International Journal of Allied Medical Sciences and Clinical Research (IJAMSCR)

ISSN:2347-6567

*IJAMSCR |Volume 5 | Issue 1 | Jan-Mar – 2017*
**www.ijamscr.com**

*Research article* *Medical research*

# Dentistry on web- Teledentistry

**[1]Dr. Bhavna Gupta, [2]Dr. Nidhi Gupta, [3]Dr. Sahil Singh Thakar, [4]Dr. Preety Gupta, [5]Dr. Surbhi Jindal**

***Corresponding Author**: **Dr. Bhavna Gupta**
**Email id**: **bhavnagupta801@gmail.com**

## ABSTRACT

The world has evolved with new technologies and one of the technology is Teledentistry. Teledentistry is a combination of telecommunication and dentistry and involves exchange of clinical information and images over remote distances for dental consultation and treatment planning.It has the ability to improve access to oral healthcare and improve its delivery by lower its costs. It has the potential to eliminate the disparities in oral health care between rural and urban communities. It plays an important role in dental health education. It is also advised that the Government should take the initiative to highlight the importance and benefits of teledentistry in the society by providing the infrastructure and basic facilities to all the states for betterment.

**Keywords:** Teledentistry ,Oralhealth, Internet,,Health education,Tele-consultation

## INTRODUCTION

The World is changing everyday with new technologies and evolution and various endeavours are made. In recent years, the field of dentistry has also seen extensive technologic innovations and one of these is Teledentistry. Using advanced information technology, the Dentistry, today, has crossed much longer distances than it was ever able to do so. This new technology used to impart Dental information has improved the quality of management of dental patients, and also partial or complete management has been made possible at distances of thousands of kilometers away from healthcare centers or qualified dentists. This entire process of networking, sharing digital information, distant consultations, workup, and analysis concerned with dentistry known as "Teledentistry".

"Tele" is a Greek word meaning "distance" and "mederi" is a latin word meaning "to heal [1]. Teledentistry is a combination of telecommunications and dentistry, which involves the exchange of clinical information and images over remote distances for dental consultation and treatment planning. The word, came into the year 1997 and is defined by Cook[2] as "The practice of using video-conferencing technologies to diagnose and provide advice about treatment over a distance." The basis or necessity of modern systems of Teledentistry is internet and it helps to transport large amounts of data.

Teledentistry has the ability to improve access to oral health care and improve its delivery by lower its costs. It has the potential to eliminate the disparities in oral health care between rural and urban communities. Like telephones affected people many years ago and the same manner within next 10 or 20 years teledentistry is expected to be routine of dental consultation. Teledentistry is not

complicated. It can be learnt easily, if one know how to turn on a television, how to make a phone call or how to fax a document. This procedure involves the referring dentist to log into a secure web server and fills in the patient's details, the chief complaints and the provisional diagnosis and attaches the digital and scanned intraoral images radiographs. The specialist subsequently logs into the secure web server, reviews the case and suggests his diagnosis and treatment plan within a limited period [3] Teledentistry has been implemented in some developed countries and needs to be encouraged and implemented on a priority basis in India due to lack of dental set ups , specialists and an extensive underserved population.

## METHOD AND SOURCE OF INFORMATION

Relevant research concerning teledentistry was identified by searching the biomedical databases for primary research material. The databases were searched for publications with key articles obtained primarily from MEDLINE.
The literature reviewed in the present work is obtained from the following sources:

- Published articles
- Online manuals and books
- Internet news clipping

The authors subsequently analysed and scrutinized the literature from these sources and relevant information from these sources was taken to discuss it in this review.

## HISTORY OF TELEDENTISTRY

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 electronics system group in Baltimore. The birth of Teledentistry was made in US army in 1994 by doing dental consultations on persons located more than 100 miles apart. This military project demonstrated that teledentistry reduced total patient care costs, As technology has advanced, new opportunities for teledentistry have been created and various institutes, organizations has started practicing teledentistry with varying degree of success.

### Types of Teledentistry

Teledentistry consists of a computer with substantial hard drive memory, adequate RAM, and a speedy processor, an intraoral video camera or a digital camera for the capture of picture, a modem and an internet connection. A fax machine, a scanner, and a printer may also be required [4].To enable live video conferencing, one might employ a widely available standalone IP/ISDN videoconferencing solution or install a PCI 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 [5].

Teleconsultation through teledentistry can take place in either of the following ways-"Real-Time Consultation" and "Store-and Forward Method." [6] Real-time consultations involve a video-conference in which dental professionals and their patients, at different locations, may see, hear, and communicate with one another. The Store-and-forward method involves the exchange of clinical information and static images collected and stored by the dental practitioner, who forwards them for consultation and treatment planning [7, 8]. During the consultation, the patient is not present. Dentists can share patient information, radiographs, graphical representations of periodontal and hard tissues, therapies applied lab results, tests, remarks, photographs, and other information transportable through multiple providers. This data sharing can be of extreme importance for patients, especially those in need of specialist consultation. 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.

## CURRENT EVIDENCE FOR TELEDENTISTRY

### Role in oral medicine and diagnosis

Bradley M *et al.* successfully proved the use of teledentistry in oral medicine in a community dental service in Belfast, Northern Ireland, using a prototype teledentistry system. [9]

Torres-Pereira C et al. suggested that distant diagnosis is an effective alternative in the diagnosis of oral lesions using transmission of digital images by e-mail [10]. Their study involved documenting 25 cases of oral lesions over a period of 1 year in a

primary care public health clinic in Parana in Southern Brazil. The clinical electronic charts and images were produced and sent by email to two oral medicine specialists with a median of 10 years experience in the field. The consultants provided a maximum of two clinical hypotheses for each case. The results revealed that distant diagnosis can be an effective alternative in the diagnosis of oral lesions and the use of two distant consultants improved diagnostic accuracy.

Summerfelt FF reported a teledentistry-assisted, affiliated practice dental hygiene model developed by the Northern Arizona University that allowed dental hygienists to provide oral healthcare to underserved populations by digitally linking up with a distant oral health team [11].

## Role in Oral Surgery

Duka M ***et al.*** concluded that diagnostic assessment of the clinical diagnosis of impacted or semiimpacted third molars assisted by the telemedicine approach was equal to the real-time assessment of clinical diagnosis. [12]According to Rollert MK *et al*., used teledentistry to adequately assess the patients for dentoalveolar surgery under general anesthesia and nasotracheal intubation and found that such method was as reliable as those conducted by traditional methods and that telecommunication is an efficient and cost-effective mechanism to provide pre-operative evaluation in situations in which patient transport is difficult or costly. [13]**Brickley** M stated that there is a need and demand for change in the referral system for Oral Surgery specialist care[14]. Telemedicine could conceivably be one way to improve access to specialist oral surgery care.Aziz SR and Ziccardi VB stated that Smartphones provide fast and clear access to electronically mailed digital images and allows the oral/maxillofacial surgeon free mobility, not restricted by the constraints of a desktop personal computer [15].

## Role in endodontics

Brullmann D *et al*. reported that remote dentists can locate root canal orifices based on images of endodontically accessed teeth with an acquired intraoral cameraand found that in 87% of the cases, the canal locations were marked correctly [16]. The results of this study highlighted the fact that the recognition of root canals by experienced dentists could help younger colleagues in the detection of root canal orifices through tele-consultation. Baker Zivkovic D *et al*. demonstrated that teledentistry based on the Internet can be helpful in the diagnosis of periapical lesions of the front teeth, that reduce the costs related with distant visits.[18] Baker WP et *al*. showed that there is no statistical difference between the evaluators to identify periapical bone lesions using conventional radiographs on a viewbox and evaluate the same images transmitted on a screen. [18]

## Role in Orthodontics

Berndt *et al*. [19], evaluate the feasibility of interceptive orthodontic services done by general dentists to disadvantaged children with real-time supervision from an Orthodontist using teledentistry [19].The Orthodontic Study models of both pre-treatment and post treatment of 30 children treated by a general dentist using teledentistry and 96 children treated by orthodontic residents directly assessed by orthodontic faculty were scored with the peer assessment rating index. The results showed that there was no significant differences between the groups before treatment or after interceptive orthodontic treatment suggesting that interceptive orthodontic treatments provided by sufficiently prepared general dentists and supervised remotely by orthodontic specialists through teledentistry were good approach in reducing the severity of malocclusions in disadvantaged children when referral to an orthodontist was not possible. It can be concluded that the use of teledentistry helps dental practitioners in remote locations to seek orthodontic consultation. These consultations will help in diagnosis, treatment planning, and application of preventive and interceptive orthodontics to reduce the severity of malocclusion[19].

## Role in Prosthodontics

Ignatius *et al*.[20] conducted a study to investigate the use of videoconferencing for diagnosis and treatment planning for patients requiring prosthetic or oral rehabilitation treatment. The consultations took place between a specialist dental treatment unit in a central hospital and general dental practitioners in seven regional health centers. Videoconferencing was conducted and a diagnosis or treatment plan could be

made. All participating dentists were satisfied with the consultation process and found that the videoconsultation in dentistry has potential to increase the total number of dental specialist services in sparsely populated areas[20].

## Role in Periodontics

The first study of teledentistry in Periodontics, Fifteen periodontal patients were referred to Fort Gordon for surgery. One week after their surgery, each patient reported to Fort McPherson 150 miles away for suture removal under tele supervision of the periodonist. At the time of suture removal, color still images were obtained of the surgical sites and these images were transmitted to Fort Gordon for examination by the periodontist who performed the surgery. The results revealed that 14 of the 15 patients saved the return trip to Fort Gordon.The patients found that they had received better care than they normally received,saved time and cost for the long trip to Fort Gordon

### Role in Preventive and Pediatric dentistry

Kedzierawski [22] and Billings evaluate dental caries prevalence and dental care utilization in preschool children enrolled in urban childcare centers which involved two groups: group one received a visual/tactile oral examination and group two received a teledentistry examination. It was concluded that teledentistry was as good as visual/tactile examinations for dental caries in preschool children for the signs of early child hood caries. This study along with others found that the teledentistry helped in assessing the dental caries prevalance and other diseasas among children and potentially in a cost-effective manner. [23]

### Role of Teledentistry in Dental Education

Dental education through teledentistry can be given by either of the two ways –

1. Web-based self-instruction
2. Interactive video-conferencing

### The Web-based self-instruction educational system

In this System before the dentist accesses the program, the information has been developed and stored digitally for future referral and subsequent & repeated accession over a period of time

The main disadvantage of Web-based self-instruction is dissatisfaction with lack of face to-face communication between the referral dentist and specialist.

### Interactive Videoconferencing

Interactive videoconferencing (conducted via POTS, ISDN, Internet or satellite) includes a live interactive videoconference. It is a two way communication between instructor and trainee and trainee can get immediate responses which increases the enthusiasm for learning.

## SCOPE OF TELEDENTISTRY IN INDIA

As India is a developing country and most of the population belongs to rural areas where some of the basic amenities of daily routine life are missing, especially primary health education and oral health care services. In order to provide better services to the population, Primary Health Center and Community Health Center can be equipped with modern telecommunication systems for referral. Also, the Ministry of Health and Family Welfare Govt of India has launched the power of mobile for Public Health in India on 20th January 2016. This step taken by the government will help people of India to improve knowledge and communication skills between operator and patients. It is also advised that the Government should take the initiative to highlight the importance and benefits of teledentistry in the society by providing the infrastructure and basic facilities to all the states for betterment.

## CONCLUSION

Teledentistry is ‘not’ a new specialty. It is a fastest growing segment of dentistry. It helps in eliminating the disparity between the undeserved patient in rural areas and the specialist i.e. has a great value in rural and urban areas where there is unavailability of specialist consultation.Also encourage isolated population who may have difficulty accessing the oral health care system due to distance, or lack of oral health care providers in their area. It was also helpful in all the branches of dentistry and providing new opportunities for dental education and continuing dental education programs.

## REFERENCES


[1]. Sanjeev M, Shushant KG. Teledentistry: a new trend in oral Health. IJCCI2, 2011, 49-53.
[2]. Cook J. ISDN video conferencing in Postgraduate Dental Education and Orthodontic Diagnosis. Learning Technology in Medical Education 1997, 111-6.
[3]. Chhabra N, Chhabra A, Jain RL, Kour H, Bansal S. Role of teledentistry in dental education: Need of the era. Journal of Clinical and Diagnostic Research5(7), 2011, 1486-8
[4]. Birnbach JM. The Future of Teledentistry. J Calif Dent Assoc28, 2000, 141-3.
[5]. Folke LE. Teledentistry: An Overview. Tex Dent J118, 2001, 10-8.
[6]. Reddy KV. Using Teledentistry for Providing the Specialist Access to Rural Indians. Indian J Dent Res22, 2011, 189.
[7]. Bhambal A, Saxena S, Balsaraf SV. Teledentistry: Potentials Unexplored. J Int Oral Health2, 2010, 1-6.
[8]. Chang SU, Plotkin DR, Mulligan R, Polido JC, Mah JK, Meara JG. Teledentistry in Rural California- A USC Initiative. CDA J2003;31, 601-8.
[9]. Bradley M, Black P, Noble S, Thompson R, Lamey PJ. Application of Teledentistry in Oral Medicine in a Community Dental Service, N. Ireland. Br Dent J 209, 2010, 399-404.
[10]. Torres-Pereira C, Possebon RS, Simoes A, Bortoluzzi MC, Leao JC, Giovanini AF. Email for Distance Diagnosis of Oral Diseases-A Preliminary Study of Teledentistry. J TelemedTelecare14, 2008, 435-8.
[11]. Summerfelt FF. Teledentistry-assisted, affiliated practice for dental hygienists: An innovative oral health workforce model. J Dent Educ75, 2011, 733-42.
[12]. Duka M, Mihailovic B, Miladinovic M, Jankovic A, Vujicic B. Evaluation of Telemedicine Systems for Impacted Third Molars Diagnosis. Vojnosanit Pregl66, 2009, 985-91.
[13]. Rollert MK, Strauss RA, Abubaker AO, Hampton C. Telemedicine Consultations in Oral and Maxillofacial Surgery. J Oral MaxillofacSurg57, 1999, 136-8.
[14]. Brickley M. Oral Surgery: The Referral System and Telemedicine. Br Dent J188, 2000, 384.
[15]. Aziz SR, Ziccardi VB. Telemedicine Using Smartphones for Oral and Maxillofacial Surgery Consultation, Communication, and Treatment Planning. J Oral MaxillofacSurg67, 2009, 2505-9.
[16]. Brullmann D, Schmidtmann I, Warzecha K, d'Hoedt B. Recognition of root canal orifices at a distance – A preliminary study of Teledentistry. J TelemedTelecare17, 2011, 154-7.
[17]. Zivkovic D, Tosic G, Mihailovic B, Miladinovic M, Vujicic B. Diagnosis of Periapical Lesions of the Front Teeth Using the Internet. PONS Med J7, 2010, 138-43.
[18]. Baker WP 3rd, Loushine RJ, West LA, Kudryk LV, Zadinsky JR. Interpretation of Artificial and In Vivo Periapical Bone Lesions Comparing Conventional Viewing Versus a Video Conferencing System. J Endod26, 2000, 39-41.
[19]. Berndt J, Leone P, King G. Using Teledentistry to Provide Interceptive Orthodontic Services to Disadvantaged Children. Am J OrthodDentofacOrthop134, 2008, 700-6.
[20]. Ignatius E, Perala S, Makela K. Use of Videoconferencing for Consultation in Dental Prosthetics and Oral Rehabilitation. J TelemedTelecare16, 2010, 467-70.
[21]. Rocca MA, Kudryk VL, Pajak JC, Morris T. The Evolution of a Teledentistry System within the Department of Defence. Proc AMIA Symp921, 1999, 4.
[22]. Kopycka-Kedzierawski DT, Billings RJ. Prevalence of dental caries and dental care utilization in pre-school urban children enrolled in a comparative-effectiveness study. Eur Arch Paediatr Dent12, 2011, 133-8.
[23]. Kopycka-Kedzierawski DT, Billings RJ, McConnochie KM. Dental screening of preschool children using teledentistry: A feasibility study. Paediatr Dent 29, 2007, 209-13.


**How to cite this article:**Dr. Bhavna Gupta, Dr. Nidhi Gupta, Dr. Sahil Singh Thakar, Dr. Preety Gupta, Dr. Surbhi Jindal. Dentistry on web-teledentistry.Int J of Allied Med Sci and Clin Res 2017; 5(1): 196-200.
**Source of Support:** Nil.**Conflict of Interest:** None declared.