THE MERITS OF TELEDENTISTRY: A NARRATIVE REVIEW

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ABSTRACT Telemedicine is defined by Medline as “Delivery of health services via remote telecommunications. This includes interactive consultative and diagnostic services.” Telemedicine was introduced as MeSH in 1993. Thus, telemedicine is not a new concept, and one of the earliest teledentistry projects was started by the US military in 1994 to serve the US troops all around the world. Literature documentation of teledentistry has steadily increased from an early publication in 1990. Teledentistry is the use of health information technology and telecommunications for oral care, consultation, education, and public awareness with the broad goal of improving oral health. In today’s circumstances of the ongoing COVID-19 pandemic, the main concern is to avoid person-to-person contact. The word ‘tele’ means ‘distant’, and therefore teledentistry satisfies the need for social distancing as has been advocated by the health authorities all across the globe to contain the spread of the SARS-COV-2 virus. Therefore, it helps patients to continue their care during quarantine and lockdown but also enables care to be provided to people in areas that are inaccessible or not covered by health services. Future applications of teledentistry have the possibility of increasing utilization of oral care services, decreasing financial and human costs and improving health outcomes. In this review, we provide a brief overview of the applications of teledentistry.

KEYWORDS Teledentistry, telehealth, telemedicine, oral health

Introduction

Telemedicine is defined by Medline as “Delivery of health services via remote telecommunications. This includes interactive consultative and diagnostic services.” Telemedicine was introduced as MeSH in 1993. Thus, telemedicine is not a new concept, and one of the earliest teledentistry projects was started by the US military in 1994 to serve the US troops all around the world [2].

Literature documentation of teledentistry has steadily increased from an early publication in 1990 [11]. Teledentistry uses health information technology and telecommunications for oral care, consultation, education, and public awareness with the broad goal of improving oral health. [1]

In today’s circumstances of the ongoing COVID-19 pandemic, the main concern is to avoid person-to-person contact. The word ‘tele’ means ‘distant’, and therefore teledentistry satisfies the need for social distancing as has been advocated by the health authorities all across the globe to contain the spread of the SARS-COV-2 virus. Therefore, it helps patients to continue their care during quarantine and lockdown but also enables care to be provided to people in areas that are inaccessible or not covered by health services. Future applications of teledentistry have the possibility of increasing utilization of oral care services, decreasing financial and human costs and improving health outcomes. [11] In this review, we provide a brief overview of the applications of teledentistry.
A: The concept of teledentistry

The concept of teledentistry is the use of telecommunication and information technology, electronic medical records, video and digital images to facilitate the delivery of dental care to distant or isolated people or for consultations and staffing between specialists. [14] The type of interaction provided by teledentistry classifies it as synchronous or asynchronous. In asynchronous teledentistry, the information can be recorded for later analysis, as in an email. In synchronous teledentistry, the interaction is in real-time (eg, a videoconference). [21] Teledentistry is used in generalist and specialty practices, e.g., orthodontics, endodontics, oral surgery, periodontics and dental public health. The greatest value of teledentistry is the potential to reduce healthcare inequalities, providing greater access to specialists and timely oral care. [11] Teledentistry has the potential to identify high-risk populations, facilitate patients’ referrals to a dental consultant and support locally-based treatment, thus reducing waiting lists and unnecessary travel and loss of productivity. [15,16,20]

B: The benefits of teledentistry

1. Teleconsultation: The most common form of teledentistry is teleconsultation. It has been valuable, especially for the consultation of patients who are physically and intellectually challenged and patients from aged care facilities and prisons. [3] Teledentistry has the potential to address the oral care needs of those who have limited access to care. [11]

2. Telediagnosis: Telediagnosis makes use of technology to exchange images and data for making a diagnosis of an oral lesion [4]. While the use of smartphones for the detection of dental caries is well recognized [5], it has also served as a reliable adjunct for screening of oral potentially malignant lesions [6]. Haron and al. developed Mobile Mouth Screening Anywhere (MeMoSA®) to facilitate early detection of oral cancer and found it beneficial for patients with limited access to specialists [7].

3. Teletriage: Teletriage involves the safe, appropriate and timely disposition of patient symptoms via smartphone by specialists. It has been used for remote assessment of school children and prioritizes those requiring dental care without unnecessary travel regardless of socio-economic and geographical difficulties in many places [8].

4. Telemonitoring: Monitoring dental patients require frequent visits of patients to their dentist to monitor the progress of treatment. The use of telemonitoring can replace frequent physical visits with virtual visits for regular monitoring of treatment outcomes and disease progression [4]. Remote digital monitoring during orthodontic treatment can help patients to enhance their oral hygiene performance and reduce the number of appointments due to emergencies, especially during the COVID-19 pandemic when non-urgent appointments may be discouraged. [24]

C: Challenges of teledentistry:

1. Unacceptance by the dentists: The lack of acceptance of teledentistry by dentists can be attributed to the fact that they may be afraid of making an inaccurate diagnosis. [12] The use of digital images in diagnosis can be a helpful tool to diagnose visible lesions, but the images have their shortcomings. The images represent a two-dimensional view of three-dimensional structures, which can affect the accuracy of diagnosis. Another limitation of images is the quality of captured images, as teledentistry requires images of high quality [1] The unacceptance is related to the following constraints: the infrastructure (the poor internet access), the lack of training, the lack of technical support and expertise, the incoordination between teledentistry and the healthcare system, absence of financial reimbursement, inadequate guidelines, and high cost of setup. [9] To overcome these challenges, dentists must be trained adequately and educated about this technology, which will increase the acceptance of teledentistry. [9]

2. Unacceptance by the patients: Lack of face-to-face communication may lead to patients’ apprehension of the inadequacy of proper communication of their problems to their dentists. Acceptability of teledentistry by the patients will increase in parallel with the acceptability of telemedicine in general, which is increasing day by day. [10]

D: Setting up a teledentistry program:

Irving et al., in their systematic qualitative review of 2016 [13], have generated some pertinent pieces of information that could be of value to health service administrators charged with the task of supporting and/or developing a teledentistry program for use in improving quality and access to dental care for their community. The key points were as follows:

1. Technology has developed so rapidly that smartphones and mobile devices are the easiest and cheapest way to set up teledentistry schemes. [13]

2. Synchronous consultations are difficult to organise for busy specialists, so it is essential to build a system whereby clinical questions can be answered at a convenient time. The store and forward options are the most straightforward option to trial teledentistry programs. [13,18]

3. Teledentistry programs will not be sustainable unless organisations provide remuneration for both the specialists and the referring practitioners. Indeed, funded designated advice sessions could be used for teaching and diagnosis. [13]

4. Clinical capacity building for clinicians and allied staff is possible and post-graduate trainees can increase their utilisation of teledentistry to help them improve their knowledge and skills without travelling. Indeed, online learning coupled with real-time teledentistry must be explored by health services and educational researchers. [13]

E: Validity of the teledentistry:

The emergence of telemedicine has led to many research studies that have evaluated teledentistry applications in different settings. Despite the heterogeneity of the studies, there is a growing body of evidence supporting the use of teledentistry, in particular, for the early detection of dental diseases. [17]

JH Alabduallah et al. 2018 concluded in their systematic review that teledentistry examinations are valid, feasible, and comparable to visual examination for oral screening. Teledentistry use in general dentistry does not appear to affect the judgment
of the dental professional significantly when compared to the judgment with a visual examination. It could be a comparable tool to face-to-face technology for oral screening, especially for school-based programs, caries assessment, referrals, and teledentistry consultations. [14]

I. Aquilanti et al. 2020 found, in their systematic review, that teledentistry has excellent accuracy for the diagnosis of dental diseases and good accuracy for the assessment of chewing ability and oral rehabilitation status among older people living in nursing homes. If, on the one hand, teledentistry could provide general and specialist oral health care support to older adults, on the other, the implementation of teledental assistance should not substitute the traditional approach in the case of the suspect of more severe diseases that need in-depth diagnostic procedures. [19] MI Meurer et al. 2015, stated in their systematic review that visual inspection was an important tool in clinical settings for the diagnosis of dental caries and enamel defects. Given that photographic examination has the same limitations as visual inspection, this may indicate store-and-forward teledentistry is most applicable to the same clinical settings. [22]

F: Ethical and legal issues:
In teledentistry practice, medicolegal and copyright issues also have to be considered. These problems arise primarily due to a lack of well-defined standards. There is no method to ensure the quality, safety, efficiency, or effectiveness of information or its exchange.

There are privacy and security issues as well as remuneration, fiscal and taxation issues associated with electronic commerce. Many of the legal issues, such as licensure, jurisdiction, and malpractice, have not yet been definitively decided by the legislative or judicial branches of various governments. In 2000, 20 states in the US enforced restrictive licensure laws requiring teledentistry practitioners to obtain full licenses to practice across state lines. In spite of this, information on teledentistry licensure does not appear to be readily available today. [23]

Conclusion
Teledentistry seems to be a promising path for providing oral health services with a shortage of oral healthcare providers. More research is needed to establish the evidence base to support teledentistry practice. Contextualisation is also required by taking into account the socio-cultural particularities of each country and even of each region within the same country.

Funding
This work did not receive any grant from funding agencies in the public, commercial, or not-for-profit sectors.

Conflict of interest
There are no conflicts of interest to declare by any of the authors of this study.

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