

Digitalizing Cosmetic Dental Practice

Dr. Suhit Raj Adhikari

General Dental Practitioner, Kathmandu, Nepal

Correspondence:

Dr. Suhit Raj Adhikari. Email: drsuhit@gmail.com

ABSTRACT

With the increasing concern regarding aesthetics, more people are seeking dental professionals for cosmetic advice and treatment. Incorporation of digital technologies in dentistry has revolutionized dental practice. Due to the rapid development of digital technologies, newer and robust technologies appear in the market in no time and keeping pace with these changes can be frustrating and financial burden to the cosmetic practitioners. Digital dental practice needs thorough evaluation and planning for better treatment outcomes and patient satisfaction. Proper and judicious selection of digital technology and incorporating them into practice will help the practitioner to perform better clinically and provide quality care to the patient, increasing work satisfaction, increasing patient load and hence gain greater financial outcome. It is up to the clinician to select the most appropriate technology. Along with advanced technology practitioner still needs basic clinical skills and understanding. Needless to say, technologies and advancements are meant to aid the practitioners not to replace them.

Keywords: Cosmetic dentistry; dental photography; digital dental practice; digital impression.

INTRODUCTION

In recent times, there is tremendous increase in the people seeking cosmetic advice and treatment in dental practice. With this optimistic flow of patient, many dentists are limiting their practice to cosmetic dentistry with the aim of delivering quality cosmetic treatment to satisfy their needs. As with any practice, cosmetic dental practice needs to incorporate the latest techniques and technologies in order to render the utmost cosmetic care and to increase office efficiency.¹⁻³

Digital technologies have been increasingly incorporated in dental practice in recent years with tremendous success especially in practice management software with the aim of going “paperless.”^{1,4,5} Digitalizing cosmetic dental practice needs thorough evaluation and planning for better outcome clinically and financially.⁴⁻⁷

A Strategic Plan

Having a strategic plan is must for any technology implementation.^{4,7,8} Such a plan provides blueprint that can guide technology decisions for several years. The

planning process should comprise:

- A statement of expectations
- A prioritized list of needs and goals of the office
- An overview of the available technologies that could meet those needs
- A comparative assessment of those technologies
- A timeframe for acquisition of each technology
- A list of resources needed for implementation (E.g. finance, personnel, training)

Establishment of digital protocol in cosmetic dental practice is important factor for acquiring digital technology.^{5, 6, 8-10} Depending upon the work flow, integration of these digital technologies can be achieved.^{2,7} The needs and financial capabilities are directly related to the amount of cosmetic work done in that practice. The needs are practically analyzed and plans are formulated so as to incorporate possible future expansion.^{5, 10-13}

Digital Component

Digital components that can be integrated in cosmetic dental practice can be grouped into two categories: viz.

hardware and software. Hardware can be non-dental and dental. Non-dental hardware includes computers with its accessories like printers and scanners, networking of computers and communication setup. When setting up new practice it is necessary to visualize the layout⁷ of the operatories so that the future positions of these hardware are in appropriate location without interferences for better ergonomic benefits. All hardware and software should integrate with each other smoothly in order to function properly and efficiently.^{2-4, 14}

Digital Photography: The most essential and common dental hardware for cosmetic dental practice is digital camera with the capabilities of taking intra-oral and head shot. The proper selection of digital camera is vital for better communication with dental lab, other specialists, staffs, patients and above all with yourself. A better picture quality in terms of color, depth of field and pixilation is required to increase quality of cosmetic care.^{4, 7, 8, 10, 11}

Intra-oral camera is another digital hardware that can have immense influence on cosmetic dental practice as a communication tool.¹¹ It can help to demonstrate intra-oral environment and patient awareness of the existing problem and education. The increasing quality of intra-oral camera with universal connectivity without the need for extra hardware has brought this gadget for more acceptance among the practitioners.⁷

Shade Selection: More sophisticated dental hardware in cosmetic dental practice is digital shade selection unit like Cynovad's shade scan. One of the important components of the cosmetic dentistry is the issue of color. Shade selection is difficult in ever changing clinical environment and is technique sensitive procedure. Digital shade matching units can overcome all these obstacles and gives the practitioner reproducible shade data in

digital printout, which can be shared by dental lab.^{8, 12, 15, 16}

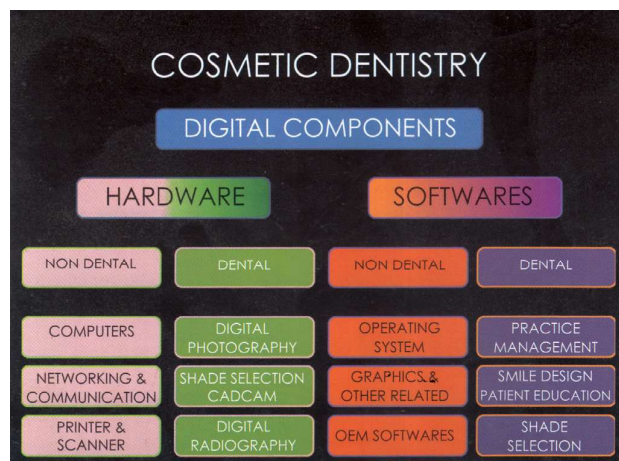
Digital Radiography: Digital radiography continues to evolve in spite of their high cost.¹⁹ Its advantages are immediate image observation, image storage, image transfer by electronic means and the ability to enhance images. Sooner most users including cosmetic dental practitioners are expected to replace conventional radiography to digital. Digital photography in grey scale can be helpful in the shade selection.¹⁷⁻¹⁹

Digital Impression and Model: It is designed to replace the uncomfortable and imprecise method of conventional impression taking. iTero; proprietary imaging technology enables the dentist to take a digital scan of the patient's teeth and bite, make any necessary adjustments in real-time, and then transmit the file via a wireless Internet connection to a Cadent-partnering laboratory for further processing where a model is milled. There are significant benefits such as increased patient satisfaction, improved clinical outcome, and enhanced office efficiency.²⁰

Computer Aided Design/Computer Aided Manufacturing (CAD/CAM): CAD/CAM is another digital gadget which can be incorporated into the cosmetic dental practice for milling all-ceramic and non-precious restorations. The next generation CAD/CAM system employs rapid prototype technology that makes automated production of precious metal substructures. These new systems take a different approach to fabricate the substructure; instead of milling down a block of material (called as subtractive manufacturing) they create the substructure by adding powdered metal in layers and bonding them together.^{17, 18}

Magnification: A high-tech system that includes a microscope and LCD monitor, allowing images from the scope to be displayed on the screen in real-time. Many of them are designed to fit into dental operatories with mounting options allowing the monitor to be attached to a light pole, wall or ceiling. They can integrate with imaging software that are already in practice.^{5, 7, 17, 19} Few companies that produce these systems are: Camsight and MagnaVu.

Software: Software can also be non-dental and dental. Non-dental software includes operating system for the computers, e.g. Microsoft Office, Adobe Photoshop, antivirus and networking software. These software help run the computers in safe, secure and stable manner.



Adobe Photoshop is useful for image enhancement and post-production. Dental software are mainly used to record patient data, to manage digital images (photographic and radiographic) and specific software related to dental hardware.^{5, 7, 8, 14, 17}

Practice Management Software: Practice Management software is the backbone of any good cosmetic dental practice. It helps in storing clinical data, financial transactions including e-claims, appointments and recalls. This ‘paperless’ implementation helps the practice to retrieve patient’s data immediately, safe and securely archive the data in few clicks, and manage the work space more efficiently. Practice management software can be used for research and clinical audit.^{7, 17}

Shade Selection Software: The software available for shade selection do not use any dedicated hardware: Clear Match a software, used for shade analysis and is a communication tool for dentists and dental laboratories. It allows the user to select the digital camera and existing PC to perform highly accurate analysis of shade, value and anatomical features of teeth. The software system is able to normalize digital images by adjusting the hues to compensate for any color imbalances that occurred when the image was taken.^{4, 5, 8, 11}

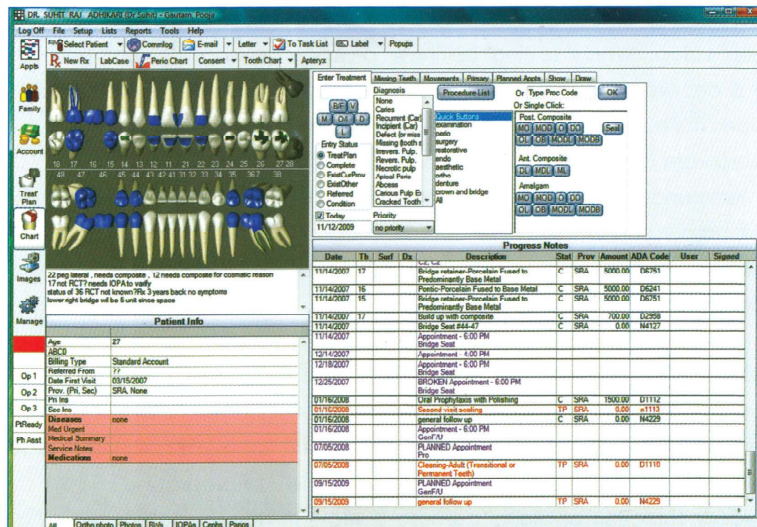
Smile Design/Treatment Planning Software: These dedicated software are important in diagnosis and treatment planning of the cosmetic cases. Generally, they are capable of identifying the problem and generating the treatment plan. With the mock-up ability, it can be used as a patient education software where patient can interact with software itself and seek for desired smile design.^{7, 8, 21, 22}

SUMMARY

The advantages of digitalizing cosmetic dental practice is unequivocally better and yields better technical efficiency and office performance. Few notable advantages are:

- Efficient time management:** Time is of essence for practicing dentist in terms of clinical output and financial gain. Incorporating and integrating digital technologies will help to do more cosmetic cases with less amount of time.
- Better Patient care:** With the use of digital diagnostic tools, more accurate diagnoses and treatment plan can be formulated, thus better treatment can be rendered. Any shortcomings in the treatment can be visualized and corrected immediately.
- Improved communication skill:** Visualizing treatment plan graphically can help establish better communication with patient. Digital shade analysis can be helpful in communication with dental lab and digital image can be readily shared.
- Secure patient data:** Good back-up plans can insure the security of patient data against theft and fire occurring in dental practice.
- Ergonomics:** Many digital technologies are made with the better ergonomic design to accommodate in small available space.

Due to rapid development of digital technologies, newer and more robust technologies appear in the market in no time and keeping pace with these changes can be frustrating and financial burden to the cosmetic practitioners. As with each technology, Digital technology also has some inherent shortcomings. They are:



1. **Cost:** The cost of the latest digital technology can be astonishingly high which can limit the incorporation of such technology in the practice. Besides, there will be ongoing updating and maintenance cost involved.
2. **Training time and learning curve:** Newer technology needs to be understood properly so as to get maximum output from it. Dentist and supporting staff need training for better understanding and maximum utilization of the technology which warrant precious time out of the practice time.
3. **Compatibility:** Newer technologies do not go along with older computer system and drives. Sometimes it becomes necessary to discard old ones in order to acquire latest innovations.
4. **Overzealous uses:** Especially digital radiography are known as over-used technology causing more than necessary radiation exposure to the patient.

Technologies are meant to aid the practitioners not to replace them. Proper and judicious selection of digital technology and incorporating them into practice will help the practitioner to perform better clinically and provide quality care to the patient, increasing work satisfaction, increasing patient load and hence gain greater financial outcome. It is up to the clinician to select better technology. Along with advanced technology practitioner still needs basic clinical skills and understanding. No technology could be better than human being at least for now!

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