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## Ceramic Dental Implants

Moluk Aivazi<sup>1</sup>

Farahnaz Nejatidanesh<sup>2</sup>

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Artificial biomaterials as dental implants consist of metals, their alloys and ceramics. Commercially, pure titanium and alloys are mostly used as dental implant materials. Titanium implants have had successful applications, but one problem is grayish color which shines through the thin peri-implant mucosa. In addition, the ablation of metals from medical applications has been proposed. Hence, ceramic implants as a viable alternative have been considered. Two types of ceramics as dental implants consist of inert and bioactive ceramics. Inert ceramics (Alumina and Zirconia) usually are more popular in dentistry. Bioceramic coating are used for surface treatment of implants and induce the new surface with completely different properties. Zirconia ceramics seem to be suitable material for dental implants because of their tooth-like color, their excellent mechanical properties and their good biocompatibility. Surface modification of implants with mechanical, chemical and physical procedures improves their biomechanical characteristics such as osteoconductivity for increase osseointegration, resistance to corrosion and wear remove the surface contamination.

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## Translucent Zirconia Ceramic

Eli Alkhor<sup>1</sup>  
Ali Besarati

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In this lecture a new zirconia ceramic (Zolid) will be introduced. This zirconia ceramic is an evolution in dental technology. In Zolid the arrangement of molecules are more homogenous. High translucency and high flexural strength (1280 MPa) are some of the properties of Zolid.

Using this ceramic will eliminate veneering procedures and therefore can save time in dental laboratory.

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1. Dental Technician

## From Full Metal to All-Ceramic Crowns

Farshad Bajoghli

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In this presentation, various full coverage crowns from full metal to all ceramic crowns will be discussed. Different criteria to select a proper crown in different situations will also be addressed. Classification of full ceramic crowns and their indications in different situation will also be discussed.

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Associate Professor, Dental Implants Research Center, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.

## The Art and Science of Porcelain Laminate Veneer

Ali Emamgholipour

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Cosmetic dentistry in the last two decades has been improved millions of patient's smiles and confidence. Dentistry has never been as exciting as today. New technology, material and bonding technique have changed the dental community and dentist attitude to the dentistry. Conservative dental treatment, occlusion and implant are the future in dentistry.

Porcelain laminate veneers are one of the most esthetic restorations available today. Porcelain veneers are considered to be strong and have great esthetics and a long-term prognosis.

Porcelain veneers can be used for functional and cosmetic correction of the following conditions: stained or darkened teeth, hypocalcification, multiple diastemas, peg laterals, chipped teeth, lingual positioned teeth, and malposed teeth not requiring orthodontics. Contraindications for veneer placement include insufficient tooth substrate (enamel for bonding), labial version, excessive interdental spacing, poor oral hygiene or caries, parafunctional habits (clenching, bruxism), and moderate to severe malposition or crowding.

In this lecture, you will learn:

1. Different indications and techniques of veneer preparation.
2. Understand the concept of conservative treatment and tooth preparation predictability and last longing restoration.
3. Temporizing and ease of cementation.
4. Utilizing different luting resins for veneer cementation.

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DDS, Lecturer and Member of American Academy of Esthetics.



## **Familiarization and Application of Posts for Restoring Extensively Damaged Teeth**

Reza Darabi

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One of the criteria for use of a metal -ceramic or all-ceramic restoration is a tooth that has been damaged to the extent that it must be reinforced and protected.

The main objective of the root post is to increase retention for the core material and to distribute occlusal stresses.

Over the past decade fiber reinforced composite (FRC) posts have gained popularity in the dental market because of their benefits regarding mechanical properties, esthetics and retrievability.

In this lecture, different kinds of posts and their characteristics will be discussed.

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## **Clinical Guidelines for Selecting Appropriate Dental Ceramic in Different Clinical Situations of Severely Destroyed Teeth**

Atieh Feiz

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All imaginable types of materials and techniques, from very conservative ceramic restorations to very complex restorations of either metal or high-strength crystalline ceramics veneered with porcelain, have been introduced and tried throughout the years, with varying levels of success. However, there is considerable misinformation and a general lack of published rational treatment planning guidelines about when to use the ceramics available in dentistry. This article provides a systematic process for treatment planning with ceramic materials. Specific guidelines are outlined for the appropriate clinical conditions for using the various ceramic materials.

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Assistant Professor, Dental Materials Research Center, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.

## The Role of Ceramic Nanocomposite of Dental Filler in Improving Amalgam Properties

Mohammad Reza Foroghi<sup>1</sup>

Abbas Ali Khademi<sup>2</sup>

Seyed Ali Mousavi<sup>3</sup>

**Introduction:** Due to the special properties of ceramic materials have shown to be suitable as a material for producing materials with high chemical stability to be used for various applications in medicine and dentistry. Dental amalgam is widely used in dentistry its modification will continue to improve its properties. One of the problems with amalgam fillings is the presence of mercury as the glue cementing, which is very toxic. The aim of this study was to increase strength and elimination of mercury from dental amalgam.

**Methods:** In order to improve the properties of dental amalgam, nano hydroxyapatite/titania that can be recognized as a high-strength dental ceramics, was added to the amalgam alloy. Hydroxyapatite nanoparticles were developed by burning the calves and thighs and titania were synthesized by sol-gel method. In order to evaluate fuzzy appearance and characterization of functional groups, XRD techniques, SEM, and TEM were used. Finally, the biocompatibility of the material, the sample solution was placed for 14 days in simulated body fluid (SBF).

**Results:** Mechanical test results indicated a significant increase in the compressive strength from 145 to 236 MPa. Bioactivity evaluation results show a good biocompatibility of the produced material. Composite grain size was estimated between 30-40 nm.

**Conclusions:** The new product can be produced commercially and use as a biocompatible alternative of dental amalgam.

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## Long Term and Successful Bonding of All-Ceramic Crowns

Alireza Hadi

In all-ceramic restorations surface treatment of the restoration is required to enhance the bonding quality. Several types of surface treatment and bonding protocols are used. We reviewed their indications, advantages and disadvantages.

All-ceramic restorations can be cemented to the tooth by conventional and resin bonded luting agents. Use of conventional cements have little advantages and is contraindicated in many cases.

Bonding in all-ceramic restoration is discussed on tooth and ceramic surface. We can use the 4<sup>th</sup>, 5<sup>th</sup> or 6<sup>th</sup> generation of bonding agent on tooth surface depends on the tooth surface properties.

Bonding on the surface of all-ceramic restoration is different. The bonding protocols depend mainly on the ceramic material that has been used. The main technique consist the using of the porcelain etch and primer which is sufficient for most of the cases but not for zirconia based ceramics. Besides this, there are number of methods like sandblast, silica bond, laser, which can be used to enhance the bonding properties.

Cement selection was found to be more important than surface treatment, and phosphate monomer-containing cements were suitable for cementing zirconia. Retention of zirconium copings cemented on the teeth with adequate resistance and retention form was higher than that cemented on teeth lacking these forms. The cement remained mostly on the tooth with the adhesive resin cement with a dentin bonding system but the cement remained mostly on the coping with the self-adhesive resin cement. Both sandblasting and laser irradiation increased porcelain zirconia bond strength. The new modified laser pre-treatment might be an alternative way to sandblasting for improving zirconia/porcelain integration. Sandblasting and silica coating modify the surface of the zirconium-oxide ceramic, creating a rougher more retentive surface, and provide a better mechanical interlocking with the ceramic and the cement. For auto polymerizing cements, silica coating the ceramic is preferred.

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## Zirconia Abutments

Fahimeh Hamed Rad

Yttria-tetragonal zirconia polycrystals (Y-TZP) has been utilized for dental applications because of the extensively reported long-term success in the orthopedics field, high flexural strength, fracture toughness, and the stress-induced phase transformation mechanism that makes this material more resistant to crack propagation.

The clinical applications of zirconia as abutment can be divided into two areas: 1) Pre and custom-fabricated zirconia posts for endodontic treated roots. 2) Zirconia abutments for oral implant reconstructions. Based on the results of an in vivo study, zirconia abutments showed resistance to high loads of up to 738 N. These loads exceed the load in anterior regions (370 N). Fracture of veneering mainly on teeth-supported restorations is seen. According to a systematic review on implant-supported single crowns, fracture of the veneering material was the third most common technical complication and appeared in 4.5% of cases after five years. No chipping occurred in one study at crowns supported by zirconia abutments, whereas chippings were found in 20% of crowns supported by titanium abutments.

Both in vivo and in vitro studies showed less bacterial adhesion on zirconia compared to titanium surfaces. There was more plaque at natural teeth than at implant crowns supported by zirconia abutments. Less biological complications have been reported for ceramic abutments (5.2%) compared to titanium (7.7%), but the difference was not significant. Regarding bone response when zirconia abutments are used as restoration support, there were no significant differences in bone levels between zirconia and titanium abutments after 3 year follow up. In summary, there seems to be no negative effect of zirconia abutments on the peri-implant bone remodeling.

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## Can Zirconia be Used Directly in the Occlusal Surfaces?

Alireza Hashemi

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Due to excellent properties of zirconia, its clinical application is increasing. In some situations such as short abutments, 2 millimeter reduction of occlusal surface is impossible. Some manufacturers recommend a zirconia full coverage crowns without veneering porcelain. This approach has the disadvantage of the enamel abrasion (wear) of the opposite natural teeth. Recent studies demonstrated that the degree of antagonistic tooth wear was less in zirconia than feldespatic dental porcelain.

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## **Infection Control in Dentistry: Procedures and Challenges**

Hamed Kalantary

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The prevention and control of infection in the health care settings remains a major goal for all health care personnel. Studies in the UK, Europe and North America indicate that approximately 10% of patients develop infection.

Dental devices, instruments and environment, also, are potent for transmit tiny infectious agents because of contact with blood and oral tissues of patients.

The America Dental Association recommends that surgical and other instruments that normally penetrate soft tissue or bone, be classified as critical devices that should be sterilized.

However uncovered operatory dental surfaces should be disinfected between patients.

For these reasons, having a good knowledge on fundamental and procedures of infection control and management of infection control plan in dentistry has special importance.

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## **What is Mandatory for Transferring Patient's Information to Laboratory?**

Hossein Kermani

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Many factors affect the success rate of all ceramic restorations. Scientific and practical abilities of clinician and dental technician are important but the communication between them can also influence the outcome of treatment. Sometimes inability to fabricate a satisfactory restoration leads to unnecessary preparation of other adjacent teeth. Considering all the details during data collection leads to acceptable ceramic restorations. Tooth color and shape, face form, smile line, age and gender, occlusion, gingival status and color must be considered. Correct communication with lab starts with compatible shade guide with used porcelain. Electronic devices are helpful. Digital photographs can be used to transfer data for tooth color and shape, Face form, smile line.

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Prosthodontist



## **Guidelines for Clinical Shade Selection and the Color Matching Methods between Teeth and Porcelain**

Fatimah Keshani <sup>1</sup>

Omid Savabi <sup>2</sup>

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Nowadays esthetic is one of the most important aspects of the dental treatments and color is a part of the aesthetic. Perceived color of an object is the result of several factors such as light source, the ability object's ability to absorb, reflect and scattering of the light and optical system of the observer. In addition, translucency of the teeth is another issue. Despite controversy about different shade guide systems, they are still the main tools for determining and communication of tooth shades in clinical dentistry. Following the principles of shade matching such as using the proper light, photography, and appropriate distance can lead to ideal results.

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## Medical Ethics in Clinician-Patient Relationship

Abbas Ali Khademi

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It is essential to have a good relationship with patients to reduce their legal complaints. Clinician's attitude toward patients has an important role for a successful treatment. Good-Temper, compassion, and sympathy with patients and their relatives can relieve their stress. According to Emam Ali's (peace upon him) advice, good communication with people is one of the secrets for successful life. American Dental Association introduced five principles regarding to dentist and patient relationship.

1. Authority and independence of patient.
2. Dentist must prevent patient's hurt and always tell the truth.
3. Dentists should be gracious of their patients.
4. Dentist should treat patients fairly.
5. Dentist should honest with the patients.

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## Bleaching and all Ceramic Restorations

Maryam Khoroushi

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Success of esthetic rehabilitation procedures depends on understanding of patients' needs and expectations. In most cases management of patients with discolored teeth is challenging. Tooth bleaching might be a proper alternative to the majority of aggressive treatment procedures; however, the procedure has its limitations. Clinicians might select different treatment plans and tooth bleaching procedures might improve the esthetic appearance of discolored teeth in a way that no further treatment might be necessary. However, after tooth bleaching procedure is completed, other restorative procedures may also be necessary to supplement the procedure and improve the esthetic appearance. This review describes some conservative clinical procedures to improve patient smile in moderate-to-severe tooth discoloration cases with a combination of tooth bleaching and all-ceramic restorations.

Combined application of tooth bleaching and adhesive restorative procedures makes it possible to render a significantly more conservative treatment for intrinsically discolored teeth; more sophisticated porcelain veneers and porcelain-fused-to-metal techniques can be confined to conditions with persistent tooth discoloration or significant loss of tooth structure.

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## Fundamentals of Esthetics in Full Ceramic Restorations

Hamid Mazaheri

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One of the greatest assets a person can have is a smile that shows beautiful, natural teeth. The positive psychological effects of improving a patient's smile often contribute to an improved self-image and enhanced self-esteem.

Esthetics is not merely a physical quantity, a perception of society from esthetics in different cultures and even in different times can undergo significant changes.

What is considered fundamentals of esthetics are points that are widely accepted in today's society, but it should be noted that even though they are of significant importance, they will not necessarily lead to esthetics and lack of them will not cause an esthetics failure.

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## A Close Look at Zirconium Oxide in Dentistry

Mahmood Moghadam

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Unlike some materials and new technologies in dentistry that have high success rate, still some clinician denies using them. One of these materials that recently have been used as a restorative material zirconium oxide. Considering the success of classical PFM that has been proved in different clinical and challenging situations perhaps this question would be asked: “Why do we have to use new materials like zirconium oxide?”

By using the zirconia in restorations, not only the success would be high as the traditional methods, but the prosthesis will be fabricated more functional and with less complication. Using this material has a lot of advantages for patient such as aesthetic, and of course lots of advantages for dentist, technician. But this question still remains that how this material will behave in challenging clinical complicated situations?”

In this lecture two basic questions will be answered:

1. Can zirconia be a suitable replacement for PFM?
2. Is this kind of restoration able to fulfill the requirements in the most functional and aesthetic cases?

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Dental Laboratory Technician

### The Effect of Base-Glass Chemical Composition on the Flextural Strength and Toughnes of Fluorapatite-Mullite Glass-Ceramics

Sahar Mollazadeh Bidokhti<sup>1</sup>, Tahereh Sadat Jafarzadeh<sup>2</sup>, Javad Javadpour<sup>3</sup>, Bijan Eftekhari Yekta<sup>4</sup>, Abbas Youssefi<sup>3</sup>

**Introduction:** A wide number of glass-ceramic systems are currently available for dental restorations. Glass-ceramics based on an interlocking microstructure of apatite and mullite materials have previously been developed for dental restorations. The aim of the present study was to investigate the effect of the different chemical composition of the base-glass on the flexural strength and fracture toughness of the apatite-mullite glass ceramics.

**Materials and methods:** The initial glass compositions were selected from  $\text{SiO}_2\text{-Al}_2\text{O}_3\text{-P}_2\text{O}_5\text{-CaO-TiO}_2\text{-BaO-ZrO}_2\text{-CaF}_2$  and heat treated at  $1100^\circ\text{C}$  for 3 hr. The 3-point bending strength of specimens were determined using rectangular bars ( $3\times 4\times 25$  mm) and a universal testing machine, at a cross-head speed of 0.1mm/min. Single-edge-notched beam method (SENB) was used to measure the fracture toughness of glass-ceramic samples.

**Results:** The results showed that the additive oxides affected both parameters differently. The highest fracture strength and fracture toughness values belonged to the  $\text{TiO}_2$  and  $\text{BaO}$  containing glass-ceramics, which contained smaller crystal size. The mechanical properties of the prepared glass-ceramic samples did not differ strongly and/or even were decreased by addition of  $\text{ZrO}_2$  and extra amount of  $\text{SiO}_2$ . On the other hand, the least improvement in bending strength of crystallized specimens belonged to the  $\text{ZrO}_2$ , as crystallization happened in it by the surface crystallization mechanism and so it had the largest crystalline particles.

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## Full Ceramic Restorations: Material Selection

Rasoul Monirifard

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Many all-ceramic restorations, from very simple to very complex ceramics, have been introduced and used throughout the years. However, there is no general guideline for selection of ceramics available in dentistry. This lecture provides a guideline for selecting appropriate ceramic materials in clinical situations. Specific guidelines are outlined for the appropriate clinical conditions for using the various ceramic materials. Subjects we discussed about each ceramic system include: 1. required space and color change, 2. Ingredients, 3. Risk of fracture, 4. Shear and Tensile strength, and 5. risk of debonding.

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## Complication Management in All Ceramic Restorations

Ramin Mosharraf

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A complication has been defined as “a secondary condition developing in the course of a primary condition.” Although complications may be an indication that clinical failure has occurred, this is not typically the case. There are many complications that occur during or after appropriately performed fixed prosthodontic treatment procedures especially in all ceramic restorations.

Knowledge regarding the clinical complications that can occur in all ceramic restorations enhances the clinician’s ability to complete a thorough diagnosis, develop the most appropriate treatment plan, communicate realistic expectations to patients, and plan the time intervals needed for post-treatment care.

In this lecture, we will talk about complications that may occur in the treatment procedures in all ceramic restorations.

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Associate Professor, Dental Materials Research Center, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.



## Application of Rapid Prototyping for Making Ceramic Dental Prosthesis

Sayed Ali Mousavi<sup>1</sup>  
Vida Kargar<sup>2</sup>  
Reza Foroughi<sup>3</sup>

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Due to the high aesthetic demands of patients and improve physical and mechanical properties, all-ceramic restorations are increasingly used for complex indirect restorations. Several research studies are interested in new manufacturing techniques and improving the quality of reconstruction. With the introduction of computer-aided design and manufacturing systems, and providing of manufacturing facility in dental offices, delivery of the fixed prosthesis to the patient in a single clinical session made possible. Application of rapid prototyping is very practical in today's medical industry. Computer-aided rapid prototyping is like layer or three-dimensional printing. In this method a master model can be duplicated to a solid model from ceramic powder. It is very short procedure. In this technique by taking scanned photos or MRI and converting it to a format of three-dimensional modeling, it would be possible to produce dental prosthesis.

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## Composite Resins or Ceramics

Seyed Mostafa Mousari Nasab

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Patients demand superior esthetics from anterior restorations. Restorative materials from esthetic stand point must simulate the natural teeth in color, translucence and texture. These materials must also have adequate strength, good marginal adaptation, and biocompatibility and remain color stable and also maintain external tooth morphology to provide last landing esthetic restorations.

Resin composites common are restorative materials in the anterior teeth that fulfill the requirements of excellent esthetics and durability. The porcelain veneers have gained wide acceptance as the treatment of choice for restoration of anterior dentition because of their conservative preparation and beautiful esthetics.

Porcelain veneers may be used to modify a tooth's color, shape, length and / or alignment and to close dental space.

Several factors enroll the selection of resin composites or ceramics including the severity of defects in anterior teeth. This speech is a review on effective factors in selections of resin composites or ceramics in anterior teeth treatment.

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Associate Professor, Dental Materials Research Center, School of Dentistry, Isfahan University of Medical Sciences, Isfahan, Iran.

## Novel Coating of Fluor-Hydroxyapatite/ Silicate Zirconium Nano Composite Ceramic for Dental Implant

Monireh Nazempour<sup>1</sup>  
Ebrahim Karamian<sup>2</sup>

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**Introduction:** While the solution rate of hydroxyapatite coating is high, osseointegration of implants in tissue will not be performed properly. One of the effective ways in decreasing the solution rate is partial substitution of hydroxyl anions (OH), in crystal structure of hydroxyapatite with fluor ion which lead to formation of a new compound called fluorhydroxyapatite.

**Method and Materials:** In this study, first the natural hydroxyapatite is obtained from heating the bovine bone at 800 °C for 2 hours. Then, by mechanical alloying with fluorine (CaF<sub>2</sub>) and natural hydroxyapatite powder for 6 hours with rotary velocity of 400 (rpm) and ball to powder ratio of 20, fluorhydroxy apatite powder is obtained. Finally it was converted to composite with micronized zircon powder with values 5, 10 and 15% wt. Then composite powder was coated by thermal plasma spray technique on a stainless steel substrate (implant). To assess the engineering and biological characteristic, techniques such as X-ray diffraction (XRD) for phase study and scanning electron microscope (SEM) for considering microstructure and morphology and biocompatibility evaluation were performed.

**Results:** Results showed that nano composite coating containing 10% wt. of zirconium silicate have optimum engineering and biological characteristics.

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## Marginal Adaptation of All-Ceramic Restorations

Farahnaz Nejatidanesh<sup>1</sup>

Omid Savabi<sup>2</sup>

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Marginal adaptation is one of the crucial factors for long term success of a restoration. Marginal deficiencies are unfavorable for both tooth and its supporting tissues. Inadequate restoration margins results in cement dissolution, recurrent caries and marginal discoloration. The consequent of cement dissolution is increase in gingival inflammation and periodontal disease due to changes in the subgingival microflora and plaque retention. Particularly in all ceramic restorations, small marginal gaps facilitate the removing excess of resin luting agents and minimize the risk of micro leakage and micro crack by reducing polymerization shrinkage. The marginal gap less than 120  $\mu\text{m}$  is clinically acceptable. The marginal discrepancy of all-ceramic restorations depends on several factors including crown location, preparation geometry, type of restoration, dental laboratory techniques, impression technique and type of luting agent.

The marginal gap values of tooth-supported all-ceramic restorations have been estimated in several studies.

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## Recent Advances in Dental Ceramics

Monireh Nili

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Although conventional ceramics provide esthetically pleasing restorations, they have many drawbacks, which limit their use. Due to last developments and introducing of digital technology newer and better products are flooding the market these days. The “Chinese clay” of old days has become the unavoidable product in esthetic dentistry. Dental ceramics classification according to their composition, processing methods, firing temperatures, micro-structure, and translucency will be discussed.

Advances in the field of ceramics, provide new products for the dentist, which will surely enhance the esthetic and strength characters. A careful selection of these products is essential for successful outcome.

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## Medical Ethics Dentist and Dental Professionals

### What Dangers are Lurking?

Seyed Mohammad Razavi

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Basically after God, the suffering patients considered the doctors as their protection. Physician will expose at the patient's body and soul. Because, the doctor have the trust of their patient and society and they have been more exposed to risk factors for falls. So, that may be they will missed celestial commitment and main duty. The higher of academic digrees, the more attention to sensual climates and more tendency to filthy ethics.doctors wil find morally serious crass.

In recent years according to massive increase graduates of dentistry, the business aspect of the profession than their humanitarian and sacred is clear and the spiritual position of dentists have been downward. According there are many factors such as stay away from science and up to practical advancing, pride and conceit , cupidity, increase complaints of patients, are threading dentists and dentistry. In this lecture, we try to describe the medical ethics and the teaching of Islam with the mention of examples, and then we discuses about various aspects of its important.

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## Contemporary Engineering Concepts in Digital Dentistry

Majid Rouhi

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Today we observe a vast cooperation between engineering and medical/dental divisions. Indeed, technologies and high tech industries in collaboration with dentistry are providing new concepts, so that the world of digital dentistry is pioneered in diagnosis, treatment planning and fabrication.

In this subject, we will present the newest high-tech systems, equipments, and materials in CAD/CAM and digital dentistry such as scanners, milling machines, rapid prototyping (optical and laser systems). In addition, their applications in planning and fabrication of high precision restorations will be discussed.

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Managing Director of KFP-Dental Co.

## A Clinical Approach to Lumineers

Shervin Salssali

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Improvement in ceramic materials and fabrication technics beside the patients demands for aesthetics result in such a fabulous treatments, which never have been imaginable.

Using Lumineers for anterior teeth is the first choice of non-invasive aesthetics treatments today.

No preparation procedure in most cases, no need to temporization and anesthesia besides natural beauty results, were made this treatment unique.

In this lecture, it has been tried out to discuss on Lumineers from clinical point of view and its applications.

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## Adhesive Cementation of Indirect Tooth Colored Restorations

Pouran Samimi

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A variety of restorative techniques with minimal invasion of the dental tissues have been reported.

As a consequence, the development of new restorative materials has been introduced based on the concept of micro-retention (rather than macro-retention), which allows better conservation of the dental structure. Appropriate adhesive procedures are used. Adhesive cementation is a complex process, which needs to know the principles of adhesion, proper material selection, and application of adhesive materials and techniques. This presentation describes the different materials and techniques that are used for adhesive cementation with particular attention to:

1. Bonding systems
2. Selection of resin cement
3. Surface treatments for various restorative materials
4. Factors may affect the durability and stability of adhesive process

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## **Tooth Preparation and Impression Making for All-Ceramic Restorations**

Omid Savabi <sup>1</sup>  
Farahnaz Nejatidanesh <sup>2</sup>

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The tooth preparation must be based on fundamental principles to provide basic criteria for predictable success of prosthetic treatment. Careful attention to every detail is imperative during tooth preparation and ensures that other subsequent procedures (making interim, impression making, and laboratory procedures) can be accomplished properly.

The principles of tooth preparation may be classified into three categories: Biologic considerations, Mechanical considerations, Esthetic considerations.

Besides the tooth preparation, an acceptable impression should be made for a successful restoration. The impression must be an exact record of prepared tooth (including sufficient unprepared tooth structure immediately adjacent to the margins), its surrounding soft tissue and other teeth in the arch. The impression can be made by conventional methods with elastic materials or digital impressions.

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## Digital Dentistry and CAD/CAM Technology for Making All-Ceramic Restorations

Omid Savabi<sup>1</sup>  
Farahnaz Nejatidanesh<sup>2</sup>

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It is becoming increasingly evident that digital technologies are essential tools in dentistry. Beyond the diagnostic imaging, digital impression making, designing, and manufacturing are also established procedures in many dental offices and laboratories.

CAD/CAM (computer-aided design/computer-aided manufacturing) systems have been used by dental professionals for over 25 years. In the beginning, CAD/CAM systems were mainly used for manufacturing of glass ceramic inlays and onlays. Nowadays the digital CAD/CAM technologies have proven to be beneficial to patients and dentists, bringing the possibility of making chair-side or laboratory-assisted restorations.

The CAD/CAM systems can produce restorations in the dental office, dental laboratory, or central milling centers. Scans generated either intra-orally or of model can be sent to these milling facilities and CAD/CAM restorations can be planned digitally. Milling machines can manufacture copings, frameworks, abutments, and final restorations using information sent directly from dental office.

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## Strengthening Methods of Weakened Endodontically Treated Teeth

Farzaneh Shirani<sup>1</sup>

Mohammad Reza Malekipoor<sup>2</sup>

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Restoring of severely damaged teeth that have lacked their dentinal support at the coronal portion of the root canal is very difficult. The amount of residual dentin and tooth canal shape play critical roles in the strength and resistance of a tooth with posts. So using the post in the common way in teeth with flared canals is not indicated. Thus in teeth with the loss of significant amount of coronal and radicular tooth structure, it has become important to assess alternatives to cast post and cores or common prefabricated posts. The recent studies have suggested using of resin composites for strengthening the immature root treated teeth. This method in combination with prefabricated post has been advised for using after apexification. In this lecture the different methods in root reinforcing with different dental materials will be discussed.

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## Law and Dentistry

Abass Ali Khademi<sup>1</sup>  
Amin Shirvani<sup>2</sup>

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Every clinical should respond to three authorities regarding his/her professional activities:

1. God
2. Conscience or internal judge
3. The judicial system or external judge

Referees responsible for medical law suits and errors are:

1. Forensic Medicine council
2. Medical council
3. Court system
4. In certain cases, National Bureau of Investigation and medical sciences Universities.

In this lecture, medical negligence and its different types, consent and reasons for increased rate of suing medical professionals will be discussed.

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## **The Techniques to Achieve Esthetics in All-Ceramic Restorations**

Mahmood Reza Talakoob

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One of the basic factors for choosing all-ceramic restorations is to create beautiful and natural looking restorations.

The technician has to follow certain methods and use definitive characterization methods to achieve this goal. Otherwise the result may not be far different from conventional metal ceramics restorations.

Introduction of new technologies, materials, and new generations of dental ceramics and increasing knowledge and expectations of patients oblige the dental team including dentist and dental technician to use these new technologies and materials to satisfy patients and themselves.

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Master Dental Technician