

## Teledentistry: A Socially Distant Approach To The Endodontic Practice

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### ABSTRACT

The COVID-19 pandemic has tested the current medical care frameworks round the globe. As it spreads by drop, fomite and contact transmission, up close and personal communication of medical services proficient with the patient conveys a grave danger of its transmission. As dental treatment constantly includes close review, assessment, indicative and restorative mediations of the naso-oro-pharyngeal arena, dental experts are generally among defenseless warriors to get tainted with Covid. Therefore, during the current pandemic, most dental practice being restricted to exception of emergency procedures.

Nonetheless, taking a gander at the current expanding pattern of COVID-19 cases, it doesn't create the impression that this pandemic will end at any point in the near future. Truth be told, even the WHO has as of late expected

that this infection may turn out to be simply one more endemic infection in our networks and may never disappear.

In the event that these hypotheses are valid and COVID-19 undoubtedly becomes endemic, dental practice should rearrange and enhance to proceed with dental consideration with negligible danger of cross-disease. We live in the age of instant technology. You have a computer in your pocket, a fitness tracker on your wrist, and a smart speaker in your living room that can order you a chocolate bar simply by asking. There are several categories of medicine that are now migrating online to help individuals who are nervous about going to the doctor or simply lack mobility to do so. Teledentistry can give a creative answer for future to dental field during the current pandemic, just as past.

## **INTRODUCTION**

Teledentistry is a blend of broadcast communications and dentistry including the exchange of clinical data and pictures over far off distances for dental diagnosis and treatment array. Teledentistry can improve admittance to oral medical services, improve the conveyance of oral medical care and lower its expenses. It likewise can possibly kill the incongruities in oral medical services among rustic and metropolitan networks. This article audits the beginning, reasoning, degree, premise, and necessities for teledentistry, alongside the current proof that exists in the writing.

## **ROOTS OF TELE DENTISTRY**

The expression "Teledentistry" was first utilized in 1997, when Cook characterized it as "... the act of utilizing video-conferencing advancements to analyze and give guidance about treatment over a distance." The underlying idea of teledentistry created as a feature of the diagram for dental informatics, which was drafted at a 1989 gathering supported by the Westinghouse Electronics Systems Group in Baltimore. Zero in was on a conversation of how to apply dental informatics in dental practice to straightforwardly influence the conveyance of oral healthcare. The introduction of teledentistry as a subspecialist field of telemedicine can be connected to 1994 and a tactical venture of the United States Army (U.S. Armed force's Total Dental Access Project), intending to improve patient consideration, dental guidance and effectuation of the correspondence among dental specialists and dental labs. This tactical task exhibited that teledentistry decreased absolute patient consideration costs, stretching out dental care to inaccessible and provincial regions and offering total data needed for more profound investigations.

## **TELE DENTISTRY SUBUNITS**

### **□ TELECONSULTATION**

The most widely recognized type of teledentistry is teleconsultation in which patients or nearby medical care unit looks for counsel from dental experts utilizing telecom. It has been important for the discussion of patients who are corporeally and mentally tested, and patients from geriatric care organizations and penitentiaries. Teleconsultation has been appeared to diminish the quantity of references from primary health centers to higher centers by >45%. In the current COVID-19 pandemic it might help the patients in proceeding with their treatment during isolate and lockdown.

## □ **TELEDIAGNOSIS**

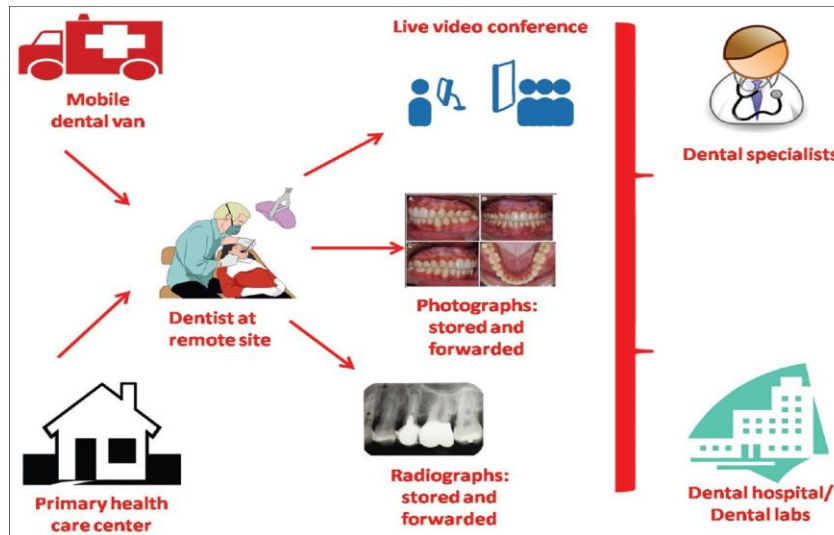
Telediagnosis utilizes innovation to trade pictures and information to make a finding of an oral anomaly. With the utilization of a telediagnosis program Estomato Net, patient reference to experts decreased from 96.9% to 35.1%. While the utilization of cell phones for location of dental caries is very much upheld; it has additionally filled in as a solid extra for screening of oral potentially malignant lesions. An expansion to telediagnosis is telecytology, a framework for early location of oral potentially malignant or malignant lesions. Haron et al. created Mobile Mouth Screening Anywhere (Me MoSA®) to work with early diagnosis of oral disease and discovered it to be valuable for patients with restricted admittance to experts. Skandarajah et al. assessed a tablet-based versatile magnifying instrument (Cell Scope gadget) as a subordinate for screening of oral malignant growth. During the current COVID-19 pandemic agents from Brazil as of late represented the utilization of WhatsApp and telemedicine in making a differential analysis of oral lesions. As the greater part of the oral lesions are frequently straightforwardly obvious telediagnosis can be made by dental photography in this manner diminishing the need of close clinical assessment.

## □ **TELETRIAGE**

Teletriage includes the protected, suitable and opportune manner of patient manifestations through cell phone by subject matter experts. It has been utilized for distant appraisal of younger students and focus on those requiring dental consideration without pointless travel paying little heed to financial and geological troubles in numerous spots. Brucoli et al. recommended utilization of teleradiology as a helpful instrument intriaging of maxillofacial injury patients from fringes to their principle emergency room.

## □ **TELEMONITORING**

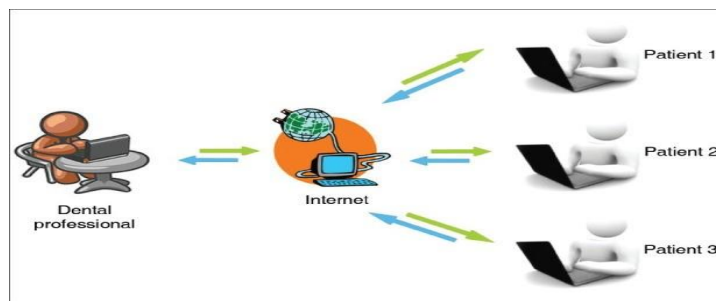
Observing of dental patients require incessant visits of patients to their dental specialist to screen the advancement of treatment. The utilization of telemonitoring can supplant the incessant actual visits by virtual visits for normal checking of treatment results and disease advancement. In a new pilot concentrate during this pandemic, telemonitoring had all the earmarks of being a promising device in the distant observing of surgical and non-surgical dental patients, particularly decreasing expenses and waiting time.

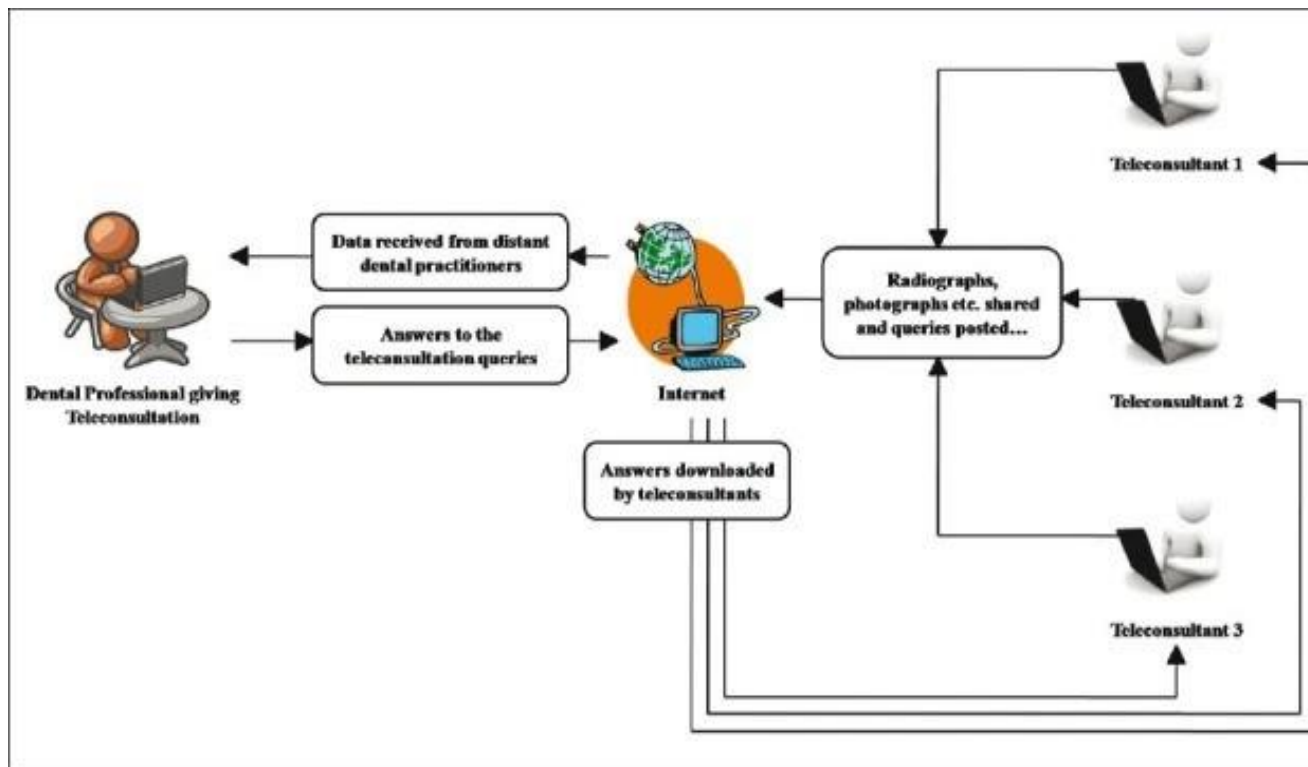


## METHODS IN TELEDENTISTRY

Teleconsultation through teledentistry can happen in both of the accompanying ways – "Real-time Consultation" and "Store-and Forward Method". Real-time consultation includes a videoconference in which dental experts and their patients, at various areas, may see, hear, and speak with each other.

Store-and-Forward Method includes the trading of clinical data and static pictures gathered and put away by the dental specialist, who advances them for conference and treatment arranging. The patient is absent during the "meeting". Dental specialists can share patient data, radiographs, graphical portrayals of endodontic issues, treatments applied, lab results, tests, comments, photos, and other data movable through different suppliers. This information sharing can be of outrageous significance for patients, particularly those needing expert meeting. A third technique has likewise been depicted, known as "Remote Monitoring Method", in which patients are observed a way off and can either be medical clinic based or home-based. A "Close Real-Time" counsel has additionally been referenced in the writing, which includes low goal, low edge rate item that resembles nervous TV.





## GOING THROUGH THE GUIDE

Brullmann D et al. reported that remote dentists can identify root canal orifices based on images of endodontically accessed teeth. Zivkovic D et al. demonstrated that teledentistry based on the Internet as a telecommunication medium can be successfully utilized in the diagnosis of periapical lesions of the front teeth, reducing the costs associated with distant visits and making urgent help available. Baker WP 3rd et al. showed that no statistical difference existed between the ability of evaluators to identify periapical bone lesions using conventional radiographs on a view box and their ability to interpret the same images transmitted on a monitor screen by a video teleconferencing system.

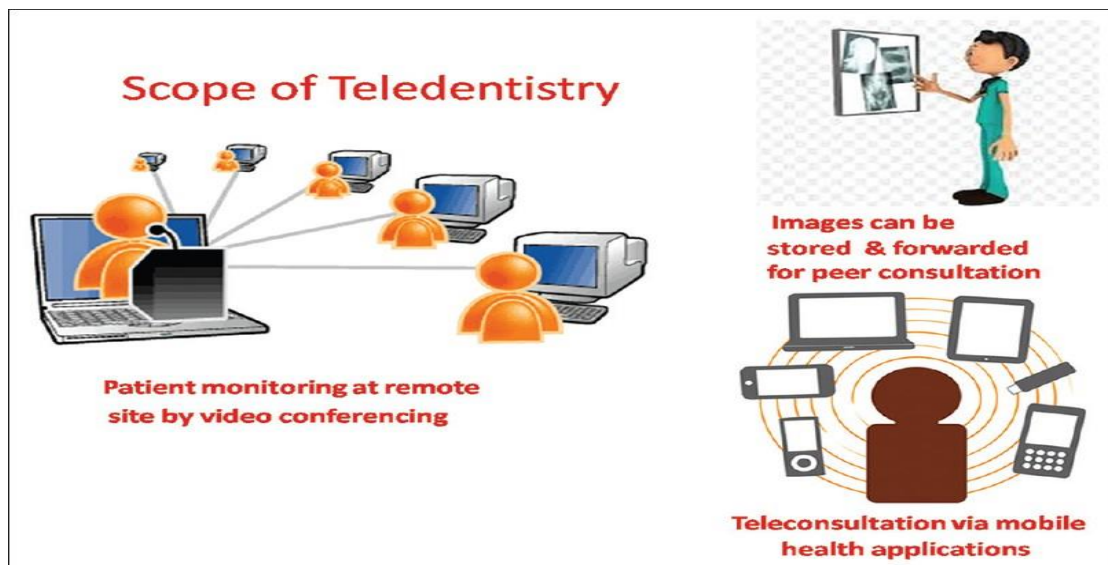
Kopycka-Kedzierawski DT and Billings RJ showed that teledentistry is as good as visual/tactile examinations for dental caries screening in young children. Kopycka-Kedzierawski DT et al. suggested that teledentistry offers a potentially efficient means of screening high-risk preschool children for signs of early childhood caries. They successfully demonstrated a teledentistry project established in inner-city child-care centers in Rochester, NY. Amavel R et al. stated that remote diagnosis of children dental problems based on non-invasive photographs constitute a valid resource. Kopycka-Kedzierawski DT et al. demonstrated that the intraoral camera is a feasible and potentially cost-effective alternative to a visual oral examination for caries screening, especially early childhood caries, in preschool children attending childcare centers.

In a feasibility study undertaken by the Chin-Shan Group Health Center and National Taiwan University Hospital in 2000, a single resident, equipped with an intraoral camera, a digital radiographic system, and a software application to transfer all images to the hospital, was sent to the Chin-Shan Township of 17,000 people. This pilot project demonstrated the effectiveness of teledentistry in providing dental care to individuals living in

a remote area and the viability of remote specialty consultations. In 2006, the Eastman Department of Dentistry at the University of Rochester employed a teledentistry project in six inner-city elementary schools and seven child-care centers and successfully screened 173 children revealing that almost 40% of the children aged 12-48 months had active dental caries. In Northern Ireland in 2010, a prototype teledentistry system was set up by the Community Dental Service of the Homefirst Legacy Trust in partnership with the Oral Medicine Department at the School of Dentistry, Belfast Trust and the feasibility of teledentistry as an alternative approach to the management of oral medicine referrals was positively established.

Torres-Pereira et al. have also shown an effective distant access to oral lesions and benefits of the use of E-mail services and a store-and-forward image system.

Among the states that have embraced telehealth technology, Alaska, Minnesota and California are at the forefront. Under Alaska's Dental Health Aide Therapist (DHAT) program, for example, DHATs and most health care providers in Alaska's Tribal Health System use telehealth technology. Apple Tree Dental in Minnesota is a nonprofit that operates five regional dental access programs in urban and rural areas of the state. Telehealth technologies link special care dental clinics with onsite clinics at schools, Head Start centers, group homes, assisted-living centers, nursing facilities, and other community sites for people facing physical, financial and geographical barriers. The Pacific Center for Special Care at the University of the Pacific, Arthur A. Dugoni School of Dentistry in San Francisco created a "Virtual Dental Home," supported by EHRs and complete with a portable dental chair, laptop, digital camera, supplies to perform temporary restorations, and a handheld X-ray machine with which registered dental hygienists in alternative practice, registered dental hygienists working in public health programs, and registered dental assistants provide care to underserved populations in schools, nursing homes, community centers, and Head Start centers.



## WHY TELEDENTISTRY?

- **Admittance to really focus on underserved and undertreated populace**

Teledentistry has been discovered to be very useful to old individuals. Subsequently, chunk of these patients can

be kept away from clinic-based treatment completely and need for costly transport charges are also diminished. Moreover, there is altogether decreased care staff time and patient's anxiety.

#### **Practical**

The underlying arrangement cost of teledentistry gear is high, however this is a one-time speculation, and the expense is insignificant later on. The expense saving of teledentistry is most noteworthy in the far-off networks as the requirement for costly vehicle is likewise avoided. Mobile telephones with different online applications can end up being the easiest methods for sending pictures for teleconsultation with positively no additional expense. As of late, there have been numerous portable applications coming up for the everyday person for their general and dental wellbeing, which they can access nonstop without an additional cost.

#### **Early bird approach**

Teledentistry may help in early analysis, and preventive therapy, for instance, early conclusion and legitimate administration of precancerous injuries assists with forestalling a lesion to transform into a threat. Likewise, carious injuries can be distinguished at a beginning phase by this technique and appropriate treatment can be anticipated the patient.

#### **Brief time frame**

As the movement time for the patient is incredibly diminished and reachability of expert is nearly a couple of moments away, there is a generous adherence on schedule. Preauthorization and other protection prerequisites can likewise be met promptly on the web, with the utilization of genuine pictures of dental issues instead of tooth diagrams and composed prescriptions. All pictures can be inspected inside couple of moments of receipt and patients can be reached inside 2–3 h of picture survey and can be welcome to go through an oral mucosal assessment later if required.

#### **Medical e-prescription**

With the assistance of teledentistry, the patient can get the therapeutic treatment without making a trip to an expert at far regions. Nonetheless, the patient ought to be asked with respect to medicate hypersensitivities. In the event that, the patient isn't recuperating, he/she should visit the expert by and by.

#### **Improved correspondence**

Teledentistry includes sending of clinical pictures or sound documents to an associate to consult and peer review which can regularly prompt better prognosis. It likewise upgrades the correspondence between the dental specialist and lab work force. The upgraded correspondence prompts early, right and quick administration of oral pathologies, accordingly improving patient's personal satisfaction.

#### **Capacity of information**

Data in regards to patient detail can be put away in PCs and cell phones for record purposes and this information,

whenever required can be additionally moved to an expert for determination and treatment arranging. These can be gotten to whenever, and their records can be sent briefly assessment from subject matter experts. This further saves the hour of the subject matter expert and the patient. Put away information can likewise be utilized in different review examines, cohort studies and surveys.

#### **Assistance to dental work force at distant site**

It is seen that there is a shortage of experts in distant regions. For this, we need to prepare the dental group at distant site since expert can't perform involved assessment accordingly prompting improved preparing of dental personnel.

### **TRAPS IN TELE DENTISTRY**

Nothing can coordinate with the exactness of the analysis of the patient performed clinically. In teledentistry, the different strides of analysis can't be performed, palpation and percussion being the main ones.

#### **Treatment expects visit to the center**

Teledentistry may just assistance in the preventive and analytic methods. For nonmedicinal treatment, the patient needs to visit the expert for clinical work like restorations and surgeries.

#### **Tedious and strategy touchy**

It tends to be tedious for the trained professional and patient, as the way toward obtaining computerized photos of an oral lesion, moving photographs to a gadget associated with web and sending the image as a connection to get an analysis requires ability and information on specialized subtleties. Specialized tangle and helpless organization can prompt postponements in teleconsultations.

#### **Beginning venture**

The underlying expense of hardware is extremely high. For example, to catch excellent pictures, an uncommon intraoral camera or advanced camera is required, and high velocity web is additionally required which expands the expense.

#### **Virtual assessment**

Analysis depends on the clinical photography that may change on up close and personal communication. The precise presentation on intraoral photos or video recording might be unique in relation to what is available really. Extra indicative guides, for example, percussion and palpation can't be performed.

#### **Diminished exactness**

Experts can't perform involved assessment. He/she needs to depend on the assessment performed by the dental group at the far-off site; in this manner, there ought to be a decent connection between dental specialist working around there and specialist.



### □ **Legitimate issues**

Telemedicine and teledentistry additionally raise worry about the secrecy of clinical and dental data. Subsequently, an educated assent ought to be taken from the patient and the patient ought to be made mindful about the inalienable danger of inappropriate conclusion or therapy because of the disappointment of technology. Technical issues happening during information transmission may cause a misdiagnosis or clinical blunder. Issues of duty and misbehavior should be considered. Licensure of teledentistry practice generally relies on the country laws of teledentistry.

### □ **Language hindrance**

A large portion of the teledentistry-based instruction programs are in English. Since the web is an overall apparatus, future objectives ought to incorporate thought of more multilingual programs.

## **MORE IN BACKWATERS**

An efficient survey of cost adequacy investigations of telemedicine mediations by Whitten PS et al. showed that there is little or no proof for telemedicine as a financially savvy methods for conveying healthcare.

Scuffham PA and Steed M directed a year preliminary of teledentistry reasoned that there were no expense reserve funds from teledentistry. Notwithstanding, they assessed that the expense viability of teledentistry would improve with more prominent commonality and utilization of equipment. It has been 10 years now since these expense adequacies examines have been distributed. Presently a-days, practically all dental practice set-ups have intra-oral cameras, computerized cameras and PCs with Internet access, which naturally oblige teledental arrangements. As innovation has progressed, changes in the size, highlights, and expenses of different mechanical segments have decreased the expense of teledental interviews.

Another significant angle that requires light is the installment of the medical care experts who give teleconsultation. For telemedical conference, it very well may be sensible to charge a similar rate as a common vis-à-vis consultation. However, repayment for teleconsultation has been a consistent issue in the new ages. The National Rural Health Research and Policy Analysis Center has suggested repayment of care gave by teleconsultants, dispensing with isolated charging methods for telemedicine, expanding repayment for the beginning telemedicine destinations, and giving repayment to store-and-advance applications. In the US, there are a few significant payers for telemedicine repayment including Medicare, Federally Qualified Health Centers, Medicaid (Medi-Cal), Healthy Families Program, California Children's Services, and County Medical Services Program. Aside from these government and state projects, business or private protections are additionally accessible, for instance, Blue Cross of California. These realities separated, repayment for teledentistry has not yet been thought of. What actually stays an inquiry is "who will pay for the teledental interviews"? Larger part of the investigations done on teledental applications have been covered by award cash and albeit the destiny of these projects after the subsidizing halted is obscure, it is plausible that the examinations were ended because of absence of monetary help. None of the projects that repay telemedical discussions have included teledental repayment in their arrangements at this point. An answer for this issue must be found right away. Repayment for teledentistry in the equivalent was telemedicine is repaid is an unequivocal choice. Different options ought to be investigated and it must be guaranteed that all teledental specialists are appropriately made up for their virtual

visits.

## **EMBRACING NOVEL IDEAS**

Several years ago, Darwin explained the concept of natural selection and survival. As we embrace modern trends from time to time, we evolve to fit into a today's fast era. Teledentistry will undeniably serve as a social acceptance option in this electronic age. Some of these suggestions can be used to maximize the benefits of teledentistry.

- Teledentistry work best on follow up principle. Centralized software of every patient including dental records right from birth to all treatments done in past stored on digital platform will be of immense help to the forthcoming clinician to treat patient with best knowledge.
- Teledentistry can be used to encourage patients in routine dental checkup virtually. Thus, avoiding the travel, fear and instilling awareness about oral health.
- Teledentistry facilitates the connection of private practices with outreach programs. This permits your practice to participate in social responsibility while making it less urgent.
- In addition to outreach, you may grow your private practice by strengthening relationships with specialists as you interact with them more frequently and connect them to your clients as needed.
- Another advantage for dentists is the ability to communicate with patients in remote locations. This broadens your patient base and expands your reach.
- Teledentistry can also be employed for post-operative appointments. In some cases, a post-operative visit may not demand an in-person visit. This will save the staff chair time and the expense of personal protective equipment (PPE) as well as reducing no-shows for post-operative visits in the office, allowing another patient to be seen. If a scenario necessitates an in-person visit, they can still be segregated.
- Teledentistry allows patients and dentists get a second opinions. In this fast age of technology, interacting digitally saves fortune and time of both parties.
- Teledentistry can assist the office by triaging patients before they need emergency care. During this time, a relationship with the caregiver can be established in order to foster trust. Medications such as over-the-counter analgesics can be addressed if necessary and antibiotics can be electronically prescribed if absolutely needed, and the patient can then be scheduled appropriately allowing a patient's appointment more efficient.
- Mass Patient education regarding brushing techniques; use of dental floss; use of fluoride tablets, mouthwashes, fluoride gels; at home bleaching techniques; can be taught using interactive virtual way.
- With use of Real-time consultation, novice dental surgeon can be trained by experts in field maintaining the quality of health care in turn reducing workload on experts. Real time consultation can also be helpful to clinician providing service to patients in rustic and remote regions connecting him/her to experts overcoming geographical barrier.

## CONCLUSION

Telemedicine and Teledentistry incorporates a developing assortment of utilizations and administrations, including two-way video, E-mail, cell phones, remote devices and different types of telecom advancements. Albeit this type of Teledentistry isn't without blunder and has medicolegal ramifications, it has the potential for working with quicker diagnostics or treatments and frequently lead to better prognosis. Dentistry shapes a significant piece of our medical care framework, which has gotten seriously undermined during the current pandemic of COVID-19. The need of great importance is to consolidate Teledentistry into routine dental practice. If not completely supplant, in any event Teledentistry can supplement the current traded off dental framework during the current pandemic.

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