The Role of Telemedicine for Symptoms Management in Oral Medicine: Retrospective Study

Zahra Alsafwani (zahra.alsafwani@ucsf.edu)
University of California, San Francisco

Caroline Shiboski
University of California, San Francisco

Alessandro Villa
University of California, San Francisco

Research Article

Keywords: telemedicine, symptoms, management, oral medicine, Retrospective study, syndrome coronavirus 2 (SARS-CoV-2), patients,

Posted Date: November 9th, 2021

DOI: https://doi.org/10.21203/rs.3.rs-1033087/v1

Abstract

Background: Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has had devastating effect on access to care in many specialties and dental services including oral medicine. Following the shelter-in-place orders in March 2020, we implemented Tele(oral)medicine practices for the diagnosis and management of some oral medicine conditions

Objectives: To assess the effectiveness of telemedicine visits with respect to pain control among patients affected by oral diseases.

Methods: A retrospective chart review for all the new patients seen at their first visit via telemedicine between April 2020 and December 2020. The patient-reported pain score was recorded at each visit using a 0-10 scale. Differences in oral pain from the first fist to the follow-up visit of the patients were evaluated using the Wilcoxon signed-rank test.

Results: A total of 137 new patients were included with a median age of 56 years. If seen in person, patients would have travelled a median distance of 65 miles. The most common oral conditions seen were reactive/inflammatory lesions. There was a 3-point median pain reduction from the first video visit to the first follow-up ($p<0.05$) and a self-reported 65% median improvement of oral symptoms.

Conclusion: Tele(oral)medicine was an effective method for symptoms management of oral medicine conditions.

Introduction

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has had devastating consequences globally, with multifaceted effects on education, and access to care in many specialties including dental and oral medicine services.[1,2] Through the first months of the COVID-19 pandemic, a variety of medical treatments and visits were put on hold resulting in significant diagnostic delays and postponement of necessary medical and dental therapies.[3]

On March 16, 2020, the American Dental Association (ADA) recommended that US dentists postpone all non-urgent dental procedures, and focus on managing dental emergencies only, in order to reduce patients' potential exposure to COVID-19 infection.[1] According to an ADA Health Policy Institute survey conducted during the week of March 23, 2020, 76% of dental offices in the US were closed, although managing emergency patients, 19% were fully closed, and 5% were open but treating a lower number of patients.[1]

In response to the pandemic most medical institutions expanded the use of Telehealth practices as an alternative solution to continue patient care.[4] While Telemedicine was already largely utilized prior to the COVID-19 pandemic amongst several medical services (e.g., dermatology), the use in oral medicine and other dental practices was limited.[4,5]

Teledentistry (a subunit of telehealth along with telemedicine) is not a new concept. It was started in 1994 by the US military to serve US troops around the word. It has been proven over the years to be beneficial for remote dental screening, making diagnoses, providing consultation and proposing treatment plans.[6] For the diagnostic standpoint, Ghai Suhani described telediagnosis as "the use of technology to share images and data in order to develop an oral lesion diagnosis. Therefore, that led to reduction of patient referrals to specialists from 96.9–35.1% with the use of a telediagnosis program named EstomatoNet. While the use of smartphones for detection of dental caries is well advocated, it is also proven to be a useful tool for screening oral potential malignant lesions.[6]

Following the shelter-in-place orders on March 16, 2020, we implemented Tele(oral)medicine practices for the diagnosis and management of some oral medicine conditions.[7,8] Tele(oral)medicine continued even after the shelter-in-place was lifted, especially for those patients who were not able to travel far, or those who wanted to avoid public transportation and maintain social distancing. The objective of the present study is to assess the effectiveness of telemedicine visits with respect to pain control between the initial telemedicine visit and the first follow up visit.

Methods

Study population

This study was a retrospective chart review of all new patients who were seen via telemedicine for the first time at the “Sol Silverman Oral Medicine Clinic” at the University of California San Francisco between April 1st, 2020, and December 22nd, 2020. This study was approved by the UCSF Institutional Review Board.

Data Collection

Clinical data were extracted from electronic medical records using a standardized data collection form and entered into an electronic spreadsheet. Specifically, we included demographic information, home Zip Code, referring doctor (and specialty), type of insurance, clinical diagnosis (based on the International Classification of Disease, 10th edition [ICD-10] codes), laboratory tests and imaging studies ordered at the time of the first video visit. Google Maps (www.google.com) was used to calculate the distance between the patient’s home and the oral medicine clinic. Patient-reported pain score was recorded at each visit using a 0-10 scale (0: no pain; and 10: the worst pain). At follow up video visits we also recorded the patient’s self-reported percentage of improvement since last visit.

Statistical analysis

Descriptive statistics were used to calculate median and range of the patients age, pain scale, percentage of self-reported improvement of oral symptoms and distance between the patient’s home and the oral medicine clinic. The presumptive diagnoses made upon the first visit were grouped into the following eight categories: (1) Reactive or inflammatory lesions, (2) Immune-mediated conditions, (3) Orofacial

pain disorders (4) Infections, (5) neoplasms, (6) Pre-neoplastic conditions, (7) Metabolic disorders and (8) Other.

Differences in patient-reported oral pain scores between first and follow up visits were evaluated using the Wilcoxon signed-rank test. The *p*-value was considered statistically significant if <0.05.

Results

Patient characteristics

A total of 137 new patients were seen as part of telemedicine consultation for their first visit from April 1, 2020, to December 22, 2020 with a median age of 56 years (range 3-89 years; Table 1). The majority of patients were females (n=79; 57%), and among 85 patients who chose to report their race/ethnicity, the majority (n=70; 82%) reported being White.

Type of insurance

For most patients (n= 92; 67%) their telehealth visit was covered by private medical insurance, followed by Medicare (n=31; 23%), dental insurance (Private dental insurance, n=4; 3%, Dentical, n=5; 4%), and five patients (4%) were uninsured.

Oral Medicine referral

More than half of the patients (n=82; 60%) were referred by medical doctors, with the greatest proportion coming from primary care physicians (n=47; 34%; Table 2), followed by otolaryngologists (n=17; 12%), oral maxillofacial surgeons (n=5; 4%), dermatologists (n=5; 4%), pediatricians (n=3; 2%), immunologists and oncologists (n=2; 2%). Twenty-one patients (15%) were referred by their general dentist and 35 (26%) were self-referred. If seen in person, patients would have travelled a median distance of 65 miles (range: 0.9-100 miles).

Diagnostic tests ordered

One third of patients (n=51; 37%) required an oral biopsy (incisional biopsy: n=32); excisional biopsy: n=19) and were asked to schedule an appointment for an in-person visit. Panoramic radiographs and laboratory studies were ordered in 13 (9%) and three (2%) patients, respectively (Table 3).

Diagnosis and symptoms

The most common presumptive diagnoses made were reactive/inflammatory lesions (40%; Table 4), followed by immune-mediated conditions (23%), orofacial pain disorders (13%), infections (12%), neoplasms (6%), other (3%), and metabolic and pre-neoplastic conditions (1%).

Symptoms management

When pain was considered, there was a 3-point median pain reduction (on a 1-10 scale) from the first video visit to the first follow up (5.5. vs. 2.5; $p<0.05$), and a self-reported 65% (IQR=50%-90%), median improvement of oral symptoms. Of note, sixteen patients (12%) did not report any pain at first visit and were therefore excluded from this analysis.

Discussion

This study revealed that tele(oral)medicine during the COVID-19 pandemic was a successful tool to manage the symptoms of a variety of oral mucosal diseases. We found that there was a significant reduction of oral pain between the first video consultation and follow up with a 65% self-reported improvement of oral symptoms.

Most patients with oral mucosal conditions see several providers before having a correct diagnosis and travel long distances due to a paucity of oral medicine specialists in the United States.[9]

Most oral medicine specialists work in academic settings in urban areas making it challenging for patients living in rural areas to easily access oral medicine services (e.g., dental schools or academic medical centers).[9] A study from Brigham and Women's Hospital in Boston, MA showed that patients travelled a median distance of 18.9 miles (range 0.2-525) to see an oral medicine specialist, with over 85% living within 60 miles away from the oral medicine clinic.[9] Similarly, another study conducted at the University of Alberta, Canada showed that the average distance traveled by patients to access the oral medicine clinic was 55.5 Km (34.5 miles) and the average wait time for the patients to be seen was 105.5 days.[10] In our study, patients would have travelled a median distance of 65 miles (range: 0.9-100) if they had been seen in person. Travelling long distances may result in increased costs to patients.[11] Telemedicine offers a unique opportunity for patients who otherwise do not have an oral medicine specialist in the vicinity.

In our study, more than half of the patients were referred by physicians (60%). Similarly, Villa et al(2015), in another US study showed that two third of the patients were referred by physicians and the remaining one third referred by dentists (22%).[9] This was different from the study by Friesen and colleagues which showed that 81% of the oral medicine patients were referred by dental practitioners with the general dentist being the most common (74.5%).[10] Similarly, another study characterizing an oral medicine practice at a dental hospital in the United Kingdom showed that nearly three quarters (75%) of the patients were referred by dentists.[12]

When the patient's insurance was considered, two thirds of our patients (67%) had private medical insurance, and (23%) had Medicare. Similar results were reported by Villa et al. and showed that the most patients (66%) had private medical insurance, with (16%) having Medicare coverage and (5.7%) having Medicaid; (11%) of patients had a mix of public and private coverages, with the remaining (0.8%) being uninsured.[9]

The most common oral conditions specifically seen were reactive lesions (40%) followed by immune-mediated conditions (23%), and orofacial pain disorders (13%), A biopsy was ordered for 37% of the patients. This was similar to what has been reported in the past for in person oral medicine visits in other practices in the US. Specifically, Villa et al.(2015) showed that the most common diagnoses included immune-mediated mucosal conditions (27%), orofacial pain disorders (25%), benign tumors or neoplasms (10%), and dysplasia and cancerous conditions (7.6%), oral biopsy was the most common procedure performed.[9] In addition, Friesen et al. reported that the most common lesions seen were red and white (38%) and the Immune-mediated conditions were the most common final diagnosis (29%) of cases.[10]

A recent systematic review demonstrated that teledentistry is not a new concept and it has been known in the US military since 1994, but it was limited to consultations, diagnosis and treatment plan.[6] During the recent COVID-19 pandemic teledentistry has been used as a remote facilitator of dental treatment, guidance and education and offered a novel solution to continue dental practices during the pandemic.[6] On the other hand, there has been several challenges around acceptance of teledentistry by the dental providers and patients who need urgent care due to the lack of the actual dental procedures.[6]

Especially at this time, reliance on telemedicine has grown, and recent studies have shown that patients are usually satisfied with telehealth.[8]A study conducted in New York showed an 8729% increase in video visit use during the COVID-19 period compared to the pre–COVID-19 pandemic.[13] Our previous work showed that oral medicine patients were pleased with Tele(oral)medicine sessions (85%).[8] Moreover, a study from Ghai Suhani at el. reported that acceptance of teledentistry has been increasing day by day by patients and health care providers.[6] Patient satisfaction with video visits is high and does not seem to be a barrier toward a paradigm shift away from traditional in-person clinic visits.[13]

Our study has some limitations. This was a single study center study within a large academic medical center, as such it may not be generalizable to other oral medicine practices in the US. Future studies should include other private and academic centers. Furthermore, we were not able to look at the reimbursement of telemedicine visits and compare it to in person consultations. The Center of Medicare Services (CMS) reported that due to the COVID public health emergency, patients would pay the same amount that they would if they got in person services.[1] However, this may change in the future.

Conclusion

Tele(oral)medicine was an effective method for symptoms management of oral medicine related conditions, with several advantages over in person visits during the COVID-19 pandemic. It helped to facilitate public health mitigation strategies during the pandemic by increasing social distancing and saved patient time and costs associated to transportation use. Furthermore, remote access to oral medicine services may increase participation for those who are medically or socially vulnerable or who do not have ready access to providers such as patients with a special need or an elderly patient who needs

transportation. Tele(oral)medicine may be continued to be used in the future for an initial screening for oral mucosal conditions and to improve access to care to those patients that do not have an oral medicine specialist in their area.

Declarations

Ethics approval and consent to participate

- The study was approved by UCSF IRB (20-31367)

Consent for publication

-Not Applicable

Availability of data and material

- The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request

Competing interests

- The authors declare that they have no competing interests

Funding

- We report no conflicts of interest for any of the authors listed and no sources of funding were required to complete this study

Authors' contributions

- Z.A: Data collection and Manuscript writing.

- C.S: Manuscript review and provided feedback.

- A.V: Conceptualization, data analysis and manuscript review.

Acknowledgements

-Not applicable

References

1. American Dental Association. HPI poll examines impact of COVID-19 on dental practices. https://stage.ada.org/en/publications/ada-news/2020-archive/april/hpi-poll-examines-impact-of-

covid-19-on-dental-practices?_ga=2.60007597.1221223386.1587062986-9041569.1523984324. Accessed July 1, 2020.

2. Brian Z, Weintraub JA. Oral Health and COVID-19: Increasing the Need for Prevention and Access. Prev Chronic Dis. 2020 Aug 13;17:E82. doi: 10.5888/pcd17.200266. Erratum in: Prev Chronic Dis. 2020 Aug 27;17:E93. PMID: 32790606; PMCID: PMC7458118.
3. Coulthard P, Thomson P, Dave M, Coulthard FP, Seoudi N, Hill M. The COVID-19 pandemic and dentistry: the clinical, legal and economic consequences - part 1: clinical
4. Doraiswamy S, Abraham A, Mamtani R, Cheema S Use of Telehealth During the COVID-19 Pandemic: Scoping Review J Med Internet Res 2020;22(12):e24087
5. Jampani ND, Nutalapati R, Dontula BS, Boyapati R. Applications of teledentistry: A literature review and update. J Int Soc Prev Community Dent. 2011;1(2):37–44. doi:10.4103/2231-0762.97695
6. Ghai S. Teledentistry during COVID-19 pandemic. Diabetes Metab Syndr. 2020;14(5):933–935. doi:10.1016/j.dsx.2020.06.029
7. Villa A, Sankar V, Shiboski C. Tele(oral)medicine: A new approach during the COVID-19 crisis. Oral Dis. 2020 Apr 20:10.1111/odi.13364. doi: 10.1111/odi.13364. Epub ahead of print. PMID: 32307831; PMCID: PMC7264524.
8. Villa A, Sankar V, Shazib MA, Ramos D, Veluppillai P, Wu A, Shiboski C. Patient and providers' satisfaction with tele(oral)medicine during the COVID-19 pandemic. Oral Dis. 2020 Oct 11:10.1111/odi.13678. doi: 10.1111/odi.13678. Epub ahead of print. PMID: 33043546; PMCID: PMC7675484.
9. Villa A, Stock S, Aboalela A, Lerman MA, Woo SB, Sonis ST, Treister NS. Oral Medicine referrals at a hospital-based practice in the United States. Oral Surg Oral Med Oral Pathol Oral Radiol. 2015 Apr;119(4):423–9. doi: 10.1016/j.oooo.2015.01.003. Epub 2015 Jan 20. PMID: 25758844.
10. Friesen R, McGaw T, Peters E, Lai H. A retrospective analysis of referral patterns to a university oral medicine clinic. Oral Surg Oral Med Oral Pathol Oral Radiol. 2019 Oct;128(4):381-385. doi: 10.1016/j.oooo.2019.04.007. Epub 2019 Apr 16. PMID: 31103528
11. Irving M, Stewart R, Spallek H, Blinkhorn A. Using teledentistry in clinical practice as an enabler to improve access to clinical care: A qualitative systematic review. J Telemed Telecare. 2018 Apr;24(3):129–146. doi: 10.1177/1357633X16686776. Epub 2017 Jan 16. PMID: 28092220.
12. Hleyer T, Mattsson U, Ní Ríordáin R, Brailo V, Glick M, Zain RB, Jontell M. Advancing oral medicine through informatics and information technology: a proposed framework and strategy. Oral Dis. 2011 Apr;17 Suppl 1:85-94. doi: 10.1111/j.1601-0825.2011.01794.x. PMID: 21382141
13. Ramaswamy A, Yu M, Drangsholt S, et al. Patient Satisfaction With Telemedicine During the COVID-19 Pandemic: Retrospective Cohort Study. J Med Internet Res. 2020;22(9):e20786. Published 2020 Sep 9. doi:10.2196/20786
14. “Telehealth.” Telehealth Insurance Coverage, . Accessed October 1, 2021.

Tables

Table 1. Demographics and insurance coverage among 137 new patients seen through a tele(oral)medicine visit from April 1 to December 22, 2020

Sex	**N**	**(%)**
Female	79	57%
Male	58	43%
Median age = 56 years (range 3-89 years)		
Race/Ethnicity		
White	70	51%
Asian	12	9%
Hispanic	3	2%
African American	1	1%
Unreported	51	37%
Type of insurance		
Private medical insurance	92	67%
Medicare	31	23%
Private Dental insurance	4	3%
DentiCal	5	4%
Uninsured	5	4%

Table 2. Referring doctors for 137 new patients seen through a tele(oral)medicine visit from April 1 to December 22, 2020

Referring Doctors	**N**	**(%)**
Dentist	21	15%
Medical doctors		
Primary care physician	47	34%
Otolaryngologist	17	12%
Oral maxillofacial surgeon	5	4%
Dermatologist	5	4%
Pediatrician	3	2%
Immunologist	2	1%
Oncologist	2	1%
Self-referred	35	26%

Table 3. Diagnosis category among 137 new patients at their first tele(oral)medicine visit from April 1 to December 22, 2020

Diagnosis Category	**N**	**(%)**	**Presumptive Diagnosis n (%)**
Reactive	56	40%	Fibroma, papilloma, pyogenic granuloma: n= 37 (52%) Hypersensitivity reactions: n=2 (3%) Other: n =17 (30%)
Autoimmune	31	23%	Lichen planus: n =14 (45%) Pemphigus/MMP: n =3 (10%) RAS: n = 14 (45%)
Orofacial Pain	18	13%	Burning mouth syndrome: n =16 (89%) TMJ: n =1 (5.5%) Myofascial pain: n =1 (5.5%)
Infection	17	12%	Oral candidiasis: n=8 (47%) Bacterial infection: n=1 (6%) Recurrent HSV infection: n= 2 (12%) Other: n=6 (35%)
Neoplasm	9	6%	SCC: n:3 (33%) Dysplasia: n =6 (67%)
Other	4	3%	Pre-radiation
Metabolic	1	1%	IBD related oral ulcer
Pre-Neoplastic	1	1%	Proliferative leukoplakia

Abbreviations: SCC: Squamous cell carcinoma; IBD: Inflammatory bowel disease; MMP: Mucous membrane pemphigoid; RAS: Recurrent aphthous stomatitis

Table 4. Diagnostic and laboratory tests ordered among 137 new patients at the time of at their first tele(oral)medicine visit from April 1 to December 22, 2020

Biopsy needed	**N**	**(%)**
Yes	51	37%
Incisional	32	63%
Excisional	19	37%
No	86	63%
Imaging studies needed	**N**	**(%)**
Panoramic radiograph	13	9%
No	124	90%
Laboratory investigations needed	**N**	**(%)**
Yes*	3	2%
No	134	98%

*CBC was ordered for two patients; PT, PTT and INR were ordered for one patient

Abbreviations: PT: Prothrombin time; PPT: partial thromboplastin time; INR: International normalized ration; CBC: complete blood count