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Assessment of the Efficiency of Virtual Orthodontic Consultations during COVID-19

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***Abstract*—**Aims: We aimed to assess the efficiency of 'Attend Anywhere' orthodontic clinics within a district general hospital during COVID- 19. Our secondary aim was to pilot a questionnaire to assess patient satisfaction with virtual orthodontic appointments. Design: The study design is a service evaluation including pilot questionnaire. Methods: The average number of patients seen per virtual clinic and the number of patients failing to attend was compared to face-to-face clinics. The capability of virtual appointments to be successful in preventing the need for a face-to-face appointment was assessed. Patients were invited to complete a telephone pilot questionnaire focusing on patient satisfaction and accessibility. Results: There was a small increase in the number of patients failing to attend virtual appointments, with a third of the patients who did not attend failing to receive the appointment link. 81.9% of virtual clinic appointments were successful and prevented the need for a face-to-face appointment. Overall patients were very satisfied with their virtual orthodontic appointment and the majority required no assistance to access the service. Conclusions: The use of 'Attend Anywhere' clinics in orthodontics offers patients and clinicians an effective and efficient alternative to face-to-face appointments that patients on average find easy to use and completely satisfactory.

***Keywords*—**Clinics, COVID-19, orthodontics, patient satisfaction, virtual.

I. Introduction

ATTEND Anywhere is a secure internet-based video consultation platform, used for patients with prearranged appointments. It has been used within the medical profession for over eighteen years and allows mainstream video call access within healthcare. It was first used in the National Health Service (NHS), in Scotland in 2016 [1]. However, in March 2020 when COVID-19 was declared a global pandemic, use of 'Attend Anywhere' within the NHS rose significantly. This was because on March 25th 2020 NHS England announced that 'all routine, non-urgent dental care including orthodontics should be stopped'. Platforms that allowed virtual consultations then became popular, in order to allow continuation of patient care and contact. NHS England and NHS Improvement did this by procuring licenses with 'Attend Anywhere' [1].

The 'Attend Anywhere' platform consists of a virtual waiting room that the patient enters, prior to a clinician accepting the patient into a video room for the consultation.

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Once approved by the trust and after clinician training had been completed, the Orthodontic Department in The Royal Gwent Hospital (RGH) Newport, began using 'Attend Anywhere'. These 'Attend Anywhere' virtual clinics began on July 1st 2020 in order to see orthodontic patients for routine and urgent reviews. 'Attend Anywhere' offers an innovative and safer way to deliver orthodontic care in the current climate but as of yet little is known about is effectiveness and efficiency [2]. As the COVID-19 pandemic is set to continue, it is important to assess and maximize the efficiency of virtual clinics, in order to improve the benefits for clinicians and patients. If we wish to adopt virtual consultations in the longer term, it is crucial we assess patient satisfaction with using this technology.

II. Aims and Objectives

Aim

The primary aim of this service evaluation was to assess the effectiveness and efficiency of 'Attend Anywhere' virtual orthodontic clinics. The secondary aim was to pilot a questionnaire to gain patient feedback regarding their virtual appointments.

Objectives

- To assess the number of patients who failed to attend their 'Attend Anywhere' appointment
- To assess the number of patients that are seen on average on 'Attend Anywhere' virtual clinic
- To evaluate if the outcomes of 'Attend Anywhere' clinics are satisfactory and prevent the need for face-to-face appointments.
- To evaluate patients' satisfaction and experiences of virtual appointments.

III. Methodology

This service evaluation was registered with and approved by the Health Board's Research and Development Department. This was a single centre audit and prospective questionnaire undertaken within Aneurin Bevan University Health Board, at RGH Orthodontic Department.

When face-to-face clinics had to cease and virtual 'Attend Anywhere' clinics began, patients were deemed suitable to be seen on a virtual clinic by a consultant orthodontist. The patient's details were then passed to the administration team, in order for the appointment to be booked. Suitable patients were contacted by the administration team via telephone three days prior to their appointment. At this time the administration team will discuss 'Attend Anywhere' with the patient and they

will receive an email with a link to the virtual waiting room. The patients are not then further reminded of this appointment by the automated 'Attend Anywhere' system.

It was decided during the development of this service evaluation that in order for a virtual clinic to be time efficient, the same number of patients should be seen virtually as were seen on face-to-face clinics before the pandemic. This decision was made as the time allotted for the clinics is the same for both virtual and face-to-face clinics. We anticipated that the virtual did not attend (DNA) rate should be the same as or better than the face-to-face DNA rate, as demonstrated in previous studies [2]. In order for virtual clinics to be an effective use of resources, a further face-to-face appointment should not be required in addition to the virtual appointment.

The Orthodontic Department within the RGH began running 'Attend Anywhere' clinics the week beginning 01/07/ 2020. Two consultant orthodontists each ran a weekly clinic from this time onwards. We audited a time period of three months, beginning the 01/07/2020 to the 01/10/2020. Clinic lists for each virtual clinic were taken from the online booking system and analysed to gain the relevant data. The data required included the number of patients seen per clinic, number of patients who failed to attend their appointment and the outcome of each appointment.

In order to compare the number of patients who failed to attend their 'Attend Anywhere' virtual appointment, the average failure to attend rate of normal consultant orthodontic clinics, prior to COVID-19 was calculated. For the purpose of comparison, the mean number of patients booked on to virtual clinics and the mean number of patients booked onto consultant orthodontic clinics prior to COVID-19 were calculated. In order to do this, a one-week period was selected to calculate the average number of patients booked onto face-to-face consultant orthodontic clinics and the percentage of patients that failed to attend. The one-week period chosen, 01/07/2019 – 07/07/2019 was selected to provide a representative sample of the time of year audited. The average number of patients booked on a face-to-face consultant orthodontic clinic was 9.7. The percentage of patients that 'did not attend' their face-to-face appointment was 6.5%. These figures then formed the targets for the virtual clinics.

To assess the effectiveness of virtual orthodontic clinics, the outcome recorded for each appointment was assessed as satisfactory or unsatisfactory, depending on if a further face-to-face appointment was required. A satisfactory outcome was defined as a virtual appointment outcome that would have also occurred if the appointment had been face-to-face [2]. For example, follow up as normal, added to a waiting list or discharged. An unsatisfactory outcome is one where an additional face-to-face appointment is required because of the limitations of virtual appointments, for example clinical examination or additional investigations are required.

To fully evaluate the benefits and long-term feasibility of using 'Attend Anywhere' clinics, we wanted to ascertain patients' views of the virtual clinics. We have done this initially by use of a pilot questionnaire given to a small sample of our target population, 12 patients [3]. We did this by phone calling patients, or their parents if the patient was under 16 and inviting them to take part. The patients were then guided through the telephone questionnaire and given the option at the end to give additional qualitative feedback. When designing the questionnaire, we wanted to assess the patients' overall satisfaction with the 'Attend Anywhere' consultation and their perceived benefit of the appointment [4]. We felt it important to ascertain if patients had technical issues as this was an anticipated issue with using virtual clinics. NHS England and NHS Improvement highlighted that communication with young people may be difficult over virtual consultation and as many of our patients are teenagers, this was important to assess also [1].

IV. Results

A. Efficiency of 'Attend Anywhere' Clinics

The average number of patients who failed to attend their virtual appointment was 10.8%, which is a 4.3% increase of the 6.5% DNA rate of face-to-face clinics. The average number of patients seen on a virtual clinic was 7.8, in comparison to an average of 9.7 patients seen per face-to-face clinics as shown on Fig. 1.

The percentage of virtual appointment outcomes that were satisfactory was 81.9%. Of these satisfactory outcomes, 56 patients were followed up as planned, 38 (55.9%) of which were to be followed up virtually and 18 (26.5%) were to be followed up face-to-face as planned. Nine (13.2%) patients were discharged straight from the virtual clinic and three patients (4.4%) were referred to another consultant within the trust. This means that 18.1% of virtual appointments had an unsatisfactory outcome and the patient required a face-to-face appointment in addition.

Criteria	Target	Result
The percentage of patients failing to attend their virtual 'Attend Anywhere' appointment.	6.5%	10.8%
The average number of patients seen on a virtual "Attend Anywhere' clinic	9.7	7.8
The percentage of clinic outcomes that are satisfactory	50.7%	81.9%

Fig. 1 Efficiency of Attend Anywhere clinics

B. Pilot Patient Questionnaire

Of the 12 completed questionnaires, 67% of the questionnaires were completed by the patient's parent and 33% by the patient themselves, one patient declined to complete the questionnaire. The questions asked and results can be seen in Fig. 2. For questions 1 and 2 a five-point Likert scale was used, in order to assess the patient's agreement with the given statement regarding their virtual appointment. Patients were asked on a scale of 1-5, 1 being not at all satisfied and 5 being completely satisfied to rate their 'Attend Anywhere' appointment. The mean satisfaction score was 4.7, showing on average patients were completely satisfied with their appointment.

On a Likert scale of 1-5 patients rated the communication with their orthodontist over video on average as excellent, with a mean score of 4.7. NHS England and NHS

Improvement highlighted that communication with young people may be difficult virtually, but our feedback has shown that effective communication with young people not to be an issue [1].

	Question	Result
1	On a scale of 1-5, how satisfied were you with your/ your child's video consultation?	4.7
2	On a scale of 1-5, how would you rate the communication with your orthodontist over video?	4.7
3	Were you able to use the video system without assistance?	83% Yes 17% No
4	Have you used video consulting before?	8% Yes 92% No
5	If required, would you be happy to have another orthodontic 'Attend Anywhere' appointment?	92% Yes 8% No
6	Do you think this video consultation prevented you needing a face-to-face consultation?	92% Yes 8% No

Fig. 2 Patient satisfaction questionnaire results

Patients/their parents were asked if they were able to use the video system without any assistance, 10 answered 'yes' and 2 answered 'no'. Of the patients who answered 'no', one reported that the link was not working but was able to contact the team to get the link successfully resent and one was unable to access the virtual waiting room. The patient who was unable to access the virtual waiting room was the only patient that answered 'no' when asked if they would be happy for a future virtual appointment if the need arose. The reason they gave for this was not wanting to take their child out of school unnecessarily to try again. This patient was also the only one who felt the video consultation did not prevent the need for a face-to-face appointment.

The final question asked was: Do you have any other comments, questions or concerns? The majority of patients had further information to add. The comments overall were positive with many commenting on how much more convenient virtual appointments are for childcare and ease of access. Other comments included "Brilliant for what we needed and prevented needing time off school", "grateful to have some communication with the orthodontist during these difficult times" and "slightly lagging connection, very impressed with it, enjoyed being able to see his x-rays on the screen".

V. Discussion

A. Average Number of Patients Seen per Clinic

Our aim was that the average number of patients seen per clinic would be 9.7, equal to the number seen on a normal clinic. The average number of patients seen per virtual clinic was actually 7.8, 1.9 patients less than the average number of patients seen on orthodontic face-to-face clinics. However, this figure could have been skewed as the number of patients seen on virtual clinics initially was low as clinicians trialled the new system, so the first clinic only two patients were seen. As clinicians become more confident with use of the new technology and efficiency increases, we anticipate the number of patients seen per clinic will increase.

B. The Number of Patients Failing to Attend Their 'Attend Anywhere' Appointment

The increased did not attend rate was discussed with the team and the following potential reasons discussed. This audit was carried out between the 01/07/2020 and 01/10/2020, six weeks of this time was during the school holidays. As the majority of orthodontic patients are children and would have been off school, which has the potential to affect the DNA rate, so this may not be the most accurate estimate of the DNA rate for virtual clinics moving forward. During the time audited national lockdown ended and people began to attend work again, so it is feasible that as patients were beginning to work again, they were forgetting their appointments or had work commitments.

Patients were contacted regarding the reasons behind failing to attend their virtual appointments, in order to assess if technical issues were at fault. Over the time period audited, 10 people did not attend their virtual appointment, 9 of these people gave feedback regarding why they did not attend. We were unable to contact one of the patients.

- 3 patients stated they had forgotten their appointment.
- 1 patient's guardian was in hospital at the time of the appointment.
- 2 patients had technical difficulties, including poor internet signal and being unable to access the waiting room.
- 3 patients received the initial phone call to inform them of the virtual appointment but did not receive the email link.

We acknowledge that a small number of patients forgetting their appointments is to be expected, as is some patients initially experiencing technical issues [5]. However, patients not receiving the link to access their appointment need to be rectified. This service evaluation has highlighted that the 'Attend Anywhere' system does not automatically remind patients of their appointment, which is likely contributing to the increased DNA rate. In order to overcome this, we have implemented a reminder system to re-send patients the link to access the virtual waiting room the day before their appointment. The 'Attend Anywhere' link is initially sent by email, so the reminder is being sent by text. This is in case of transcription errors with the patients recorded email addresses that prevent them from receiving the initial link.

C. Percentage of Satisfactory Clinic Outcomes

Our target for the percentage of satisfactory clinic outcomes was taken from a recently published paper by Crawford and Taylor [2]. This study found that 50.67% of their Attend Anywhere clinic outcomes were satisfactory, so this is what we aimed for. Our results showed that 81.9% of clinic outcomes were satisfactory, which is significantly higher than the results from the previously published study. This can be partially accounted for as we were not seeing emergency orthodontic patients over Attend Anywhere and the previous paper was. In [2], 11 patients out of 300 patients were 'emergency' patients and all of these had unsatisfactory clinic outcomes. This is because they all required face to face appointments, as would be expected for emergency

appointments. This highlights the importance of patient selection for virtual clinic attendance.

D. Patient Feedback Questionnaire

The overall satisfaction of orthodontic patients and their parents regarding 'Attend Anywhere' appointments during COVID-19 was very high and the majority of patients would be happy for further virtual appointments in the future. Although some technical issues were reported, the majority of patients accessed the system without assistance, even with no prior experience of using video consulting. When technical issues were experienced these were related to being unable to access the virtual waiting room, highlighting the need for further reminders and opportunities to correct this.

VI. Conclusion

In conclusion, 'Attend Anywhere' virtual clinics offer an efficient and effective alternative to face-to-face clinics for orthodontic patients during the COVID-19 pandemic. Patient satisfaction with virtual clinics was very high with 92% of patients being happy for a further virtual appointment. As we move forward through the pandemic, virtual clinics offer a viable long-term solution for some orthodontic consultations. As clinicians and patients gain experience with telecommunication software, virtual consultations will become more accessible.

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