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# The COVID-19 experience of orthodontists in Jordan

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## Abstract

**OBJECTIVES:** To understand the impact of the COVID-19 pandemic on orthodontic clinical services in Jordan.

**MATERIALS AND METHODS:** Google Forms electronic questionnaires were distributed between March and June 2021 using the WhatsApp platform of the Jordanian Orthodontic Society and via direct WhatsApp messages. The survey was identical and contemporaneous to that used in the United Kingdom.

**RESULTS:** The survey yielded 127 unique responses, giving a response rate of 53.1%. The factors that had the greatest impact on service delivery were government guidance (78%), patients' fear of attending (70.1%), and increased cross-infection measures (65.4%). The survey revealed that there had been a perceived deterioration in oral hygiene (60.3%) and levels of compliance (61.9%) in patients in active treatment even though patients in treatment were prioritized during the pandemic. Also, 56.8% of respondents felt clinical staff should be vaccinated and undergo regular testing for COVID-19. Orthodontists within Jordan were optimistic regarding the speed at which clinical services would return to pre-pandemic levels of activity with 32.5% anticipating this would take less than 6 months.

**CONCLUSIONS:** Patients in active orthodontic treatment, during COVID-19, have been prioritized but at the expense of new and review patients. Respondents in Jordan felt COVID-19 would have ongoing effects on clinical care, professional practice, and society. Most respondents supported the vaccination of orthodontic staff and were optimistic about the effect of a vaccination program on restoring clinical services.

## Keywords:

COVID-19, Jordan, orthodontics, survey

## Introduction

COVID-19 has caused an unprecedented international health crisis. This has led to international collaboration to identify new strains of the virus, produce and distribute vaccines, and understand how to learn to live with COVID-19. Health care systems managed to continue to provide care despite the fact the virus is primarily spread by droplets and face-to-face contact with infected persons. This puts health care

workers on the frontline of exposure to the infection, with dental care professionals being particularly at risk.<sup>[1]</sup>

Jordan has an estimated population of about 10.3 million, 4.5 million of which reside in the capital Amman. Jordan is renowned for its high-quality health care services<sup>[2]</sup> and in 2008 was ranked, by the World Bank, as the number one healthcare service provider in the Middle East and North Africa.<sup>[3]</sup> International collaboration in postgraduate education has been encouraged between the UK and Jordan.<sup>[4]</sup> The health care system in Jordan consists of two main sectors—the public/semi-public sector and the private

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sector. Some aspects of dental provision are better in Jordan than in the UK, with Jordan having a ratio of 0.7 dentists per 100,000, compared with 0.5 in the UK.<sup>[5]</sup> Under the “public sector,” orthodontic services are provided mainly by the Ministry of Health, the Royal Medical Services, and University Hospitals. Personally financed orthodontic care is provided by privately owned practices.

Orthodontic treatment need is similar in Jordan and the UK. Using the Index of Orthodontic Treatment Need (IOTN) a “definite need” for treatment was recorded in 28% of Amman school children.<sup>[6]</sup> Approximately one-third (34%) of 12–14-year-old North Jordanian school children had a definite need for orthodontic treatment with half of the children wishing to have orthodontic treatment.<sup>[7]</sup> In the UK, 37% of 12-year-old and 20% of 15-year-old have unmet needs.<sup>[8]</sup>

## Materials and Methods

The Jordanian survey was distributed using the WhatsApp platform of the Jordanian Orthodontic Society followed by direct WhatsApp messages. This Google Forms questionnaire was circulated between March and June 2021 contemporaneous with the survey undertaken in the UK.<sup>[9]</sup> The questionnaire included participants’ socio-demographics, the impact of the COVID-19 pandemic on dental and orthodontic specialist practice, response to the crisis, their outlook on the legacy of the pandemic, and the impact of vaccination campaigns. It also included “free text” spaces so that respondents could provide additional comments to allow thematic analysis to improve our understanding of the quantitative data. The questionnaire was approved by the ethics committee and faculty approval process at Jordan University of Science and Technology (Institutional Review Board/KAUH-JUST/Jordan. Ref. No. 26/138/2021).

The returned survey responses were downloaded to an Excel Document to allow detailed analysis. The data were “cleaned” by assessing the data at an individual level with reference to the date stamps, demographic information, and free-text entries to allow removal of any duplications. The cleaned data was analyzed to produce quantitative and qualitative results.

All statistical analyses were performed using the Statistical Package for Social Sciences (SPSS) software version 22.0 (IBM Co., Armonk, NY, USA) to derive frequency tables and descriptive statistics. Chi-square, Wilcoxon signed rank, and Friedman tests were used to detect any associations or differences between the groups. The significance level was set at ( $P < 0.05$ ). Responses to open-ended questions were read and grouped according to themes.

## Results

### Demographic data

The Jordanian survey generated 134 responses which, after data cleansing, resulted in 127 unique entries. The Jordanian Orthodontic Society (JOS) contains 239 members although only 208 of these are active on WhatsApp. This gives our survey a response rate of 53.1% (for the entire JOS membership) and 61.1% of those who communicated via WhatsApp. Fifty-seven percent (57%) of the respondents ( $n = 72$ ) were male [Table 1] with the majority of respondents (81.1%,  $n = 103$ ) describing themselves as either orthodontic specialists or consultants [Table 2]. Also, 55.1% ( $n = 70$ ) worked in specialist practice and most were based in the capital city Amman [Table 3]. More than half of the respondents were under 50 years of age [Figure 1].

### Changes to clinical practice

The most significant influence on clinical practice during the pandemic was the result of government guidance (78%,  $n = 99$ ) although the patient’s fear to attend (70.1%,  $n = 89$ ) and additional cross-infection control measures (65.4%,  $n = 83$ ) also had a significant effect [Table 4]. Additional measures were introduced to mitigate the effects of the pandemic, with telephone consultations (62.8%,  $n = 76$ ) being the most frequently utilized, although surprisingly 22.3% ( $n = 27$ ) of respondents did not make any changes to their clinical practice [Table 5].

**Table 1: Gender of respondents (127 respondents)**

Gender	Percentage	Number
Female	43.3	55
Male	56.7	72
Prefer not to say	0	0

**Table 2: “How would you describe yourself?” (127 respondents)**

Category	Percentage	Number
DwSI	3.1	4
Orthodontist in training	15.7	20
Orthodontic specialist	52.8	67
Orthodontic consultant	28.3	36
Other	0.8	1

**Table 3: “In which location(s) do you undertake orthodontic treatment?” (127 respondents)**

Category	Percentage	Number (136)
General dental service	9.4	12
Community/government-run clinic	23.6	30
Orthodontic specialist practice	55.1	70
District general hospital	4.7	6
Dental hospital	11.8	15
Other	2.4	3

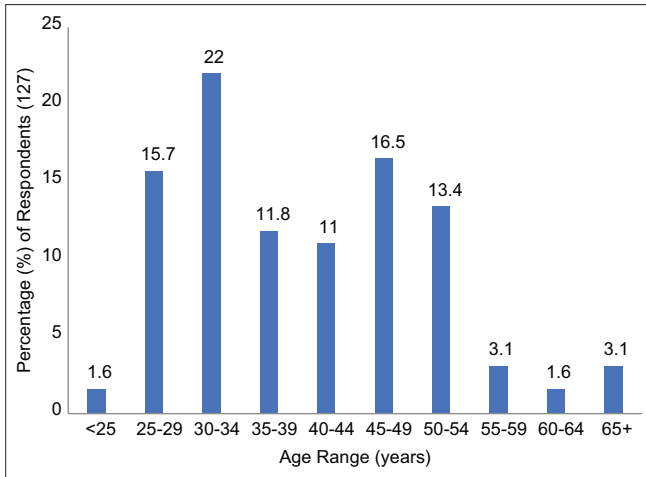


Figure 1: Age range of respondents

### Clinical care

Jordanian respondents were relatively optimistic about how quickly orthodontic clinical care would recover, with 32.5% ( $n = 41$ ) feeling it would be under 6 months and 62.7% ( $n = 79$ ) anticipating that it would be under a year [Figure 2].

The Jordanian respondents felt that orthodontic and dental services were equally well prepared for a pandemic such as COVID-19. The majority of respondents felt that orthodontic and dental services had coped well during the crisis [Figure 3]. Although the majority of respondents felt COVID-19 will be an ongoing issue for both clinical services and society, they felt it would be significantly more of an ongoing issue for society ( $P < 0.05$ ) [Figure 4].

Respondents reported patients undergoing active orthodontic treatment were least affected by the clinical restriction in contrast to new and review patients [Figure 5]. Over 65% of respondents agreed with the statement “Following COVID-19, there will be less clinical capacity due to additional infection control.” This is at odds with their perceptions of how quickly clinical services could return to pre-pandemic levels [Figure 2].

### Vaccination

Respondents were split over whether the ongoing vaccination campaign will prevent COVID-19 from being an issue for dental and orthodontic clinical practice in the future [Figure 6]. However, it must be noted that our survey was circulated at a time when vaccinations were limited to the adult population.

The majority of Jordanian respondents (56.8%,  $n = 71$ ) supported the concept that orthodontic staff should have evidence of vaccination before providing clinical care, and more respondents supported a monthly testing regime for the virus over a weekly testing regime [Figure 7].

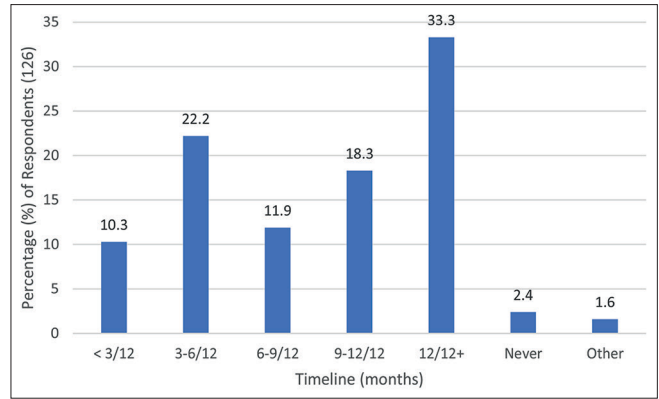


Figure 2: Respondents' views on the length of time it would take for orthodontic clinical activity to return to the pre-pandemic level

Table 4: “During the pandemic what were the main causes of changes in your clinical capacity (tick all that apply)” (127 respondents)

Category	Percentage	Number (673)
National restrictions	56.7	72
Local restrictions	46.5	59
Government guidance	78.0	99
Professional guidance	53.5	68
Increased cross-infection measures	65.4	83
Staff sickness/self-isolation	48.0	61
Patient sickness/self-isolation	55.1	70
Patient's fear of attending	70.1	89
Social distancing policies	56.7	72
Other	0	0

Table 5: During the pandemic, in what ways did you adapt to the crisis (tick all that apply)

Category	Percentage	Number
No additional measures	22.3	27
Telephone consultations	62.8	76
Video consultations	23.1	28
Extended opening times (Monday to Friday)	13.2	16
Extended opening times (Saturday and Sunday)	10.7	13
Hired more staff	5.0	6
Other (specified)	9.1	11
Other (non-specified)	0	0

### Effects of the pandemic

More than half of Jordanian respondents (60.3%,  $n = 76$ ) reported a deterioration in oral hygiene with a similar number (61.9%,  $n = 78$ ), feeling that patients' compliance had suffered as a result of the pandemic [Figure 8].

### Free-text comments received

Free-text space was provided to allow the respondents to expand on their answers and provide additional comments.

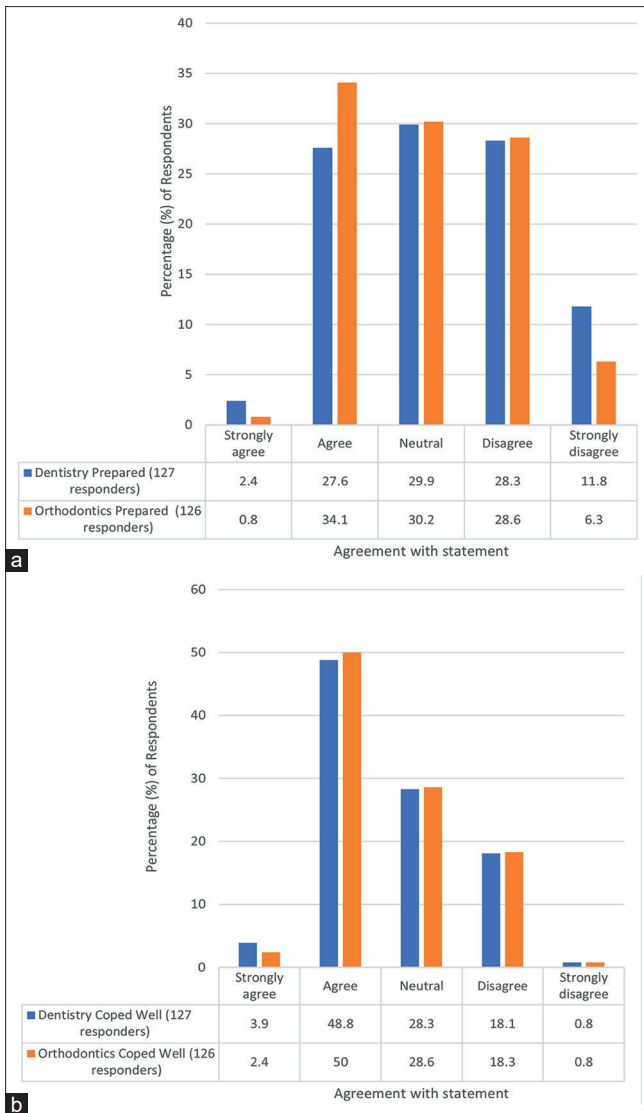


Figure 3: (a) Respondents agreement that "clinical services were well prepared for the pandemic". (b) Respondents agreement that "clinical services coped well during the pandemic"

General comments from Jordan:

Hesitation to attend and less working hours limited the number of patients  
 Restrictions in the number of patients seen per working day, longer appointment intervals, extra cross-infection measures time and cost  
 We did not want too many patients in the waiting area+more cross-infection control measures were needed between patients that took a longer time  
 Lockdowns, long preparation time for cross-infection control, fear of patients, reduced number of staff due to isolation measures and others  
 Increase in between patient's intervals. Less appointments per day. increased the time length of the visit. Less days in work due to the lockdown. Early closing hours  
 Patients are afraid of being infected

Comments regarding the long-term impacts COVID-19 will have on clinical services:

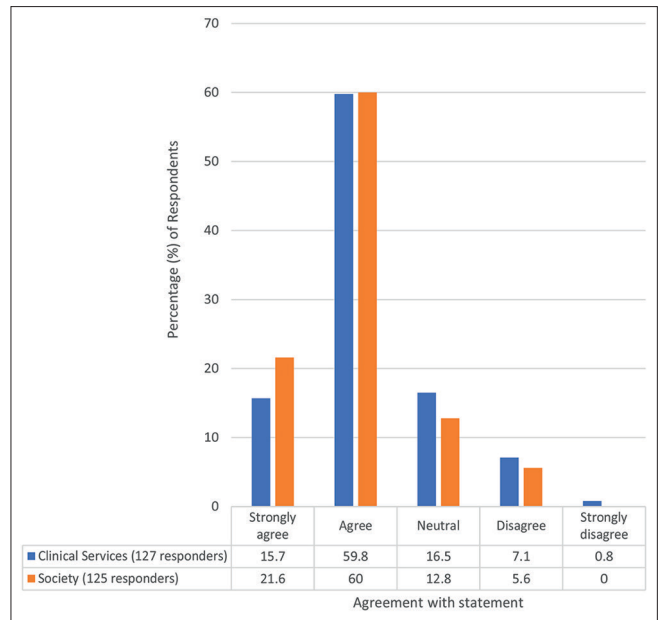


Figure 4: Respondents agreement that COVID-19 will have an ongoing impact on clinical services and society

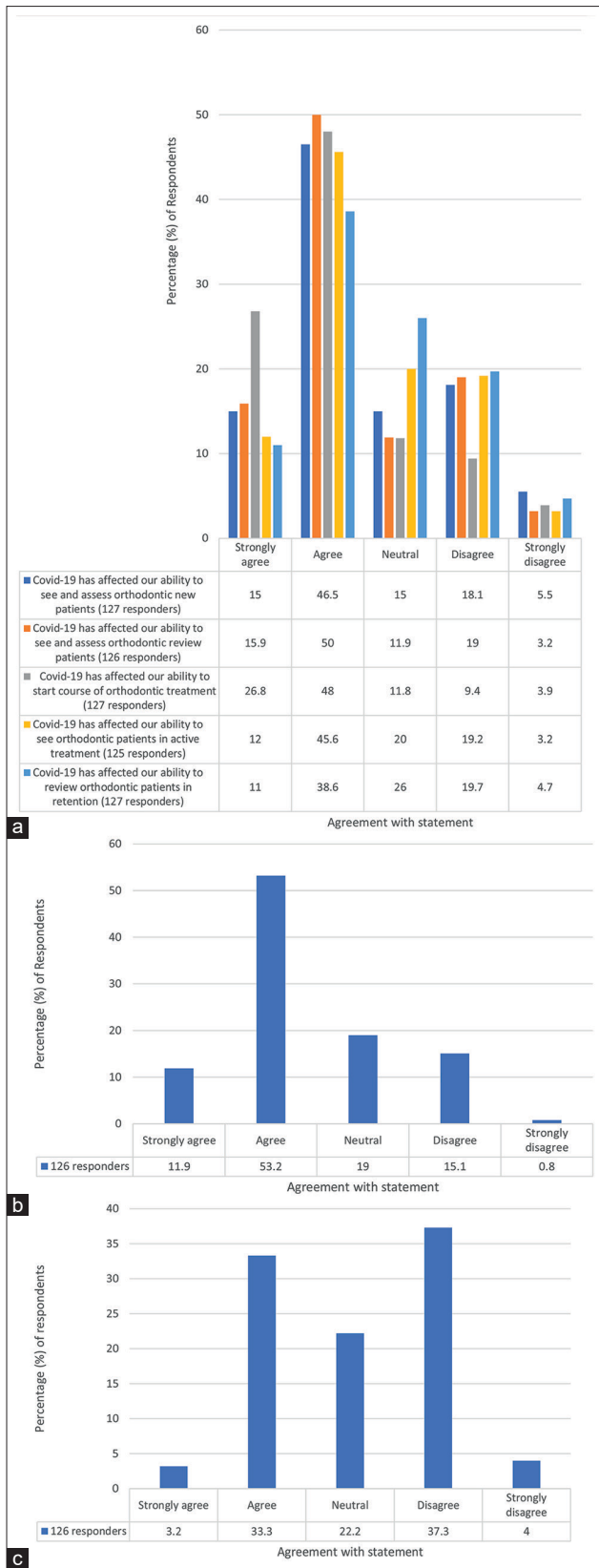
Patients will be seeking a well-sterilized clinic with possible changes to digital orthodontics like aligners and online monitoring  
 Since it affected the economy overall, some patients are less keen to spend money on orthodontic treatment and there is a delay in payments  
 The importance of PPE is emphasized forever  
 The infection control measures will be more important to the dental staff than before  
 I think social distancing is precedent. Continuous sterilization of the face mask, tools and furniture, clinics, and continuous sterilization

Discussion

COVID-19 remains an unprecedented international crisis. The virus has no respect for international borders and has caused death and disruption across the world. However, this challenge has improved international collaboration on vaccines, personal protective equipment, and understanding of cross-infection control measures required to reduce the spread of the virus. International collaboration in research and postgraduate education has encouraged comparisons between the UK and Jordan.<sup>[4]</sup> Our survey was contemporaneous and identical to a published survey in the UK.<sup>[9]</sup>

Demographics

The largest subset of Jordanian respondents were 30–34 years with only 38% of respondents being older than 45 years. The age range of respondents from Jordan had an "M-shaped" curve with peaks at 25–34 and 45–54 [Figure 1], in contrast to the "bell-shaped" curve seen in the UK<sup>[9]</sup> where the respondents were generally older. The age demographic may have some influence on results with regard to the level of optimism with which respondents feel care will return to pre-pandemic levels of activity.



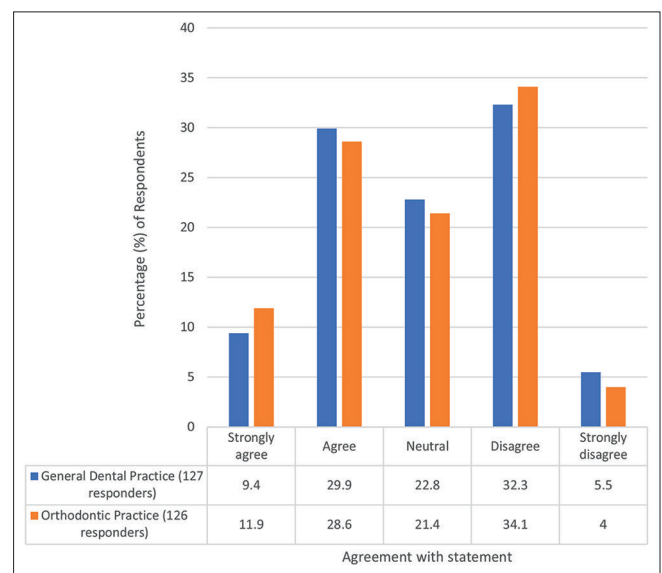
**Figure 5:** Impact of COVID-19 on clinical services. (a) Respondents' perception regarding the impact of the pandemic on the provision of orthodontic services, (b) Respondents' agreement that there will be less clinical capacity due to additional infection control, (c) Respondents' agreement that it will be difficult to arrange dental extractions

The majority of respondents in Jordan (55%) were working in specialist practice with 11% working in general practice and 3% of Jordanian respondents describing themselves as dentists with a special interest in orthodontics (DwSI). This categorization is in contrast with the UK, which had a much higher proportion of respondents describing themselves as DwSI (10.7%). These surveys utilized orthodontic professional networks, which are likely to create a bias toward clinicians who are specialists. Respondents in Jordan work in a single clinical setting with an average of 1.07 settings per respondent, whereas it was 1.36 in the UK.

### Impact of COVID-19

Several factors played a role in the disruption of orthodontic services. Jordanian respondents reported that government guidance was the most significant (78%), closely followed by patients' fear of attending (70.1%) and cross-infection control measures (65.4%). However, national restrictions (56.7%), social distancing policies (56.7%), and professional guidance (53.5%) affected the majority of respondents [Table 4].

Disruption to services will be influenced by national and professional politics, including the establishment of a vaccination program, along with cultural perceptions and attitudes to risk, both within the profession and the public. In the UK, the greatest impacts were deemed to be national restrictions (85%), increased cross-infection measures (84.1%), social distancing policies (79.6%), professional guidance (79.5%), and government guidance (77.3%) with approximately half of the UK respondents (50.7%) feeling that patients' fear of attending had a significant impact.<sup>[9]</sup>



**Figure 6:** Comparison of the respondents' agreement that Covid-19 will not be an issue in clinical practice following a vaccination programme

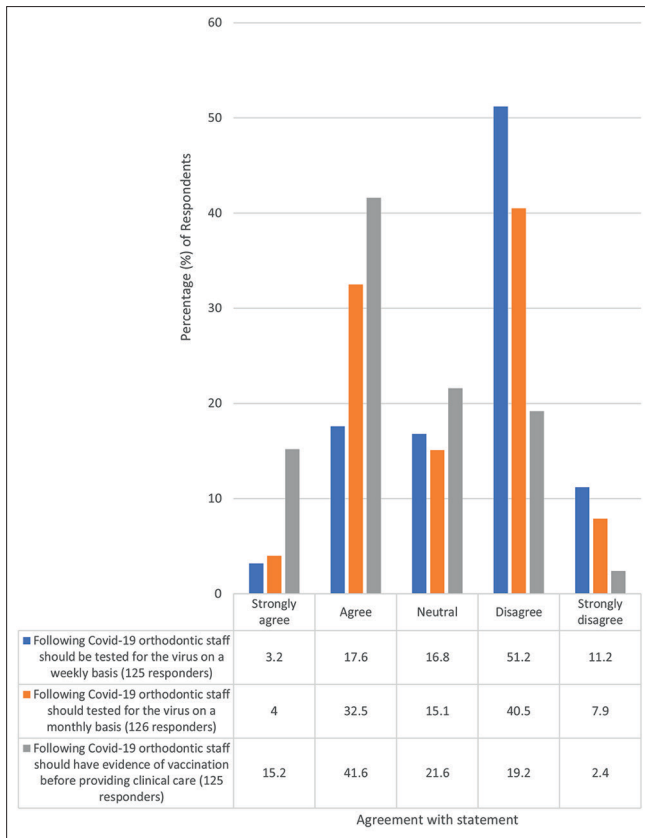


Figure 7: View on asymptomatic testing and evidence of vaccination

Making contact with patients who are not able to attend face-to-face has been suggested as a way of managing their anxiety and monitoring treatment progress remotely.<sup>[10]</sup> During the crisis, the most significant clinical adaptation was the use of telephone consultations (62.8%) although interestingly 22.3% of the respondents did not feel the need for any adaptations to their practice. This is in marked contrast to the UK, where 84% of the respondents utilized telephone consultations with only 3.1% not using any additional measures to adapt to the crisis.<sup>[9]</sup> Telephone reviews were already in place before COVID-19 and it is unsurprising that this approach was developed as an easy, cost-effective method of monitoring patients and provide an opportunity to answer queries, without additional technological infrastructure being required. Telephone or video appointments negate the need for travel or having face-to-face contact, reducing the infection risk of Covid-19 among patients and staff. Telephone and video consultations have proved helpful during the pandemic and may remain a preferred option for both clinicians and patients.

### Reduction in clinical capacity

Respondents felt a reduction in clinical capacity was inevitable during COVID-19 with uncertainty about testing of patients and staff; the need to avoid aerosol-generating procedures; fallow times; and social

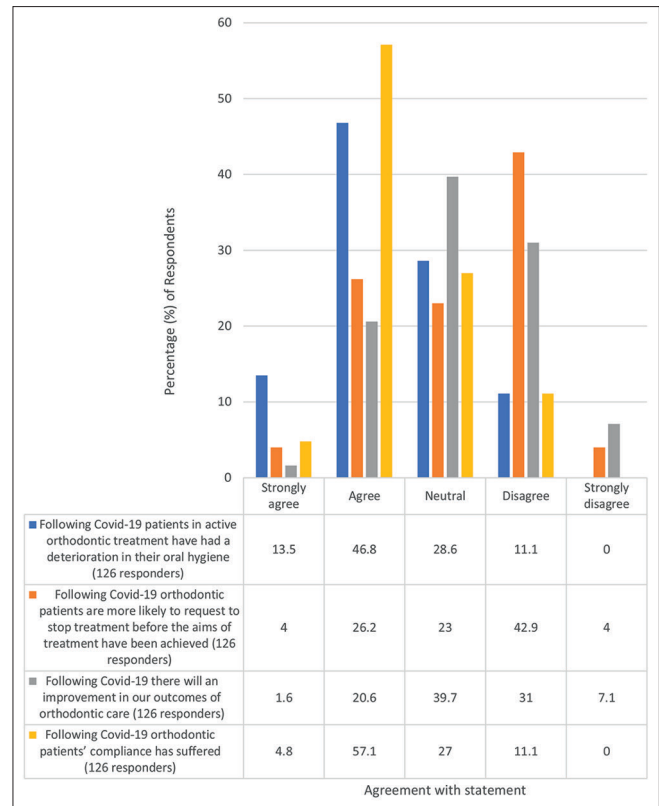


Figure 8: Impact of the pandemic on patients

distancing leading to a slowdown in patients' flow. This will have a significant financial impact on orthodontic providers as the unit cost of providing orthodontic treatment will increase. Respondents' comments on the causes of the reduced capacity focused on the reduced number of patients seen per day and the need for additional cross-infection measures.<sup>[11]</sup> Concern about the financial impact of COVID-19 was greater for specialists compared to trainees<sup>[12]</sup> and most respondents (67%) thought they would need to increase their working hours to compensate.<sup>[13]</sup>

Jordanian respondents were divided on whether, following the restart of clinical services, there will be delays in orthodontic treatment due to the difficulty of arranging dental extractions [Figure 5], with only 36% of respondents expressing concern about delays due to dental extractions. This is in contrast to the UK where 74.2% of respondents felt that there would be delays to orthodontic treatment due to the difficulty of arranging dental extractions.<sup>[9]</sup> This can be explained by the fact that the majority of Jordanian respondents worked in private specialist practice or the general dental service (64.5%) and traditionally undertook their own orthodontically related extractions rather than requesting these from the general dental provider.

More than half of Jordanian respondents (60.3%) reported a deterioration in oral hygiene in patients in

active orthodontic treatment during the pandemic, along with a reduction in compliance (61.9%). Respondents felt that compliance of patients under active treatment had been adversely affected during COVID-19. This could be because patients had not been seen as frequently and thus there had been less opportunities to reinforce messages about oral hygiene, elastic wear, or how to respond to an appliance breakage.<sup>[14]</sup> Patients noted changes to their diet and frequency of brushing during the pandemic. Orthodontic patients believed that a negative impact on the overall duration of treatment would occur. Compliance with orthodontic instructions was suboptimal during the pandemic, with the stresses experienced during “lockdowns” adding to the psychological pressure on the patients.<sup>[14]</sup>

The majority of Jordanian respondents (56.8%) supported the concept that orthodontic staff should have evidence of vaccination before providing clinical care, and more respondents supported monthly testing for the virus rather than a weekly testing regime. This is an interesting finding as a weekly testing regime would be more costly and inconvenient; however, monthly testing is likely to be less effective in identifying asymptomatic COVID-19 positive clinical staff.

Also, 62.7% of respondents from Jordan felt that orthodontic clinical activity would return to pre-COVID-19 levels of activity within a year. This is in marked contrast with data from the UK (31.4%). In the UK, almost 17% felt that we would never return to pre-COVID-19 levels of activity due to the need for additional cross-infection measures.<sup>[9]</sup>

There was an agreement between respondents on the impact of COVID-19 on society and that issues for society related to the pandemic would be ongoing for longer than a year. Respondents were not optimistic about the positive influence of vaccinations; however, at the time of the survey, the vaccination programs were limited to the adult population, similar to the results found in the UK.<sup>[9]</sup>

### Recommendations

Orthodontists should consider remote oral hygiene support, especially for patients who are not seen for an extended period.

Telephone reviews can help reduce travel to clinics, help support patients and reassure them about treatment progress as well as encourage better compliance.

### Conclusion

Respondents from Jordan felt less dissatisfied with the preparedness of orthodontic and dental services than respondents in the UK. Jordanian respondents reported that

during the pandemic, patients undergoing active orthodontic treatment had been prioritized at the expense of new and review patients. Respondents in Jordan felt COVID-19 would have ongoing effects on clinical care, professional practice, and society. The majority of respondents supported the vaccination of orthodontic staff and were optimistic about the positive effect of a vaccination program on restoring clinical services to pre-pandemic levels of activity.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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