



TELEDENTISTRY: THE FUTURE'S WAY TO SMILE.

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ABSTRACT

Technology dictates modern life. From our electronic toothbrushes in the morning to communication devices, binary codes drive us ahead. Teledentistry, however, still grows slow with its nascent evolution.

The field of medicine has inarguably taken huge strides with its technical advancements. The recent situation of pandemic has cemented the need for development of newer methods of diagnosis and treatment planning. Gone are the days where the patient needs to be physically examined for the prognosis of an anomaly. Digital growth has opened several avenues in every field of medicine, with digital dentistry taking clinical strides along the way.

Telecommunication in dentistry is not as synonymous as it has been the general field of medicine. Teledentistry, though introduced in the last decades has found its true use in these dire times, paving a way for the future. Here, we enumerate upon the history, the recent advancements and the need of telecommunication in dentistry or teledentistry, along with pitching some of our ideas as dental practitioners to advance upon the field.

KEYWORDS : Technology, Teledentistry, COVID-19, Digital Dentists.

INTRODUCTION:-

The concept of teledentistry proposes the application of a variety of information and communication technologies to facilitate oral health care for geographically distant patients and practitioners. The term "Teledentistry" was first used in 1997, when Cook defined it as "The practice of using video conferencing technologies to diagnose and provide advice about treatment over a distance".^[1]

Teledentistry is a major need of the hour for medical growth in the country. Racial and ethnic minorities, the mentally or physically challenged and those from low-income families, particularly children, are especially hard hit due to decreased access to dental care. In most rural areas, there are many barriers to dental health care, including geographic remoteness. A low number of dentists relative to total population, lack of expertise in proper diagnosis cause a hindrance to overall dental care. Especially, in a country like India, with a vast landmass and majority populace residing in the rural areas, it provides a suitable avenue for spreading dental awareness.

HISTORY:-

The first teledentistry initiatives were started by the U.S military in 1994 offering oral healthcare to its troops around the world. In 1999, the Ministry of Communication and Information Technology (Government of India) launched the project "Development of Telemedicine Technology" aimed at establishing teleconsultation and telediagnostic services for the specialties of radiology, pathology and cardiology.

In 1995, Rocca et al conducted a pilot study in Haiti to connect a general dentist to a dental specialist in Washington D.C. via satellite systems.

These small steps opened the doors to a new method of treatment, abridging the gap between the physician and the patient.^[7]

The Concept:-

Teledentistry works in the following ways:-

Real-time consultation:

It employs the standard video conferencing technique, where the patients can consult their respective dental physicians at different locations, using video communication devices. This method is also known as "SYNCHRONOUS" mode.^[2]

Store and Forward Method:

As the name suggests, this method puts to use the pre-installed patient records in digital form, stored and secured in servers. The information saved, is consulted anytime for the prophylaxis of the patient. Also known as, "ASYNCHRONOUS" method since live interaction is not required.^[2]

Remote Patient Monitoring:

This enables the dentist to monitor and treat individuals in remote or geographically inaccessible areas. The medical information is collected and sent to the concerned health provider in that area, digitally, bridging the gap between the dental expert and the execution of proper diagnosis.^[2]

Mobile Health:

Cellular phones along with the advent of the internet, has inarguably made the world a smaller place. From cooked meals to medicines, everything is just a click away in our hands. Mobile health utilizes the boon of applications to directly consult doctors on smartphones.^[2]

The Pandemic:-

On 31st December,2019, China reported the World Health Organization(WHO) of 27 cases of "viral pneumonia" in the province of Wuhan^[7]. Since then, the world plunged into a new kind of war against COVID caused by the SARS-CoV-2 virus and its ever evolving strains.^[1]

Spreading across all continents,affecting millions,with fatality of thousands in every country the virus had become a global pandemic in less than a few months.With the impending doom,COVID forced us to adapt a new way of life.

The "new normal",imposed measures of the highest sanitary standards, social distancing and lockdowns.The airborne virus,infecting men and women of all ages,took a stern test of the medical fraternity.The "frontline workers" toiled hard, paying the price of their lives to control the spread of the pandemic.

The concept of "Telemedicine" and "Teledentistry" gained new grounds in the new world of lockdowns and social distancing.The COVID protocols prevented the populace from stepping out of their homes,prioritizing the need of a way to provide health care with the physician and patient at different locations.

The field of dentistry has maximal contact with aerosols dealing with the anomalies of the oral cavity. This puts dental experts in extreme risk of coming in contact with the virus. In this time of need, teledentistry assured the minimal spread of infection, without compromising on dental aids.^[1]

Pros:-

The Australian Dental Association,published the guidelines for Teledentistry and it considers that teleconsultation is most suited to patients for follow-up,for those presenting with acute dental problems that need to be dealt with outside normal practicing hours along with those in quarantine.Vulnerable patients during the pandemic,including those who meet the triage protocol criteria for suspected COVID-19 infection.^[4]

The advantages of teledentistry during COVID-19 crisis have been observed during a pilot study,where it was determined that teledentistry allowed monitoring of all patients, reducing costs and spreading contact.^[2]

Cons:-

The cases of stained teeth can be treated remotely however, patients with gum swelling,cysts or pain due to cavities require physical dental treatments.

Orthodontic treatments and musculoskeletal disorders require proper surgical skills which can't be dispensed digitally.Moreover due to the lack of adequate infrastructure the states are unable to utilize the full potential of teledentistry.

Teledentistry is solely dependent on the availability of wireless networks,which is still a major hindrance in third world countries like India with ever changing weather conditions and irregular landmass.^[3]

The Way Ahead :-

Challenges pave the way for advancing opportunities .The ongoing waves of the pandemic,even after being a major jolt on the health care sector, has cemented the need for newer methods of treatment for the populace at large.

The constraints of the current time,explored the advancements of the future portraying the scenario of a digital way of treatment.As dental practitioners and doctors of the future, it is our responsibility to move ahead with the progress and establish ourselves as "Digital Dentists".

Here we enumerate our recommendations,with an aim to

establish the treatment of the future in a developing country like India with impoverished health facilities,especially after the COVID-19 crisis.

1) Smart health with smartphones -

In the 21st century it is impossible to think of life without our "smartphones".The cellular device is not just a communication anymore but an imperative essential capturing every detail of our day to day lives.

There are already several applications enabling us to order all our health supplies and consult our doctors via online mode.

However,we feel there's still a long way to progress in this sector.Digital scanners have come a long way and most of our phones are equipped to do so.Enabling the cellular scanners to scan and radiologically diagnose the oral cavity, invariably reduces the number of visits to the dentist.

2) Artificial Intelligence:-

The clinical evaluation of the oral cavity and diagnosis of underlying diseases with the help of A.I or artificial intelligence based technologies bridges the long gap between the dental expert and the patient.

The idea of an application in our phones which would diagnose the oral cavity and send all the necessary details to the concerned physician,is the one to look for in the future.

For example,an edentulous patient requiring a complete denture prosthesis could send all his facial details from alveolar ridge resorption to the maxillomandibular relations via the scanner. The information stored in a central hard drive could be used for the fabrication of the prosthesis with the help of 3-D printers.^[6]

3) Promoting advanced digital dentistry practices by the Dental councils:-

The dental councils of the country at large and the state in general,should work hand in hand to implement better policies of teledentistry enabling the virtual doctor to reach every nook and corner of the country.

The major hindrance of a digital world of health is the availability of wireless cellular networks in rural and geographically challenged areas.

The local governing authorities along with the health-care department could carry out camps encouraging the use of smart "health" phones and educating the masses about the revamped medical facilities.^[4]

CONCLUSION:

In the modern times of automation, the world has become a smaller place.The field of health care ought to rejuvenate to suit the needs of a populace with better,faster and wide reaching treatment options. This research paper aims to bring light upon the advancements of teledentistry,and it's dominance in the recent future giving rise to a new era of "DIGITAL DENTISTS."

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