The Contribution of Computer in Dentistry Advancement: A Review

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ABSTRACT

Computer is basically an electronic device which can convert data into information at a very high speed and in a reliable and accurate way. It has a large and perfect memory that enables it to handle large volumes of data and analyze it to come up with logical decisions. Computer also has been applied in various medical fields. In this paper we discuss its application in preventive and curative dentistry, where it becomes a powerful tool in educational dentistry, surgery, radiology.

INTRODUCTION

The computer as a tool has become a necessity in dental clinics. It is no longer used as a luxury, but as a powerful tool that is available for a variety of applications related to education and professional development. Computer has been used in dental informatics to improve dental practice, research, education and management. It use in translational oral health informatics, human computer interaction in dentistry, dental bioformatics and computing and clinical research informatics systemic and dental. Computers play tremendous role in different educational and clinical dental displenses as surgery, periodontolyg, conservative dentistry, lazer, endodontic, orthodontic, prosthodontic, radiology, implant ology, fronsic and community dentistry. There are many computer programs that were designed to help in accomplishing dental work. The first computer program on a large scale was started in 1981 by SCICON and was commissioned by British Dental Association. Since then computers are being used in community dentistry programs and other fields of dentistry and have been a boon to it. With the advent of new computer technology, handling of various processes in dentistry has become easier and efficient.

The dental process that can be carried out using the computer and its applications include patient data storage and analysis, dental educational and practice process, community dentistry, dentistry's administrative works, manufacturing, repairing dental materials and equipment, Research, oral epidemiology and dental services planning.

Use of computer in dentistry

Computer is used in different fields of community dentistry as researches, preventive dentistry, screening and epidemiological surveys and surveillance.

In conducting surveys on dental health, entire data on dental health of each and every individual of a community can be stored in a computer hard disk from time to time. Then various statistical works can be done on this collected data. This can give the status of dental health of a community over a period of time. With these results various measures can be carried out to improve the dental health of a community. The maximum use of computer is in the field of community dentistry which is responsible for the dental health of the entire community. Computers are very helpful in the community dentistry and are used for the following: Data recording, grouping and analyzing, statistical analysis and computations, and evaluation of the results of the surveys and epidemiological studies.

Figure 1 shows the use of computer in dentistry visualization. Statistical data and the analyzed results can be accurately and quickly represented graphically through colored pictures, maps and graphs. By the use of MEDLINE and MEDLAR services, the data and the information and literature of the epidemiological and research work can be instantaneously procured for comparisons, guidance, modifications and analysis, etc. of the similar studies carried out anywhere else in the world.

Dental researchers can utilize computers to collect, store and analyses the data especially for large research projects. Various computerized approaches to data entry can be designed to assist the researchers in collecting clinical and non-clinical data. The computer analyzed results, interpreted and compared carefully and correctly and odd variable should be excluded to prevent invalid conclusions.

Also computer can uses in oral diseases indicators, to compare oral diseases prevalence and incident, evidence base dentistry and research and audit which help in dental services planning, implementation, supervision and evaluated.

The application of computers have successful impact in maintaining good oral and dental hygiene by raise community and individual awareness and prevention of oral diseases and subsequent complication.

The computer can also be used to describe and explain a lot of things to the patients. It can be used for bad habit control and modification (e.g. sump sucking, bruxism, weight or smoking control), psychological motivation, etc. The patients can understand that if they do not undergo a particular treatment what consequences they will have to suffer. Before undergoing treatment they can themselves see how the treatment will be carried out and what results are expected out of the treatment. They can themselves observe that if they do not undergo treatment what will be the complications and how it will affect the general health. In patient health education, the use of computer graphics has enabled simulation of cosmetic changes to be presented to the patient with before and after possibilities**.**

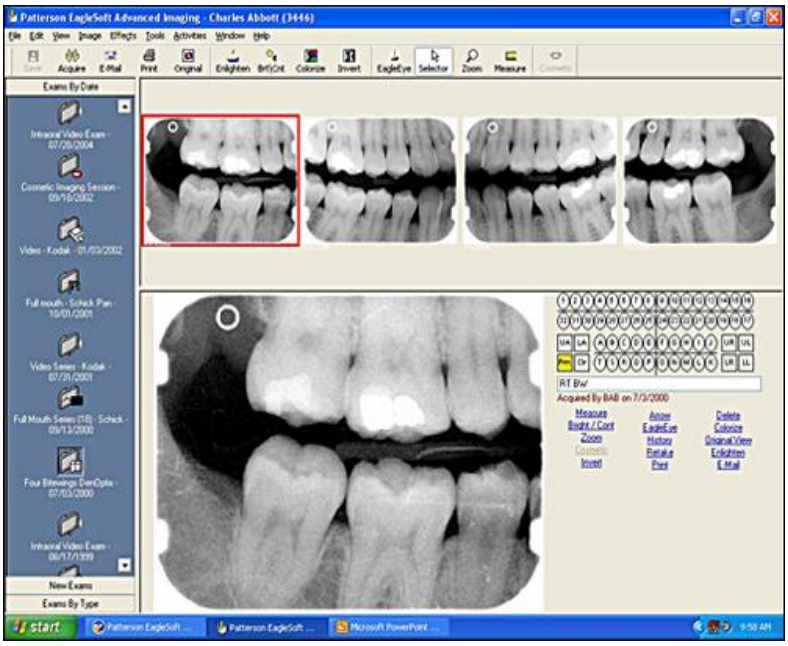

Figure 1: An image shows the use of computer in dentistry

Use of computer in Therapeutic and Diagnostic Dentistry

Computer applications have also been used in forensic dentistry where identification systems describe tooth conditions and other oral characteristics besides automated screening and matching of antemortem databases. Also radiographic tracings of alveolar bone levels, hard tissues (dentistry) and shapes of both the jaws and caries can be made on a digitizing board or with a computer video camera for analysis of the presence and rate of bone loss, periodontal disease, etc. and accordingly diagnosis and treatment planning can be done. With the use of digitisers or video cameras, bite marks and other marks of evidence can be analyzed. Images can be superimposed and tissues rearranged on bone or radiographic images for fetal reconstruction to help in forensic odontology and reconstructive plastic surgery.

The computer has also become an integral part and can assist in various other programs, preventive and curative as school health program and geriatric health program as fissure sealant, fluoride application and in curative lazer and piezosurgery in the dental clinic. In computer-assisted dental (CAD) diagnosis and treatment planning, the data handling capabilities are merged with algorithms to ideally produce diagnostic outcomes of equal or greater accuracy than those made by experts in the field. For less experienced or isolated dental surgeons, this system could be very useful in providing alternative opinions. This would be respectally true in those circumstances in which small differences in diagnostic judgment could result in radically different treatments. Advent of CAD-CAM has made possible the use of cutting devices which mills and three-dimensional model of the designed restoration materials.

CALAY, CEREC and CDROM ceramic analysis systems are used for chairside preparation of inlay, only and other restorations without laboratory services and can be cemented on the same appointment of cavity preparation. Computerized endodontic apex locators, drug pumps for anaesthesia and electroanaesthesia controlled by computer are becoming common in dental clinics. Biofeedback devices are helpful in pain and habit control of the individuals.

For orthodontic diagnosis and treatment planning, cephalometric programs use digitizing board and a computer to analyze head plate tracing. Usually it takes 2 to 5 minutes to directly digitize the 57 landmarks on the lateral and frontal head films. For minutes later, the complete printout is available for diagnosis and treatment planning. Computer is also used for diagnosis and treatment planning in orthognathic surgery and other oral and maxillofacial surgeries. Radio Visiography (RVG). Radio visiography is a system of computerized radiographs where they are stored in the computer and the software automatically digitizes and performs the cephalometric analysis. This is very useful in diagnosis, orthodontics, endodontics and implantology. Beside that computer can be used in Radiotherapy, in oncology, and in diagnosis and treatment of different types of oral cancer

In a radiograph, different shades of grey showing as dark Translucent (radiolucent) and transparent areas (radiopaque) can be recognized by the computer showing bone conditions and colored appropriately on a plotter or a color printer. This helps with prosthesis or implant design placement and selection. Ceramic crowns and bridges can be prepared and cemented on the same sitting without laboratory help. Computers also help in the placement, design and selection of the implants. Also computer use in determine dimension, length and width and location of implants in jaws bone.

Use of Computer in Administrative and Learning Dentistry

Computations are very useful in teaching dental curative works, dental health educational preventive programs, dental learning programs in pre-clinical and clinical lectures, clinical meeting, seminars, internet and workshops, student's results and exam evaluation, dental laboratory works, manufacturing and repairing dental materials and equipment, computer also is very useful in administrative dentistry.

In hospital and clinic administration computers are mainly used to keep records of the patient, to help in keeping patient appointment schedule, to help in communication and follow up via internet and E-mail, to maintain fees details, to create books of accounts, to act as answering machines and a FAX.

In many hospitals and dental clinics, the patients' records are stored in the floppies with the help of computer which require minimum space. Information and all data can be retrieved within a second. By special systems, photographs, radiographs and other images can be stored in the floppies. Bony changes during and after the treatment can be recorded and can be examined as and when required. Most of the latest instruments and equipment's work with the help of computers.

The great innovation, the simple design and easy access of computer that

Make it communication to internet, mobile telephone, multimedia and power point devices which play essential role in dental learning and practical educational processes acceptable, affordable and preserve time.

Student dental education has been related to computer-assisted learning programs covering all dental subjects, basic sciences, preclinical, clinical and laboratory courses. A number of learning programs, traditional learning and E-Learning programs have been developed to assist dental students in learning preclinical as well as clinical techniques in all the subjects. Computer also use in management and evaluation of students by scoring their grades in different subjects, courses, semesters and certificate submission.

CONCLUSTION

The advance in computer technology in last 30years play great roll in development of oral health care .The development not restricted to the health education but included all different disciples of preventive, clinical diagnostics and curative dental methods .For extensive benefit of computer technology uses, need to established strong and effective informatics integrated system, educational and clinical for all dental departments and medical colleges.

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مجلة الجزيرة للهندسة والعلوم التطبيقية المجلد الثاني عشر، العدد الأول، 2017م/ 1438هـ

النشاط المضاد للبكتيريا لنبات القرض

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الملخص

نبات القرض ثبت أنّ به بعض المواد المثبطة للكائنات. هدفت هذه الدراسة لبحث النشاط المضاد للبكتيريا لنبات القرض. تم استخدام طريقة المنطقة المثبطة لاختبار المذيبات المختلفة, أظهرت النتائج أنّ مستخلصات الحوافظ هي الأكثر فعالية ضد البكتيريا *E. coli* و S. *paratyphi* ومع ذلك كانت مستخلصات الحوافظ واللحاء والأوراق أكثر فعالية ضد البكتيريا *Staphylococcus* sp. أظهرت اختبارات المذيبات المختلفة إلى أنّ المستخلصات الميثانولية لأوراق القرض هي الأكثر فعالية ضد البكتيريا . *Staphylococcus* sp و كانت مستخلصات لحاء وبذور وحوافظ القرض الإيثانولية أكثر فعالية ضد البكتيريا *E.coli* والبكتيريا *S.paratyphi*. كل مستخلصات نبات القرض التي تم استخلاصها بواسطة إيثر البترول والهكسان كانت غير فعّالة ضد كل البكتيريا التي تم اختبارها.