An Overview Of Digital Dentistry – A Boon To Clinician

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INTRODUCTION

A new field of dentistry known as "digital dentistry" has emerged in recent years as a result of the development of inventive production technologies, functional restorative materials, and cutting-edge clinical techniques. This field of dentistry now offers a wider range of treatment options and operative strategies. From restorative dentistry, including crowns, bridges, and dentures, to cosmetic dentistry, like veneers and Invisalign, it seems there is not much left that a dentist cannot do to create a perfect smile. With the probability that most procedures would be based on digital technology in the next years, digitalization has become a part of dentistry. [1] Due to the fact that Pierre Fauchard's book was the first to outline a comprehensive framework for dental treatment, he was recognised as the founder of modern dentistry in 1723. Digital technologies have played a significant role to the introduction of innovative conservative techniques in several medical branches. These techniques are distinguished by a notable reduction in operative timing and operative invasiveness as well as a notable improvement in the psychological and physical comfort of the patient. The creative solutions provided by digital tools and technologies have greatly aided such minimally intrusive methods. [2] A practicing dentist nowadays must keep up with the latest developments, but given how quickly technology is developing, this poses great challenge. The potential for digitalization and technology in dentistry is limitless. This purpose of this review article is to look into the use of digital dentistry in multidisciplinary approaches.

DIGITAL IMAGING AND RADIOGRAPHY

The proper diagnosis is the first step in effective treatment and it is an essential component of implant treatment planning, and a variety of advanced imaging modalities have been recommended to assist the dentist in assessing potential sites for implant. The overlapping anatomical features and lack of 3D details are drawbacks of conventional radiographs. [3] Additionally, this makes it difficult to distinguish between the buccal and lingual plates and makes it more difficult to identify bone deformities. The first digital radiography system came in 1987 called radiovisiography (RVG), launched by Dr. Francis Mouyen. This acts on two principles direct and indirect in which rays pass through photoconductor and scintillator respectively to produce the image. [4]

CAD/CAM TECHNOLOGY

CAD/CAM technology have transformed the design and manufacture of appliances, models, and other items. It is a computer software introduced in the year 1985 in dentistry. It is available as three systems based on the production methods, namely in office system, in laboratory system and centralized production. In laboratory system, workflow begins with history taking and overviewing followed by preparation of teeth and later taking imprints of the tooth or teeth. Then the model casting is done, and 3D scan is taken and teeth printing is done. [5]

DIGITAL SMILE DESIGNING

It is a digital mode that help us to create and project the new smile design by attaining a simulation and previsualization of the ultimate result of the proposed treatment. The software creates an aesthetic treatment plan using the data it receives from the photos. Provisional restorations or wax mock-ups will give the patient and the therapist a preview of the outcome after aesthetic evaluations have been completed. [6] There are 6 different generations in digital smile designing. Generation 1 consists of analogue drawings which has no connection to analogue models. Generation 2 consists of digital 2D drawing where there is a visual connection to analogue models. Generation 3 consists of digital 2D model. Generation 4, where digital 2D model has digital connection to 3D model. Generation 5 has complete 3D flow. The recent advances is generation 6 which consists of adding 4D concept that is adding motion to smile design process. It is a focused technique that works well for aesthetic rehabilitation. [7]

LASER

Light Amplification by the Stimulated Emission of Radiation (LASER) that are commonly used in dentistry are Erbium, Nd:YAG (Neodymium Yttrium Aluminium Garnet), Diode, and CO2. Its first application in dentistry was by Maiman in the year 1960. The interaction of LASER in tissue is by scattering, reflection, transmission and absorption. It has various applications in dentistry such as gingival contouring, depigmentation, frenectomy, treating aphthous ulcer, for dentin hypersenstivity, teeth whitening etc., Laser Assisted New Attachment Procedure concept was endorsed by Yukna et al in 1996. Though it has various advantages, at the same time, hazards associated with laser energy exist. Therefore, various safety precautions are required to protect anyone involved in laser dental therapy. [8]

T-SCAN

T-SCAN is a computerized occlusal force analysis device which plays an essential role in clinical functional analysis for disocclusion, prosthetic and endodontic restorations. The T-Scan computerised occlusal examination system by Maness et al in 1984 introduced the advancement of pressure sensitive ink-Mylar enclosed sensor technology. [9] The components of T-Scan are sensor and support, handle assembly, computer software and printer. Time analysis and force analysis are the two operational modes for the system. Here the data is interpretated as force film. The force trajectories are used to evaluate the level of force. It identifies disproportional loading forces and transient impact forces acting on specific teeth and identifies active tooth contact occurring within the functional range of mandibular movement and the interaction between working and nonworking interferences. It has various applications like in diagnostic screening, Implantology and Temporomandibular disorders. [10]

CONCLUSION

One of the most significant aspects of contemporary dentistry is digitalization. A dentist's practise and potential future will be determined by whether they adopt modern technology. It assists in more accurate patient assessment and quicker and more comfortable patient treatment. Thus, digital dentistry is a boon to clinical practice in the current era.

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