A two-centre study assessing the impact of the COVID-19 pandemic on orthodontic patients in secondary care

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Abstract

Objective: To evaluate the impact of the coronavirus pandemic on patients in active orthodontic treatment.

Design: Digital online survey.

Setting: Two secondary care orthodontic departments in the United Kingdom.

Participants: A prospective convenience sample of 103 patients in active orthodontic treatment.

Methods: A 12-item questionnaire developed using the platform SurveyMonkey was used to assess the following: (1) patient’s feelings towards attending their orthodontic appointments; (2) their desire to continue with their treatment; (3) how many patients encountered problems with their appliance during the lockdown; (4) how patients sought help during the first national lockdown period; and (5) any other concerns regarding impact on their orthodontic treatment.

Results: A total of 103 participants responses were collected over a four-week period across two departments. Of them, 45% required a face-to-face appointment to solve a problem with their appliance; 45% of patients who had problems with their orthodontic appliance were able to resolve the issue through digital means either via telephone/email advice from their provider or from accessing help via the Internet; and 99% of patients wanted to continue with their orthodontic treatment.

Conclusion: Our study has shown that a significantly higher percentage of patients are more concerned regarding attending face-to-face appointments after the first national lockdown due to the coronavirus pandemic. Providers of orthodontic care should ensure they support their patients by providing digital support and adopt virtual means of managing emergency cases patients in the event of any further imposed national or local lockdowns. Furthermore, access and availability of emergency face-to-face orthodontic care is necessary for many patients in active orthodontic treatment.

Keywords
psychological aspects of orthodontics, health services and quality of life aspects, COVID-19, orthodontics

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Key Points

- Patients are more concerned about attending face-to-face appointments since the national coronavirus lockdown
- Patients are still keen to have orthodontic treatment
- Virtual/digital aids for some self-help orthodontic emergencies are beneficial in the event of further imposed lockdown
- A high number of patients still required a face-to-face appointment to manage their issues with their appliance. Access to emergency orthodontic care for urgent cases must be considered in the event of further local or national restrictions

Introduction

The coronavirus pandemic has caused international disruption to medical and dental healthcare around the globe. On
23 March, the UK government placed the country into lockdown as a result of the pandemic, which resulted in major disruption to all healthcare services (Table 1) (Prime Minister’s statement on coronavirus (COVID-19): 23 March 2020). Orthodontic services, along with most elective outpatient services including all non-urgent elective surgery, were suspended with many being closed to face-to-face patient contact (Iacobucci, 2020). This period produced a challenge to patients and clinicians who had to adapt to a ‘new normal’. The lockdown led to the development and use of virtual emergency appointments, telephone consultations and online videos to assist those patients in need (Rimmer, 2020). This two-centre prospective survey aimed at reviewing the first cohort of orthodontic patients who were seen face-to-face after the COVID-19 lockdown period had eased and elective appointments resumed from June 2020. We wanted to assess what percentage of patients had a problem with their orthodontic appliance during the lockdown, and if so, how they sought help or advice. We also wanted to gather information and feedback from patients on their feelings towards continuing with their orthodontic treatment in the post-lockdown environment and any other concerns they may have.

**Methodology**

This study was registered and approved by the clinical effectiveness and governance teams at both Nottingham University Hospitals and Sheffield Teaching Hospitals (CAEC registration: 20-317C; registered on 17 June 2020).

A convenience sample was used to gather the data. This included asking patients already in active orthodontic treatment who were attending for a face-to-face appointment if they were happy to voluntarily participate in our survey. This is a commonly used non-probability sampling method that utilises participants who are easy to reach. The inclusion criteria were as follows: any patient undergoing active orthodontic treatment and those who agreed to participate in the study.

As a result of the new cross-infection protocols introduced after the coronavirus lockdown, the study was designed and carried out entirely digitally. The first cohort of patients who attended the orthodontic department for a face-to-face appointment when elective clinical activity resumed were invited to take part in the study following their appointment. A QR code and weblink was made available for patients to access the survey which was designed on the SurveyMonkey platform. This enabled us to minimise the risk of any transmission of the virus and maintain social distancing guidance at all times.

Prospective data were collected anonymously over a four-week period simultaneously in two secondary care orthodontic departments after the reopening of orthodontic services between July and August 2020. In total, 103 patients were recruited to participate in the study. Of those who were invited to participate, 100% agreed to take part in the survey. None of the patients who were invited refused to take part in the study and there was a 100% completion rate of the survey questions. There was a single researcher responsible for recruiting the patients across the two sites. During the recruitment period, approximately 600 patients attended for orthodontic review across the two units. Patients were only recruited when the primary researcher was present in each department.

The survey (Table 2) comprised 12 questions. Patients answered specific questions about how concerned they were about attending their appointments, whether they wanted to continue with their brace treatment, if they had problems with their brace and how they felt COVID-19 may affect their treatment. The participants were asked to select one of the pre-agreed answers for each question apart from the final question where a free-text answer box was available.

**Data analysis**

The results were collected and analysed using Microsoft Excel software. Descriptive statistics were used to summarise the data.

**Results**

A total of 103 patients took part in the study (52 patients from Sheffield and 51 patients from Nottingham). All of

### Table 1. Brief timeline of the coronavirus pandemic leading to the first national lockdown period.

<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 January 2020</td>
<td>First reported death linked to SARS CoV 2 in China</td>
</tr>
<tr>
<td>29 January 2020</td>
<td>First reported cases at a hotel in York, UK</td>
</tr>
<tr>
<td>20 March 2020</td>
<td>All pubs, restaurants, gyms and other social venues ordered to close</td>
</tr>
<tr>
<td>23 March 2020</td>
<td>Lockdown restrictions introduced in UK</td>
</tr>
<tr>
<td>13 April 2020</td>
<td>Lockdown restrictions eased in UK</td>
</tr>
<tr>
<td>8 June 2020</td>
<td>Limited return for patients to be seen for non-urgent face-to-face clinical appointments at the orthodontic department</td>
</tr>
<tr>
<td>4 July 2020</td>
<td>Pubs, restaurants, barbers and places of worship allowed to reopen</td>
</tr>
</tbody>
</table>
those who participated in the survey completed the survey in full. There were no significant differences between the results between the two orthodontic departments and therefore the data were pooled together for the analysis.

**Discussion**

**Concern about attending face-to-face appointments**

Before the coronavirus outbreak, 89% of patients were either ‘not at all worried’ or ‘not so worried’ about attending their orthodontic appointment as displayed in Figure 1. After the coronavirus outbreak, 33.3% of patients reported they were either ‘Extremely worried/ Very worried/ Somewhat worried’ about attending their orthodontic appointments (Figure 2). There could be a number of other factors that could contribute to an individual’s anxiety about attending face-to-face appointments. Our patients’ personal experience during the COVID-19 pandemic could be very different. Furthermore, for some of our patients, their orthodontic appointment may have been the first time since the imposed lockdown to travel out of their local area or attend a hospital setting.

A reassuring finding was that patients reported feeling safe returning to face-to-face clinic appointments after the*

### Table 2. Example of the 12-item questionnaire used for the survey.

| Q1. Where do you have your brace treatment? |
| Q2. How worried were you about attending your appointments before the coronavirus outbreak? |
| Q3. How worried are you about attending your appointments following the coronavirus outbreak? |
| Q4. Do you still wish to continue with your brace treatment? |
| Q5. Did you have any problems with your brace during the lockdown period? |
| Q6. If yes, how did you manage the problem? |
| Q7. Did we send you information about this appointment? |
| Q8. If yes, was the information helpful? |
| Q9. How safe did you feel attending your most recent orthodontic appointment? |
| Q10. How worried are you about the impact of coronavirus on your brace treatment? |
| Q11. How do you think the coronavirus lockdown will affect your brace treatment? |
| Q12. Is there anything that you would like to feedback to the orthodontic team? |

![Figure 1. Responses to Q2: ‘How worried were you about attending your appointments before the coronavirus outbreak?’](image)
lockdown period (Figure 3). This is an important finding as it reaffirms that patients have the confidence in us as their healthcare providers to look after their health and wellbeing alongside providing their orthodontic care. Clear written and verbal instructions were given to the patients over the telephone prior to them attending their appointment to help them follow the newly introduced measures (Table 3). All the patients who received this information reported to have found this helpful.

Desire to continue with orthodontic treatment

Almost all the patients (99%) included in the survey wanted to continue with their orthodontic treatment despite the disruption of the coronavirus lockdown and the consequent pause in their treatment. This was a reassuring finding that confirms patients are committed to achieving an optimal result despite an extension of their treatment time.

Patients who had a problem with their orthodontic appliances during the lockdown

One-third of patients (31%) had a ‘problem’ with their orthodontic appliance during the lockdown period (Figure 4).

An important finding was that 45% of participants who had a problem with their appliance were able to manage their problem without attending a face-to-face appointment. This was enabled through either advice from the department via email using photographs taken by the patients of their appliance using a mobile device or following a telephone or video consultation. Our patients were also able to manage problems with their appliances using advice found on the Internet. This demonstrates that both patients and clinicians were able to adapt under the challenging circumstances faced during the initial lockdown period. However, it is difficult to conclude whether these approaches actually solved the problems which existed or merely alleviated the initial concern but did not actually correct the issue with the appliance.

The British Orthodontic Society developed useful online resources for both patients and orthodontic providers to help manage any orthodontic emergencies. This included the British Orthodontic Society (BOS) COVID-19 flowchart, guidelines (Figure 5) and self-help videos for managing orthodontic emergencies or instructions on how to take photos for more specific orthodontic advice and management. These resources were utilised by many of the patients included in our survey. Given the nature and
complexity of some orthodontic emergencies, virtual
advice and guidance could only resolve some cases for a
short period until the patient was able to be seen safely in
an appropriate clinical setting. This is reflected in the pro-
portion of patients (45%) who had to be seen for a face-to-
face consultation at their orthodontic department to
manage the issue (Figure 6).

The findings do suggest that in the event of any further
local or national restrictions, triaging patients who have
problems with their appliances will ensure we make best
use of available resources before offering face-to-face
appointments that may be limited. However, a high per-
centage of patients (45%) still a face-to-face appointment
to solve the problem with their appliance. This reinforces
that in the event of any further local or national restrictions,
access to emergency orthodontic care must be readily avail-
able for patients who are in active orthodontic treatment.

Table 3. Example list of the verbal instructions given to the patients over the phone prior to them attending their appointment after the lockdown period.

- Arrive no earlier than 10 min before their appointment
- Entrance/Exit to department discussed
- Re-check COVID-19 status and remind patient will be checked again at reception
- Alco-gel hands on entry to department
- Socially distanced in waiting room
- Adults: attend alone if no capacity issues
- Children: ask for only one accompanying adult/guardian
- They may receive a phone call from a member of staff outline more details of how their appointment will be coordinated
- Inform the patient that there is a chance of last-minute cancellations due to unpredictable current circumstances (personal protective equipment, staffing, etc.)
- Details of their next appointment will be arranged by phone or posted out after their appointment

Figure 4. Responses to Q5: ‘Did you have any problems with your brace during the lockdown period?’

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>31.3%</td>
<td>68.7%</td>
</tr>
</tbody>
</table>

Overall, 50% of patients reported some level of concern about the impact of the coronavirus on their orthodontic treatment (Figure 7). These results show that there is a high level of concern among patients who are currently in active orthodontic treatment. The most common concern reported by patients in the survey was the increase in the length of treatment time as a result of the coronavirus lockdown (Figure 8). This has been reported in similar studies looking at the impact of the coronavirus pandemic on orthodontic patients (Cotrin et al., 2020). The suspension of all non-urgent elective surgery has caused significant delays to patients on waiting lists for orthognathic surgery, cleft lip and palate surgery, and patients requiring surgery for dental anomalies such as impacted teeth, supernumerary teeth or other diagnoses. This is likely to have an adverse effect on those patients who have not started active treatment and will result in increased numbers on waiting lists for NHS treat-
ment. With the resumption of services focussed on emer-
gency and oncology cases, there could be a significant impact on orthodontic patients awaiting adjunctive elective surgery.

Positive feedback

Both units received extremely positive feedback from the patients who took part in the survey.

‘I feel completely safe and feel like you’re taking all procedures to reduce the spread corona... I’m not worried at all with the steps you are taking.’ Anonymous patient

‘Very helpful in doing their best to ensure an appointment when it was safe and able to do so.’ Anonymous patient

BOS COVID-19 Guide to the Management of Orthodontic Emergencies

Most emergencies can be managed via appropriate telephone advice from an appropriately qualified health care professional. Only acute or urgent emergencies should be offered an appointment, pre-booked in strictly allocated appointment slots, subject to staff availability.

Figure 6. Responses to Q6: ‘If yes, how did you manage the problem?’
The results of this survey clearly show that patients still want to have orthodontic treatment in the post-lockdown climate. A reassuring finding was that the majority of patients felt safe attending their dental appointments after the lockdown. This may be attributed to the introduction of pre-treatment health screening, social-distancing measures, stricter cross-infection control policies, and the availability and use of increased personal protective equipment (PPE) for staff and patients in the hospital setting.

Patients are well aware their treatment may be affected as a result of the coronavirus outbreak. This could be issues with availability of appointments or increased waiting times in between appointments. Patients are concerned their overall orthodontic treatment time will be extended.

**Limitations of study**

No demographic data were collected from the participants who took part in the survey and all of the responses were anonymous. There could have been a difference in the responses given by patients of different ages and those with family members who are deemed clinically vulnerable. Therefore, in the event of any future studies, these factors should be investigated as they could have
an impact on an individual’s feelings towards attending a face-to-face appointment, especially in the event of an increase in coronavirus case numbers and another national lockdown.

There was no method of randomisation carried out in terms of selecting patients who were invited to take part in this study. As a result, there could be some element of selection bias in the results gathered. The researchers felt that gathering as much prospective data as possible would be useful to get an overall picture of the impact of the coronavirus pandemic on our patients. The sample size was limited to only 103 patients across the two departments. The participation rate of the survey was restricted as there was only one researcher responsible for recruiting patients to take part in the survey. We acknowledge the fact this survey relies on convenience sampling of the population under investigation. A larger sample size may have increased the reliability of the results. However, the external validity of the findings are reasonable given the inclusion of patients of different ages and from two separate orthodontic departments.

**Conclusion**

After the first wave of the pandemic and lockdown, patients were more concerned about attending their orthodontic appointments. However, the majority still want to continue with their orthodontic treatment. Clinicians must be mindful that should there be any further local or national lockdown measures they must ensure their patients have access to digital or virtual means of providing emergency assistance, especially those in active orthodontic treatment. We would recommend clinicians signpost patients to online resources available such as the BOS COVID-19 BOS Advice pages (BOS, 2020).

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**Informed Consent**

Informed consent was obtained from all necessary participants included in the article.

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