

Review Article

TELEDENTISTRY: AN OVERVIEW

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ABSTRACT

“Teledentistry” is a synergistic combination of telecommunications technology, internet and dental practice. Teledentistry increased patient access to dental care, improved quality of care and the cost effectiveness. Telemedicine is transferring medical data between geographically separated areas. Teledentistry has the potential to be a highly effective mechanism for enhancing early diagnosis and to be used in dental education. Teledentistry has the potential to meet these needs by just logging into the side on interest and getting relief immediately. Teledentistry approaches may hold the potential to address many of the problems related to access, cost, efficiency, and the quality of dental care.

Key words: Teldentistry, Telecommunication, Telemedicine

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INTRODUCTION

Health care has changed dramatically with the era of computers and telecommunication. There are many implementations of telecommunications in hospitals and with time a new term arrived i.e. Telemedicine. Association of American Medical Colleges states that “Telemedicine is the use of telecommunications technology to send data, graphics, audio, video and images between participants who are physically separated (i.e., at a distance from one another) for the purpose of Clinical care”.¹ Teledentistry is one of the recent advances in the use of Telecommunication technology, digital Diagnostic imaging services, computers devices and Software for analysis and follow-up.² Term “teledentistry” was used in 1997 by Cook, who defined it as “the practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance” Most dental professionals are unaware that teledentistry can be used not only for increased

access to dental care but also for advanced dental education. There is a significant potential of teledentistry.³

HISTORY

In its simplest form, telehealth has been around for decades. The familiar use of the telephone for consultations between patients and clinicians and the use of radios to link emergency medical personnel to medical centers have been common place in health care for this and most of the last century. In past 30 years, clinicians, health services researchers, are investigating the use of advanced telecommunications and computer technologies to promote health care.⁴ Teledentistry was used in practice in US army in 1994 by doing dental consultations on person located more than 100 miles apart. Since then, various organization have practiced teledentistry with varying degree of success.⁵

FORMS OF TELEDENTISTRY:

Teledentistry be in two forms:

- (1) Real-time Consultation
- (2) Store and forward.

Real-time consultation includes video-conference in which dentists and their patients are at different locations and they may see, hear, and communicate with one another using advanced telecommunication technology and ultra-high-bandwidth network connections.

Store and forward, involves the exchange of clinical information and static images collected and stored in the telecommunication equipment. In store and forward, the dental practitioner collects all the important clinical information and digital intraoral and extra oral images and radiographs and forwards them for consultation and treatment planning via established networks and the Internet and treatment is provided in a far timelier, targeted, and cost-effective manner.¹

The third method may be home based or hospital based where patients are monitored at a distance i.e "Remote Monitoring Method". A "Near-Real-Time" consultation has also been mentioned in the literature, where use of low resolution, low frame rate product like jittery television.²

TOOLS IN TRANSFER OF INFORMATION

POTS- plain old telephone system- it is frequently used in teledentistry because of its low maintenance and technical support. It works through Telephone Company with low speed and unreliable connection.

ISDN- Integrated Service Digital Network- it provides high speed which increases accessibility and reliability.

The World Wide Web is tool for easy access of information. Web based dentistry is more cost effective but poses security and privacy concern due to hackers.⁶

BENEFITS OF TELEDENTISTRY

- Reduces the cost of service and improves the Quality of care
- Decrease in peer isolation and increased Specialist support and education.
- General dentists will mail multimedia Patient records to dental specialists, enabling the specialist to make a diagnosis and develop a treatment plan without seeing the patient.

- Improvement in diagnostic services
- Improved integration of Dentistry into the better health care delivery system.
- It helps in communication with the Insurance industry with respect to requirements.
- Better communication with Dental laboratories.²

LIMITATIONS OF TELEDENTISTRY

- Proper internet connection is needed for teleconferencing.
- A backup communication system and technical support group is necessary.
- Experience of the consultant and his knowledge also matters.
- Discussion of problems on social networking sites is also risky as we don't know whose opinion is the best and we have to depend on judgement.
- One must be careful when providing consultations across state lines, because technical problems occurring during the data transmission can lead to a Medical error or misdiagnosis which is an issue of responsibility and malpractice.
- Privacy and security is again an important issue in cyberspace. If patient's Data is lost or stolen during transmission, the whole Project may need to be discontinued, especially when Health Insurance Portability and Accountability Act becomes law.
- The ability of providers to bill and collect fees for health-care services provided through telehealth is a large issue for sustaining a telehealth program. Reimbursement for these kinds of services is limited.
- Liability or medical malpractice exposure will attach to any Health-care practitioner who actively participates in the treatment of a patient.⁷

APPLICATION OF TELEDENTISTRY

Oral and Maxillofacial Surgery

Use of new technologies in dental surgery provides better diagnosis, situational analysis and planning of appropriate treatment solutions. Technologic development is at a highest level in computerized support in dental implants placement, where it is possible to observe the

patient in one part of the world and in the other part make a digital project of complete implant and prosthetic construction and route the direction for navigational Technique of dental implantation. Some very good telemedical results have been achieved in one of the principal areas of oral Surgery i.e. impacted wisdom teeth.

Orthodontics

Clinical orthodontics advanced the most in routine use of computerized technology, where instead of traditionally used study Casts, present orthodontics use digital 2D and 3D models and all analyses, Measurements and assessment of relationships are done by using software to process the Images. The two most renowned computerized digitization systems are Orthocad i emodels.

Endodontics

Any faults in differential diagnosis and prognosis of treatment of periapical lesions can cause complications, problems, a waste of time and money, Sometimes can lead to complete revisions of prosthetic restorations based on poorly Treated teeth. With the use of Teledentistry methods, diagnosis of periapical lesions can be adequately assessed, a necessary plan can be devised for a proper endodontic or oral surgical management of the lesions.

Using mobile Internet connection, text and photographs are uploaded to an on-line server. Distant consultants in endodontics, is informed via their mobile phones about the received request, they download the digital images and accompanying Anamnestic data. They form the diagnosis and a treatment, then post the Information on an on-line server and inform the consultation-requester dentist regarding Received response.

Pediatric and preventive dentistry

In addition to its Basic role in providing dental screening in distant, rural and other inaccessible areas, the Method of teledentistry has been demonstrated as a high quality alternative in children Afraid of dentists, reducing their fear and anxiety compared to clinical examination in real Time.

Oral medicine

An effective distant access to oral lesions and benefits of use of e-mail services and a Store-And-Forward image system. Specialist in oral medicine, analyzes independently the obtained images and clinical information. They make the diagnosis (usually one or two) and electronically return the results.⁸⁻¹³

Dental prosthetics

CAD/CAM (computer-aided design and computer-aided manufacturing) systems are gaining priority in the manufacturing of individual dental crowns, dental inlays and Onlays, over traditional hand modelling and casting of prosthetic reconstructions.^{9,12,14}

CONCLUSION

Teledentistry is a progressing field in developing countries as a tool for better access to health care , education and treatment. It can play a important role in improving health care in rural areas , mountains and villages . Our community health care centers and primary health care centers should be equipped with the facility of teleconsultation to spread a beautiful smile to our society.

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