PRACTICE BRIEF

Teledentistry applications for mitigating risk and balancing the clinical schedule

Nathan Suter, DDS [iD]

Green Leaf Dental Care, 7214 Executive Parkway, House Springs, MO, USA

Abstract

The upheaval of providers and their patients has led to many changes in the way people live and work. In addition to the changes in Personal Protective Equipment (PPE) guidelines, there has been evidence of rapid adoption of telehealth services. In April of 2020, the American Dental Association's Health Policy Institute released a report stating that 1 in 4 dentists nationally were utilizing teledentistry to perform limited evaluations. Many of these dentists are new to teledentistry, and unfortunately, direct-to-patient consultations yield limited clinical outcomes. The more traditional methods of using teledentistry have been extending the reach of dental care for over a decade, using an allied team member such as a dental hygienist or expanded-function dental assistant. As dentistry adapts to this new environment, it is important that there be adequate awareness of the diverse uses of teledentistry to meet the needs of the population. This brief, outlines one dental clinic's attempt at providing a broad use of teledentistry.

Clinic name

Green Leaf Dental Care.

Objective/Goal

Re-opening a dental clinic using multiple applications of teledentistry to mitigate risk of COVID-19 exposure to patients and staff.

Methodology

Green Leaf Dental Care is a small clinic just outside the St. Louis Metropolitan area. The clinicOur clinic has a single dentist, two part-time dental hygienists, and four support staff[1]. The clinic was utilizing teledentistry[2] to cover hygiene recall when the doctor was out of the office prior to the COVID-19 pandemic. The dentist and hygienist also had previous experiencehad been utilizing teledentistry for several years at a community health center before working at this clinic. The literature also supported the utilization of teledentistry to increase access[3,4] to dental care. In response to COVID-19, the clinic has expanded teledentistry services to include multiple types of teledentistry

appointments. We describe these visits as Patient-to-Dental Team Member (DTM), DTM to Dentist, and DTM to Specialist. The visits can be performed either synchronous or asynchronous depending on the patient's needs and the availability of the DTM, dentist and patient. From March 15, 2020, through June 10, 2020, the dental clinic was closed and patients only had access through teledentistry triage and limited exams. Upon reopening the clinic, all patients are were triaged via teledentistry either Patient to DTM or DTM to Dentist. Teledentistry is being used as a method to limit person-to-person contact by reducing the number of people in the office each day. In addition, the dentist is only seeing patients in person that are in need or presenting as new patients. These controls have been put in place to mitigate risk as well as to preserve the amount of PPE used per patient. Prior to COVID-19, the office was open to patient cares 3.5 days per week. The office schedule has been adapted as shown in the Scheduling Template to have a treatment team provide care 2.5 days per week and a hygiene team provide intake of teledentistry patients 2 additional days per week. Dividing the staff and patients provides risk mitigation and allows for almost half the amount number of people to be in the

office throughout each day. This also limits the amount number of patients and staff in the office while aerosol-producing procedures are being conducted. This method gives the dental practice the ability to not have to close down for forced quarantine if there is exposure to a COVID-19 positive patient or staff member. In order to try to keep up with patient demand while decreasing in-person appointment availability, we have implemented multiple applications of teledentistry to meet our patients' needs.

Teledentistry applications

Teledentistry has many proven applications[5] that can be implemented to increase access to care, provide safeguards to mitigate risk, demonstrate innovative ability to deliver care, and create convenience for patients. The following are a handful of ways Green Leaf Dental Care is reaching patients using the tool of teledentistry. There are more applications possible, but these are the main ways we currently implement them into our new clinical workflows.

Limited evaluation and triage: This application is useful during a crisis or pandemic scenario. If a provider does not have access to a dental clinic or patients' clinical records, they can use teledentistry to complete triage, screen, or complete a limited evaluation. This application helps determine if a patient's needs are nonurgent or emergent. The limiting factor is that a differential diagnosis cannot be fully formed with a Patient to Dentist visit since more clinical data such as radiographs may be needed.

Hygiene assessment: Recall and preventive appointments are completed using teledentistry. This increases the clinic's capacity for a high level of hygiene care thus allowing the dentists to focus on diagnosis and restorative care. Additionally, if the dentist is not available, preventive care does not stall or halt. The hygiene assessment is also an avenue to see "emergency" patients when there is no dentist in the dental office. Patients are able to come into the office and get radiographs and photographs to aid in the diagnosis. The dentist can then gain a definitive diagnosis and decide if treatment can be rendered with the treatment team, should be referred, or put on hold due to high risks.

Patient consultations: This application uses teledentistry in order to provide a convenient service to patients. This can include follow-up consultations between a patient and the dental team member or a more in-depth discussion about treatment plan options with the dentist. This service addresses multiple needs in relation to COVID-19 such as reducing in-person contact, eliminating the use of PPE, reducing the amount of people in a space at any one time, and allowing the provider and patient to communicate in a setting where they are comfortable.

Outreach: Teledentistry is an important element in comprehensive community outreach programs. Most often implemented in school or nursing home settings, participants receive a complete examination and treatment plan and staff can be utilized more efficiently based on the needs of the patients. The University of Pacific, through an almost decade-long pilot program, has shown this method of reaching people to be as effective[6] as in-person examinations.

Specialist consultations: Navigating the health care system can be difficult. Teledentistry assists patients by allowing providers to transfer data to specialists for additional consultation. This application has shown[7] that you can extend the reach of a dental specialist into communities that lack specialty care. There is evidence[8] that this method is predictable and not just a convenience.

In response to COVID-19, Green Leaf Dental Care has implemented all of the applications listed above in some capacity. The outreach capacity has been limited since quarantine began, but we plan to expand our community outreach using our enhanced adoption of teledentistry tools. These applications allow our practice to extend outside of the physical walls of our practice and bring patients into a dental home from multiple different points of care. In order to illustrate how we started using our practice management scheduler for both the scheduled teledentistry visits that are synchronous and the asynchronous visits we created the Scheduling Template in Figure 1. The different types of teledentistry visits are colored to illustrate some of the different ways teledentistry can present in a daily schedule. The inherent problem is that asynchronous "visits" do not really belong in a schedule. Due to these limitations in current software platforms, we decided we needed to find a solution to organize our teledentistry exams and coordinate the follow-up care of our patients.

We found after searching for tools on the market for teledentistry that there was a gap in functionality to provide a seamless management of teledentistry patients. Our normal workflow of using a schedule combined with in person handoffs of the patient as well as notes and sticky notes
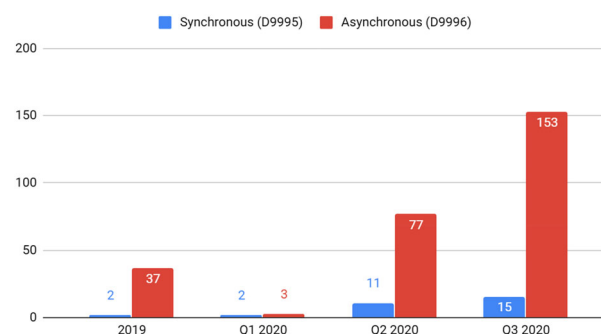

Figure 1 Green leaf dental care teledentistry by code.

would was not meeting the demand of this innovative way to treat patients. The teledentistry tools available only offered the video conference and messaging capability to perform the visit but not the functionality to close the workflow cycle. We found that the closest functionality in project management tools from other industries. We tested these tools and found that they were far more effective in organizing our asynchronous visits while providing a platform to communicate between all of the members of the care team.

Scheduling Template

	Hygiene Assessment Team			Treatment Team			
Days per Week	Tuesdays and Thursdays			Mondays, Wednesdays, and Fridays			
Staffing	1 Hygienist - 1 Secretary			1 Dentist - 1 Dental Assistant - 1 Secretary			
Operatory	Operatory #1	Operatory #2	Operatory #3	Operatory #1	Operatory #2	Operatory #3	Virtual Operatory
Category	Hygiene Assessments	Emergency Triage	overflow chair	non-areosol procedures	aerosol procedures	overflow chair	scheduled teledentistry
8:00 AM	Teledentistry Assessment - Adult Recall			Extractions			
8:15 AM							
8:30 AM							
8:45 AM		Teledentistry Assessment- Limited					
9:00 AM							
9:15 AM	Teledentistry Assessment - Adult Recall				Filling Appointment		
9:30 AM							
9:45 AM							
10:00 AM		Teledentistry Assessment- Limited		Lab Case			
10:15 AM							Synchronous Consultation
10:30 AM	Teledentistry Assessment - New Patient						
10:45 AM					Crown/Bridge		
11:00 AM							
11:15 AM		Teledentistry Assessment- Limited					
11:30 AM							
11:45 AM	Teledentistry Assessment - Adult Recall			Lab Case			
12:00 PM							
12:15 PM							
12:30 PM				LUNCH	LUNCH	LUNCH	LUNCH
12:45 PM							
1:00 PM	LUNCH	LUNCH	LUNCH				
1:15 PM					Filling Appointment		
1:30 PM							
1:45 PM	Perio Maintenance						
2:00 PM							
2:15 PM		Teledentistry Assessment- Limited		Extractions			
2:30 PM							
2:45 PM							Synchronous Consultation
3:00 PM	Teledentistry Assessment - New Patient						
3:15 PM							
3:30 PM		Teledentistry Assessment- Limited			Filling Appointment		
3:45 PM							
4:00 PM	Teledentistry Assessment - Adult Recall						Synchronous Consultation
4:15 PM							
4:30 PM							
4:45 PM				Lab Case			
5:00 PM							
				Asynchronous exams from previous day			
				Adult Recall	Adult Recall	Adult Recall	Adult Recall
				New Patient	New Patient	Limited Eval	Limited Eval
				Patient-DTM Limited Eval	Limited Eval	Limited Eval	Limited Eval

Figure 2 Scheduling template.

Outcomes

Green Leaf Dental Care has seen a significant increase in patient care provided via teledentistry. As illustrated in Figure 2, we have performed far more asynchronous exams since the clinic resumed in-person care. We also found that by using the technology of teledentistry, we can start to reopen and become more efficient with the time we have by using digital tools and limiting person-to-person contact. The most significant operational and patient satisfaction outcome was a decrease hygiene recall time. Using a synchronous teledentistry, we could decrease chair time between 10–15 minutes. This was very helpful in allowing us to maintain our pre-pandemic patient volume while adhering to new infection control and social distancing guidelines.

We found out very quickly that the current dental scheduling module in the electronic dental record does not have an adequate way of tracking asynchronous teledentistry exams. We used the existing PMS/EDR to organize our asynchronous exams at the end of the next day's schedule, however, it was not a dependable work around. That is why we tested several project management tools to organize the que of patients and communicate regarding follow-up. We also created what we call a virtual operatory in our practice management system to have same day synchronous examination spots for the dentist and patient to discuss treatment plans.

In the Scheduling Template, you can see that we are able to keep a minimum number of people in the office including staff and patients by separating our staff into teams and staggering patient visits. Separating our staff into a hygiene assessment team and a dentist treatment team allows us to mitigate risk and avoid a second full closure in the event of an exposure to COVID-19. This phased reopening strategy has given us flexibility as we are already seeing some states roll back their reopening plans due to spikes in the disease and increases in hospitalizations. This did in fact help us mitigate risk in early September 2020 where one of the hygiene team members experienced community spread resulting in the exposure of the hygiene team. The treatment team was able to maintain the schedule with only a partial disruption in patient care.

Lessons learned

We have learned three main points from our emerging method of delivering care:

- Telehealth allows for adaptability. We started using teledentistry thinking there were only a few applications. However, when our team came with an open mind, we were able to evaluate the technology's capabilities and our patients' needs in order to find new ways to deliver care. We are realizing that as we ramp back up our clinical services, we can continue to limit exposure while adding more teledentistry visits into the schedule. The more practical way to do this is with asynchronous communication since the dentist's schedule is more impacted by the new PPE and infection control guidelines.
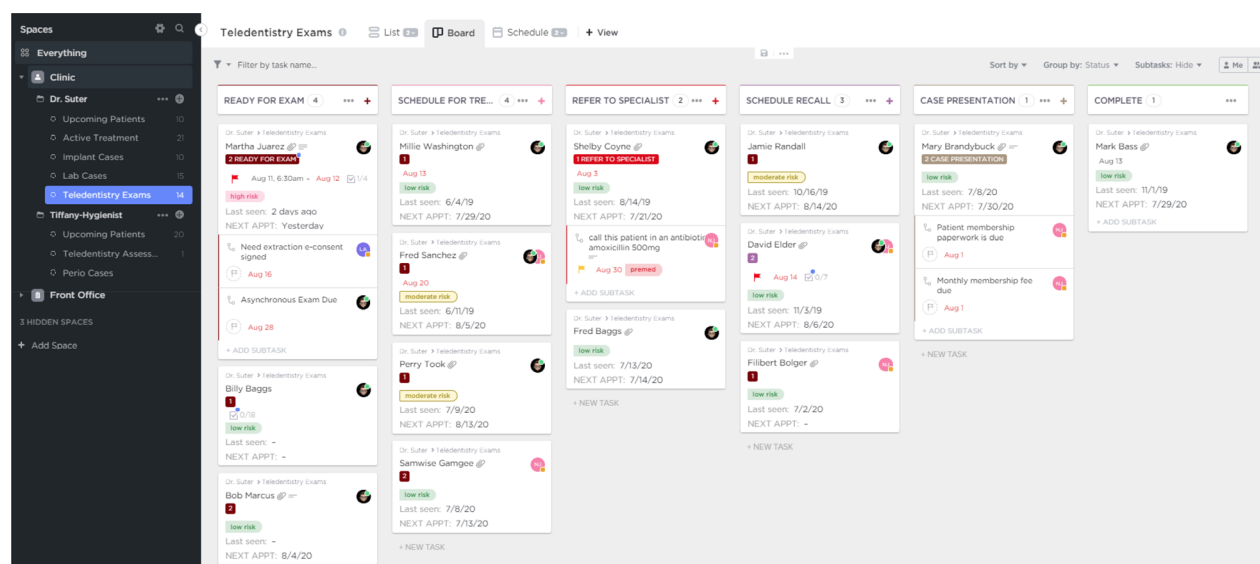
Figure 3 Screen shot of care coordination platform. This is a mockup of patients and is not actual patient information.

- Digital tools still have room to grow. Our clinic, along with many others, has added digital solutions to reduce person-to-person contact to help limit the spread of COVID-19. These solutions are all pieces of teledentistry, including patient forms, patient messaging, consent, virtual waiting rooms, online payment, video conferencing, and more. The difficulty in implementation is that most of these platforms are not connected to one another. Many of these solutions were also built for dental clinics that have all of their staff and patients in a "traditional" setting. The restrictions of these platforms mean that custom and innovative workarounds need to be created by team members to utilize teledentistry. The main obstacle we have run into has been the ability to manage an asynchronous que of patients and the care coordination required to make sure none of the care team drops the ball (Figure 3). We decided that we needed a tool that was predictable and started to develop our own solution to manage these patients. The key is to have a system that organizes both the patient and all of the communication between the care team in order to make sure the appropriate follow-up care is delivered. The easiest comparison would be a project management and task management system for dental teams to work regarless of when or where they are physically located.

- Patients are doing a great job adapting. Teledentistry may have been hard to explain to patients before COVID-19, but that is no longer the case. The acceptance of telehealth services broadly has made conversations around teledentistry much easier. We have found that as long as the dental team member is comfortable with the technology then they can help the patient troubleshoot any problem they have. Patients are very receptive to the extra layer of risk mitigation as well as a visit that takes less time.

Conclusion

Telehealth services, which include teledentistry, have been rising in the public's awareness. *Business Insider* reports[9] that global growth of the telehealth market is set to climb nearly 20% in the next 5 years. That is an increase from $38 billion in 2018 to almost $130 billion by 2025. More than half of that growth is reported to come from the United States. The April 20 COVID economic tracking poll[3] from the ADA's Health Policy Institute indicated that more than 25% of dentists are now offering some form of virtual, limited evaluation of patients. Demand among patients can drive these trends—and with that, acceptance of providers. This acceptance and even preference by

patients[10] is already shown in other areas of telehealth. In the coming months and years, patients will likely expect that a dental office will offer some sort of virtual communication tool for announcements, payment, reminders and education, as well as patient "visits." Green Leaf Dental Care has adapted to this new environment by utilizing multiple digital solutions. These digital tools have given the practice an ability to reach patients virtually and provide a safer environment for both patients and staff. The software platforms currently available lack some key functionality to make the workflows easy and dependable. The adoption of these tools has been made easier since most patients are expecting some form of telehealth incorporated into their care.

References

1. Ugalmugale S, Swain R. Telemedicine Market Size By Service (Tele-consulting, Tele-monitoring, Tele-education/training), By Type (Telehospital, Telehome), By Specialty (Cardiology, Gynecology, Neurology, Orthopedics, Dermatology, Mental Health), By Delivery Mode (Web/Mobile {Telephonic, Visualized}, Call Centers), Industry Analysis Report, Regional Outlook, Growth Potential, Price Trends, Competitive Market Share & Forecast, 2020 – 2026 (Rep.); 2020. Available from https://www.gminsights.com/industry-analysis/telemedicine-market

2. Health Policy Institute. COVID-19: economic impact on dental practices (week of April 20 results by specialty) (Rep.); 2020. Available from https://www.ada.org/~/media/ADA/Science%20and%20Research/HPI/Files/HPI_COVID_Survey_Specialists.pdf?la=en

3. Glassman P, Harrington M, Namakian M, Subar P. The virtual dental home: bringing oral health to vulnerable and underserved populations. *J Calif Dent Assoc.* 2012;**40**(7):569–77.

4. 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;**24**(3):129–46. https://doi.org/10.1177/1357633X16686776.

5. Namakian M, Subar P, Glassman P, Quade R, Harrington M. In-person versus "virtual" dental examination: congruence between decision-making modalities. *J Calif Dent Assoc.* 2012;**40**(7):587–95.

6. Böhm da Costa C, Peralta FDS, Ferreira de Mello ALS. How has teledentistry been applied in public dental health services? An integrative review [published online ahead of print, 2019 Oct 1]. *Telemed J E Health.* 2019;**26**(7):945–954. https://doi.org/10.1089/tmj.2019.0122.

7. Queyroux A, Saricassapian B, Herzog D, Müller K, Herafa I, Ducoux D, Marin B, Dantoine T, Preux PM, Tchalla A. Accuracy of teledentistry for diagnosing dental pathology using direct examination as a gold standard: results of the Tel-e-dent study of older adults living in

nursing homes. *J Am Med Dir Assoc*. 2017;**18**(6):528–32. https://doi.org/10.1016/j.jamda.2016.12.082.

8. McLaren SW, Kopycka-Kedzierawski DT, Nordfelt J. Accuracy of teledentistry examinations at predicting actual treatment modality in a pediatric dentistry clinic. *J Telemed Telecare*. 2017;**23**(8):710–5. https://doi.org/10.1177/1357633X16661428.

9. LaRock Z. The telemedicine boom is imminent, and it's creating opportunities for providers. Business Insider; 2019. Available from https://www.businessinsider.com/telemedicine-will-boom-but-barriers-persist-2019-3

10. Kruse CS, Krowski N, Rodriguez B, Tran L, Vela J, Brooks M. Telehealth and patient satisfaction: a systematic review and narrative analysis. *BMJ Open*. 2017;**7**(8):e016242. https://doi.org/10.1136/bmjopen-2017-016242.