

# TELEDENTISTRY: A NEW TREND TO ORAL HEALTH

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## ABSTRACT:

Teledentistry is a combination of telecommunications and dentistry involving the exchange of clinical information and images over remote distances for dental consultation and treatment planning. Teledentistry has the ability to improve access to oral healthcare, improve the delivery of oral healthcare, and lower its costs. It also has the potential to eliminate the disparities in oral health care between rural and urban communities.

**Keywords:** Teledentistry, Rural population, Telecommunication, Live consultations, Store and forward consultation, internet



## INTRODUCTION:

Teledentistry is defined as 'as the provision of real time and offline dental care such as diagnosis, treatment planning, consulting and follow up electronic transmission from different sites' <sup>[1]</sup>. The birth of teledentistry as a subspecialist field of telemedicine can be linked to 1994 and a military project of united state army (U.S. Army's Total Dental Access Project). aiming to improve patient care, dental education, effectuation of the communication between dentist and dental laboratories. The military project demonstrated that teledentistry reduced total patient care cost, extending dental care to distant and rural areas and offering complete information required for deeper analyses. <sup>[2]</sup>

### Need for Teledentistry

People living in rural or underserved area are among the most in need for oral health care in their communities. Many rural communities lack the clinical settings

and finances that are required to attract specialized dental providers. Patients living in rural areas who are referred to dental care providers in more urban settings must travel to these areas which are usually expensive and time consuming. It has been estimated that 38% of the nation's rural communities do not have dentists. <sup>[3,4]</sup>Teledentistry can close this distance gap by allowing oral healthcare providers in the rural areas to seek advice from specialists in the urban settings. This can be performed without the patient having to physically enter the specialty practice. An appropriate treatment plan can be devised prior to a direct patient–specialist visit. At least one preliminary appointment can be saved for the patient.

### Teledentistry modes:

Teledentistry can be followed by following modes: (i) live consultations, or real time videoconferencing, which are described as

resource and cost intensive; and (ii) asynchronous, or store and forward consultations, which are considered to have the potential to be cost effective [5].

Both techniques involve a dental care professional digitizing and electronically transmitting videos, drawings, diagrams, photographs and X-rays. The information is then prepared for transmission and data are transmitted to distant sites.

Real time videoconferencing allows people at two or more sites to communicate with each other's by using a digital screen to display a video image of the person or people at either or both sites.

This system uses a video camera and speaker phones so that user at either site can see and hear them. For this type of consultation, both parties are agreeing upon a meeting time and information that is exchanged in real time is transmitted simultaneously between sites. Users can verbally clarify points, add comments, physically point to certain data and amend details already entered during the consultation as it happens. This type of consultation allows for more in-depth discussion and personal contact than store and forward. However, the equipment and high speed network connection required to run the operations can be more expensive (Fig 1).

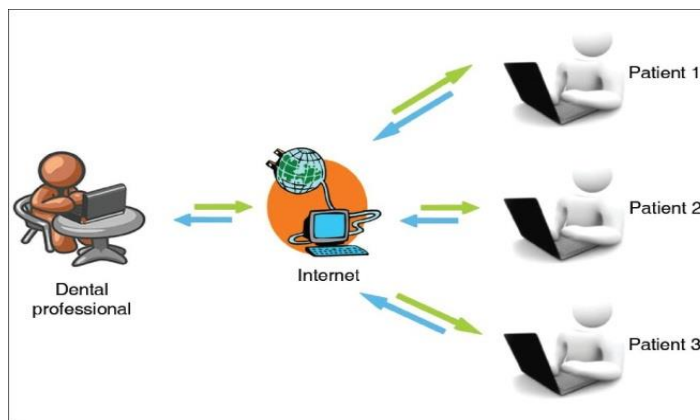


Fig 1. Real time videoconferencing

The store and forward technique operates via the internet. The dental professional seeking advice collects all the necessary information and stores it in a file. The file is forwarded via e-mail as an encoded file to ensure a secure transfer of information, which can only be accessed by the appropriate parties. The consultant

retrieves the file and examines its contents. Recommendations are then provided to the dental professional in the same manner in return. This technique is the least expensive, yet provides ample benefit for a wide range of applications, and is just effective as presenting cases in a real-time setting (Fig 2).

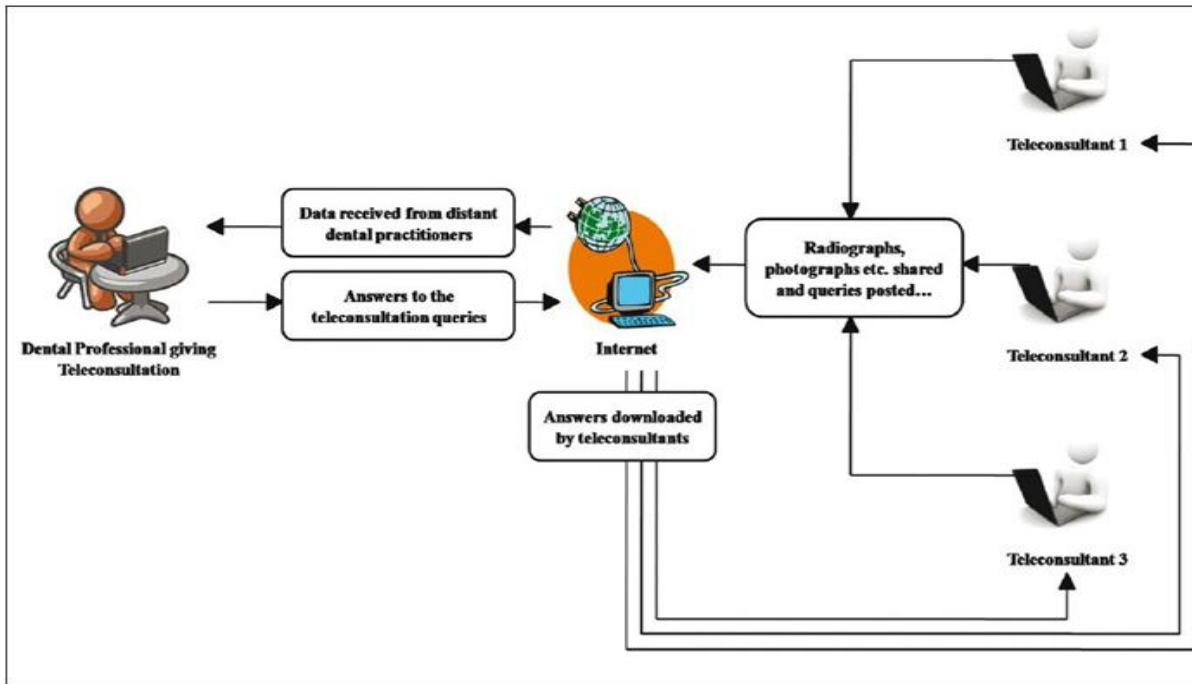


Fig 2. Store and forward

A third method has also been described, known as “Remote Monitoring Method”, in which patients are monitored at a distance and can either be hospital-based or home-based. A “Near-Real-Time” consultation has also been mentioned in the literature, which involves low resolution, low frame rate product that looks like jittery television [6, 7].

#### Requirements:

For most dental applications, store-and-forward technology provides excellent results without excessive costs for equipment or connectivity. A typical store-and forward teledentistry system consists of – a computer with substantial hard drive memory, adequate RAM, and a speedy processor; an intraoral video camera and a digital camera for the capture of pictures; a modem and an Internet connection. A fax

machine, a scanner, and a printer may also be required in some cases [6,8,9]. To enable live videoconferencing, one might employ a widely available standalone IP (Internet protocol)/ISDN (integrated service digital network) videoconferencing solution, or install a PCI (Peripheral component interconnect) codec board into the system. If a live group session is desired, a multipoint control unit that bridges three or more parties is required. The codec must be able to accommodate audio and visual functions [10].

#### Benefits of teledentistry [11,12,13]:

- ✓ Reduce cost of service and improved quality of care.
- ✓ Reduction in peer isolation and increased specialist support as well as education.

- ✓ General dentist will send multimedia patient records to dental specialists, often enabling the specialist to make a diagnosis and develop a treatment plan without having to see the patient in person.
- ✓ Inter-professional communication will improve dentistry integration into larger health care delivery system.
- ✓ Improvement in diagnostic service.
- ✓ Improvement in communication with insurance industry with respects to requirement.
- ✓ Improvement in communication with dental laboratories.

#### **Ethical and Legal issues:**

Concerns about the confidentiality of dental information arise from the transfer of medical histories and records as well as from general security issues of electronic information stored in computers [14]. The practitioners of teledentistry should take utmost care to ensure that patient privacy is not compromised by unauthorized entities. However, patients should be made aware that their information is to be transmitted electronically and the possibility exists that the information will be intercepted, despite maximum efforts to maintain security<sup>[9]</sup>. Concerns also may arise about the proper method of informing patients of the potential transmission of their data. Informed consent in teledentistry should cover everything that exists in a standard, traditional consent form. The patient should be informed of

the inherent risk of improper diagnosis and/or treatment due to failure of the technology involved [15].

In teledentistry practice, medicolegal and copyright issues also have to be considered [16]. These problems arise primarily due to a lack of well-defined standards [15]. Currently, there is no method to ensure 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 legislative or judicial branches of various governments [17].

#### **CONCLUSION:**

Currently, teledentistry has not yet become an integral part of mainstream oral health care. In the near future, teledentistry will be just another way to access an oral health care, especially encouraging for isolated population who may have difficulty accessing the oral health care system due to distance, inability to travel, or lack of oral health care providers in their area. Future advances in technology will enable teledentistry to be used in many more ways, such as clinical decision support, quality and safety assessment, consumer home use, medication e- prescribing and simulation training. Teledentistry provides new opportunities for dental education by providing the primary care professionals with an easy access to efficient consultation and by helping in conducting postgraduate education and continuing dental education

programs. In spite of some issues which need to be resolved, the potential of

teledentistry is tremendous, which needs to be explored

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