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Chapter 1 : Dentistry | VetBooks - Part 2

Rapid Reference To Implant Dentistry - 1st Edition A guide to dental implant pre-plannning, placement, restoration and management of complications. 66 pages of tables, graphics and useful technical information for any practioner or student of implant dentistry.

You must be signed in to read the rest of this article. It will discuss the integration of digital technology into dental practice and dental laboratory settings. Intraoral digital scanning and lab scanners will be reviewed along with the multiple options available regarding the uses of such optical impression data. The digital data acquired is processed into a computer program that builds the geometric data that is transferred into a modeling algorithm. In addition to visualizing the data in 3-dimension 3-D , dental-specific CAD software enables limitless design of restorations in an open software environment rich with digital design tools similar to analog tools used in a dental laboratory. Various dental CAD software exists, and each has a different capacity and dental application. CAD applications range from analysis tools for orthodontics and oral surgery to restorative design tools for crowns, onlays, inlays, veneers, copings, frameworks, removable prosthodontic appliances, orthodontic appliances, implant prosthetics including abutments and crowns, splints, surgical guides, and more Figure 1 and Figure 2. The software allows for complete design of the specific dental application and includes the ability to freely configure, construct, shape, size, and adapt the designs to the original surface data scanned. Often, the objective is to produce the restoration through the CAM process of either milling or constructing through additive rapid prototyping. There are multiple successful workflows for digital dentistry. Other systems are designed with open architecture for freedom of design and machining. Such open systems require great care, diligence, and quality control analysis from the operator to control the grade of the final product. Because every system is different in regards to hardware and has different dental applications, the end-user should thoroughly evaluate each system and its dental-specific applications. The CAM process resultant should be evaluated with the same quality control and inspection as when using traditional methods. The software available to the dental laboratory industry tends to be more robust and sophisticated, allowing for complete customization and control of acquisition, design, and milling. Although the laboratory software is more stout, the rich features and software workflow are not conducive to chairside application. The data acquired can be evaluated and analyzed chairside and must be transmitted electronically to the laboratory for use in multiple applications, including model fabrication, prosthetic design, orthodontic design, and restoration fabrication. The objective of digital impression systems is to accurately record the intraoral condition to a CAD data file that can be manipulated only by the laboratory or manufacturer. Most systems have adopted a digital intraoral camera or scanner for image acquisition; in particular, all chairside systems incorporate an intraoral camera. Although manufacturers have modified the software to recognize stone-modelâ€”based scans, the data is often less accurate than direct intraoral scans due to known distortion in traditional impressions and setting expansion of dental stone. Modern computers with updated central processing units CPUs and graphical processing units GPUs are capable of handling much more data. While earlier versions of intraoral camera systems were large and obtrusive in design, newer systems include cameras that fit comfortably intraorally, are less bulky, and provide improved intraoral access. Concerted efforts have been made on improving ergonomics for the clinician. The motions necessary to position, translate, and rotate the camera intraorally during image acquisition are extremely important and play a significant role in capturing accurate intraoral scan data. They can simply use the camera to obtain digital data for the CAD software that is retained on a central server, using an existing computer and network infrastructure. These plug-and-play style cameras alleviate the need for the traditional cart-based system that houses the CPU, viewing monitor, CAD software, and digital intraoral scanner. Open architecture refers to the format of the data that is acquired as being compatible across multiple, different manufacturers of both software and hardware. An open system allows for transfer of data across multiple devices for design and final restoration. Closed architecture systems are common among chairside solutions primarily to help streamline the workflow. Benefits to such a system include a streamlined workflow that is controlled and consistent in

quality. These digital chairside impression systems include both the hardware for scanning and the software for management of patient data. Although the learning curves for the various systems available differ, generally the use of an intraoral scanner requires an understanding of the specific imaging modality of the individual scanner static images versus video streaming utilized along with proper patient isolation and retraction. The data is archived within the computer system attached to the digital impression system and can be transmitted digitally to the lab via the Internet. Once the data is transmitted, the lab may open the data for evaluation, design, and production of the dental restoration. The digital impression system does not allow for the clinician to design or mill, as these features are only available to the lab that receives the digital scan data. Specifically, the design function of the software for restoration design takes time to master. When facing such clinical treatment challenges as limited restorative space or limitations in restorative material, the clinician may switch from a chairside workflow and send the optical impression to the lab for restoration fabrication. This feature creates flexibility for both the clinician and the patient alike depending on the clinical circumstances and restorative requirements. As improvements have been made in material science, these digital systems have introduced chairside multi-unit restorations such as bridges, implant abutments and restorations, temporary restorations, and surgical guide fabrication. Intraoral imaging systems today allow for digital scanning of intraoral conditions prior to definitive treatment to create digital models. These digital models are processed in dedicated orthodontic CAD software to assist in diagnostic modeling for documentation, clinical diagnosis, and treatment planning with virtualization of tooth setups. In addition, the lab-based systems allow for fabrication of patient-specific orthodontic brackets, custom robotically bent treatment wires, milled custom seating trays for bracket placement, clear orthodontic aligners and retainers, and fabrication of removable orthodontic appliances. When combined with 3-D cone-beam computed tomography CBCT imaging, the CAD data aids substantially in complex planning of orthognathic treatment and surgical approaches to orthodontic and airway therapy. CBCT generates 3-dimensional digital radiography without the traditional distortion and magnification of traditional x-ray imaging modalities Figure 8. Such 3-D imaging has become a preferred aid for accurate diagnostic measurements, comprehensive pathology diagnosis, and digital surgical treatment planning. When combined with implant software, the CBCT data can work with CAD data from digital impressioning systems to aid in restorative implant planning and placement. Essentially, the design software within the CAD systems can virtually wax-up teeth based on a functionally esthetic stable position and export the virtual restoration into a CBCT software environment to aid in ideal implant positioning Figure 9 through Figure Both chairside and laboratory workflows for surgical guide fabrication exist today and have improved the accuracy as well as reduced the morbidity of implant therapy. Laboratory-based benchtop scanners vary in style from small scanners for simple impression, die, and model scanning, to large scanners that permit scanning of fully articulated models. Highly esthetic glass ceramic materials can be used chairside for fabrication of single-tooth restorations that can be adhesively bonded. Some materials require post-mill processing such as firing in a ceramic oven to convert the material from a softer millable state to the final chemical state as an indirect restoration as shown in Figure 5 through Figure 7. These materials often require different milling protocols and post-processing for final finishing. Such innovation has also enhanced the clinical workflow and final clinical outcomes for patient therapy in restorative, surgical, and orthodontic care.

Chapter 2 : Shimizu's Dermatology, 2nd Edition | Dermatology | Medicine, Nursing & Dentistry | Subjects |

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Classification[edit] Necrotizing gingivitis is part of a spectrum of disease termed necrotizing periodontal diseases. It is the most minor form of this spectrum, with more advanced stages being termed necrotizing periodontitis, necrotizing stomatitis and the most extreme, cancrum oris. The word acute is used because usually the onset is sudden. Necrotizing ulcerative periodontitis NUP is where the infection leads to attachment loss, and involves only the gingiva, periodontal ligament and alveolar ligament. Signs and symptoms[edit] In the early stages some patients may complain of a feeling of tightness around the teeth. Bad taste metallic taste. The predisposing factors for ANUG are smoking, psychological stress, malnutrition and immunosuppression. Zones of infection have been described. These are superficial to deep the bacterial zone, the neutrophil rich zone, the necrotic zone and the spirochetal zone. Diagnosis[edit] Diagnosis is usually clinical. If there is systemic involvement, then oral antibiotics may be given, such as metronidazole. As stated, the condition can occur and be especially dangerous in people with weakened immune systems. This progression to noma is possible in malnourished susceptible individuals, with severe disfigurement possible. Epidemiology[edit] In developed countries, this disease occurs mostly in young adults. In developing countries, NUG may occur in children of low socioeconomic status, usually occurring with malnutrition especially inadequate protein intake and shortly after the onset of viral infections e. Uncommon, except in lower socioeconomic classes, this typically affects adolescents and young adults, especially in institutions, armed forces, etc. Xenophon observes sore mouth and foul smelling breath in Greek soldiers in the 4th century BC. Hunter describes the clinical features of ANUG in , differentiating it from scurvy avitaminosis C and chronic periodontitis. Later in , Vincent describes the same pathogenic organisms in "ulceronecrotic gingivitis". The term trench mouth evolved because the disease was observed in front line soldiers during World War I, thought to be a result at least partly because of extreme psychologic stress they were exposed to. It has also been associated with high tobacco use in the army.

Chapter 3 : VetBooks | Veterinary Free Library

Current Dental Terminology (CDT): The ADA reference manual that contains the Code on Dental Procedures and Nomenclature and other information pertinent to patient record keeping and claim preparation by a dental office; published biennially (e.g., CDT).

Rua Quarenta e oito, , apto. Abstract Recent developments in molecular methods have revolutionized the detection and characterization of microorganisms in a broad range of medical diagnostic fields, including virology, mycology, parasitology, microbiology and dentistry. PCR is an excellent technique for the rapid detection of pathogens, including those difficult to culture. Along with conventional PCR techniques, Real-Time PCR has emerged as a technological innovation and is playing an ever-increasing role in clinical diagnostics and research laboratories. Due to its capacity to generate both qualitative and quantitative results, Real-Time PCR is considered a fast and accurate platform. The aim of the present literature review is to explore the clinical usefulness and potential of both conventional PCR and Real-Time PCR assays in diverse medical fields, addressing its main uses and advances. The discovery of Polymerase Chain Reaction PCR brought enormous benefits and scientific developments such as genome sequencing, gene expressions in recombinant systems, the study of molecular genetic analyses, including the rapid determination of both paternity and the diagnosis of infectious disease 73 , PCR enables the in vitro synthesis of nucleic acids through which a DNA segment can be specifically replicated in a semi-conservative way. It generally exhibits excellent detection limits 19 , Recently, a technological innovation of PCR, known as Real-Time PCR, has become increasingly important in clinical diagnostics and research laboratories due to its capacity for generating quantitative results. This technique allows accompanying the reaction and presentation of results in a faster and more accurate fashion than conventional PCR, which only displays the qualitative results 50 , 62 , It also seeks to evaluate and discuss the indications, uses and advantages of these techniques, as well as their advances in various medical areas. Since its description, this technology has caused a veritable revolution in biological research, establishing the agreement of basic biological processes in applied areas involving diagnoses and genetic improvements for plants and animal PCR enables the synthesis of specific DNA fragments using a DNA-polymerase enzyme, which takes part in the replication of the cellular genetic material. This enzyme synthesizes a complementary sequence of DNA, as a small fragment primer is connected to one of the DNA strands in the specific site chosen to start the synthesis. Primers limit the sequence to be replicated and the result is the amplification of a particular DNA sequence with billions of copies 66 , The development of tools for amplifying DNA segments has generated enormous benefits in gene analysis as well as the diagnosis of many genetic diseases and the detection of bacterial, viral and fungal pathogens 4 , 72 , 73 , Another useful PCR application is the cloning of a particular DNA fragment, which allows the study of gene expression and has considerable potential in forensic medicine Real-Time PCR allows the precise quantification of these nucleic acids with greater reproducibility. This technique provides a sensitive method for the accurate quantification of individual species, which could be very relevant to the diagnosis of pathogens and genetic diseases. Advantages of Real-Time PCR include the ease of quantification, greater sensitivity, reproducibility and precision, rapid analysis, better control of quality in the process and a lower risk of contamination 62 , Real-Time PCR requires a thermocycler with an optical system to capture fluorescence and a computer with software capable of capturing the data and performing the final analysis of the reaction. The programs available from diverse manufactures exhibit differences regarding sample capacity, method of excitation and total sensitivity. There are also differences between regarding the data processing. The emission of fluorescence generates a signal that increases in direct proportion with the amount of PCR products. Fluorescence values are recorded during each cycle and represent the amount of amplified product. Its fluorescence is undetectable when not bound to dsDNA. Amplified non-specific products affect the efficiency of the amplification of specific products. Thus, analysis should be optimized in such a way that non-specific amplification does not occur. Melting curve analysis after the PCR reaction is a good practice for controlling the formation of dimer primers. Fluorescence is measured as a function of temperature, gradually

diminishing with the increase in temperature of the amplified product However, upon reaching the temperature at which the double-stranded DNA separates, the stain detaches and fluorescence drops off abruptly Once optimized, detection by SYBR Green I is highly sensitive to the identification of a single molecular target in the reaction mixture. The greatest advantage is that it can be used with various pairs of different primers, making it less expensive than a probe. MGB is released from a probe that binds to the minor groove of the dsDNA consisting of part of the MGB probe and complementary target sequence by which it is hybridized related to the nucleotide sequence. The MGB increases binding stability to the amplification probe Hybridization probes Oligonucleotide probes marked with fluorophores are used for the detection of specific sequences 16 , The amount of the fluorescence may be related to the amount of PCR product through the product-dependent reduction of a quencher fluorophore and a reporter or through an increase in the fluorescent resonance energy transfer FRET from a donor fluorophore to a receptor. Only the donor fluorophore is excited in such a way that no fluorescent acceptor is detected in the free-floating probes. During the annealing phase of the primer, the probes hybridize adjacently to the single-stranded DNA ssDNA and the excitation energy is transferred from the donor to the acceptor. Four oligonucleotides are used in this format: Intact probes do not emit fluorescence because they are bound quenched. Two events must occur to generate a fluorescent signal. The quencher is released from the fluorophore, which now fluoresces after excitation 28 , Molecular beacons Tyagi, Kramer first evaluated molecular beacons combine an oligonucleotide capable of forming a stem-loop structure with the quencher-reporter pair. Specifically, an oligonucleotide probe with a binding domain to the antisense target flanked by two short arms of complementary sequences is marked in one terminal with the reporter dye and in the opposite terminal with the quencher dye. In the absence of the target, the short arms anneal to form a hairpin structure stemloop , forcing the flourophore toward the quencher. The transition between the dark and shining state of the molecular beacon allows the differentiation between bound and unbound probes 49 , , When the probe is extended and integrated within a dsDNA molecule, the quencher and reporter are kept apart by a recently copied complementary strand. Like conventional TaqMan, Sunrsire primers require a new probe for each amplification In the first phase, the Sunrise primer is extended with the forward primer. This extended product serves as the template for the reverse primer in the second phase. In the end, polymerase opens the hairpin structure and a double-stranded PCR product is formed, in which the reporter and quencher are separated Scorpion primers Scorpion primers are structurally and functionally related to molecular beacons, but serve as primers in PCR. Two different formats are possible: In both cases, the marking mechanism is intra-molecular. The basic elements of scorpions are: After PCR amplification of the scorpion primer, the resulting amplicon contains a sequence that is complementary to the probe, which is restituted a single strand during the denaturation stage of each PCR cycle. With cooling, the probe is free to bind to this complementary sequence, producing increased fluorescence. Thus, the quencher is not increased in the proximity of the fluorophore Methods such as PCR enable the amplification of specific regions of interest. Technological improvements in the detection systems of gene sequences provide a complete viral characterization, determining the subtype, genotype, variation, mutation and standards of genotypic resistance of these viruses 56 , This method is useful in quantifying a larger range of sequences of viral nucleic acids than most quantitative methods. Moreover, the qualitative detection also is possible. Quantification and qualification are carried out automatically. Examples of the detection and quantification of specific viral regions have been published and this field of study is growing very quickly 39 , It has also led to the development of amplification assays on nearly all human viruses, including those that are more easily be cultivated, such as HSV-1 and HSV-2 Herpes Simple Virus type 1 and 2 The newer molecular methods are advantageous, mainly in cases for which the viral culture routine is not available. The introduction of molecular biology in clinical diagnosis is important to reducing the use of viral culture techniques. The implementation of automatic extraction and detection, combined with an extensive quality control program, should convince the clinical community that molecular diagnosis is important in clinical virology 46 , The ability to exclude viral infections can help avoid unnecessary therapies, such as powerful antibiotics and antiviral medicines, as well as reduce costs incurred on the part of patients. Thus, these techniques are important to establishing the best therapeutic protocol 56 , Real-Time PCR is extremely useful in the study of

viruses that cause infectious diseases. The majority of published assays show an increase in the frequency of viral detection. This is therefore an attractive technology for many virological fields It is valued for its quickness in the detection of viral variants and the syndromes caused by these viruses The method contributes to epidemiological studies due to its capacity to quantify nucleic acids in a single reaction 46 , New chemicals have allowed a better discrimination of multiple viral genotypes within a single reaction 44 and have provided an alternative viral detection method based on morbidity and mortality assays. For many years, the diagnosis of viral infections has been hampered by the high costs, laboratory time and qualified personnel required in the cell culture process. An additional negative factor is the low sensitivity and slow development of many viruses in artificial mediums. PCR technology facilitates and improves detection, thereby facilitating the diagnosis of a certain number of these viruses In phytopathology, the early identification of disease-causing agents is essential to the recognition of pathogens In the last ten years, advancements have been made in the molecular diagnosis of fungi through PCR technology. Unlike conventional methods, samples can be tested directly through PCR and isolated without the need for cultures. The technique is fast and highly specific. It can be used to detect trace amounts of fungal DNA from environment samples before symptoms occur. It therefore allows the implementation of early disease control methods. PCR can be performed routinely and does not require specialized skill to interpret the results. The technology can also offer more accurate quantitative data, providing additional information necessary for decision making and the assessment of how effective fungal agents are in biological control. Since its introduction in the mid s, PCR has become the cornerstone of DNA technology and has cleared the path for the creation of innumerous associated technologies. It is remarkable for its ability to detect amounts of DNA amplified from one or few original sequences. Conventional PCR is not quantitative, but rather qualitative. It has been used to detect, monitor and identify fungi from an entire set of environmental samples and is the core of molecular fungal diagnostics 4. Fluorescent PCR in situ utilizes fluorescently marked primers or probes to detect and locate fungi in fixed environmental samples following semi-permeabilization The fluorescence of the primers or probes is detected using a confocal microscope. This technique allows the direct detection of the organism in the sample. It also shows the spatial distribution, interactions with the host and other organisms. The scope of PCR is infinite 5. It can be used to investigate either a single species or entire communities 22 , 35 ,

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The development of CAD/CAM for clinical dentistry was initially established for single-tooth fabrication of indirect restorations. 14 Initially, these CAD/CAM systems were designed to handle single restorations such as inlays, onlays, crowns, and veneers (Figure 3 and Figure 4). 2 Today, both chairside and laboratory-based CAD/CAM systems have.