



Embracing Digital Technology in Dentistry - Opportunities and Challenges

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Digital Dentistry has become a part of everyday Clinical and Laboratory practice. The current learners in dental profession are digital natives who have integrated digital technology in every walk of their lives. These digital natives are extremely carried away by the fantasy and thrill digital technology offers in dental practice. We find that the current generation is shifting their focus and interest towards this field in the façade of upgrading. In the process, they fail to gather basic sciences, scientific rationale, concept building skill, evidence-based practice and development of their psychomotor skills. Digital Dentistry nowadays make the dentist busy in learning the trick of the trade by virtue of its tools and technological adaptation than application of science.

It is important to consider that digital technology is not a complete replacement to conventional technology and techniques. From the time of inception, digital advancements have taken place in leaps and bounds. The new age dentists are exposed to advancements in technology, which may be advertised as seemingly smart, easy or effective method. The reality is the practitioners are exposed only to the expenditure involved and a superficial knowledge on digital technology and its features. As a result the practice becomes technology driven and the practitioner is left in the dark on the factors that could possibly result in failure or success of an appliance, restoration or prosthesis.

There are many myths and facts which are related to digital dentistry which the clinician is expected to have clarity on. Digital dentistry has two aspects - one is the Clinical Workflow and the other the Digital workflow. The Clinician should understand that the knowledge and basic skill in digital technology is required to almost the same extent as the knowledge of the clinical proce-

dures. A clinician who is inadequately trained in the clinical aspects of digital dentistry [Clinical workflow] may not be able to fabricate predictably accurate restorations.

Role of digital technology in clinical practice

A variety of impression materials and techniques are being used over a period of time, with advancements alongside improvising the properties required to excel in performance and produce accurate results. Impression making using digital intra oral scanners are still a challenge to capture movable tissues. The fit of the prosthesis depends on the dynamic soft tissue interface which are captured using a mouldable material during function in the conventional technique called the border moulding. However, the pressure applied on stress bearing and relief areas can be controlled by providing planned relief during the designing stage in the visual interface. In future a functional capture of the peripheral tissues including posterior palatal seal, mandibular and maxillary vestibular area may become a reality. However, addition vs subtraction technology has their own advantages and disadvantages [1]. Fabrication of Cast partial denture pattern and final restorations are already in existence. In fixed prosthodontics, with immobile scanned structures, there has been rapid development in the technology and predictable accurate restorations are made possible [2]. Procedures like wax pattern fabrication, metal casting, ceramic processing are replaced with computerized designing and milling or printing with metals, acrylic, peek, esthetic thermopolymers and ceramics for fixed prosthodontics, removable prosthodontics and implants.

A wide range of materials including Titanium, Cobalt Chromium, Polyetheretherketone-PEEK, Polyaryletherketone-PAEK,

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polyoxymethylene-acetal and polyamide [new] can be adopted for milling or printing technology for cast partial dentures [3].

Although complete digital workflow may be future in implant, the current evidence does not support it. Operator's decision to adopt partial or complete flow should be based on treatment cost, quality of digital support and resources available and access to laboratory and patient comfort [4]. In maxillofacial prosthesis, the design and fabrication nowadays be made possible with remote scanned data as like in other divisions of prosthodontics [5].

With digital smile designing and integrating photographs and scanned data of the mouth and certain reference landmarks, a denture or crown and bridges can be fabricated in absence of the patient [6]. This can be used even for teaching and training. Despite the advantage of chair time, cost, precision and predictable outcomes are some challenges faced with digital technology to be adapted to routine clinical practice [6].

Diagnosis of Occlusal problems and Temporomandibular joint disorders, assessment of fabricated restorations and appliances are made possible with digital technology [7]. Human errors in the use of face-bows, tracing and records are completely eliminated thereby reliability of such clinical procedures have increased. Very few institutions and private clinics have adopted this rapidly growing technology in the Global arena.

With the development of Artificial Intelligence, the interpretation of dental radiographs may replace the role of a specialist in future. Digital advances in orthodontics like the Invisible aligners have also minimized the role of a specialist. Although these technologies have been developed and created by experts in the field, it is a sad situation to face the fact that such experts who are strong in their field may not be groomed in future as the current generation is keener on the electronic applications than trying to understand the scientific aspects behind them. The clinician should not reduce himself to a technician who just captures the tissues and rest of the work is done by the digital laboratory technician.

Patient Information acquisition, data storage for further retrieval and easy data transfer to enable inter-disciplinary and inter-professional patient care is nowadays indispensable. It is time

tested and found to be extremely useful in quality improvement by a neat documentation and research.

On the other hand there are many institutions who are far from embracing digital technology in their curriculum and practice, owing to lack of resources, expertise and other administration issues [8]. Growth of an establishment and quality improvement can be brought with such time saving measures. The outgoing graduates and advanced trainees are not exposed to such technology. When they pass out of the institution they are exposed to a completely different world of practice which integrates digital technology.

How do we prepare ourselves to seamlessly embrace the digital technology?

There is no doubt that the future dentists should be exposed to digital dentistry. But the training institutions should ensure the achievement of hidden competency of thorough scientific knowledge, while operating such gadgets on patients.

Those who are already in clinical practice should upgrade themselves and tune in to the advancements in the field. Faculty development programmes, continuing dental education and capacity building workshops and certificate courses should be encouraged to equip the clinician on the same.

Research should be carried out to critically evaluate the claimed merits of the digital technology. As these studies involve a huge monetary support, funding from institution, government and non-government agencies should be given to promote such research. Otherwise, we would find the literature filled only with data provided by company sponsored research in which reliability is usually a question.

For any prosthesis, appliance or restoration fabricated with digital technology, much time should be devoted to diagnosis and treatment planning.

Proper acquisition of the information using the right technology on the clinical features and patient specific conditions is considered paramount and it should be conveyed to the technician so that a prosthesis or an appliance may be fabricated, based on the instructions given by the clinician. The government should also en-

courage development of indigenous digital dental innovations so that they can be brought to the doorstep of every clinic at an affordable price.

The clinician or the specialist should integrate digital technology into practice after a thorough background research based on the reliability, efficiency, cost effectiveness and value addition of the same.

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