



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 14, Issue, 12, pp.4437-4441, December, 2023

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

TELEDENTISTRY: REVOLUTIONISING THE PROVISION OF DENTAL CARE

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DOI: <http://dx.doi.org/10.24327/ijrsr.20231412.0833>

ARTICLE INFO

Article History:

Received 12th October, 2023

Received in revised form 23rd October, 2023

Accepted 15th November, 2023

Published online 28th December, 2023

Keywords:

Teledentistry, telecommunication, health care

ABSTRACT

Teledentistry, a transformative facet of modern healthcare, harnesses telecommunications technology to revolutionize dental services. It enables patients to remotely consult with oral health professionals, breaking down geographical barriers and enhancing accessibility to care. Through virtual platforms, individuals can engage in video consultations, sharing images and information for accurate diagnosis and treatment planning. This approach proves particularly invaluable in underserved areas or for those facing logistical challenges. Teledentistry not only facilitates timely interventions but also prioritizes preventive care by providing guidance and education to patients. The utilization of digital tools streamlines communication between dentists and individuals, fostering efficient and comprehensive oral health management. By integrating technology into dentistry, teledentistry not only ensures convenience for patients but also extends the reach of dental services, ultimately contributing to improved oral health outcomes on a broader scale.

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INTRODUCTION

Teledentistry, a branch of telehealth, is a rapidly evolving field that utilizes telecommunication technology to provide dental care, consultation, education, and other related services remotely. Its applications have significantly transformed the dental industry, enabling access to oral healthcare in remote or underserved areas, improving patient engagement, and streamlining dental practice management. Teledentistry has the power to increase oral healthcare accessibility, enhance oral healthcare delivery, and reduce oral healthcare expenses. Additionally, it may end the differences in oral health treatment between urban and rural areas. It is a link in a longer chain of medical care. It can strengthen this network, raising the standard and effectiveness of medical care in the process.[1]. Recent years have seen significant technological advancements in the dental sector. The utilisation of computers, telecommunications, digital diagnostic imaging services, analysis and follow-up tools and software, and gadgets has advanced.[2] Through the use of cutting-edge information technology, dentistry has expanded well beyond its previous boundaries.[3] Not only has new information technology increased the standard of dental patient care, but it has also enabled partial or full patient management thousands of kilometres away from medical facilities or licenced dentists[4] The dental branch of telemedicine known as "Teledentistry"

handles the full process of networking, transferring digital information, remote consultations, workup, and analysis[5]. Cook originally introduced the word "teledentistry" in 1997 and defined it as "the practise of using video-conferencing technologies to diagnose and provide treatment advice over a distance." [6]

The design for dental informatics, which was drafted during a 1989 conference sponsored by the Westinghouse Electronics Systems Group in Baltimore, included the original idea of teledentistry. The main topic of discussion was how dental practises might use dental informatics to improve the way oral healthcare is provided.[7]. With the development of technology, new teledental prospects have emerged. The way dental care is delivered is starting to shift due to the availability of new technologies. Teledentistry is expected to present novel prospects for enhancing patient treatment and restructuring prevailing business frameworks. It bloom in the pandemic many problem got solved [8-9].

Approaches of Teleconsultation

This innovative approach to dental healthcare has gained significant momentum, especially in recent years, due to advancements in telecommunication tools and the need for accessible and convenient healthcare services. This introduction explores various approaches to teledentistry,

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highlighting its potential to transform the way oral health is managed. Real-Time Consultation” and “Store-and Forward Method” “Remote Monitoring Method “;“Near-Real-Time” [10] Real-time video consultations between patients and dental professionals, allowing for the assessment of oral health issues and the provision of advice and recommendations. Additionally, store-and-forward teledentistry enables the sharing of patient information, such as X-rays and images, with dental experts who can provide remote diagnostic evaluations. These approaches facilitate timely responses to patients' concerns and promote efficient dental care. [11, 12]

Scope of teledentistry

Teledentistry, a burgeoning field in modern healthcare, offers a promising scope for both dental professionals and patients. This innovative approach leverages technology to facilitate remote dental consultations and treatment planning. It addresses several significant challenges, such as improving access to dental care in underserved areas, reducing appointment wait times, and enhancing the overall patient experience[13]. Teledentistry enables dentists to diagnose oral health issues, provide preventive guidance, and offer initial assessments via video calls or online platforms. Furthermore, it fosters continuity of care and allows for the management of non-emergency cases from the comfort of one's home. Perhaps the quickest and least expensive way to close the health gap between rural and urban areas is through teledentistry. Given the enormous advancements in ICT, teledentistry has the potential to provide specialised treatment to even the most remote regions of the globe.[14]. Teledentistry will be crucial for our urban and suburban communities as well as those living in rural locations.[15]. The use of teledentistry for diagnosis, treatment planning and coordination, continuity of care, and expert consultations will offer some decision support and make it easier for dentists to share patient contextual knowledge. Additionally, teledentistry will offer new chances for dental students and dentists, as well as a way to enhance current dental education approaches {16.17}

Application of teledentistry in diagnosis

What makes teledentistry so important is that it may reduce waiting times significantly, shorten treatment durations without compromising quality, and enhance patients' access to expert counsel [18]. Patients may have simple access to diagnosis and management of their oral health concerns with the inclusion of teledentistry into oral health services [19]. The incorrect diagnosis of oral lesions is one of the potential causes of the delayed diagnosis of mouth cancer. A potential explanation for the postponed detection of oral cancer could be the incorrect identification of oral lesions [20]. By allowing contact between dentists and clinical professionals, teledentistry helps in the early detection of malignant lesions, enabling speedier measures for the treatment of oral cancer and boosting the effectiveness and safety of the therapy [21]. Furthermore, the detection of oral lesions may benefit from remote diagnosis [22]. Including numerous experts in the diagnostic process appears to be a viable strategy to improve the accuracy of remote diagnosis

Application of in oral surgery

Teledentistry revolutionizes oral surgery by employing remote consultation, diagnosis, and treatment planning through digital communication technologies. Oral surgeons utilize high-resolution imaging, video conferencing, and patient data

sharing to assess conditions, offer guidance, and recommend appropriate interventions. This approach enhances accessibility, enabling patients to receive preliminary evaluations from remote locations, reducing travel and time constraints. Teledentistry in oral surgery also supports post-operative follow-ups, facilitating continuous care and monitoring. While not a complete substitute for in-person procedures, it significantly improves patient access, streamlines consultation processes, and enhances overall oral surgical care, ultimately contributing to better treatment outcomes and patient satisfaction. [23, 24]

Application of Teledentistry In orthodontics

Teledentistry in orthodontics revolutionizes the delivery of dental care by leveraging technology to remotely diagnose, monitor, and provide consultations for orthodontic concerns. This approach involves the use of digital communication, imaging, and telecommunication tools, allowing orthodontists to assess and guide patients without requiring in-person visits. Through teleconsultations, patients can seek expert advice, discuss treatment plans, and receive ongoing guidance from the comfort of their homes. Utilizing high-resolution images, videos, and live chats, orthodontists can remotely monitor treatment progress, provide recommendations, and address concerns promptly. Teledentistry enhances accessibility, particularly for those in remote areas or with mobility constraints, providing timely orthodontic care. However, limitations exist, such as the inability to conduct physical examinations or perform certain procedures remotely. Despite challenges, teledentistry in orthodontics continues to evolve, offering convenience and expanding the reach of quality orthodontic care while complementing traditional in-office visits.

Application of teledentistry in conservative and endodontics

Teledentistry has significantly impacted the field of endodontics, offering innovative ways to deliver patient care and consultations. In endodontics, this remote approach has transformed the traditional patient-dentist interaction.[25] Using teledentistry, endodontists can remotely assess, diagnose, and even provide initial treatment recommendations for various dental conditions related to the pulp and root of teeth. Through the use of high-resolution imaging, such as X-rays and intraoral photographs, patients can share their dental concerns with endodontists from the comfort of their homes. This technology allows for efficient triaging of cases, enabling endodontists to determine the urgency of treatments, offer advice, and guide patients on necessary steps before an in-person visit. Additionally, teledentistry aids in post-treatment follow-ups, allowing endodontists to monitor recovery and offer ongoing support. However, while it streamlines many aspects of patient care, some limitations remain, particularly in performing certain procedures that require physical intervention. Overall, teledentistry in endodontics has revolutionized initial assessments and guidance, enhancing access to specialized care while ensuring timely and efficient treatment for patients.

Application of Teledentistry In pedodontics

Tele-dentistry in pedodontics, or pediatric dentistry, has revolutionized the way oral healthcare is delivered to children. This approach utilizes technology to provide remote dental care, consultations, and guidance to young patients, often in the comfort of their homes. Through video conferencing, imaging,

and digital communication, pediatric dentists can assess oral health, offer advice, and even diagnose certain conditions. As 60-70 % of the school going children face the problem of dental caries by topical fluoride or fluoridated tooth paste help us to reduce the prevalence and incidence of dental caries (26) This method has proven particularly beneficial for children who might feel anxious or apprehensive about visiting a traditional dental office, as it allows for a more relaxed and familiar environment during consultations. Additionally, parents can receive expert guidance on oral hygiene practices, dietary habits, and early identification of dental issues, promoting preventive care from an early age. Tele-dentistry in pedodontics enhances accessibility, especially in remote or underserved areas, ensuring that children receive timely and essential dental care while minimizing the potential stress and anxiety associated with in-person visits.

Limitations during Online Consultations

Online dental consultations offer convenience and accessibility but come with inherent limitations. While they provide a platform for preliminary assessments and guidance, certain constraints must be considered. Firstly, the absence of physical examination restricts the dentist's ability to conduct a comprehensive assessment, often impeding their ability to detect subtle oral issues. Factors like palpation, percussion, and intraoral examinations are limited or absent in virtual consultations, limiting the dentist's ability to thoroughly evaluate the patient's condition. Additionally, technological barriers such as poor internet connectivity, low-resolution cameras, or inadequate lighting can compromise the visual clarity necessary for accurate diagnoses [27]. Patient reliance on self-reporting symptoms might also lead to misinterpretations or omissions, as patients may not accurately describe their conditions due to limited dental knowledge. Furthermore, the inability to perform immediate procedures, such as X-rays or minor surgeries, diminishes the scope of treatment options. Prescribing medications without a physical examination also poses challenges, potentially leading to incorrect prescriptions or overlooking underlying issues. Lastly, patient privacy and data security concerns are prevalent in online consultations, highlighting the need for secure platforms to ensure the confidentiality of sensitive medical information. While online dental consultations offer preliminary guidance and support, these limitations underscore the importance of in-person visits for a comprehensive and accurate dental evaluation and treatment.

Recommendations for Effective Online Teledentistry Consultation

Effective online teledentistry consultations require a seamless blend of technology, communication, and professional expertise to ensure high-quality virtual dental care. Firstly, choosing a user-friendly platform or software that prioritizes security and complies with HIPAA regulations is crucial for protecting patient confidentiality. Dentists should establish clear communication protocols, providing patients with detailed instructions on how to join the virtual consultation and ensure a stable internet connection for smooth interaction. Utilizing high-definition cameras and imaging tools is essential for accurate assessments, allowing dentists to examine oral conditions comprehensively. Clear, jargon-free explanations during the consultation help patients understand their oral health status and treatment options effectively. Additionally, dentists should actively engage patients, encouraging them to

ask questions and participate in the discussion. To enhance the experience, dentists can employ visual aids such as diagrams or videos to explain procedures or conditions. Timely follow-ups post-consultation, including sharing summaries and treatment plans, reinforce patient understanding and compliance. Moreover, maintaining thorough documentation of the consultation is vital for records and future reference. Lastly, a well-trained support staff capable of troubleshooting technical issues and assisting patients throughout the process significantly contributes to a successful teledentistry experience, fostering trust and patient satisfaction. Integrating these elements ensures a comprehensive, secure, and patient-centered online teledentistry consultation that delivers quality care while respecting privacy and convenience.

Future Perspectives of Teledentistry

The future of teledentistry holds tremendous promise as it continues to transform the field of oral healthcare. Advancements in technology, particularly in the realms of telecommunication and artificial intelligence, are set to drive teledentistry to new heights. With the increasing availability and affordability of high-quality video conferencing and remote monitoring tools, patients can expect greater convenience and access to dental consultations from the comfort of their homes, reducing the barriers of geographical distance and improving overall healthcare equity. Teledentistry will likely play a pivotal role in preventive care and early diagnosis through remote screenings and assessments, helping to mitigate oral health issues before they escalate. Additionally, the integration of AI-driven diagnostics and treatment planning will enable more accurate and efficient decision-making in dental practices, streamlining the treatment process and enhancing patient outcome [28]. Furthermore, teledentistry's potential extends to enhancing dental education and professional collaboration, fostering a more interconnected global dental community. However, as this field evolves, it will be crucial to address regulatory and ethical considerations, ensuring patient privacy and data security, as well as maintaining the standard of care. Tele practice not only help dental but also help medical personale it play huge role in understanding the psychology or mental health of the patient. (29-30) In summary, the future of teledentistry holds great promise, driven by technological innovation, increased accessibility, and the potential for more efficient and effective oral healthcare delivery, all while advancing the dental profession and promoting overall wellness

CONCLUSION

With the ability to provide teleconsultation support via internet-based media platforms at any time and location, teledentistry is now a more convenient approach to contact patients on a large scale thanks to advanced medical technology and devices. Using this media platform to reach a large number of targeted patients can help with public awareness campaigns about health issues and the dissemination of important information, especially during emergencies. There is no substitute for teledentistry when it comes to reducing the strain on clinics during emergencies and offering a safer patient consultation. Thus, teledentistry is essential in providing patients with a dynamic management plan and meeting their treatment demands as effectively as possible.

ACKNOWLEDGEMENT

All the authors have given equal contribution in writing my research work.

References

1. Roine R, Ohinmaa A, Hailey D. Assessing Telemedicine: A Systematic Review of the Literature. *CMAJ*. 2001; 165: 765-71. [PMC free article] [PubMed] [Google Scholar]
2. Clark GT. Teledentistry: What is it Now, and What Will it be Tomorrow? *J Calif Dent Assoc*. 2000; 28: 121-7. [PubMed] [Google Scholar]
3. Bhambal A, Saxena S, Balsaraf SV. Teledentistry: Potentials Unexplored. *J Int Oral Health*. 2010; 2: 1-6. [Google Scholar]
4. Mihailovic B, Miladinovic M, Vujicic B. Telemedicine in Dentistry (Teledentistry) In: Grasczew G, Roelofs TA, editors. *Advances in Telemedicine: Applications in Various Medical Disciplines and Geographical Areas 2011*. Rijeka (Croatia): InTech; 2011. pp. 215-30. [Google Scholar]
5. Yoshinaga L. The Use of Teledentistry for Remote Learning Applications. *Pract Proced Aesthet Dent*. 2001; 13: 327-8. [PubMed] [Google Scholar]
6. Friction J, Chen H. using Teledentistry to Improve Access to Dental Care for the Underserved. *Dent Clin North Am*. 2009; 53: 537-48. [PubMed] [Google Scholar].
7. Chen JW, Hobdell MH, Dunn K, Johnson KA, Zhang J. Teledentistry and Its Use in Dental Education. *J Am Dent Assoc*. 2003; 134: 342-6. [PubMed] [Google Scholar]
8. Birnbach JM. The Future of Teledentistry. *J Calif Dent Assoc*. 2000; 28: 141-3. [PubMed] [Google Scholar]
9. Jagriti Yadav *et al.* 2021, COVID-19 Impacts of Intervention And Risk Exodus Plan For Competent People In The Field of Dentistry. *Int J Recent Sci Res*. 12(07), pp. 42394-42397. DOI: <http://dx.doi.org/10.24327/i> View publication stats [jr.sr.2021.1207.6087](https://doi.org/10.24327/i)
10. Reddy KV. Using Teledentistry for Providing the Specialist Access to Rural Indians. *Indian J Dent Res*. 2011; 22: 189. [PubMed] [Google Scholar].
11. Chang SU, Plotkin DR, Mulligan R, Polido JC, Mah JK, Meara JG. Teledentistry in Rural California-A USC Initiative. *CDA J*. 2003; 31: 601-8. [PubMed] [Google Scholar]
12. Golder DT, Brennan KA. Practicing Dentistry in the Age of Telemedicine. *J Am Dent Assoc*. 2000; 131: 734-44. [PubMed] [Google Scholar]
13. Golder DT, Brennan KA. Practicing Dentistry in the Age of Telemedicine. *J Am Dent Assoc*. 2000; 131: 734-44. [PubMed] [Google Scholar]
14. Bagchi S. Telemedicine in Rural India. *PLoS Med*. 2006; 3: 297-9. [Google Scholar]
15. Rossomando EF. Innovation and Entrepreneurship-The National Crisis in Access to Oral Health Care: A Dental Industry Association Responds. *Compendium*. 2004; 25: 266-70. [PubMed] [Google Scholar]
16. Kirshner M. The Role of Information Technology and Informatics Research in the Dentist-Patient Relationship. *Adv Dent Res*. 2003; 17: 77-81. [PubMed] [Google Scholar]
17. Liu SC. Information technology in Family Dentistry. *Hong Kong Dent J*. 2006; 3: 61-6. [Google Scholar]
18. Daniel S.J., Kumar S. Teledentistry: A key component in access to care. *J. Evid. Based Dent. Pr*. 2014; 14: 201-208.] doi: 10.1016/j.jebdp.2014.02.008. [PubMed] [CrossRef] [Google Scholar]
19. Flores A.P.D.C., Lazaro S.A., Molina-Bastos C.G., Guattini V.L.D.O., Umpierre R.N., Gonçalves M.R., Carrard V.C. Teledentistry in the diagnosis of oral lesions: A systematic review of the literature. *J. Am. Med. Inform. Assoc*. 2020; 27: 1166-1172. doi: 10.1093/jamia/ocaa069. [PMC free article] [PubMed] [CrossRef] [Google Scholar]
20. Roxo-Gonçalves M., Strey J.R., Bavaresco C.S., Martins M.A.T., Romanini J., Pilz C., Harzheim E., Umpierre R., Martins M.D., Carrard V.C. Teledentistry: A tool to promote continuing education actions on oral medicine for primary healthcare professionals. *Telemed.E-Health*. 2017; 23: 327-333. doi: 10.1089/tmj.2016.0101. [PubMed] [CrossRef] [Google Scholar]
21. Alabdullah J.H., Daniel S.J. A systematic review on the validity of eledentistry. *Telemed. E-Health*. 2018; 24: 639-648. doi: 10.1089/tmj.2017.0132. [PubMed] [CrossRef] [Google Scholar]
22. Irving M., Stewart R., Spallek H., Blinkhorn A. Using teledentistry in clinical practice as an enabler to improve access to clinical care: A qualitative systematic review. *J. Telemed. Telecare*. 2018; 24: 129-146. doi: 10.1177/1357633X16686776. [PubMed] [CrossRef] [Google Scholar]
23. Aziz S.R., Ziccardi V.B. Telemedicine using smartphones for oral and maxillofacial surgery consultation, communication, and treatment planning. *J. Oral. Maxillofac. Surg*. 2009; 67: 2505-2509. doi: 10.1016/j.joms.2009.03.015. [PubMed] [CrossRef] [Google Scholar]
24. Roccia F., Spada M.C., Milani B., Berrone S. Telemedicine in maxillofacial trauma: A 2-year clinical experience. *J. Oral. Maxillofac. Surg*. 2005; 63: 1101-1105. doi: 10.1016/j.joms.2005.04.020. [PubMed] [CrossRef] [Google Scholar]
25. Brüllmann D., Schmidtman I., Warzecha K., d'Hoedt B. Recognition of root canal orifices at a distance—A preliminary study of teledentistry. *J. Telemed. Telecare*. 2011; 17: 154-157. doi: 10.1258/jtt.2010.100507. [PubMed] [CrossRef] [Google Scholar]
26. Jeevan Josh, Pradeep Tangade, Thanveer K, Supurna Pandit. Flourides as double edged swordareview TMU *J Dent*. 2020;7(3):8-11
27. Suetenkov D.E., Popkova O.V., Kiselev A.R. Possibilities and limitations of teledentistry. *Rev. Cuba. Estomatol*. 2020; 57: 1-8. [Google Scholar].
28. Supurna Pandit, Sanchit Pradhan, Mayank Das, Jeevan Josh, Mohnish Muchhal., DhruvGarg. The Futuristic trend of Artificial Intelligence in Health Care, *International Neurourology Journal*. Vol. 27; Iss. 4 (2023) DOI: 10.5123/inj.2023.4.in56.
29. Pandit S, Tangade P, Josh J, Singh AV. Oral Health Profile of Chronic Mentally Ill Patients in Moradabad

City: A Cross-Sectional Study. *Int J Sci Stud* 2021; 8(10):74-78.

30. Singh AV, Tangade P, Jain A, Saleem A, Josh J, Pandit S. Psychological Distress and its Relation with

Periodontitis among Patients Attending Outpatient Department in Moradabad - A Cross-Sectional Study. *Int J Sci Stud* 2020; 8(7):97-101.

How to cite this article:

Supurna Pandit, Sanchit Pradhan, Jeevan Josh. (2023). Teledentistry: Revolutionising the Provision of Dental Care. *Int J Recent Sci Res.* 14(12), pp.4437-4441.
