TELEDENTISTRY: IT'S ALL ABOUT ACCESS TO CARE

Vikas Singh, [1] Bhaskar DJ, [2] Chandan Agali R, [3] Mallika Kishore, [4] Swapnil Bumb, [5] Safalya S. Kadtane[6]

Post Graduate Student, [1] Professor & Head, [2] Associate Professor, [3] Post Graduate Student, [4] Post Graduate Student, [5] Post Graduate Student,[6]
1 – 6 Department of Public Health Dentistry, Teerthanker Mahaveer Dental College & Research Center, Moradabad.

Abstract

Teledentistry is a relatively new field that combines telecommunication technology and dental care. 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. In dentistry it is used by specialist in various branches and serving the general dentist too. Most of the dentists are unaware about Teledentistry, about its goals and advantages and how to get involved into it. Some barriers still exist for Teledentistry practice including legal, educational and insurance issues. In spite, of having these "teething problems", the potential of telemedicine and Teledentistry is tremendous. This article illustrates as to how Teledentistry can be an effective solution for dentists and their patients.

Key Words: - E-health, Tele-health, Tele-medicine

Introduction

Technologic innovations in the field of dentistry have been extensive in recent years. Just as communication technology and uses of electronic information has developed over the years, terms to describe health care services at a distance, such as Telehealth and telemedicine, have also evolved. Teledentistry is a combination of telecommunications and dentistry. "Tele" is a Greek word meaning "distance" and "mederi" is a latin word meaning "to heal.[1]

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 the treatment over a distance.[2]"Teledentistry" has come to mean the use of electronic information and telecommunications technologies to support long-distance clinical oral health care, patient and professional health-related education, public health, and health administration.[3]

Internet is the basis of modern systems of Teledentistry, being up-to-date and fast, and able to transport large amounts of data. Almost all new systems of Teledentistry are Internet based (fixed and mobile), as well as all kinds of distant consultation (Real Time, Store and Forward, but Late as well). As the result of all the qualitative and quantitative characteristics of Internet, all other Internet-independent forms of telecommunication are thought to be of secondary importance.[4]

Thus the main application of Teledentistry is Tele-education and remote diagnosis in remote areas of country like India where the majority of the population lives in rural areas. In rural areas, health care facilities are insufficient and inadequate, and tools like Teledentistry can contribute substantially in bridging the gap between demand and supply.[5]

Forms of Teledentistry

Teledentistry can occur in two form "real time consultation" and "store and forward." The real-time method transfers the information immediately, whereas the store-and-forward method allows data to be stored in a local database to be forwarded as needed. In real time consultation dentist and patient at different location can see, hear and communicate with each other using advanced telecommunication technology. The store-and-forward method, involves collecting all the patient information and images and storing that data for review by a dentist specialist at a later time.[6]

Teledentistry appointment

It is much like a standard dental first visit. The local dentist with his dental hygienist records patient's medical and dental histories. This information with photographs taken with intraoral cameras is then forwarded by fax or through electronic record to the specialist .With this information in hand an appointment is fixed for the patient through video conferencing. Right away the specialist works to put the patient at ease.[7]

Applications of Teledentistry in Various Fields of Dentistry

1. Tele Oral Medicine

Orofacial disorders include oral cancer, temporomandibular disorders, oral mucosal disease, salivary gland disorders, orofacial pain disorders, oral neurosensory disturbances, orofacial dystonias and dyskinesias, bruxism, burning mouth, dental sleep disorders, malodour, and dental phobias. If the recognition and treatment of the orofacial disorders are inadequate or inappropriate, the personal impact can be tragic, and the costs are great. Most general dentists and dental specialists feel inadequately trained to recognize and manage these problems, for several reasons, including inadequate clinical and didactic training in dental school, lack of knowledge about appropriate medical billing procedures and codes, and the different office protocols that require more time. The complexity and difficulty of managing orofacial disorders usually results in a consultation with or referral to a specialist. Teledentistry can bring the specialist in orofacial pain or oral medicine to the rural dentist or dental hygienist through remote teleconsultations.[8]

2. Teledentistry in Orthodontics

Orthodontic specialists, after taking dental impressions of the jaws, instead of casting jaw models in plaster, send the impressions by special postal service to specialized

companies for 3D digitization of working models; then they create-digital 3D models using patent-protected systems for 3D scanning and digitization, form a computer file, and return it via Internet to the therapist. The therapists share this digital model of the jaws with others via network, effectuating necessary consultations with his colleagues. Peer teleconsultants, if required, may also participate from a distance in the creation of a plan and program of orthodontic management, using digital patient model.[9]

3. Teledentistry in Endodontics

Periapical lesions constitute a large portion of dental pathology and their treatment is commonly performed by dentists who are not specialists in endodontics. Modern telemedical systems are an ideal solution for seeking and obtaining timely expert help in that regard. Distant consultants, specialist in endodontics, are informed via their mobile phones about the received request, after which they download the digital images and accompanying an amnestic data. They establish the diagnosis and suggest a treatment, then post this information on an on-line server, which informs the consultation-requester dentist about the received response.[10]

4. Teledentistry in Pediatric and Preventive Dentistry

Prevention and early detection of caries are the key factors in the suppression of this mass disease of etiologically insufficiently known nature. Telemedicine is here to a method of choice in many situations where direct clinical inspections are not possible. It has been demonstrated in real conditions that distant diagnosis of pediatric dental problems, based on non-invasive imaging, is a valid grounding for an appropriate insight into dental problems. The success with these teledentistry systems largely depends on the quality of intraoral cameras.[11]

5. Teledentistry in Dental Prosthetics

There are dentists and dental technicians who are not very skillful doing this somewhat complicated process of designing shapes and interjaw relationships using CAD software, the usual practice is to request teledentistry help of computerized dentistry specialists. The resulting project file is encrypted and sent by e-mail to a teleconsultant for model analysis, projection of the shape of restoration, of its height and interjaw relationships using a virtual articulator; the completed project is then encrypted and returned to the clinic, usually by e-mail.[12]

6. Teledentistry in Oral and Maxillofacial Surgery

A very common practical problem is differential diagnosis by dentists or doctors who are not specialists of oral surgery that the cause of patient's complaints is an impacted or half impacted third molar. Then, an appropriate treatment should be established in the form of extraction, some minor surgery or conservative treatment. As the presence of oral surgeons outside large centres is very limited, the availability of high quality telemedical consultation is essential. It has been documented by a study that

telemedical examination does not differ from clinical examination of the dentists of this speciality.[13]

Teledentistry and its Use 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 the specialists to the rural and underserved communities for their dental needs, besides decreasing the time and the cost which are associated with the speciality consultations.[14]

Scope of Teledentistry in India

India has opened up to telemedicine to address various issues which are being faced by the healthcare delivery system, like inadequate health infrastructure and clinical services, paucity of qualified doctors, the almost non-availability of specialist care, the late discovery of the ailment, the delay in the delivery of the treatment due to the greater time which is required for the transport of the patients to urban healthcare facilities and the provision of healthcare by inexperienced primary healthcare service providers.[15]

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 (Uttar Pradesh).[16]

Future Prospects

The advances in telecommunication have rightly enabled the dental care to promise many exciting changes during the next few years. However, like any revolution, it will not be easy or painless. There are certain issues which require resolution for the success of Teledentistry. These issues include inter-state licensure, jurisdiction and malpractice, as well as technological, security and ethical aspects. Various measures that can be employed for the effective implementation of Teledentistry are: The instructors of the Teledentistry education courses need to be well versed with computer knowledge and they should have adequate teaching Experience. The practitioners who are engaged in Teledentistry must have a license in each state in which they Practice. Dentists who are engaged in Teledentistry must make every effort to ensure the security of their systems, as well as of any data that they may transmit. For example, data encryption, password protection and user access logs can help in deterring most of the people and in protecting patient confidentiality.[17]

Conclusion

Despite the fact that telemedicine has been used in medicine for many years, there has been little use in dentistry. Currently, Teledentistry has not yet become an integral part of mainstream oral health care. . The reasons are many including: reimbursement; regulatory and legal

sanction; privacy and security; compatibility and interoperability of technology across systems; sustainability; and acceptance of Teledentistry by patients and providers alike In the near future Teledentistry will be just another way to access an oral health care, especially encouraging for isolated populations 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

References

1. Mittal Sanjeev, Garg Shushant K. Teledentistry a new trend in oral Health. IJCCI.2011;2:49-53.
2. Cook J. ISDN video conferencing in Postgraduate Dental Education and Orthodontic Diagnosis. Learning Technology in Medical Education1997:111-16.
3. Agrawal Rahul, Adit, Kumar Singh Rajat, Agarwal Ashish, Chandra Akhilesh. Teledentistry: Now And Then. Journal of Dentofacial Sciences. 2013; 2:34-36.
4. Jadad AR, Haynes RB, Hunt D, Browman GP. The Internet and evidence-based decision-making: a needed synergy for efficient knowledge management in health care. CMAJ. 2000;162:362-5.
5. Shirolkar Rajan, Ruparelia Pritesh Kosha, More Chandramani, Teledentistry: An art and science of Healing. JIAOMR.2011;23:108-111.
6. Clark GT. Teledentistry: what is it now, and what will it be tomorrow? J Calif Dent Assoc. 2000; 28:121-7.
7. Susan Es .Teledentistry .A new view on oral health care.JCalif Dent Assoc 2000;28:219-25.
8. Locker D, Grushka M. The impact of dental and facial pain. J Dent Res 1987; 66:1414–7.
9. Mihailovic, B., Miladinovic, M., Mladenovic, D., Lazic, Z., Jankovic, A, Zivkovic, D. &Vujicic, B. Computerized dentistry [In Serbian]. Obelezja, Belgrade.2009
10. 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 Endod. 2000;26:39-41.
11. Kopycka-Kedzierawski DT, Billings RJ, McConnochie KM. Dental screening of preschool children using teledentistry: a feasibility study. Pediatr Dent. 2007;29:209
12. Späth C, Kordass B. Optimization of the static occlusion by "occlusal surface settling" in the Cerec 3D software. Int J Comput Dent. 2006;9:121-6.
13. Duka M, Mihailović B, Miladinović M, Janković A, Vujicić B. [Evaluation of telemedicine systems for impacted third molars diagnosis]. Vojnosanit Pregl. 2009;66:985-91.
14. Friction J, Chen H. Using teledentistry to improve access to dental care for the underserved. Dental Clinics of North America 2009; 53: 537-49.
15. Sood, Sanjay P. India telemedicine venture seeks to improve care, increase access. Telemedicine Today 2002;25-26.
16. Development of telemedicine technology in India – Sanjeevni- An integrated telemedicine application. J Int Oral Health 2010, 2: 308-11.
17. Bimbuch JM. The Future of Teledentistry. J Cal Dent Assoc 2000; 28: 121-27.
18. Young HJ, Waters RJ. Licensure barriers to the interstate use of telemedicine. Telemed Today 1996; 4: 10-11.

Correspondence Address:

Dr. D.J. Bhaskar
Professor and Head
Department of Public Health Dentistry
Teerthanker Mahaveer Dental College & Research Center,
Moradabad.