Softwares used in dentistry: An overview

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Softwares used in dentistry:
An Overview

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ABSTRACT: To date, there has been various softwares used in the field of dentistry as a whole, be it in case history, imaging and in clinical practice management. This article classifies the different types of dental softwares and gives an overview of the different softwares available and used in dentistry across the world with a brief note on its history. We highlight on the different dental softwares available for various imaging modalities, practice management, easy diagnostics in the field of dentistry. It also gives an insight into the future with different kinds of dental softwares used in the field of dentistry.
Key Words: Dental Software, Digital Imaging.

INTRODUCTION:

Dentistry had a love affair with new materials and new technologies that can be traced since last few decades. Soon after the discovery of anesthetics the dental drill was invented, which meant that filling materials such as silicates and amalgams became widely used. In the early 20th century Dr. William H. Taggart introduced the loss-wax casting process to dentistry for the construction of crowns and bridges, which was adapted from the method then used in the jewellery business.

The developments in new polymers during the 1940s and 1950s resulted in the use of acrylic resins for dentures, acidic polymers for restorative cements and monomers for composite resin restorative materials. The lasting contributions of Michael Buonocore, Dennis Smith, Raphael Bowen, John McLean, Alan Wilson and many others in this respect are well known. The discovery by Branemark of the special properties of titanium metal did not take long to be translated into an explosion in dental implantology. Thus dentistry has shown itself to lead the medical disciplines in embracing new materials and new technologies.

The term dental software defines software used in dentistry. Computer software or just software is any set of machine-readable instructions (most often in the form of a computer program) that directs a computer's processor to perform specific operations. Software refers to one or more computer programs and data held in the storage of the computer. In other words, software is a set of programs, procedures, algorithms and its documentation concerned with the operation of a data processing system.

On most computer platforms, software can be grouped into a few broad categories:

- System software: is the basic software needed for a computer to operate (most notably the).
- System software: is all the software that uses the computer system to perform useful work beyond the operation of the computer itself.
- System software: resides as firmware within , devices dedicated to a single use.

HISTORY:

The history of the development of the dental software is brief. For the first time the computers have been used in the dental medicine in the 1960s. [1] Since then computers and information technologies spread progressively in the dental practice. The statistical data of dentists using computers in United States were 1 % in year 2000, which was found to increase ever since then, according to Atkinson.[2]

CLASSIFICATION OF SOFTWARES USED IN DENTISTRY:

There are many types of dental software, in dependence of the specific task, that they do to help the dental practice.

- One classification is given from Schleyer and Kirsher.[3] They categorize three main categories of dental software:

1) Administrative
2) Clinical

- The clinical category from other side is categorized in:

1) Electronic dental records
2) Electronic dental designs
3) Dental imaging software and
4) Software used for diagnostics and treatment.

- Zimmerman [4] recognizes the following types of computer software, depending from their task:

1) Administration and management of patient documentation.
2) Electronic archives of the documentation.
3) Telecommunication computer - aided education computerizing instruments and techniques in the dental office software helping the clinical decision making.

All classifications of dental software are relative, since there are software products,

designed for realizing more than one task. A larger classification based on the specific task shows more types of tasks and software. This classification of dental software is:

- Dental administration management
- Dental diagnostics

DENTAL IMAGE PROCESSING SOFTWARE:

The dental imaging processing software, or imaging software, defines software used for creating, processing, viewing and storing dental radiographs (X-Rays), intra and extra-oral images. Generally, dental imaging software is included in the product package of dental radiographic devices or can be purchased separately.

Most imaging software follows DICOM (Digital Imaging and Communications in Medicine) format or it will be at an upgraded price.

There are several types of imaging software:

1. Manufacturer proprietary
2. Open hardware
3. Practice management linked
4. Native

1) Manufacturer Proprietary:

There are many dental hardware manufacturers that produce their own imaging software. A few even have their own practice management (PM) solutions that integrate very tightly between the two products to produce a near seamless environment (which can fall under practice management linked- see below). All have their own database engines to help link and locate patient images, or they utilize a linked database structure from the PM software, which is known as bridging. In some cases, bridged imaging software cannot be utilized without the PM software operating in the background.

Manufacturer imaging software will have all the needed enhancements to make the X-Rays their product produces look the best. Generally, this sort of software comes free with the hardware and will have limited licensing usage or functionality unless an upgraded version is purchased. A couple of manufacturers will sell a full use, unlimited user license with their products. Most software of this nature will only operate with the hardware manufacturer they were designed for and will accept very few outside vendors. Because of this, the dental provider is generally required to use the manufacturer's hardware and support.

2) Open Hardware Imaging (OMI):

Some software vendors have created imaging software that will work with multiple hardware vendors and in some cases will produce derivative copies for manufacturers and PM vendors. Open Hardware Imaging (OHI) also focuses completely on the end result after taking an X-Ray or intra/extra-oral image, and that is image management and manipulation.

All OHI software requires the manufacturers software to be installed prior to usage. This insures the dental hardware's device software is operational and provides a default testing environment in the advent of a malfunction. It also provides a basis for the OHI software to obtain device settings.

Bridging to PM software is the most common way OHI can retrieve patient info for its own databases. Some PM vendors provide ways to integrate imaging into their software by use of creating toolbar buttons and other methods. In the case the PM software doesn't have a direct bridge integration, the use of a data grabber or bridger is required.

OHI software generally works off of their own database engines and therefore require their own database utilities. An advantage of this type of software is if one part of the system fails, such as the PM software, the practice can continue to work and take images, which is what is used most of the time.

3) Practice Management Linked (PML):

Practice Management Linked (PML) imaging software provides the tightest integration with PM vendors software. Because of this, patient images can be displayed in the patient charting screens. This generally doesn't combine the imaging and PM databases, but some vendors claim that is the case. Most PML software is open to most hardware vendors though generally the biggest brand names are accepted. Some PML vendors will not work with certain dental hardware manufacturers because of various contractual matters or preferences. Some popular brands of PM software favor certain hardware that they prefer to sell and thus have adjusted their imaging to work well with those devices. For all purposes, PML software behaves like OHI software and can be used with other PM vendors.

4) Native:

Imaging software that shares the same code as the practice management software is native and does not require integration. As a result, the imaging software and the practice management software utilize the same database. The manner in which the user seeks and obtains technical assistance may also be easier as there is only one vendor, one set of code, and one database.

DENTAL DIAGNOSTICS HELPING SOFTWARE:

The software products are usually based on technologies, that try to simulate the human intellect, called or AI. The designed to enhance the diagnostic process, are part of the dental expert systems software. Today for more appropriate definition is supposed to be decision support system (DSS)and knowledge based systems (KBS). The only one software product, designed to help the dentists with the diagnosis that can be found in internet is the Diagnostic Helper Software. [5]

DENTAL INTERNET AND ETHERNET COMMUNICATION SOFTWARE:

Telecommunication technologies found application in the medicine in the 1950s, which led to the defining of a new term "telemedicine". In 1997 Cook for first time uses the term "teledentistry"[6] and he defines it as the practice to be used videoconference technologies for diagnosis placement or consultations for the treatment from destination. Different variations of medical and dental data interchange using internet are

Readily made forms for dental patient report writing and printing appeared to be sufficient for the generation (by the dental practitioner, not automatically) dental patient records and their printing. Dental schedules management software can in a high degree be replaced with standard schedule management software projects, created for schedule management for general purposes, some of which can legally be downloaded for free. For processing of dental images were used many software products for general image processing, such as Adobe Photoshop, Irfwan View etc. Processing dental images with software products for general pictures processing proved to be powerful, easy to use, reliable, and much cheaper.

Dental treatment planning software was "replaced" with legally scanned and legally purchased via internet books over the treatment topic, opened with e-books opening software and shortcuts, designed to open the book on specific pages. For calculating hard to be calculated dental bills were used specially adjusted Microsoft Excel Sheets, instead of Dental Billing Software. Many dentists are successful in receiving computer aided dental education without the usage of software for this purpose, by finding and purchasing eBooks, lectures from the websites of medical universities, browsing the and other medical and dental databases, using usual email clients for communication via email and materials interchange via email, using internet explorer and other web browsers for participating in dental forums, and using e-learning, that do not require the purchasing of software. So far now the only type of dental software, for which special formats are not effective enough, is the diagnostics helping software.

RECOMMENDATIONS FOR CHOOSING THE APT DENTAL SOFTWARE:

For choosing the best management software for their practice, the dentists should have many things in mind, but the most important is whether the software fulfills the specific need of the dental practitioner. Another important advice to be considered is the usage of special format and degree in which the special format will satisfy the practitioner's requirements.

Dental imaging software has several factors to be considered as well and is dependent upon the dentist's needs or wants. Some imaging software is proprietary and will accept very few outside hardware vendors, yet will produce good images for diagnosis. Others are more open and will work with a wide array of hardware and will have good image quality as well. Another factor is integration with the and how well it can incorporate patient information into itself.

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