Successful implementation of restoration concepts!

Treatment protocol, dental technology and new materials harmonize together!

The prosthetic implant restoration concept
Dr. Andreas Kurbad explains the protocol for the best red-white esthetic.

Achieve the best results with veneering composite
Master Dental Technician Urszula Mlynarska demonstrates the most important steps for natural results.

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Editorial

Successfully implement sustainable restoration concepts!

Whether it is shade communication between the practice and the laboratory, using new materials for complex cases or modern technologies, it is important to keep the entire supply concept in mind and to ideally coordinate all sub-steps in a situation-specific and indication-related manner.

In which cases can the strengths of hybrid ceramics be used in a particularly profitable manner? How does the restoration have to be conditioned for a reliable bond between the luting composite and hybrid ceramic? How can I optimally shape the gingiva with an implant restoration? How can different materials be combined with each other in digital fabrication processes?

In this edition of DENTAL VISIONIST, we share the latest insights and everyday practical tips that will help you to successfully implement restoration concepts.

Stay curious!

Have fun reading.

Angley Eckardt
Managing Editor
A prerequisite for accurate shade reproduction is the precise and efficient transfer of relevant tooth shade information from the dentist to the dental technician. Digital communication with software and app solutions such as VITA ShadeAssist and VITA mobileAssist (VITA Zahnfabrik, Bad Säckingen, Germany) enables the transmission of acquired measurement data and patient photos in seconds. For example, the practice can send information via Bluetooth from a tablet, directly from the treatment unit to the technical workplace. Dr. Philipp Grohmann (Berikon, Switzerland) reports in an interview how he successfully implements this technology in routine clinical practice.

For best results: Digital shade communication between practice and laboratory

Dr. Philipp Grohmann, Dentist
Berikon, Switzerland

What devices and systems do you use to efficiently exchange tooth shade information between yourself and the laboratory?

Dr. Philipp Grohmann: In addition to the VITA shade scales, I use the VITA Easyshade V digital shade measuring device and the associated VITA mobileAssist app.

What do you do to transmit digital tooth shade information from the practice to the laboratory?

Dr. Philipp Grohmann: In most cases, the laboratory receives intraoral photos and the tooth shade information determined with VITA Easyshade V via app by email. This provides the dental technician with a very good working foundation.

What prior knowledge is required to successfully use the VITA software and app solutions in daily clinical and laboratory practice?

Dr. Philipp Grohmann: Naturally, it is helpful if you already know how to use certain programs on a tablet or similar device. But no special computer knowledge is required. The software is self-explanatory.

How do you and your team benefit from using the new technologies for digital shade determination and communication?

Dr. Philipp Grohmann: The entire practice team was trained in a standardized workflow with the shade measuring device and app so that shade determination and communication take place very efficiently, objectively, and clearly. The unambiguous transmission of all information to the laboratory ensures predictable results in shade reproduction. The digital data can also be used for patient discussions, and it can be easily archived. This makes it simple to follow up on particular work steps. The use of the new technology is beneficial, particularly when the dental technician cannot be personally present for the shade selection.

For best results: Digital shade communication between practice and laboratory

Fig. 1 After an accident, the teeth in region 11 through 13 were devitalized and were scheduled to be restored with veneers. Since tooth stumps 11 and 12 were too gray, they were first pretreated with internal bleaching.

Fig. 2 Bleaching produced an adjusted stump shade. This is just as important for the dental technician as the shade of the neighboring tooth and can also be transmitted with the app or by email.

Fig. 3 The end result after fixation. The veneers were manufactured by Dental Technician Alex Keller (Schönenberger Dentaltechnik, Glattbrugg, Switzerland). The shade measuring device and the communication app were a valuable aid in this case.

"Achieving predictable results with digital shade communication."
Composite or ceramic? A systematic classification of indirect tooth shade materials

Indirect, tooth-colored ceramic materials such as feldspar and glass ceramics have now become established as standard for CAD/CAM-fabricated restorations. The range of CAD/CAM materials has expanded tremendously in recent years. Apart from traditional ceramics, dentists can now also use hybrid ceramics or highly filled composites for definitive prosthetic restorations. In this article, Dr. Sebastian Horvath (Jestetten, Germany) discusses the systematic classification of traditional and new tooth-shaded CAD/CAM materials.

What distinguishes hybrid ceramics from traditional composite?
Ceramics are inorganic mineral materials that are molecularly structured and feature covalent/ionic bonds. They are usually characterized by high mechanical bending strength. However, when force is applied, traditional ceramics react with a brittle behavior and are prone to cracking. Composites are multi-phase materials. They consist of a resin matrix in which mostly ceramic filling material is embedded in order to improve the mechanical properties.

What are typical representatives within the respective material classes today?
Everything started in 1985 with VITABLOCS feldspar ceramics. This was followed by reinforced glass ceramics, including lithium disilicate, and the hybrid ceramic VITA ENAMIC, which has been available since 2013. Recently more composites and high-performance polymers are becoming available, such as GC CERASMART, for CAD/CAM use on the market.

How is hybrid ceramic different from traditional composite?
The hybrid ceramic is a fundamentally new combination of ceramic and polymer. The ceramic provides for mechanical stability, the polymer for elasticity. In composites, ceramic fillers are embedded in a polymer network. The hybrid ceramic, in contrast, has a ceramic network infiltrated with polymer. It contains a high percentage of ceramic (approx. 86% by weight), which contributes to the high durability of the material.

What advantages can be expected from the new hybrid ceramic for a clinic?
Thanks to the high load capacity and elasticity, hybrid ceramics exhibit a high absorption potential in relation to chewing forces. VITA ENAMIC is significantly less brittle than pure ceramics and has similar mechanical properties as dentin. This leads to a uniform distribution of stress. If any cracks are formed, the cracks are deflected or stopped at the polymer-ceramic interfaces. The elasticity of the material allows the CAD/CAM process to have thin yet precise restoration edges.

How are ceramics, hybrid ceramics, and composites fixed?
Due to the ceramic structure, hybrid ceramics such as feldspar ceramic are pretreated by etching with hydrofluoric acid and silanization. Studies show very good adhesion values. According to current data, CAD/CAM composite materials should be corundum blasted and silanized prior to cementation, which results in comparatively lower adhesion values according to laboratory tests.

What is the decisive practical advantage of VITA ENAMIC?
The original goal of accomplishing esthetic and long-lasting single-tooth restorations using the CEREC process with just one session, is revitalized with hybrid ceramics because no crystallization firing is necessary with this material. For this reason, I use the material for standard single tooth restorations in the posterior area.

Source:
DENTAL VISIONIST 02/16
Photo documentation of inlay restoration of VITA ENAMIC hybrid ceramic

Fig. 1 Insufficient amalgam filling in tooth 16.
Fig. 2 Condition of tooth 16 after excavation, dissection, and adhesive build-up filling.
Fig. 3 The virtual partial crown created with the CEREC software.
Fig. 4 Final polishing with the VITA ENAMIC high brilliance polisher.
Fig. 5 Finished restoration before adhesive fixation.
Fig. 6 Final adhesive-cemented VITA ENAMIC crown in situ.

Source: Dr. Sebastian Horvath, Jestetten, Germany
NEW DEVELOPMENTS FROM SCIENCE AND RESEARCH

Clinical research on VITA ENAMIC IS: A first case report

In a clinical study, the University of Geneva investigates the performance and durability of screwed implant-supported crowns made of hybrid ceramics (VITA ENAMIC IS, VITA Zahnfabrik, Bad Säckingen, Germany), lithium disilicate (IPS e.max CAD, Ivoclar® Vivadent, Schaan, Liechtenstein), and metal ceramics. In this interview, Prof. Dr. Irena Sailer (Clinic for Prosthetics and Biomaterials, Dental Clinic, University of Geneva, Switzerland) reports on her initial clinical experience with the new VITA IMPLANT SOLUTIONS (IS) blanks.

Prof. Dr. Irena Sailer: Because these materials have some flexibility, a lower chipping rate is expected than with conventional ceramics. In addition, it can be expected that the restorations will feel “softer” to the patients. These people actually report a very pleasant wearing comfort.

Prof. Dr. Irena Sailer: The earliest we will have any significant results is at the 1-year mark. Up to now, however, we have not observed anything noticeable. No cementing losses have occurred, for example.

Prof. Dr. Irena Sailer: In general, it is important for this indication to create a correct emergence profile for the CAD (Computer Aided Design). In regard to material, special care must be taken to prepare very carefully for bonding with the titanium adhesive base or the abutment assembly and to follow the manufacturer’s instructions precisely.

Report 08/16

"With VITA ENAMIC, a lower chipping rate is expected than with conventional ceramics.”

INFORMATION: WHAT ARE VITA IMPLANT SOLUTIONS (IS)?

VITA IMPLANT SOLUTIONS (IS) are blanks which have an integrated interface to an adhesive/titanium base (e.g., TiBase) and are used for the CAD/CAM fabrication of implant-supported dental restorations. VITA IMPLANT SOLUTIONS are available in three variants: VITA CAD-T emp IS composite blanks for temporary restoration and shaping of the emergence profile, as well as VITA ENAMIC IS hybrid ceramic and VITA SUPRINITY IS glass ceramic for the fabrication of the final superstructures.

The blanks are suitable for the CAD/CAM fabrication of mesostructures (two-element solution) and/or abutment crowns (single-element solution) for tooth-colored implant-supported superstructures.

VITA IMPLANT SOLUTIONS are compatible with the implant systems of many manufacturers (e.g., Nobel Biocare, Straumann, Biomet 3i, Dentsply, and many more) via the integrated interface for the adhesive/titanium base (TiBase, Sirona Dental, Bensheim, Germany).
To achieve the best bond strength – what should be taken into consideration?

The restoration must be conditioned for a reliable adhesive bond between the luting composite and the hybrid ceramic.

**Dr. Julián Conejo** (University of Pennsylvania, School of Dental Medicine, Philadelphia, USA) investigates, in a current in-vitro study under the leadership of Prof. Dr. Markus B. Blatz, how different conditioning types/protocols may influence the bond strength to the hybrid ceramic VITA ENAMIC (VITA Zahnfabrik, Bad Säckingen, Germany). In the following interview, he reports his scientific results.

**Prof. Dr. Markus B. Blatz**, Dentist (right)

**Dr. Julián Conejo** (University of Pennsylvania, School of Dental Medicine, Philadelphia, USA) investigates, in a current in-vitro study under the leadership of Prof. Dr. Markus B. Blatz, how different conditioning types/protocols may influence the bond strength to the hybrid ceramic VITA ENAMIC (VITA Zahnfabrik, Bad Säckingen, Germany). In the following interview, he reports his scientific results.

**Prof. Dr. Markus B. Blatz**, Dentist (left) Philadelphia, USA

**Dr. Julián Conejo**: Different etching patterns on the test specimens were generated with different exposure times to the hydrofluoric acid. In our study, a short etching time of 20 seconds resulted in significantly lower adhesion values. The adhesive force increases with longer etching times. However, there was no difference for etching times between 60 and 120 seconds.

**Prof. Dr. Markus B. Blatz**: How important is it to carefully observe the manufacturer’s conditioning protocol when applying hydrofluoric acid and bonding agents?

**Dr. Julián Conejo**: That is very important. Our results show that the current surface conditioning recommended by VITA Zahnfabrik enables the greatest adhesion and is also the simplest. According to the instructions for use, hybrid ceramics should be etched for 60 seconds and then the silane bonding agent (primer) massaged in for 60 seconds.

**Prof. Dr. Markus B. Blatz**: According to your experience, can the treatment provider have a positive influence on the adhesive bond with further or additional steps?

**Dr. Julián Conejo**: Not really. That was one of our hypotheses. Now we know that additional cleaning steps after the etching with hydrofluoric acid does not produce any significantly higher values. Neither the additional surface treatment with phosphoric acid nor the ultrasonic bath has improved the adhesive strength values compared to the hydrofluoric acid etching. For a reliable bond, a clean, pre-treated surface of the restoration is always important after the try-in.

**Prof. Dr. Markus B. Blatz**: Besides the conditioning of the restoration, what is important in the pretreatment of the tooth substance in order to achieve a good adhesive bond?

**Dr. Julián Conejo**: Isolation with a rubber dam allows absolute dryness and a clean working field. The surface of the dissection should also be conditioned with an adhesive system prior to attachment. This in turn makes a perfect connection between the hard tooth substance and the luting composite possible.

**Report 02/16**

**Graph**: Shear bond strength of Bifix QM luting composite (VOCO GmbH) to VITA ENAMIC (VITA Zahnfabrik) after pretreatment of VITA ENAMIC with different conditioning types/protocols.

Source: Research Report of the University of Pennsylvania, Dr. Julián Conejo, School of Dental Medicine, Philadelphia, USA, 02/2016

**Fig. 1**: Control group: unetched hybrid ceramic surface

**Fig. 2**: Hybrid ceramic surface after hydrofluoric acid etching for 20 seconds

**Fig. 3**: Hybrid ceramic surface after hydrofluoric acid etching for 60 seconds

**Fig. 4**: Hybrid ceramic surface after hydrofluoric acid etching for 120 seconds

For the study, including the control group with no pretreatment, seven different subgroups were formed. After the application of the bonding agent and the composite application, the test specimens were stored in distilled water. The final shear strength was determined and the data was statistically evaluated.

**DV**: Based on your discoveries, how important is the etching with 5% hydrofluoric acid for a reliable adhesive bond of the luting composite to the ceramic restoration?

**Dr. Julián Conejo**: It is very important to apply hydrofluoric acid to create a roughened surface for a good micromechanical retention. All etched sample specimens showed a significant increase in bonding strength to the luting composite. In order to ensure a sustained clinical success of the restoration, hydrofluoric acid is a critical process step for the treatment provider.

**DV**: How can the exposure time to the hydrofluoric acid affect the bonding strength of the luting composite to VITA ENAMIC?

**Dr. Julián Conejo**: Different etching patterns on the test specimens were generated with different exposure times to the hydrofluoric acid. In our study, a short etching time of 20 seconds resulted in significantly lower adhesion values. The adhesive force increases with longer etching times. However, there was no difference for etching times between 60 and 120 seconds.

**DV**: Please explain the study method and what parameters were modified in the conditioning and pretreatment of the hybrid ceramic?

**Dr. Julián Conejo**: 70 test specimens of the hybrid ceramic VITA ENAMIC were etched for 20, 60, or 120 seconds with 5% hydrofluoric acid. The etched surfaces were cleaned with either phosphoric acid or an ultrasonic bath. For the study, including the control group with no pretreatment, seven different subgroups were formed. After the application of the bonding agent and the composite application, the test specimens were stored in distilled water. The final shear strength was determined and the data was statistically evaluated.

**DV**: How well can you explain the etching with 5% hydrofluoric acid to create a roughened surface for a good micromechanical retention?

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Source: Research Report of the University of Pennsylvania, Dr. Julián Conejo, School of Dental Medicine, Philadelphia, USA, 02/2016
VITA IMPLANT SOLUTIONS: The implant prosthetic restoration concept

For implant prosthetic crown reconstructions with VITA IMPLANT SOLUTIONS (IS) blanks (VITA Zahnfabrik, Bad Säckingen, Germany), there is a 3-step restoration concept. It begins with the implantation and leads to the final ceramic reconstruction via the temporary restoration for the optimization of the emergence profile. All blanks have an integrated interface to a titanium/adhesive base (e.g., Sirona TiBase, Bensheim, Germany) and enable an efficient restoration. Dr. Andreas Kurbad (Viersen-Dülken, Germany) explains the individual steps in a case report.

1. The patient case

20 years after the endodontic treatment of tooth 46, a 39-year-old patient had recurrent acute complaints. Mesial and distal periapical brightening in the X-ray showed evidence of bone resorption. After a root tip resection did not result in the desired therapeutic success, the tooth should be extracted in a manner that protects the bone. Because of the intact bone below the resection area, the gap was to be provided with an immediate guided implantation.

STEP 1
Implantation

STEP 2
Temporary superstructure

STEP 3
Final superstructure
2. Prosthetic planning

The entire dentition was initially scanned with the CEREC Omnicam, and the crown was then designed and functionally optimized with the CEREC software V 4.4 (Sirona Dental, Bensheim, Germany). A plaster model etched for 46 was used to create an X-ray template. After a bone-protecting extraction, a DVT was created with the X-ray template used. The intraoral scan with crown planning was imported into the image data and virtually implanted with the Galaxis software (Sirona Dental, Bensheim, Germany). The data was used to grind an insert that converted the X-ray template into a drill template through perfect fitting.

3. Gingival shaping

The drilling template made possible a positionally stable implantation with optimal use of the bone. Digital forming was performed with a scan post screwed on. A temporary abutment crown made of VITA CAD-Temp IS could be virtually designed to the exact implant position. The focus was on the formation and maintenance of the gingival structures. Occlusal and approximal interferences were still consistently avoided here for the sake of undisturbed healing. The blank was ground while keeping the interface in mind. After completion, the completed crown was adhesively fixed and integrated on the titanium base.

4. Final restoration

An ideal gingival emergence profile appeared after four months of the healing phase. The missing cement joint of the abutment crown contributed to the absence of inflammation. After a new scan, the final abutment crown could be fabricated from "VITA ENAMIC 15". The dentine-like modulus of elasticity of the hybrid ceramic allows for the absorption of the chewing force, providing long-term relief of the bony structures around the implant. After elaboration and individualization, the restoration was harmoniously integrated into the gingival structures and residual dentition. Immediate implantation and VITA IMPLANT SOLUTIONS (IS) have enabled an efficient treatment protocol.

Report 08/16
Partially veneered, implant-supported bridge of VITA YZ HT

Complex, implant-supported whole-jaw restorations are a particular challenge for dentists and dental technicians. In the current case, a vestibularly partially veneered bridge restoration was made for the edentulous upper jaw from the highly translucent zirconia VITA YZ HT and the veneering ceramic VITA VM 9 (both VITA Zahnfabrik, Bad Säckingen, Germany) and screwed to six implants. Vincent Fehmer, Master Dental Technician (Geneva, Switzerland), explains the fabrication of the restoration step-by-step, which was created in collaboration with the dentist, Dr. Eric van Dooren.

1. Initial situation

A 72-year-old patient presented with insufficient total prostheses in the upper and lower jaw. For esthetic and functional reasons, he desired new, secure restorations. Six implants were inserted into the upper and lower jaw bones as prosthetic pillars. The lower jaw could be rehabilitated with a screwed-in resin restoration. The opposing jaw was now to be supplied with a highly esthetic, partially veneered zirconia bridge.

INFORMATION: WHAT IS VITA YZ HT?

VITA YZ HT is a highly translucent zirconia that is particularly suited to monolithic restorations due to its immense strength (approx. 1,200 MPa) and effective light-transmitting properties. The material is a cost-effective and esthetic alternative to non-precious metal and partially veneered metal ceramics. Practices and laboratories benefit with VITA YZ HT due to precise results thanks to high edge stability and precision fit veneering. This includes excellent potential thanks to high translucency.
2. Planning and design

An initial setup with an idealized tooth arrangement was fixed by means of a silicone key and provided the required prosthetic orientation during the course of treatment. After scanning the maxillary mandibular setup, a trial milling of temporary resin intraorally revealed the occlusal relations to the integrated mandible. After the bite registration, the functional contacts only had to be reinforced by wax-up in the molar area. The optimized arch was scanned and served as the basis for computer-aided design with the inLab software 15.1 (Sirona Dental, Bensheim, Germany).

3. CAM fabrication and veneering

“Previously, frameworks made of opaque zirconia had to be completely veneered in order to achieve an esthetic restoration. Today, the highly translucent zirconia VITA YZ HT, in combination with the staining fluids VITA YZ HT SHADE LIQUID, allows me to create a ‘fully anatomical’ milled bridge restoration in 80% to 90% of cases,” explains Vincent Fehmer. Only a minimal vestibular veneering with VITA VM 9 should be necessary for a true-to-nature color and light play. The functional advantage: “Thanks to the thin veneering layers, the chipping risk is automatically reduced.”

4. Integration and conclusion

The completed bridge construction was screwed into the upper jaw, and the screw channels were sealed with composite. The anatomically minimized substructure made of highly translucent zirconia facilitated fast and esthetic fabrication. The upper and lower jaws harmonized with each other despite the different materials. The patient was delighted with his new, securely-positioned restoration, and along with the dental technicians and the treatment provider, was completely satisfied with the result.

Report 08/16
For the clinical long-term stability of full ceramic restorations, a resilient and reliable adhesion after adhesive fixation is essential. However, different materials must be conditioned and adhered appropriately for the material. Dr. Julián Conejo (University of Pennsylvania, School of Dental Medicine, Philadelphia, USA) explains step-by-step the material-specific protocols for feldspar, glass, hybrid, and zirconia ceramics and demonstrates the differences.

**Selection of the bonding system**

"An adhesive bonding is indispensable for feldspar and hybrid ceramics," according to the recommendations of clinicians. Although full crowns of zirconia-reinforced lithium silicate glass ceramics and zirconia can also be conventionally cemented, Julián Conejo recommends this procedure only in the case of a retentive dissection form and in treatment situations with suboptimal drainage.

**Conditioning the tooth substance**

Julián Conejo performs the clinical conditioning steps as follows: "If the dissection is mainly in the enamel, I allow the phosphoric acid to act for 20 seconds. After that, I apply the adhesive components." If the dissection is in the dentine, he recommends a self-etching bonding system. "No phosphoric acid is required for these adhesive systems, which prevents sensory disturbances after the adhesive conditioning," says Julián Conejo.

**Conditioning the restoration**

"To obtain friction, feldspar and hybrid ceramics must be etched with hydrofluoric acid for 60 seconds, and zirconia-reinforced lithium silicate glass ceramic for 20 seconds," reports the dentist and scientist. He further explains, "A rough surface of the ceramic restoration is necessary for a good micromechanical retention. If this step is omitted, it can lead to adhesive failure." The silane bonding agent should be massaged in for 60 seconds to achieve a chemical bond to the restoration material.

**Summary**

"Every step is of great importance for the adhesive incorporation of ceramic restorations," according to Julián Conejo’s conclusion on adhesive bonding. The flawless surface of the restoration should be properly conditioned. The instructions for use of the adhesive and bonding systems have to be followed, and only a careful drainage of the working field allows a reliable adhesive attachment.

Source: Dr. Julián Conejo, Philadelphia, USA
Minimally invasive inlay restoration from the hybrid ceramic VITA ENAMIC

Inlay restorations using CEREC procedures have been an established process in digital dentistry for decades. However, due to the required minimum wall thickness, a lot of tooth substance frequently had to be dissected in reconstructions of traditional ceramics. Due to reduced minimum wall thicknesses, VITA ENAMIC (VITA Zahnfabrik, Bad Säckingen, Germany) allows minimally invasive restorations and can be precisely ground in thinly tapering edge areas. In the report, Dr. Gerhard Werling (Bellheim, Germany) explains the clinical procedures for an inlay-restoration of hybrid ceramic in region 24-26.

1. Initial situation

Figures 1 and 2 show the initial situation. On the basis of the patient’s history and according to the patient’s request (male, 38 years), he was not treated with alternative methods (infiltration technique, fluoridation, regular controls, etc.). Instead, a filling cavity was carefully dissected on the tooth in which the caries had already penetrated the approximal enamel in the X-ray image. Surprisingly, in the clinical image, the caries had penetrated deep into the dentine, so that after extensive excavation, a considerable defect in the substance was present.
Since the patient wanted a permanent enamel-like and tooth-like restoration, composite could not be used as a restoration material. It was decided to proceed according to the “extension for prevention” rule - but as minimally invasive as possible. The hybrid ceramic VITA ENAMIC is very advantageous in this case. The unique network structure in which ceramic and acrylate polymers interpenetrate, provides for enormous resilience and offers more freedom than traditional restoration materials.

Three VITA ENAMIC inlays were fabricated using the CEREC System (Sirona Dental, Bensheim, Germany). The intraoral scan was done using the CEREC Omnicam. With the biogeneric software, the reconstruction was done analogously to the missing chewing surfaces. In the grinding preview, the inlays were placed in the material blanks. The geometry EM-10 (8 x 10 x 15 mm) was chosen according to the shade determination with VITA Easyshade (VITA Zahnfabrik) in the color 1M2 HT. The hybrid ceramic can be processed very simply and quickly by machine as well as manually. Thanks to the high load-bearing capacity and edge stability, constructions with comparatively small wall thicknesses and thin-running edges are also feasible. Edge chipping, which can occur in traditional ceramics, are rare with this material.

It is advantageous that there is no firing process, and a shade characterization is possible if desired. The available shade selection (0M1 - 4M2) in two translucent steps, plus the good light transmission of the material allow for esthetically pleasing results. The inlays have been polished to a high gloss with the VITA ENAMIC Polishing Set in the clinic. The hybrid ceramic can also be easily polished intraorally. With VITA polishing instruments, the restoration edges can be polished in a unique, fine manner so that virtually no transition between the tooth and the restoration remains visible. Bonding is performed adhesively.

Result: A defect-oriented restoration with composite fillings was planned. The result was a minimally invasive restoration with VITA ENAMIC inlays.
Using VITA Rapid Layer Technology (RLT), a fully anatomical composite bridge consisting of a substructure and veneer structure is fabricated in a digital fabrication process. One advantage of this technology is that different materials and their specific properties can be combined with one another. For example, VITA YZ zirconia can be used for a stable substructure, and the relatively elastic hybrid ceramic VITA ENAMIC (VITA Zahnfabrik, Bad Säckingen, Germany) can be used for the veneering structure. In the following report, Hans Jürgen Lange, Master Dental Technician (Dental-labor Teuber, Darmstadt, Germany), explains the restoration steps with a comprehensive implant-supported reconstruction in the lower jaw using individual crowns and a composite bridge.
MATERIAL 2.0: NEW OPPORTUNITIES AND METHODS FOR PRIVATE PRACTICES AND LABORATORIES

2. Fabrication of the substructure

In the software exocad DentalCAD (exocad, Darmstadt, Germany), the titanium bases were initially designed fully anatomically, then were followed by a design that was reduced to almost a thimble framework (similar to the jacket crowns). The orientation of the screw channels, the space relations to the antagonists, etc., can be checked virtually at any time. After completion of the design for the substructure, this was milled from pre-stained VITA YZ zirconia, sintered, fitted, and provisionally fixed on the titanium bases.

3. Fabrication of the veneer structure

In contrast to the classical RLT method which requires only one scan, the framework was scanned again for an even more precise design of the veneer structure. In the case of the CAD, the positions of the screw channels were set according to the specified axis and later manually opened with the veneer structures from VITA ENAMIC. Emergence profiles and basal contact surfaces were made from zirconia to reach a high gloss polish that currently offers the greatest possible biocompatibility in contact with the gingiva. The bridge components are produced with the 5-axis simultaneous milling machine vhf S2 Impression (vhf camfacture, Ammerbuch, Germany).

4. Production of the composite bridge

The bonding followed the usual protocol for VITA ENAMIC, which has a good microretention after etching with 5% hydrofluoric acid. The zirconia is conditioned with a bonding agent. In addition, prior to the sintering process, we worked with a thin cutting disc in the horizontal plane for the restoration of micro-slits in the adhesive surfaces. The crowns were characterized with the stains of the VITA ENAMIC STAINS KIT, and the surfaces were sealed. In order to obtain the accentuations in the surface structure, the glazing should be as thin as possible.

5. Recommendation

For the reliable implementation of VITA RLT, the space relations must allow the minimum wall thicknesses for the restoration materials to be used. Implant situations are therefore very well suited. Thanks to the composite bridge solution, this patient was able to achieve a uniform, harmonious restoration result for the entire lower jaw.

Report 08/16

Digital composite bridges:
Zirconia framework plus tooth-colored veneer structure.

Composite bridges are very well suited for implant restorations!

RESULT immediately after incorporation.
GLASS CERAMIC, VENEERING MATERIALS, AND STAINS FOR MORE NATURAL ESTHETICS

VITA VM LC flow:
Artful and multi-faceted individualization with composite

Urszula Mlynarska, Master Dental Technician (Warsaw, Poland), describes the entire process of a crown restoration of teeth 11 and 12 in her case report, starting with planning, followed by wax-up and cut-back, then individualization. In addition, the author explains how natural, multi-faceted results can be achieved with the veneer composite.

The female patient, who is now 23 years old, originally had a bicycle accident at the age of 16. The result was a traumatic crown fracture on 11 and 21 without involvement of the pulp and dislocation. The vital teeth were restored immediately with composite. However, the reconstruction did not allow long-term stability or a natural appearance, which the patient did not like. It was her desire to have the incisors restored in a highly esthetic and stable manner. In order to restore them as desired, VITA ENAMIC in combination with VITA VM LC flow were selected as the restoration materials.

The visual tooth shade determination was done with the VITA linear guide 3D MASTER. The result was checked with VITA Easyshade V. A VITA ENAMIC blank in the shade 1M2-HT was selected. A wax-up on a situation model helped to define the final treatment result. Preparation and impression followed. The produced master model was scanned with the aid of the 3Shape D850 (3Shape A/S, Copenhagen, Denmark). A fully anatomically crown was then digitally constructed and milled. After the try-in, a cut-back was conducted incisally and centrally.

VITA ENAMIC can be customized with VITA VM LC Flow (VITA Zahnfabrik, Bad Säckingen, Germany) for esthetic reconstruction in the front. The initial situation is clinical situation after veneer preparation on 11 and 21. The result is a smile with a natural play of color and light.

INITIAL SITUATION: Clinical situation after veneer preparation on 11 and 21.
RESULT: A smile with a natural play of color and light.
After the final polymerization of the veneer, the morphology and texture of the surface were shaped with fine-grain diamond tools. To obtain natural reflections, the final polishing was done with a cotton buff and diamond polishing paste.

For a reliable adhesive bond, the lumen of the crowns was etched with 5% hydrofluoric acid and then silanized. The end result shows a highly esthetic restoration which integrates perfectly with the juvenile neighbors teeth. The young patient was very satisfied with the “invisible” reconstruction.

INFORMATION: WHAT IS VITA VM LC FLOW?

The low-viscosity VITA VM LC flow veneer composite is ideal for delicate and esthetic individualization in the cutting area as well as the intensification in the cervical area of the tooth. Dental technicians and dentists can apply the materials either with an instrument, a brush, or directly from the syringe.

The indication spectrum includes the veneering of reduced crowns as well as framework and bridge constructions. The following materials can be customized with VITA VM LC Flow: hybrid ceramics, metal, zirconia, and composite. Furthermore, the veneer composite is also suitable for individualizing VITA prosthetic teeth made from MRP composite.

"Then used VITA VM LC flow for individualization. The flowable veneer composite stays exactly where I have applied it. This makes it simple to maintain control during the veneering," reports Urszula Mlynarska. Thanks to the warm basic color of the hybrid ceramic, a combination of warm and cold shades could be used. In order to create a three-dimensional effect, the dental technician recommends the interplay of opaque and translucent layers.

Urszula Mlynarska’s summary of the veneering composite: “Millions of combinations are possible. We are only limited by our imagination.”
Esthetic anterior tooth reconstruction using VITA YZ HT and VITA VM 9

In order for a single anterior crown to blend harmoniously into the oral appearance, the special features of the natural neighboring teeth must be reproduced. In the current case, tooth 11 was restored with a crown. The challenge was to replicate distinct individual characteristics of the natural dentition, such as calcifications. Chia Heng Chung, Dental Technician (Kaohsiung, Taiwan), explains how he was able to achieve a natural result using VITA VM 9 veneering ceramic (VITA Zahnfabrik, Bad Säckingen, Germany).

1. Intraoral situation

After the filling therapy of an advanced carious lesion on tooth 11, the soft pulpal tissue of a 37-year-old patient showed signs of irreversible infection. A root canal treatment was performed to prevent pain and bone resorption. The tooth had to be functionally stabilized after this invasive therapy. To enable a highly esthetic and natural restoration, a zirconia crown made of VITA YZ HT with a VITA VM 9 veneer was planned.

2. Shade determination and substructure fabrication

The tooth shade determination with the VITA Toothguide 3D-MASTER was a critical step for the successful veneering of the crown. 2M1 was determined as the base shade. A black and white photo helped to select the correct lightness and color saturation. The preparation for the full crown was carried out with a pronounced hollow shape in order to create space for the substructure fabrication. In this case, I used a combination of VITA AKZENT Plus EFFECT STAINS and VITA VM 9 BASE DENTINE,” Chia Heng Chung describes as the first, important step. In his opinion, the correct lightness is 60 percent of the success. “By controlling shade intensity and hue, we can already achieve 80 percent of the natural appearance. The remaining 20 percent depends on the individual abilities of the technician,” explains Chia Heng Chung.

3. Veneering

“Even after the first firing, the basic shade and lightness of the veneered framework should correspond to the determined tooth shade. In this case, I used a combination of VITA AKZENT Plus EFFECT STAINS and VITA VM 9 BASE DENTINE,” Chia Heng Chung describes as the first, important step. In his opinion, the correct lightness is 60 percent of the success. “By controlling shade intensity and hue, we can already achieve 80 percent of the natural appearance. The remaining 20 percent depends on the individual abilities of the technician,” explains Chia Heng Chung.

4. Treatment result

The finished restoration is integrated harmoniously into the esthetic zone. The full ceramic crown exhibited a natural play of color and light. Thanks to the precise determination of the basic tooth shade and the perfectly matched veneer ceramic VITA VM 9, a simple and structured approach was possible. The patient was very happy with the esthetic result. For Chia Heng Chung, CAD/CAM and craftsmanship complement each other: “The synergy between technology, art and beauty is the key factor for successful full ceramic crown and bridge restorations.”

PREVIOUSLY Full crown dissection on tooth 11 after endodontic treatment.

AFTERWARDS The final restoration on tooth 11, the patient was pleased with the highly aesthetic result.
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