowchart of mixed-methods design



The study has two parts that will be undertaken sequentially:

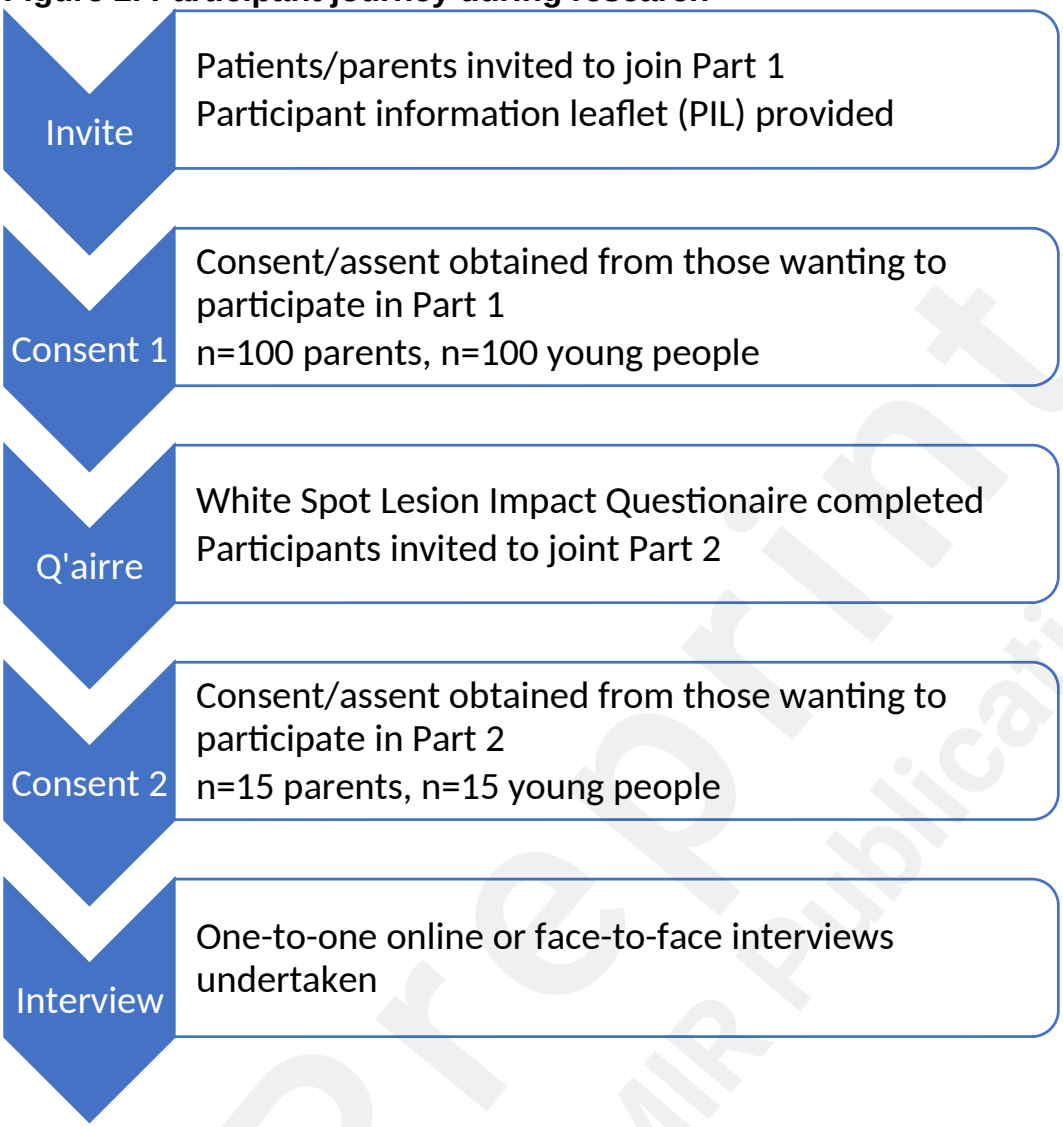
1. Quantitative data, from a questionnaire, will be collected and analysed. See Appendix 1.

2. Qualitative data, from one-to-one interviews, will be collected to explore the findings from the questionnaire in more detail. See Appendix 2.

The integration of the mixed-methods data will take place in the results section (14).

A summary of the participant flow is illustrated in Figure 2:

Figure 2. Participant journey during research



Inclusion Criteria

- Young people aged 11-15 years inclusive who are considering or undergoing fixed orthodontic treatment at Liverpool University Dental Hospital
- Parent/guardian or person who has parental responsibility for a young person considering or undergoing fixed orthodontic treatment at Liverpool University Dental Hospital

Exclusion Criteria

Young people with:

- Learning difficulties which preclude them from answering the questionnaire or making an active contribution to interviews
- Cranio-facial or other syndromes
- Non-orthodontic WSL

Recruitment

A pragmatic estimation of a sample size of 200 survey respondents (100 patients and 100 parents) will be sufficient to address the aims and objectives of the first part of the study. The survey respondents will be recruited by convenience sampling methods from a pool of patients attending the orthodontic clinic at Liverpool University Dental Hospital. The study is purely descriptive, so a power analysis is not required. Eligible participants will be invited to take part in the research by a member of the research team (AH). Eligible young people and their parents/guardians will be invited to complete the questionnaire on the same day as they attend for their orthodontic appointment.

Data Collection

Patients willing to take part in the study will be provided with a password protected tablet displaying an information leaflet about the questionnaire. The information can also be accessed using their own device, via a QR code, or in paper format. For those willing to participate, written assent will be obtained from the participants under the age of 16 years and written consent from their parent/guardian.

The 5-point Likert-type scale will be used to assess participants' perceptions of WSL. Although there are limited studies assessing young people’s/parent’s perception of WSL in orthodontics using a Likert-type scale, other published studies in orthodontics have used similar approaches and sample sizes to those proposed in our protocol (17). Close-ended questions have been used to elicit higher response from participants (see supplementary material, item 1.) (15). Participants will also be asked to rate a selection of images of WSL

of varying levels of severity before and after treatment.

Data Analysis

Descriptive statistics will be used to provide a summary about the quantitative research, so no statistical or power analysis is required. Descriptive statistics will be summarised using simple quantitative measures like averages, percentages and with visual summaries such as charts and graphs created on Excel. We will also use Kappa statistics to measure the degree of agreement between participants and the ratings of the images when the 5-point Likert scale is used in the questionnaire.

Qualitative research

Recruitment and sampling

In the first instance, 30 interviews with 15 young people and 15 parents/guardians will be undertaken. This sample size is comparable with the sample sizes of similar orthodontic studies (19). Where possible, the main researcher (AH) will avoid recruitment of participants who are directly under his clinical care.

Purposive sampling will be used to ensure the study recruits a sample with heterogeneous characteristics. Sampling will be based on age, gender, ethnicity, stage of treatment, Index of Orthodontic Treatment Need (IOTN), and condition of first molar teeth based on previous clinical records. See Table 2.

Patients who experience WSL have in the past been shown to have worse condition first molars; therefore, it would be useful to collect participant data from this demographic (16) as they are a higher risk group. The condition of first molars will be assessed using patient records/notes - participants will not be assessed by looking in the mouth or through taking radiographs specifically for this project. IOTN data will be collected as young people have a variety of malocclusions and complexities; having a higher IOTN may influence their perspective and the ‘trade-off’.

Table 2. Interview purposive sampling framework

Minimum 12 interview participants	Gender		Age (years)			Stage of treatment			Condition of first molar teeth	
	Female	Male	11-13	14-15	Adult (parent/ guardian)	Pre-treatment	Mid treatment	Post treatment	C/R*	S*
Fixed appliance only	Min 1	Min 1	Min 1	Min 1	Min 1	Min 1	Min 1	Min 1	Min 1	Min 1
Functional appliance first	Min 1	Min1	Min1	Min1	Min 1	Min 1	Min 1	Min 1	Min 1	Min 1

*C/R= Carious/Restored, S= Sound

Data collection

The parents/guardians and young people will be interviewed separately to ensure discussions are not influenced by each other. If required, a chaperone will be present for the young people. A semi-structured one-to-one interview process will enable the researcher to explore relevant topics raised by the participants.

An interview schedule has been devised to provide flexible direction, consistency and to probe all key topics sufficiently. The interview schedule may be adapted considering the findings of Part 1 of the study (see appendix 2.). Discussions will be online using MS Teams and will last for approximately 45-60 minutes. They will be audio recorded and transcribed verbatim. Interviews will continue until there are no recurring themes or patterns emerging from the data and thematic saturation has been achieved.

Data analysis

Data coding and themes of transcripts will be undertaken by AH using NVivo 12 (21). NVivo is a qualitative analysis software that enables researchers to view, categorise, analyse, and store qualitative data systematically. The transcripts and codes/themes generated will be sent to a second or third researcher to confirm reliability (JH or JD). The data will be analysed using deductive (from the questionnaire responses) and inductive thematic analysis in a modified framework analysis approach which incorporates aspects of grounded theory (17). The framework method will be used to analyse data from the interviews for themes. The analysis process will follow Clarke's six-step framework: Step 1: Familiarisation of the data, Step 2: Create codes, Step 3: generate themes, Step 4: Review themes, Step 5: Defining themes, Step 6: Write-up (14). Main themes and sub-themes will be developed iteratively alongside further data collection, with a search for confirming and disconfirming

cases, until data saturation is reached (18).

Integration- data analysis

Once both sets of data have been analysed, then the study will combine the two datasets and compare them for convergence or divergence, similar to another study previously published (19).

Data management

Participants will be assigned a pseudonymised participant ID. Any personal/identifiable information, required for the study and linking them to participant ID, will be kept in a separate location.

The questionnaire will be completed in a private room or surgery in the Liverpool University Dental Hospital using a password protected iPad. The questionnaire will be accessed using JISC Online Surveys through the University of Liverpool. Data will be transferred from the questionnaire using JISC and exported to Excel (Microsoft Corporation, 2018). The data will be saved on an NHS password protected computer. The iPad will be stored in a locked office. If participants choose, they can complete the questionnaire on paper, the data will then be transferred to Excel on an NHS password protected computer and the paper copies destroyed with confidential waste.

The interviews will take place using Microsoft Teams or in person and recorded using Microsoft Teams. External funding will be sought to complete the transcription using a university approved transcription service but if this is not successful then AH will complete the transcription or auto-transcription function used on MS Teams. Once transcribed, the audio-recording will be deleted.

Data will be retained for a maximum of 10 years and deleted thereafter. The study staff, involved with this study, will comply with the requirements of the General Data

Protection Regulations (GDPR) and the Data Protection Act 2018.

Discussion

The aims of orthodontic treatment are to improve the occlusion and appearance of teeth which has overall benefits to function, confidence, self-esteem, and quality of life (20, 21). Detecting WSL after removing fixed orthodontic appliances may detract from the benefits of orthodontic treatment. WSL are likely to have negative associations for people with anterior tooth discolouration, and they may experience unfavourable judgments of personality traits and characteristics, such as friendships, relationships, and career prospects (22).

WSL have implications for the consent process for orthodontic treatment. Although young people can understand risks, they can have false perceptions about them if they are not fully understood (23). Poor communication can lead to issues with consent and other negative outcomes like complaints and litigation (23).

This study has the potential to inform clinicians' communication with young people and their parents/guardians, about WSL. Furthermore, the study may help researchers to improve their understanding of what methods can help to inform young people of the potential consequences of WSL and to support WSL prevention.

Limitations

The study is only recruiting participants from one hospital in Liverpool, UK and there may be a difference if the young people and parents/guardians were to be recruited in primary care, another area of the UK and/or another country. Patients attending hospital orthodontic departments tend to have more complex treatment needs which might influence their perceived post-treatment satisfaction.

With all cross-sectional studies, there are limitations to questionnaires, as they collect data at a set timepoint therefore they are unable to establish cause and

effect. The participants who are likely to respond to the questionnaire are more likely to be young people and their parents/guardians who are interested in the project and may be more motivated to improve/maintain OH than those who do not volunteer to take part. Although it will be difficult to ensure all relevant groups in the population are included, the study will recruit a heterogeneous sample of participants with regards to age, gender, IOTN, condition of first molars and type of orthodontic treatment they are receiving. The study will identify participants from different cells of a sampling framework. See Table 2.

As a clinician/dentist (AH) will undertake the qualitative research, this increases the risk that the researcher could make assumptions about what the participants think/feel based on their professional experience. Parents/guardians may not want to feel blamed by health care professionals and avoid being responsible for the young person's poor oral hygiene practices. Participants may forget to recall information during the interview, and all participants can answer questions differently based on what they think the researcher would like to hear as the 'correct' answer rather than their own honest experience, especially if they are aware that the researcher is a clinician. As discussed, the study will confirm reliability between the respondents to the questionnaire. To aid transparency, if there is a disagreement in the interpretation of the qualitative data, the themes/codes will be sent to another researcher for secondary/tertiary analysis. Where possible the researcher (AH) will avoid recruiting patients directly under his care, as it may affect their responses and/or his questions due to prior knowledge of each other. The study will also promote reflexivity by a post interview debrief with participants and members of the research team. This will help to ensure that the study findings agree with the participant views, rather than any subjectivity or researcher bias.

Conclusions

This is a mixed methods study that aims to investigate the impact of WSL on young people, who are considering or undergoing orthodontic treatment with fixed appliances, and their parent/guardian, and to explore their perceptions, attitudes, and feelings towards WSL.

Declarations

Ethics approval and consent to participate: Ethical (IRAS) and Liverpool University Hospitals NHS Foundation sponsor/trust, approvals will be obtained prior to study commencement.

Consent for publication: Not applicable.

Availability of data and materials: By request.

Competing interests: Dr Harrison has been awarded funding from the British Orthodontic Society (BOS) for an RCT looking at two different clinical interventions for preventing WSL in young people with fixed orthodontic appliances. Dr Harrison is not receiving any reimbursements, fees, funding, or salary from the funding organization and will not, in any way, personally gain or lose financially from the publication of the manuscript.

Funding: The authors have applied for external funding for £7693.70 with FDS RCSEng – British Orthodontic Society (FDS-BOS) and the outcome will be made in the next few months. The funding is to provide vouchers for involvement of participants/PPI, printing, external transcription costs, and an iPad to assist with data collection. The external funding does not include the salary of staff or researchers.

Authors' contributions: Amaar Hassan, Jayne Harrison, Janine Yazdi-Doughty have all been involved in the conception and design of the work; drafting the manuscript and substantively revised it.

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Appendices

Appendix 1

Part 1 Questionnaire

9.4 QUESTIONNAIRE

WHITE SPOT LESION IMPACT QUESTIONNAIRE [YOUNG PEOPLE OR PARENTS/GUARDIANS]

Part 1 - Participant information

Question 1.	
What is your name?	

Question 2.	
What is your date of birth?	

Question 3.	
What is your parent/guardians or childs name?	

Question 3.	
With which gender do you identify?	o Male o Female o Other (please state) o I'd rather not say

Question 4.	
What is your ethnicity?	o White British o Any other white background o Indian, Pakistani or Bangladeshi o Asian o African o Caribbean o Arab/middle eastern o Mixed race (please state) o Rather not state o Other (please state)

Question 5.	
At what stage of treatment are you / your child?	o Thinking about having brace treatment. o Wearing a brace o Had brace taken off

Part 2 – Participant Questionnaire
PLEASE SELECT ONLY ONE OPTION THAT BEST DESCRIBES YOUR ANSWER

Question 1.	
Do you remember being told that **white marks could form** on teeth during brace treatment?	Please write any thoughts you have about this, below
o Yes o No o I'm not sure	

Question 2.	
What did you think of the conversation you had about white marks forming on teeth during brace treatment?	Please write any thoughts you have about this, below
o It was explained very well. o It could be explained better. o I was given some information, but it wasn't enough. o I wasn't given any information. o I'm not sure	

Question 3.	
Do you know why people get white marks on their teeth after brace treatment?	Please write any thoughts you have about this, below
o Not brushing properly. o Drinking acidic drinks (like fizzy drinks / fruit juice) o Eating sugary snacks o A mix of not brushing, eating sugary snacks and drinking acidic drinks o I'm not sure	

Question 4.	
Which problem bothers you the most after brace treatment?	Please write any thoughts you have about this, below
o Brown marks on front top teeth o White marks on front top teeth o Root shortening of teeth o Gum shrinkage (recession) o Teeth moving back to where they were before braces were fitted (relapse)	

Question 5.	
How likely do you think you/ your child will get white or brown marks on your/ their teeth	Please write any thoughts you have about this, below

o Very likely o Quite likely o Likely o Unlikely o Very unlikely	

Question 6.	
How worried are you about having white marks on your / your child's teeth after brace treatment?	Please write any thoughts you have about this, below
o Extremely worried o Quite worried o A little worried o OK o Not worried	

Question 7.	
How would you feel if you had marks on your teeth, at the end of treatment, like in the photo?	Please write any thoughts you have about this, below
o Very Happy o Happy o OK o Unhappy o Very Unhappy	

Question 8.	
How would you feel if you had teeth before (on the left) and after (on the right) after braces?	Please write any thoughts you have about this, below
o Very Happy o Happy o Ok o Unhappy o Very Unhappy	

Question 9.	
How would you feel if you had teeth before (on the left) and after (on the right) after braces?	Please write any thoughts you have about this, below
o Very Happy o Happy o Ok o Unhappy o Very Unhappy	

Question 10.	
How would you feel if you had teeth before (on the left) and after (on the right) after braces?	Please write any thoughts you have about this, below
o Very Happy o Happy o Ok o Unhappy o Very Unhappy	

Question 11.	
Rank in order what you think you or your child would be willing to do to prevent white/brown marks (1-5, 1= most preferred option, 5=least)	Please write any thoughts you have about this, below
☐ Rub a pea sized blob of toothpaste on my teeth every night before bed ☐ Visit the dentist every 3 months to place varnish during a dental check-up ☐ Let the orthodontist place a varnish on my teeth during my brace visits ☐ Rinse daily with mouthwash at a separate time to brushing. ☐ Spend time brushing teeth, cleaning in between teeth with bottle brushes and cut out sugary foods and drinks	

Question 12.	
How easy was it for you to understand this questionnaire?	Please write any thoughts you have about this, below
o Very easy o Easy o OK o Difficult o Very difficult	

Question 13.	
Do you feel the questionnaire asked questions about white spots, that were important to young people and parents / guardians, like you?	Please write any thoughts you have about this, below
o Yes o No o Not sure	

Question 14.	
Would you like the research team to contact you about the study findings?	o Yes o No

Question 1.	
Would you like to take part in the second part of the study which includes a chat?	o Yes o No

Part 3 – Participant contact details if you responded yes to Question 15 or 16. (separate questionnaire)

Question 1.	
What is your name?	

Question 2.	
What is your best contact number?	

Question 3.	
What is your email address (if you have one)?	

Appendix 2

Interview schedule

Introduction about the study and interview

Knowledge and beliefs of white spot lesions

What do you know about white marks on teeth after brace treatment (icebreaker question)

Do you/parent think you do enough to avoid getting white marks on your teeth after brace treatment?

Whose responsibility is it to avoid getting white marks on your teeth?

What can the dental team do to help you / your son/daughter avoid white spot lesions?

If you had white spot lesions on your teeth:

a) How do you think they would affect you?

b) How would manage them?

Tell me about a time you remember where white marks were mentioned as part of brace treatment?

a) How much of a problem do you think white spot lesions are to you during brace treatment?
b) How much of a problem do you think white spot lesions are to other people who have brace treatment?

What is the best way to discuss risks of white marks during brace treatment between clinician and patient/parent?

- Probes: how are white spot lesions formed? How much do you think white marks are likely to affect your brace treatment? How common do you think white marks are at the end of brace treatment? What sort of discussion did you have about white spot lesions before you started treatment? E.g., verbal/visual/once/repetitive? What other ways could staff motivate you/other patients to avoid white marks Whose responsibility (Parent/young person/clinician) is it to avoid/manage white spot lesions?

Attitudes towards WSL

To what degree do you think that these white marks would stop you from doing your usual activities like socialising, smiling etc.? (mild / mod / severe images)

How likely would you be to make a verbal/written complaint about white marks following brace treatment? (mild/mod/severe)

Would this change if the marks were brown?

How else might you be affected if you had white marks on your teeth?

In terms of overall risks of brace treatment, how much did white spot lesions bother you about brace treatment compared to other risks?

How common did you think about/worry about white marks during brace treatment?

Who do you think should pay the treatment of the white spots?

- Probes:
    - How did you feel about white spot lesions before this study?
    - Tell me about your worries of WSL from brace treatment.
    - How sever do you think the changes are? – mild/moderate/severe, brown/white/pitted/front teeth/back teeth/small/large?
    - Would have they stopped you from having brace treatment?
    - What differences do you think clinicians/patients/parents have about their views of white marks?
    - Do you think the term white spot lesions accurately describes the risk it poses?
    - Who do you think should pay for the treatment of these marks? – the patient / GDP / orthodontist?

Motivation towards avoiding WSL.

How did having brace treatment affect the way you look after your teeth (to YP)? (Rephrase depending at what stage the young person is in treatment pre/mid/post)

How does your son/daughter having brace treatment affect the way you helped with his/her brushing/mouth care of the young person because of brace treatment (to parent)? (Rephrase depending at what stage the young person is in treatment pre/mid/post)

How did knowing your son/daughter was having brace treatment affect the way you supported the oral health of your young person because of brace treatment (to parent)?

How you feel (patient/parent) if you were told that the young person's tooth brushing/ diet is not very good meaning that there is a higher chance of him/her developing/getting white marks?

Why do you think a young person will find it difficult to respond to warnings about oral health and risks of WSL?

a) what do you think clinicians can do to help avoid white marks for patients?
b) Who do you think is best at talking to patients about this – person doing the brace treatment / their general dentist / a dental nurse/hygienist?

What can clinicians do to help prevent people from getting white spots?'

(Same questions again but what can patients/parents do to avoid getting white marks)

How do you feel long brace treatment (2-3 years) affects a person's motivation to look after their teeth?

How would you feel about having brace treatment if you knew you would develop a severe white mark?

- Probes:
    - What are the barriers to avoiding WSL (patients' parents')?
    - Do you clean your teeth any differently since you started brace treatment? (e.g., ways to clean under brace/interdental brushes).

- Do you find that knowing about the risks of white marks, compared to other problems of brace treatment, has changed the way you looked after your teeth?
- How can clinicians motivate young people to improve toothbrushing/diet to avoid WSL (e.g., videos, leaflets, pictures)?
- Would having marks on your teeth like this……. make you think twice about having brace treatment? or similar.

Summary

Summarise the young person's / patent/guardian's thoughts and perceptions about WSL.

Thank you

Thank the participants for taking part in the study and let them know the results.