# The use of telehealth during the coronavirus (COVID-19) pandemic in oral and maxillofacial surgery – A qualitative analysis

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## Abstract

**Introduction**: Telehealth usage increased especially in the coronavirus pandemic.
**Objective**: To determine whether oral and maxillofacial surgeons (OMS) believe that telehealth is an adequate substitute for in-person consultations.
**Methods**: OMS were interviewed. These were transcribed and themes and subthemes coded. Quotes were selected to create narratives about themes and subthemes and a frequency table generated.
**Results**: 20 OMS were interviewed. There were 200 positive, 215 negative, 9 neutral and 256 unstated comments. Major themes were diagnosis, accessibility, patient-centred care, technology and finances. 34 sub-themes were identified. OMS were most satisfied with accessibility and most dissatisfied with diagnosis.
**Conclusion**: OMS had mixed opinions regarding telehealth. While it can improve access, the technology, interventional capacity and diagnostic ability are limited. Face-to-face was preferred. Further studies are required to improve telehealth.

## 1. Introduction

Telehealth is the usage of information and communication technology to facilitate efficient communication and remote consultations between health care professionals (HCPs) and patients.[1] Telehealth allows for the triage of referrals and increased efficiency by reducing wait-times for specialist services.[1] The coronavirus (COVID-19) pandemic spread in March 2020 led to government mandated lockdowns. During the lockdowns, utilisation of telehealth increased.[2] Telehealth has been used to protect frontline HCPs from being exposed to patients with COVID-19 as care could be provided remotely without exposing HCPs to the virus.[3] The imposed sanction to minimise social contact to reduce the transmission of the virus meant that HCPs had to provide telehealth in cases of emergency care, although telehealth has also been used for non-emergency care. Automated analysis of chest x-ray images has also been developed using convolutional neural networks in order to diagnose COVID-19 without exposing HCPs to the patient.[4] While telehealth has been widely adopted, there has been some resistance due to perceived difficulties in accurate diagnostic capabilities, data security as well as a high cost and time investment required [1, 3].

Oral and maxillofacial surgeons (OMFS) are registered specialists with dual dental and medical qualifications.

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They are involved in the diagnosis and treatment of conditions affecting the face and skeleton including the head and neck region.[5] During the COVID-19 lockdown, general dental practitioners were advised by the Australian Dental Association, a representative organisation for general dental practitioners, to refer all extractions to OMFS as specialists usually have facilities to minimise aerosol production during procedures,[6] and COVID-19 can transmit through aerosols. Therefore, telehealth was adopted to facilitate the exchange of information between dentists and OMFS. Additionally, telehealth consultations would also be utilised by OMFS in order to triage patients to determine eligibility for emergency care under the guidelines.[7]

With increased usage of telehealth, it is important to determine whether telehealth is an adequate substitution for face-to-face healthcare consultations and that patients using telehealth are not disadvantaged. Although some research has been done analysing patient satisfaction on telehealth,[8-10] limited studies have investigated telehealth from clinicians' perspective, especially OMFS.[11, 12]

## 2. Aims

The study aims to use a quantitative and qualitative analysis to determine OMFS' perspectives on whether telehealth is an adequate substitute for in-person consultations.

## 3. Motivation

The theoretical framework underpinning this project is phenomenology. Phenomenology is "the approach that focuses on people's subjective experiences and interpretations of the world".[13] We aimed to understand and analyse how OMFS view telehealth by investigating their experiences with it.[14] In doing so we hoped to identify areas in which we could improve telehealth for the future.

## 4. Methods

This study is a heuristic mixed methods study with a phenomenological approach. The qualitative analysis reported according to the Consolidated criteria for Reporting Qualitative research (COREQ) guidelines.[14]

### Ethics approval
Ethics approval has been obtained from the University of Western Australia Human Research Ethics Committee [Reference Number: 2021/ET000310].

### Theoretical framework
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### Participant selection
Practising Australian OMFS were recruited through representative organisations and social network groups. The interviewees read the participant information sheet and informed consent was obtained. The participants were able to withdraw from the study at any point throughout the study.

### Setting
The interviews were conducted face-to-face, online meeting using Zoom (San Jose, CA, USA) or via telephone.

### Data collection
The interviews were semi-formal. The questions were a mix of open and close-ended (Table 1).

### Audio/visual recording
When interviews were conducted via Zoom, the software was used to record video and audio. When interviews were conducted through telephone or face-to-face, a voice recorder was used to record audio only. Field notes were made as required. The recordings were transcribed and de-identified. The transcriptions were then verified by an independent second person.

### Duration
Interviews were conducted between May 2021 and September 2021. One initial and one reminder post were made on social media. Therefore, everyone received reminders regardless if they participated in the interview.

### Data analysis
The transcriptions were imported into a coma-separated values file and the data imported into NVivo12 (QSR International). Themes and sub-themes were coded allowing generation of world clouds and a frequency table. The table was used to quantitatively analyse the data for common factors. The data was then imported into Graph Pad Prism 9.00 (Windows) (GraphPad Software, CA, USA) and analysed using a paired t-test and p-value was <0.05 for significance. The world cloud was used to determine potential common opinions and viewpoints that OMFS have regarding telehealth.

## 5. Results

### Demographics
A total of 20 OMFS were interviewed. One practised in South Australia while the remaining 19 were from Victoria. The average age was 40.7 years and the average years of practice was 6.8 years. 5 were female and 15 were male.
Descriptive Analysis

Five main themes were identified: accessibility, diagnosis, patient-centred care, technology, and finance. The distribution of positive, neutral, negative, and unstated comments is displayed in table 2. Out of the total stated comments, 200 were positive, 215 were negative and 9 were neutral. 256 codes were unstated by the interviewee. The number of positive, negative, neutral and unstated codes for each sub-theme is outlined in tables 3-7.

Overall, more interviewers were unsatisfied in diagnosis (n=162; positive=35.80%, negative=62.35%, neutral=1.85%) and technology (n=60; positive=8.33%, negative=83.33%, neutral=8.33%). Results were mixed for finances (n=8; positive=50%, negative=50%, neutral=0%), patient-centred care (n=114; positive=47.37%, negative=51.75%, neutral=0.88%) whilst results were positive for accessibility (n=80; positive=98.75%, negative=1.25%, neutral=0%). Of the sub-themes, clinicians were satisfied with simple consultations, remote patient accessibility, benefits during pandemics, convenience and patient acceptance. Sub-themes which clinicians were most dissatisfied with were reliability of patients to self-report symptoms, diagnosis of complex conditions/pathology, confidence in diagnosis, inability to tactile examine, interventional capacity, comparability to face-to-face and quality of the technology.

## Quantitative analysis
Paired t-test analysis was completed (Table 8). The number of positive (p<0.01), negative (p<0.01) and unstated (p<0.01) comments were all statistically significantly larger compared to the number of neutral comments. There was no significant difference between positive (p=0.84), negative (p=0.64) and unstated (p=0.46) comments.

## Diagnosis
Telehealth was effective for diagnosing simple cases.

*"It's excellent healthcare delivery for the very straightforward procedures and very straightforward patients who don't have any major requirements nor needing an examination."*

However, clinicians found it difficult to rely on patients to self-report signs of disease.

*"I don't think you could rely on a patient to assess their own kind of condition"*

Confidence was low regarding the diagnosis of complex cases and pathology through telehealth.

*"For the complex workup, there's just some things you can't do without the person physically being there so."*

One of the biggest downsides to telehealth was the inability to conduct a tactile examination

*"...being unable to make an accurate diagnosis and losing the whole clinical examination, laying hands on a patient*

*which I think is really key part of the whole being a doctor and being a surgeon"*

Telehealth was perceived to be very convenient.

*"I think from a cost and time perspective, travelling for patients it's a lot easier"*

## Accessibility
Telehealth improved access for rural and remote regions.

*"...allows patients who have difficulty coming in. So rural and also in circumstances where they're reliant on transport from either family members or assisted transport via ambulance etc. So, distances and inability for transport are the biggest areas where telehealth is important"*

Clinicians understood that telehealth was beneficial during pandemics e.g., COVID-19.

*"There's lower risk (of transmission) versus face-to-face which is why we use it during coronavirus"*

Telehealth was convenient for patients and clinicians.

*"...useful for quite a lot of young families and mothers quite liked it for the same reason as they didn't have to bring in their kids"*

Telehealth was beneficial in reducing waiting times and increase efficiency of services.

*"It has the potential to free up face-to-face time for those that truly need it"*

Benefits were seen with older patients however it was noted that some struggled with technology.

*"...older patients preferred it even though they weren't as comfortable with the technology. It meant that they did not need to have an additional carer or family taking time off to bring them to their appointment"*

## Patient centred care
Clinicians found that telehealth was effective for triaging.

*"...as a screening tool it's really helpful for surgical specialities and it reduces the consultation time later."*

Telehealth was also useful for post-operative reviews.

*"...good way of quick follow up with patients where clinicians might assess progress or treat one minor post-op complication"*

Patients generally accepted telehealth.

*"We had patient questionnaires and 100% of patients were very appreciative of the access to telehealth as they didn't have to take a whole day off work to travel to Melbourne."*

The lack of interventional capacity was a flaw of telehealth.

*"Limited interventional capacity. For our specialty it's not very good."*

All said telehealth was not comparable to face-to-face however the benefits were acknowledged.

*"...the experienced examination is the gold standard and that's what you need for most of our patients"*

Telehealth could potentially affect professionalism.

*"...may be less likely to show up if it's just a phone call. They may also be more likely to be doing their shopping or something like that when they take the call. They don't place as much importance as having the assessment at the appointment and giving their full attention"*

Developing patient rapport was difficult over telehealth

*"Developing rapport with patients is probably a bit more clunky than if you were actually doing that face-to-face"*

It was difficult to obtain non-verbal information

*"A lot of times you'll either find the consulting over the phone or over zoom or whatever, the patients have no idea what you're talking about, and you can't see that the patient doesn't understand. Whereas the clinic situation you can pretty much get the perplexed look on their faces"*

Language barrier difficulties became amplified over telehealth.

*"Language barriers become a problem and even more so when we have to have a 3rd person in the conversation to provide interpreting services."*

### Technology

The perception around technology of telehealth was mostly negative.

Most clinicians preferred face-to-face and those that didn't were neutral as they could see specific-use cases of telehealth.

*"Face-to-face is ideal because you can examine the patient more thoroughly"*

The current quality of technology caused difficulties.

*"I've had issues with setting up telehealth accounts in the past where they've taken ages to set up because you try and do it at hospital and it doesn't work then you ring the*

*company, and they send you emails and this and that. This creates such a big hurdle"*

Patients had difficulties using the technology

*"My older patient struggled to use telehealth and she couldn't use it even though we sent her instructions and things like that"*

Security of the telehealth data was a concern.

*"A concern is having secure platforms where patients can log in securely and have a confidential examination without the fear of privacy related issues"*
*Finances*

Finances were not a widely commented subject. There was some uncertainty for the future regarding the future financial viability of telehealth.

*"...currently funded by Medicare with no clear direction if it will continue"*

The overall sentiment was that telehealth should be continued in the long term and that clinicians are willing to use it.

*"... it should be continued and I would be more than willing to participate in it for the future."*

## 6. Discussion

This was the first study to analyse telehealth from the perspective of OMFS. Clinicians were mostly dissatisfied with diagnosis of conditions using telehealth (62.3% dissatisfaction), the current level of technology (83.3% dissatisfaction), and they felt that they were unable to deliver similar levels of care through telehealth compared to face-to-face (75% preferred face-to-face over telehealth). They were satisfied regarding the accessibility (98.8% satisfaction), triaging capabilities (100%) and post-op telehealth care (100%). Comments were mixed regarding the ability to build patient rapport (55.6% satisfaction) and the financials of telehealth (50% satisfaction).

Most clinicians felt that the diagnostic capability of telehealth was inadequate (62.3% dissatisfaction). While telehealth was appropriate for simple dentoalveolar conditions, however many felt it was inadequate for more complex conditions such as pathology. The one clinician who was confident using telehealth to diagnose pathology used telehealth between specialists and general dental practitioners where the specialist would guide the general dentist through a consultation with a patient in-person, rather than clinicians consulting patient over telehealth. Therefore, an appropriately trained general dentist would be examining patients face-to-face with guidance from the specialist rather than patients self-assessing themselves.

The main reason for this lack of confidence is the inability to conduct a tactile exam which is an essential part of any consultation. This lack of physical contact is an "implicit limitation of telemedicine" however it has been noted that certain specialties will be affected more than others.[15] For example, specialties that rely on physical exams, e.g., oral and maxillofacial surgery, would be heavily affected while specialists that rely on "visual physical examinations such as dermatology or verbal communication, such as psychiatry, may be relatively spared".[15] Furthermore, while prescriptions can be sent using telehealth, the lack of being able to intervene physically is a major flaw of telehealth, particularly in oral and maxillofacial surgery.[16] The technology behind telehealth was also perceived to be a hindrance. The quality of the technology, e.g., the cameras and the internet connection, were inadequate. Secure internet connections and cameras able to transmit accurate data is essential for accurate diagnosis and hence being unable to trust the equipment would create difficulties trusting diagnosis.[17] Technological issues were often compounded by patients who struggled to use the technology and software even when sent explicit instructions. Previous studies have also shown that equipment is a barrier to the adoption of telemedicine worldwide.[18] Streamlining software would greatly assist the use of telehealth. There were concerns regarding the data security and medicolegal implications of telehealth. As telehealth is transmitted over the internet, they are more vulnerable to security risks. While platforms are encrypted, none are completely safe and this limitation will likely never be rectified.[17] Concerns were raised regarding reimbursement for telehealth due to uncertainty of whether telehealth would continue to be funded through the MBS. Lack of organisational support regarding reimbursement is a large barrier to telehealth as many health insurance companies do not support telehealth for all medical practitioners.[19] If MBS were to halt funding for telehealth, this barrier would be even more difficult to overcome. Another issue were difficulties with language that became further compounded by telehealth. For face-to-face consultations, an in-person interpreter can provide clear instructions. A similar scenario in telehealth would require the interpreter to be added into the call, increasing the chances of poor internet streaming or lag which will result in miscommunication. This reinforces concerns raised in the literature regarding language barriers and the accessibility of telehealth.[18]

Telehealth was extremely beneficial to increase healthcare accessibility, especially for people living in rural or remote communities. This is one of the major benefits of telehealth and was supported by the outcomes of this study as well.[20] Telehealth was also perceived to be helpful during pandemics as it reduces patient movement, hence reducing transmission risk.[7] Telehealth has also been documented to protect those who are at greater risk of COVID-19 and HCPs from patients who have COVID-19.[21] The interviewees also commented that waiting times could be reduced using telehealth. Existing literature have already shown that telehealth improves efficiency by reducing wait-times for specialist services in dental hospitals as well as improve efficiency in hospital emergency departments.[1, 22] The feedback that clinicians received from their patients was mostly positive indicating that patient acceptance and satisfaction for telehealth is high. This is supported by the literature with patients reporting a high satisfaction rate for telehealth.[8, 9] However, the interviewees noted that they found it more difficult to establish patient rapport. Increased usage of technology has "led to patient complaints about physicians spending more time looking at computer screens than their patients" and delivering healthcare over screens may further exacerbate this grievance.[15] Telehealth has led to the perception of impersonal care and this may be due to the inability to be physically present with the patient.[18]

An interesting application of telehealth in the future would be combining the use of neural networks and deep learning combined with telehealth to improve diagnosis for patients. For example, deep learning was used to diagnose diabetic eye disease.[23] Furthermore, deep learning as also used to diagnose epilepsy from electroencephalogram signals.[24] If these techniques could be used in conjunction with a HCP using telehealth, it could potentially improve access to healthcare, especially for those living in rural and remote regions.

A limitation of the qualitative analysis was that individuals would have different standards regarding satisfaction of telehealth. Although sub-themes were generated and an analysis into the answers was completed in order to minimise the effects of this limitation, it cannot be completely eliminated. This study also did not account for the different types of telehealth used such as through telephones, video conferencing, between clinicians and patients and between specialists and a generalist who is consulting the patient. To minimise conflicting information, questions were asked to mostly focus on phone and video between clinicians and patients. Some clinicians did mention specialist to generalist services and hence this was also analysed.

The qualitative analysis of this study had 20 participants which created a large amount of rich data that could be analysed. Previous studies have recommended "a minimum sample size of at least 12 to reach data saturation".[25] We have achieved beyond this saturation point for our study.

While this study focused on the perspectives of OMFS, future studies should consider including a wide range of health care practitioners from different backgrounds to determine which specialties would benefit from telehealth and reasons behind it. This could allow for more efficient allocation of funding whilst also allowing development of strategies in effective delivery of telehealth across all health fields.

# 7. Conclusion

Telehealth has seen increased usage during the pandemic and improved access for those living in rural and remote

communities. Oral and maxillofacial surgeons were most satisfied with accessibility and most dissatisfied with diagnosis using telehealth. While the perspective from OMFS on telehealth was mixed, this is likely due to current limitations of the healthcare system and implementation. Further studies are required to assess the implementation of telehealth so that the limitations can be addressed. Telehealth will likely play an integral role in healthcare delivery in the future and hence it is important to continue to improve this service.

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Table 1. Interview questions asked in chronological order

| |
|---|
| Gender, Age, State, Years of practice (Close-ended) |
| Have you used telehealth consultations? (Close-ended) |
| What do you think of telehealth as a medium for healthcare delivery? (Open-ended) |
| ○    How confident are you in telehealth for diagnosis of health conditions? (Open-ended) |
| Advantages and disadvantages of telehealth?  (Open-ended) |
| ○    Why do you believe this is the case? (Open-ended) |
| What do you think are the main challenges to overcome to adopt this new technology? (Open-ended) |
| Do you prefer telehealth consultations or face-to-face consultations? |
| ○    Why do you believe this is the case? |
| Have you received feedback from your patients?  (Open-ended) |
| Do you have any other comments for me? |

Table 2. Number of positive, negative, neutral and unstated comments of the main themes

| | Diagnosis | Accessibility | Patient Centered Care | Technology | Finances | Total |
|---|---|---|---|---|---|---|
| Positive | 58 | 79 | 54 | 5 | 4 | 200 |
| Negative | 101 | 1 | 59 | 50 | 4 | 215 |
| Neutral | 3 | 0 | 1 | 5 | 0 | 9 |
| Unstated | 38 | 40 | 106 | 40 | 32 | 256 |

Table 3. Number of positive, negative, neutral and unstated comments of the sub-theme diagnosis

|  | Consults | Patient Self-Reporting Reliability | Simple Cases | Complex Cases | Pathology | Confidence in Diagnosis | Tactile Exam | Reliability | Accuracy | Convenience for operator |
|---|---|---|---|---|---|---|---|---|---|---|
| Positive | 20 | 0 | 20 | 0 | 1 | 1 | 0 | 3 | 2 | 11 |
| Negative | 0 | 12 | 0 | 19 | 17 | 16 | 20 | 6 | 10 | 1 |
| Neutral | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 |
| Unstated | 0 | 8 | 0 | 0 | 2 | 1 | 0 | 11 | 8 | 8 |

Table 4. Number of positive, negative, neutral and unstated comments of the sub-theme accessibility

|  | Remote | Pandemic | Convenience | Waiting times | Flexibility | Older Patients |
|---|---|---|---|---|---|---|
| Positive | 17 | 16 | 19 | 10 | 11 | 6 |
| Negative | 0 | 0 | 0 | 0 | 0 | 1 |
| Neutral | 0 | 0 | 0 | 0 | 0 | 0 |
| Unstated | 3 | 4 | 1 | 10 | 9 | 13 |

Table 5. Number of positive, negative, neutral and unstated comments of the sub-theme patient centred care

|  | Triage | Interventional capacity | Comparable to Face-to-Face | Post-op Care | Patient Rapport | Professionalism | Education | Patient Understanding | Patient Acceptance | Non-Verbal Information | Language Barrier |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Positive | 11 | 1 | 0 | 11 | 4 | 1 | 7 | 0 | 19 | 0 | 0 |
| Negative | 0 | 14 | 20 | 0 | 5 | 3 | 0 | 4 | 0 | 10 | 3 |
| Neutral | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| Unstated | 9 | 5 | 0 | 9 | 11 | 16 | 13 | 16 | 0 | 10 | 17 |

Table 6. Number of positive, negative, neutral and unstated comments of the sub-theme technology

|  | Telehealth Preference | Technology Quality | Data Security | Patient's Technology Use | Medicolegal |
|---|---|---|---|---|---|
| Positive | 0 | 4 | 0 | 1 | 0 |
| Negative | 15 | 14 | 5 | 12 | 4 |
| Neutral | 5 | 0 | 0 | 0 | 0 |
| Unstated | 0 | 2 | 15 | 7 | 16 |

Table 7. Number of positive, negative, neutral and unstated comments of the sub-theme finances

|  | Billing | Cost |
|---|---|---|
| Positive | 2 | 2 |
| Negative | 4 | 0 |
| Neutral | 0 | 0 |
| Unstated | 14 | 18 |

Table 8. Paired t-test analysis for positive, negative, neutral and unstated comments

|  |  | Mean | Std. Deviation | Lower 95% CI | Upper 95% CI | Sig (2-tailed) |
|---|---|---|---|---|---|---|
| Pair 1 | Positive - Negative | 0.46 | 13.62 | -4.22 | 5.14 | 0.84 |
| Pair 2 | Positive - Neutral | 6.74 | 9.73 | 3.40 | 10.08 | 0.00 |
| Pair 3 | Positive - Unstated | -0.91 | 11.50 | -4.87 | 3.04 | 0.64 |
| Pair 4 | Negative - Neutral | 6.29 | 6.77 | 3.96 | 8.61 | 0.00 |
| Pair 5 | Negative - Unstated | -1.37 | 10.93 | -5.12 | 2.38 | 0.46 |
| Pair 6 | Neutral - Unstated | -7.66 | 6.73 | -9.97 | -5.34 | 0.00 |