# **Explore Dentistry With Teledentistry - A Future Perspective**

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#### **Introduction:-**

elemedicine" is the use of information based technologies and communications systems to deliver health – care across geographic distances. <sup>[1]</sup>It uses electronic information to communicate technologies to provide and support healthcare when distances separate the participants.<sup>[2]</sup> Telemedicine is part of a wider process or chain of care. It can improve this chain and thus enhance the quality and efficiency of health care.<sup>[3]</sup> Telemedicine is being used today in academic medical centres, community hospitals, managed - care companies, rural hospitals and is also being used internationally to link providers in developing countries to hospital in developed countries. Advances in digital communication, telecommunication and internet introduce an unprecedented opportunity to remote access to medical care.<sup>[4]</sup> The entire process of networking, sharing digital information, distant consultations, work

up and analysis is dealt with by a segment of the science of telemedicine concerned with dentistry known as "Teledentistry".<sup>[7]</sup>

#### **Definitions:-**

"Teledentistry is a combination of telecommunications and dentistry, involving exchange of clinical information and images over remote distances for dental consultation and treatment planning".<sup>[8]</sup>

The term "Teledentistry" was used in 1997, when Cook defined it as "The practice of using video – conferencing technologies to diagnose and to provide advice about treatment over a distance.<sup>[9]</sup>

#### Abstract

Recent Advances in dental care have documented that early diagnosis, preventive treatments and early intervention can prevent or reduce the progress of most oral diseases, conditions that, when left untreated, can have painful, disfiguring and lasting negative health consequences. Teledentistry is an exciting new area of dentistry that combines electronic health records, telecommunications technology, digital imaging and internet to link health care providers in rural or remote communities to enhance communication, the exchange of health information and access to care for underserved patients. Most of the dentists are unaware about goals, advantages and how to get involved into Teledentistry. This article illustrates as to how Teledentistry can be effective solution for dentists and their patients.

Teledentistry presents a possible solution to many longstanding problems in dentistry, but it also faces significant challenges. Teledentistry can meet the dental care needs of the underserved in rural areas of India and it can ensure the good oral health of the children in schools and child care centres. Teledentistry provides new opportunities for dental education by providing an easy access to primary care professionals for effective postgraduate education and continuing dental education programmes. **Keywords :-** Teledentistry, Telecommunication, Telemedicine.

#### **Origin:-**

The initial concept of Teledentistry developed as part of the blueprint for dental informatics, which was drafted at a 1989 conference funded by the Westinghouse Electronic System Group in Baltimore.<sup>[10]</sup> The birth of Teledentistry as a subspecialist field of telemedicine can be linked to 1994 and a military project of the United States Army [U.S. Army's Total Dental Access Project}aiming to improve patient care, dental education and effectuation of the communication between dentists and dental laboratories. This military project demonstrated that Teledentistry reduced total patient care costs, extending dental care to distant and rural areas and offering complete information required for deeper analysis. As technology has advanced, new opportunities for

Teledentistry have been created. Technologies currently available are beginning to change the dynamics of dental care delivery. It will offer new opportunities to improve the level of patient care and reshape current business models.<sup>[11]</sup>

# Approaches Of Teledentistry In Dental Education:-

The teleconsultation through Teledentistry can take place in either of following ways:-

1] The web based self instruction education system = "Real – Time Consultation".<sup>[12]</sup> 2] "Store and Forward Method".

Real – time consultation involves a videoconference in which dental professionals and their patients, at different locations, may see, hear and communicate with one another.<sup>[6]</sup> Store and Forward method involves the

exchange of clinical information and static images collected and stored by the dental practitioner, who forward method involves exchange of clinical information and static images collected and stored by the dental practitioner, who forwards them consultation and treatment planning.<sup>[13]</sup> During the "Consultation" patient is not present. Dentist can share remarks, photographs and other information transportable through multiple providers.

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.<sup>[15]</sup> 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.<sup>[11]</sup>The advantage of this system is that the user can control the pace of learning and can review the material multiple times as he or she wishes.

Johnson and Schleyer studied the web – based dental continuing education or the CE courses and evaluated them on the basis of a set of well – designed guidelines by using the design of education software. Spallek and colleagues conducted a survey of the participants in several webs based dental CE courses and found that lack of face to face communication with their peers and instructors could result in dissatisfaction.

#### Interactive Video Conferencing

It may be conducted via POTS [Plain Old Telephone Service], Satellite, ISDN [Integrated Services Digital Network] at 128 Kbits/s

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Internet or Intranet. It includes both a live interactive video – conference with a proper camera set up where the patient's information can be transmitted and supportive information that can be sent before or at the same time[ for ex:- via fax] as the videoconference. The advantage of this type of education system is that the user can receive an immediate feedback.<sup>[10]</sup>



#### **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 internet connection. A fax machine, a scanner and a printer may also be required in some cases. For live videoconferencing, one might employ a widely a v a i l a b l e st a n d a l o n e I P / I S O N videoconferencing solution or install a PCI Codec board into the system.<sup>[6],[11],[13]</sup>

#### **Basics Of Teledentistry: The Internet.**

Internet is the basis of modern systems of Teledentistry, being up - to - date and fast and able to transport large amounts of data. A study conducted by Nainar SMH etal showed that most paediatric dental practices in Connecticut were connected to the internet.<sup>[16]</sup> Leao JC and Porter SR suggested telediagnosis of common orofacial diseases via the internet a feasible

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prospect.<sup>[17]</sup> Internet based Teledentistry education enables students to choose themselves the place, time and mode of learning.

#### Use Of Teledentistry In Rural Areas.

In rural areas, where there is a shortage of specialists, the lack of comprehensive and sophisticated health care is a problem. Teledentistry can increase the accessibility of specialist to rural and underserved communities for their dental needs, besides decreasing the time and the cost which are associated with the speciality consultations.<sup>[9]</sup>

# Role Of Teledentistry In Postgraduate Education And Dental Practice.

Teledentistry can serve as a good tool for educating postgraduate students and for providing continuing updates for the practicing dentists. In interactive video - conferencing, the patient information is evaluated first [with or without the patient's presence], which allows for the interaction and feedback between the educator and the students. The patient cases can be reviewed thoroughly and at the student's pace. The cases can be discussed at length after all the clinical data have been collected and transmitted, without the patient being present at the scheduled meeting. This enhances the student's enthusiasm and provides new learning opportunities for the dental students and the practicing dentists.<sup>[18]</sup>

#### Scope Of Teledentistry In India.

In 1999, the department of information technology, the Ministry of Communication and Information Technology

[Government of India] launched a pilot project which was entitled, 'Development of Telemedicine Technology' with the objective of reinforcing the national healthcare delivery system.<sup>[19]</sup>

## The key specifications of the project included:-

1] To identify the appropriate technological tools and services which are required to implement telemedicine technology at the three premier hospitals in the northern parts of India, namely All India Institute of Medical Sciences [AIIMS], New Delhi, the Post Graduate Institute of Medical Education and Research [PGIMER] at Chandigarh and the Sanjay Gandhi Post Graduate Institute of Medical Sciences [SGPGIMS] at Lucknow [UP].

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2] To develop and carry out system integration to enable telemedicine and for establishing telemedicine services [teleconsultation and telediagnosis services for the specialities of radiology, cardiology and pathology and tele- education] at three tertiary level hospitals.

3] To train clinicians in the use of telemedicine technology.

India has opened up to telemedicine to address various issues which are being faced by healthcare delivery system, like inadequate health infrastructure and clinical services, paucity of qualified doctors, almost non – availability of specialist care, late discovery of ailment , the delay in the delivery of treatment due to greater time which is required for transport of patients to urban healthcare facilities and the provision of healthcare by inexperienced primary healthcare service providers. In India, where a majority of population lives in rural areas, Teledentistry can have a significant contribution in bridging the gap between the demand and the supply.

#### Future Prospectives Of Teledentistry.

The advances in telecommunication have rightly enabled the dental care to promise many exciting changes during next few years.<sup>[20]</sup> However, like any revolution, it will not be easy or painless. There are certain issues which require resolution for the success of Teledentistry. These include inter – state licensure, jurisdiction and malpractice, as well as technological, security and ethical aspects.<sup>[21]</sup> **Summary.**In spite of some issues which need to be resolved, the potential of Teledentistry is tremendous which needs to be explored.

#### References

References are available on request at editor@healtalkht.com



Fig. Procedures Followed in The Recruiting Patients in the Dental Office & Obtaining Consultation, Illustrating the Process For Communicating Between the Remote Site & the Specialist Clinic Site.