

# DENTAL VISIONIST



## Systematic reproduction of shape, shade and function!

A systematic approach to applying the laws of nature.



### Non-prep veneers made of hybrid ceramic

A team of dentists and technicians demonstrate how VITA ENAMIC blanks produce non-prep veneers with very small wall thicknesses.

> Page 12



### Systematic shade reproduction with metal ceramic

Dental technician Marcio Breda describes how to coordinate production processes, materials and wall thicknesses intelligently.

> Page 36

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**Editorial**

# The systematic reproduction of shape, shade and function



Producing lifelike, natural restorations is one of the daily challenges faced by dental professionals in both the clinic and the laboratory. Patients expect dental prostheses to have a harmonized appearance, to meet all of the essential functional criteria and to feel absolutely natural when it comes to chewing. This requires processes and materials that create the ideal combination of shape, shade and function. In addition, it is also important to follow a standardized, systematic process in order to achieve results that can be reliably reproduced.

This edition describes clinical success factors for all-ceramic restorations based on the findings of long-term studies and contains all the latest on the optical integration capabilities of CAD/CAM materials.

A number of case studies taken from everyday practice and laboratory procedures describe the methods, materials and technologies available to you for creating a systematic workflow, as well as how they can be integrated efficiently into your practice and laboratory operations.

Our goal is to support you in providing patients with systematic and long-lasting treatments.

We are pleased to show you a number of exciting processes and insights.

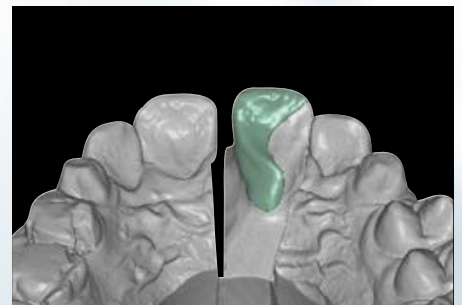
DENTAL VISIONIST wishes you an enjoyable read!

Felicitas Ledig  
Chief Editor

**Photo-optical integration capabilities of CAD/CAM-materials**

Study on the optical integration of inlays under different light sources

> Page 10

**Treatment of anterior tooth trauma in mixed dentition**

Defect-oriented, long-lasting restoration with VITA ENAMIC hybrid ceramic

> Page 24

**Youthful and lifelike anterior reconstructions**

Crowns and non-prep veneer made from VITA VM 9 with natural shade effects and light dynamics

> Page 32

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The testimonials by dentists and dental technicians published in this magazine are based on practical experience with the specified VITA materials gained during the course of processing, and/or on manufacturer information based on the data provided in the technical and scientific documentation (VITA Zahnfabrik, Bad Säckingen, Germany; download from [www.vita-zahnfabrik.com](http://www.vita-zahnfabrik.com)). The statements of the named dentists and dental technicians reflect the status of the report authorization of 11/2018. The testimonials by developers or technical marketing department published in this magazine are based on individual and/or internal studies conducted by VITA R&D (VITA Zahnfabrik, Bad Säckingen, Germany) and/or on the results of pilot testing.

*Shade determination can be standardized with VITA Easyshade V.*



## Reliable workflow for tooth shade determination and reproduction



*Dr. José Gabriel Martínez  
Barcelona, Spain*

Standardizing visual tooth shade determination and precise shade reproduction are some of the everyday challenges faced in dental practices. The perception of color is based on subjective, visual sensory impressions and is influenced by a number of factors. For example, lighting conditions have a significant impact on the shade chosen during tooth shade determination. The basic shade of the tooth is mainly defined by the dentin, while the layers of enamel on top produce a variety of optical effects, depending on the thickness and translucency. In the following case, dentist Dr. José Gabriel Martínez demonstrates how easy and reliable tooth shade determination and material selection can be using the VITA Easyshade V digital spectrophotometer (VITA Zahnfabrik, Bad Säckingen, Germany).



*Precise tooth shade determination was achieved using VITA Easyshade V spectrophotometer.*

### Clinical situation

A patient's upper middle incisor was reconstructed using a direct composite restoration, which fractured. In addition to the material deficiency, the patient was also not satisfied with the tooth shade and esthetic appearance. For that reason, the decision was made to reconstruct the tooth using an efficient, digital workflow with a monolithic, tooth-colored feldspar ceramic crown. In order to treat the patient in a single session, a full crown restoration was performed and the composite structure was almost entirely removed. Following, a temporary crown was made from the CAD/CAM VITA CAD-Temp multiColor composite material using the 2M2 shade, in order to stabilize the tooth and soft tissue.

### Tooth shade determination

The shade was digitally determined using VITA Easyshade V, achieving a perfect color match between the new restoration and the neighboring left incisor tooth. A spectrophotometer was used to transmit defined light into the dentin core and the reflected light spectrum was recorded by a measuring probe. Then the spectral data was analyzed independently from the ambient conditions and the tooth shade was determined. This procedure was used to determine the 2M2 tooth shade for the patient and to select the system-recommended VITABLOCS RealLife blank (VITA Zahnfabrik, Bad Säckingen, Germany). In order to provide the dental technician with detailed information on the results, additional digital photos were created in RAW format. The photographs were taken using the shade guide and a polarizing filter in order to reduce reflections.





**Fig. 1** The insufficient, fractured composite filling on tooth 11 was to be restored using a CAD/CAM-supported feldspar ceramic crown.



**Fig. 2** As a quick solution, a temporary composite crown was fabricated using CAD/CAM-based VITA CAD-Temp multiColor.



**Fig. 3** During the preparation of tooth 11, the composite filling was almost completely removed.

**CAD/CAM Workflow**

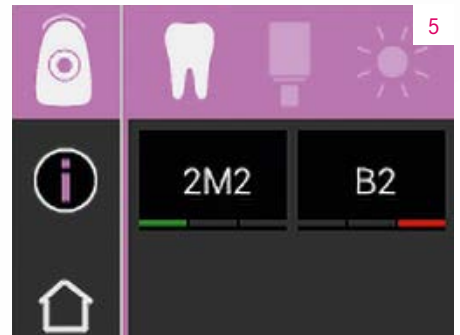
After an analog method was used for the impression and model fabrication, the situation was scanned using the inEos X5 and the crown was constructed using the inLab-CAD- Software (both Dentsply Sirona, Bensheim, Germany). The applied VITABLOCS RealLife replicated the tooth's natural arched shade gradient between the dentin and anterior, thanks to 3D layered structure. In order to reproduce the shade and translucency of the neighboring anterior teeth with a natural appearance, the virtual restoration was positioned individually within this three-dimensional layer structure. The monolithic restoration was then fabricated using the inLab MC XL milling unit (Dentsply Sirona, Bensheim, Germany). Finally, the restoration was finished with fine diamond and polishing tools.

**Treatment result**

During the clinical try-in, the patient and technician were both highly satisfied with the results, as the feldspar ceramic crown was very well-integrated into the natural tooth structure. After conditioning the lumen with hydrofluoric acid and silane, the crown was fixed with adhesive. Precise digital tooth shade determination, the correct blank choice based on the VITA Easyshade V block mode and the additional information provided by digital photography were the success factors in the efficient production of an esthetic, monolithic restoration with natural shade effects and light dynamics.



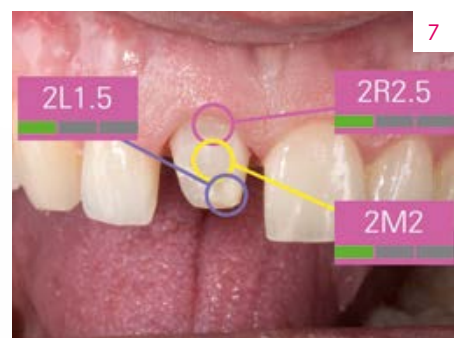
**Fig. 4** During the preparation, the minimum layer thicknesses of the restoration was observed.



**Fig. 5** The basic shade 2M2 was determined using VITA Easyshade V.



**Fig. 6** The shade of the neighboring tooth was integrated into a digital photo and sent to the laboratory.



**Fig. 7** Since the shade of the prepared tooth affects the shade of the restoration, a 3-point measurement was conducted.



**Fig. 8** A digital photograph with polarizing filter and corresponding shade tabs provided the dental technician with individualized information.



**Fig. 9** The highly esthetic monolithic crown naturally integrated into the dental arch.

**ISCD** INTERNATIONAL SOCIETY OF COMPUTERIZED DENTISTRY

**Ceramic Success Analysis**

**agkeramik** Arbeitsgemeinschaft für Keramik in der Zahnheilkunde e.V.

**Eingabe Einsetz untersuchung**

**Informationen zur Seite einblenden**

FÜR DIE ERFASSUNG VON MINDESTENS 30 DATENSÄTZEN (EINSETZ- UND/ODER NACHUNTERSUCHUNGSDATEN) WERDEN GEMÄß DEN RICHTLINEN DER BZÄK 4 PUNKTE VERGEBEN.

Kartellkartennummer: [ ] Geburtsdatum: [5] [April] [1998] Geschlecht:  männlich  weiblich Behandlungsdatum: [24] [November] [2018]

K/B	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	K/B
I/V																															I/V
I/V																															I/V
K/B																															K/B

**Inlay**

Verfahren:  Keramik:  Verblendkeramik:

Chairside  Labor indirekt

Vitalität:  negativ (wurzel behandelt)  positiv

Papilläre Blutung:  negativ  positiv

Kariesausdehnung:  kein CP  CP  PI

Fächchen:  m  o  d  b

Kavitätenbegrenzung:  ausschließlich Dentin  Partiiell Dentin  Überall Schmelz

Aufbau:

deutsch  
english  
français  
español

## Clinical success factors for all-ceramic treatments



*Dr. Bernd Reiss  
Malsch, Germany*

For the past two decades, the Ceramic Success Analysis (CSA) from AG Keramik has been used to document and analyze data on all-ceramic treatments. As part of this multicenter, internet-based study, data sets from more than 12,000 treatments across 150 practices have now been statistically evaluated. In addition to the findings, the data pool also includes the clinical procedures, materials used and processing techniques. The observation period was up to 20 years. In the following interview, the chairman of AG Keramik, Dr. Bernd Reiss, explains what findings this long period of observation indicates concerning potential clinical success and risk factors.



Survival curve of all treatment types

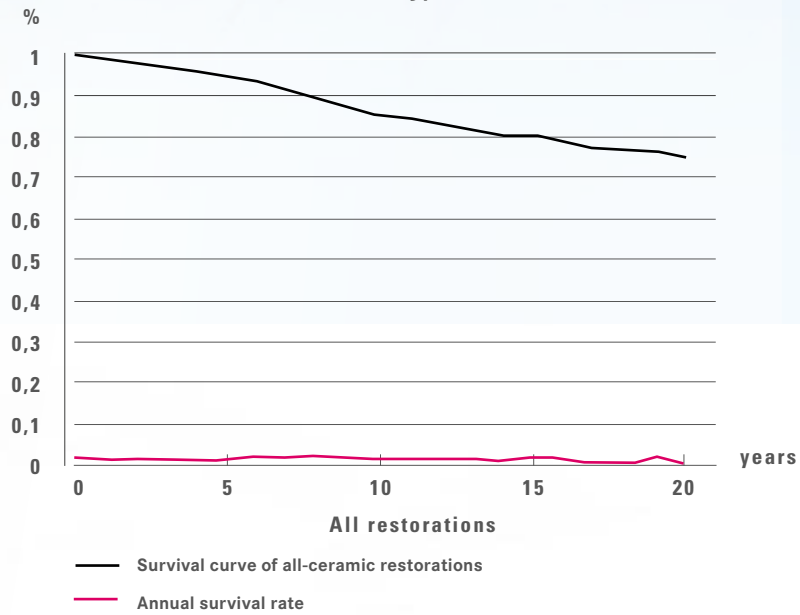


Fig. 1 Kaplan-Meier Estimator: Annual failure rates remained at a consistently low level of 0.5 -0.9% per year over a 20-year observation period; N = 9542 restorations

Source: Dr. Bernd Reiss, CSA database, Report: 11/18

**DV:** How is clinical data collected and evaluated during the Ceramic Success Analysis?

**Dr. Bernd Reiss:** Participating dentists in the CSA entered their data on the internet platform [www.csa-online.net](http://www.csa-online.net). A separate database was developed there for each participant, allowing default settings to be created. The evaluation can be accessed online at any time; a specific evaluation with comments and individual suggestions takes place once a year.

**DV:** What all-ceramic treatment types indicated the best clinical success rates in the multi-center CSA study?

**Dr. Bernd Reiss:** In general, all of the all-ceramic restorations show good results. However, inlays, onlays and partial crowns have higher success rates than the conventional full crown.

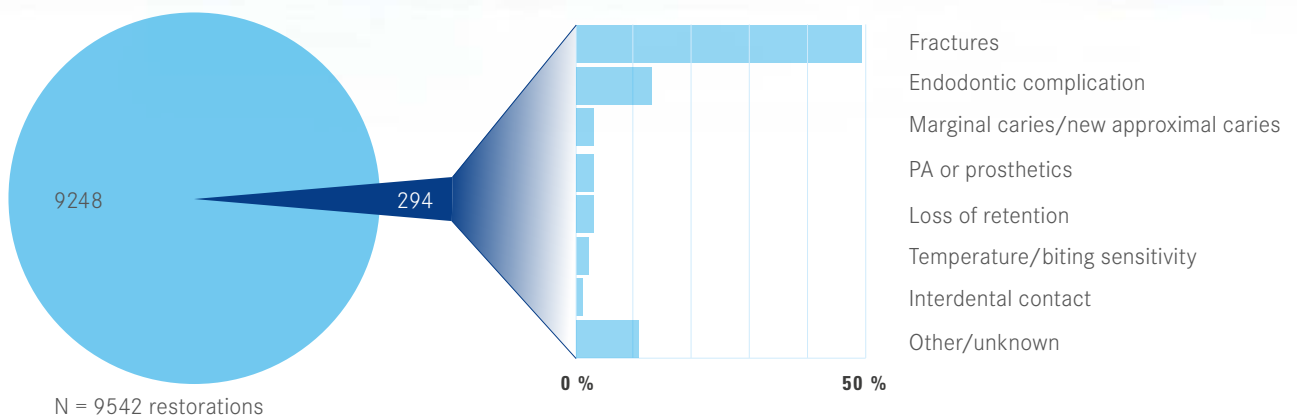
## "Practitioners have a major impact on the results."

**DV:** What role does the level of invasiveness play in achieving a positive long-term prognosis for all-ceramic restorations?

**Dr. Bernd Reiss:** Surprisingly, invasiveness has no effect on long-term prognosis. In any case, the prognosis for major restorations that sometimes involve the replacement of several cusps is as good as one to three-surface inlays. However, a defect-oriented approach is recommended both for replacing insufficient plastic fillings, as well as for treating extensive defects with missing or undermined cusps. That still leaves an option to proceed from a partial restoration to a full crown in the case of a failure. The reverse option is not possible.



**Failures in full-ceramic restorations**



**Fig. 2** Data analysis of failures by causes: The most common failures are fractures and endodontic complications.

**Source:** Dr. Bernd Reiss, CSA database, Report 11/18

**DV:** What all-ceramic dental prostheses have thus far proven particularly effective in practical use?

**Dr. Bernd Reiss:** VITABLOCS feldspar ceramic is a classic among CAD/CAM all-ceramic solutions and shows very good results. Interestingly, this material shows similar results to high-strength materials, even with crown restorations. This may also be due to the meticulous observance of the minimum wall thickness by the dentists who choose this material.

**DV:** What indications and types of material processing and fixation show an increase in the likelihood of complications?

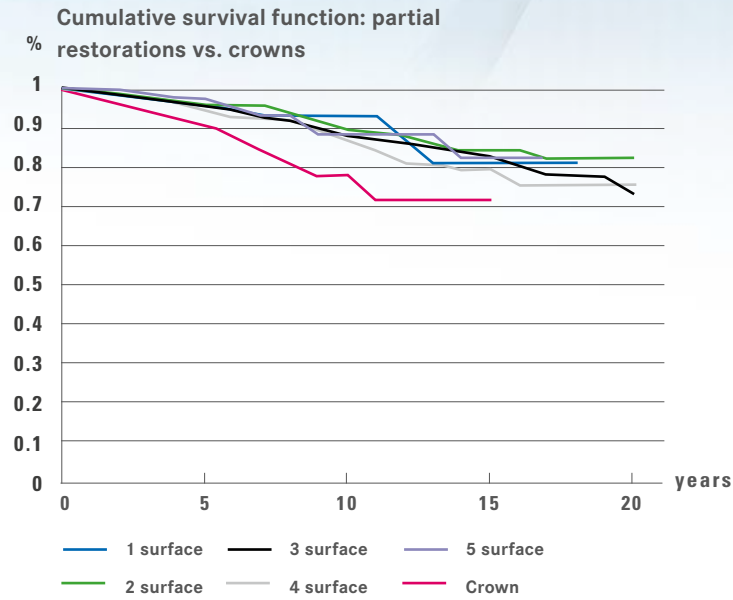
**Dr. Bernd Reiss:** The biggest risk group we were able to identify is primarily avital teeth. This pertains to both crowns, as well as partial restorations. Patients need to be informed

about this increased risk. Implant treatments, on the other hand, have better than average rates. A strict, fully adhesive fixation shows better results than a self-adhesive or classic cementation technique, though the differences are not as great as I would have expected. The same applies to the positive effects of using a rubber dam. Omitting silane has a negative effect on the prognosis of ceramic treatments.

**DV:** How much of an influence does the practitioner have on the long-term clinical stability of a treatment?

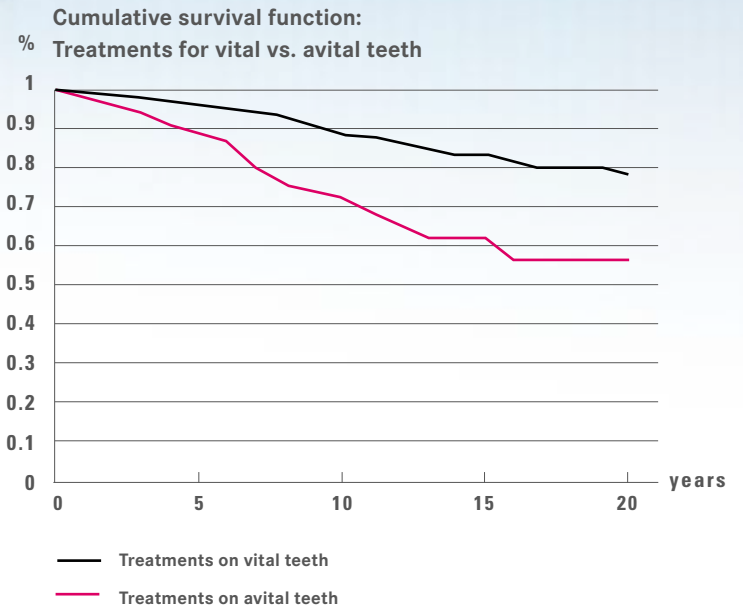
**Dr. Bernd Reiss:** Practitioners have a major impact on the results. It is one of the main reasons for the success and importance of the CSA. It is not only important to show dentists the strong points of their treatments, but also to identify the risks that could lead to increased failure rates. If there are major failures, practitioners can use the CSA to





**Fig. 3** Kaplan-Meier Estimator: The analysis of the survival rate of one to five-surface partial restorations, as compared to crowns, shows a lower survival rate for crowns

Source: Dr. Bernd Reiss, CSA database, Report 11/18



**Fig. 4** Kaplan-Meier Estimator: Significantly lower survival rate for treatments on avital teeth as compared to vital teeth

Source: Dr. Bernd Reiss, CSA database, Report 11/18

analyze their approach and choice of materials, and to achieve improvements in clinical success based on their findings.

**DV:** What treatment steps should dentists pay particular attention to in order to achieve good long-term results for all-ceramic restorations?

**Dr. Bernd Reiss:** Defect-oriented work procedures and compliance with manufacturer recommendations are certainly two very important pillars for long-term clinical success.

Report 11/18



**Fig. 5** Initial situation/preparation.



**Fig. 6** Baseline evaluation; VITABLOCS all-ceramic crowns (24-27).



**Fig. 7** VITABLOCS crowns during a follow-up appointment after 17 years.



**Fig. 8** VITABLOCS crowns follow-up appointment after 20.5 years.

Photo source: PD Dr. Andreas Bindl, Zürich, Switzerland



## The photo-optical integration capacities of CAD/CAM materials



PD Dr. Jan-Frederik Güth  
Munich, Germany

Achieving excellent optical integration of CAD/CAM-fabricated, monolithic inlays into the natural tooth substance requires materials that achieve natural light dynamics. That is why the material should have near-natural translucency, fluorescence and opalescence, in addition to shade accuracy. If a material meets all of the key parameters, completely harmonious integration is possible. During one study, subjects were asked to visually assess the optical integration of inlays from different CAD/CAM materials under four standardized light sources. PD Dr. Jan-Frederik Güth reports on the key findings of this study in the following interview.

**DV:** What criteria does a restoration material need to meet in order to achieve completely harmonious optical integration into the remaining tooth structure?

**PD Dr. Jan-Frederik Güth:** In addition to the shape, surface and matching tooth shade, the natural translucence of the material is also absolutely essential. Harmonious, optical integration is made possible primarily through near-natural light transmission. But other optical parameters, such as opalescence and fluorescence, also affect the natural appearance of a restoration.

**DV:** In a study, you investigated the quality of the optical integration of various restoration materials. How did you proceed in that case?

**PD Dr. Jan-Frederik Güth:** We produced geometrically identical partial restorations from different materials and standardized

photographs under a variety of lighting conditions. We then presented the images to dentists and dental technicians, who were asked to evaluate the optical integration of the materials as compared to the natural tooth.

**DV:** What concrete findings can be concluded on the optical integration of VITABLOCS and VITA ENAMIC as a result of the test series?

**PD Dr. Jan-Frederik Güth:** Under daylight conditions, the monolithic inlays showed good optical integration and were hardly distinguishable from the natural tooth structure, even by experts. Under indirect lighting, the materials also showed no difference, but could be distinguished from the surrounding tooth structure.

**DV:** Where did the greatest difference lie in the materials examined in terms of photo-optical properties and what can be attributed to these differences?





Fig. 1 In the cavity of a test tooth, inlays made of different CAD/CAM materials were temporarily fixed with glycerine gel.

**PD Dr. Jan-Frederik Güth:** There were significant differences in the fluorescence of the investigated materials. In comparison to the other materials and independent of the tooth shade, VITABLOCS Mark II feldspar ceramic and VITA ENAMIC hybrid ceramic showed very good optical integration here. However, the study was only based on one reference tooth, and natural teeth have different degrees of fluorescence.

**DV:** What recommendations for daily practice can be concluded from your study results for achieving attractive visual results?

**PD Dr. Jan-Frederik Güth:** As dentists, we have to focus very closely on the optical properties of CAD/CAM materials, especially when it comes to monolithic restorations. That goes well beyond determining the precise tooth shade and choosing the matching blank. I am sure that it is already possible for us to achieve esthetically pleasing, monolithic results today by choosing the right posterior material, and by taking parameters such as translucency and fluorescence into account.

**DV:** What should practitioners pay attention to in treating patients with prosthetic restorations in order to ensure good optical integration into the residual tooth structure that can be reproduced?

**PD Dr. Jan-Frederik Güth:** Translucence and shade effects are influenced by the restoration's wall thickness. And the composite cement also determines optimal light transmission through the restoration into the residual tooth structure and vice versa. I tend to go for brighter, translucent CAD/CAM blanks, and then modify the shade effects with more chromatic, fluorescent composite cements.

Report 11/18

**Photographs of photo-optical integration of VITABLOCS and VITA Enamic under various light sources.**


	Natural Tooth	VITABLOCS Mark II		VITA ENAMIC	
		A1	A2	A1	A2
Direct lighting with white daylight					
Indirect lighting with white daylight					
Black light					
Polarized light					

**Study design:**

This study was a joint project between PD Dr. Pascal Magne (Herman Ostrow School of Dentistry, USC, Los Angeles) and PD Dr. Jan-Frederik Güth (Poliklinik für Zahnärztliche Prothetik, LMU, Munich). The aim was to examine the photo-optical behavior of geometrically identical, monolithic partial restorations from different CAD/CAM materials on a natural test tooth in order to provide practitioners with tips for achieving successful optical integrations.

Six dentists and six dental technicians rated standardized restorations on 18 different restorations on a scale from 1 (low optical integration) to 4 (restoration not visible) under different light sources.

**Source:** PD Dr. Jan-Frederik Güth  
**Report:** Study published in the Int J Esthet Dent 2016; 11:394-409



*VITA ENAMIC makes delicate restorations with minimal wall thickness possible, thanks to its dual ceramic polymer network structure.*

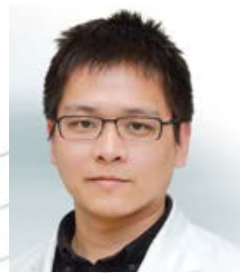


# Delicate anterior treatments with non-prep veneers made of hybrid ceramic

Manual layering of non-prep veneers on refractory dies is a time-consuming, as well as a technology- and cost-intensive method of fabrication. Until now, it has been virtually impossible to fabricate these delicate restorations using CAD/CAM, due to the brittleness of ceramic materials. With wall thicknesses of only 0.2 mm, all-ceramic CAD/CAM materials often have chipped edges after the grinding process. In the following report, dentists Dr. Ting-Huan Lai and Dr. Cheng-Han Li, and dental technician Sharon Chou, show how the dual ceramic-polymer network structure of VITA ENAMIC (VITA Zahnfabrik, Bad Säckingen, Germany) allow non-prep veneers with the wall thicknesses of a contact lens to be technically created with CAD/CAM.



*Dr. Ting-Huan Lai*  
CEREC Asia, Taipei, Taiwan



*Dr. Cheng-Han Li*  
CEREC Asia, Taipei, Taiwan



*ZT Sharon Chou*  
CEREC Asia, Taipei, Taiwan



→ **INITIAL SITUATION** The initial situation with a pronounced diastema between the two middle anterior teeth of the lower jaw.

## 1. Diastema in the lower jaw

A 28-year-old patient came to the practice because he was dissatisfied with the esthetic appearance of his lower anterior teeth. The clinical examination showed a pronounced diastema between his middle anterior teeth. The patient refused orthodontic treatment due to the time and cost involved. The preparation and loss of healthy tooth substance were out of the question for him. The manual fabrication of non-prep veneers on refractory dies proved to be too expensive for the young patient as well. For this reason, economical and time-efficient CAD/CAM-supported fabrication of the delicate veneers from the hybrid ceramic VITA ENAMIC was chosen.



**Fig. 2** The tooth shade determination with the VITA Toothguide 3D-MASTER covered the tooth shade range and made it possible to select a suitable block.



**Fig. 3** Before the intraoral scan, retraction threads were placed to make the cervical area detectable as well.

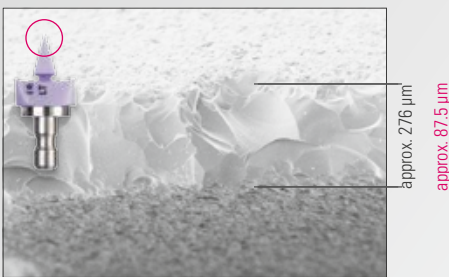


**Fig. 6** The clinical try-in showed the pronounced chameleon effect of the hybrid ceramic material.

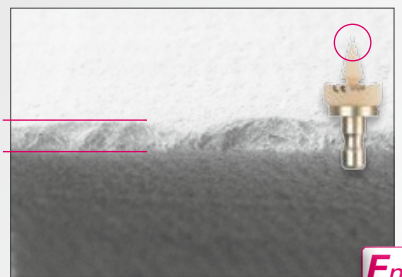


**Fig. 7** The two microveneers blended invisibly into the natural row of teeth.

## INFO: CAM-PROCESSING CAPABILITIES VITA ENAMIC



IPS e.max CAD



VITA ENAMIC



Thanks to its high edge stability, VITA ENAMIC enables the manufacture of CAM restorations with delicate and precise marginal areas to achieve an exact marginal seal. Hybrid ceramic produces high marginal accuracy in testing for objects with thinning marginal areas. Traditional CAD/CAM ceramics with such

low wall thicknesses often have chipped edges after the CAM process, as they are highly brittle as compared to hybrid ceramics. For this reason, some materials such as IPS Empress CAD and IPS e.max CAD are not approved by the manufacturer for wall thicknesses of approx. 0.2 mm.

**Source:** Internal study of VITA R&D, Untersuchung von standardisierten Dreiecksformkörpern (30° Keil, Aufsicht) aus o. g. Materialproben mittels REM nach CAM-Fertigung mit Sirona MC XL-Schleifeinheit, 200-fache Vergrößerung, Report 05/10, published in technical document. VITA ENAMIC, download at [www.vita-enamic.com](http://www.vita-enamic.com)

## 2. Tooth shade determination and CAD

Before the optical scan, the tooth shade was determined with the VITA Toothguide 3D-MASTER (VITA Zahnfabrik, Bad Säckingen, Germany). The tooth shade 1M1 was determined for the two central incisors, and the corresponding VITA ENAMIC blank was selected. For the optical scan with the CEREC Omnicam (Dentsply Sirona, Bensheim, Germany), a tooth cleaning was performed, the cervical areas of 31 and 41 were made detectable with retraction threads and scan powder was applied. The non-prep veneers were then designed using the CEREC Premium 4.5.1 software (Dentsply Sirona, Bensheim, Germany).





**Fig. 4** The design of the non-prep veneers in the CEREC Premium 4.4.4 software.



**Fig. 5** The wafer-thin microveneer proved to have absolutely stable edges after the grinding process.



**→ RESULTS** The efficient digital workflow with the hybrid ceramic VITA ENAMIC has led to a highly esthetic cosmetic result.

### 3. Wafer-thin grinding result

The hybrid ceramic VITA ENAMIC consists of a structure-sintered glass-ceramic matrix (86% by weight), which is then infiltrated with a polymer (14% by weight). The polymer network makes the hybrid ceramic elastic, enabling reconstructions to be made with very thin walls that also exhibit high edge stability. The hybrid ceramic blank was processed with the CEREC MC XL grinding unit (Dentsply Sirona, Bensheim, Germany) until extremely delicate microveneers with wall thicknesses of 0.2 mm were produced. Traditional CAD/CAM ceramics with such low wall thicknesses often have chipped edges after the CAM process, as they are highly brittle. In the next step, the hybrid ceramic veneers were separated from the attachment with a fine diamond.

### 4. Integration and final result

The try-in showed the outstanding chameleon effect of the wafer-thin restorations. Thanks to the dominant ceramic content of the hybrid ceramic, the veneers could be etched with hydrofluoric acid and silanized. Sandblasting, as is necessary with CAD/CAM composites, would have most likely destroyed such a delicate restoration. After renewed thread placement on 31 and 41 and phosphoric acid etching, the two microveneers could be successively attached in a fully adhesive manner. After final removal of the composite cement residues and careful polishing with the VITA ENAMIC Polishing Set, a highly esthetic result was achieved that was minimally invasive and efficient.

Report 11/18



**VITA ENAMIC hybrid ceramic has dentin-like elasticity, thanks to its integrated polymer network.**





# Lifelike front tooth reconstruction made of polychrome feldspar ceramics

VITABLOCS blanks made of feldspar ceramic have been proven millions of times since their first clinical use in 1985. The first generation of VITABLOCS were monochrome blanks designed primarily for inlay restorations. The next step was to develop polychrome blanks for esthetically pleasing monolithic anterior and posterior restorations. VITABLOCS TriLuxe forte (VITA Zahnfabrik, Bad Säckingen, Germany) have an integrated translucency and shade gradient in four intensity layers, enabling a natural play of shade and light in the esthetic zone. In the following clinical case, dentist Dr. Mon Li and dental technician Sally Hsieh show how these polychrome blanks can be used to achieve an individual shade and translucency effect.



*Dr. Mon Li*  
CEREC Asia, Taipei, Taiwan



*ZT Sally Hsieh*  
CEREC Asia, Taipei, Taiwan



➔ **INITIAL SITUATION** The right middle incisor in the upper jaw, which had been treated with a root canal, had become discolored.

## 1. Situation after root canal treatment

A 20-year-old patient came to the clinic because she was dissatisfied with the appearance of the middle left anterior tooth in her upper jaw. The clinical examination showed that tooth 11, which had been treated with a root canal, had darkened. During the radiographic check, a sufficient root canal filling could be diagnosed in the symptom-free tooth. Morphologically, 11 and 21 were symmetrical. After an in-depth consultation, the patient decided on a time-efficient, all-ceramic crown restoration made of the polychrome feldspar ceramic VITABLOCS TriLuxe forte in order to stabilize the tooth in the long term and meet her esthetic expectations.

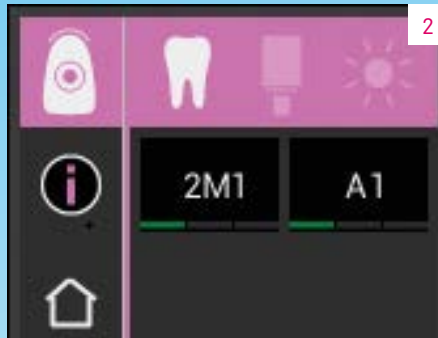


Fig. 2 VITA Easyshade V was used to precisely determine the tooth shade.



Fig. 3 A digital photograph with the corresponding shade tabs provided the dental technician with individual information.

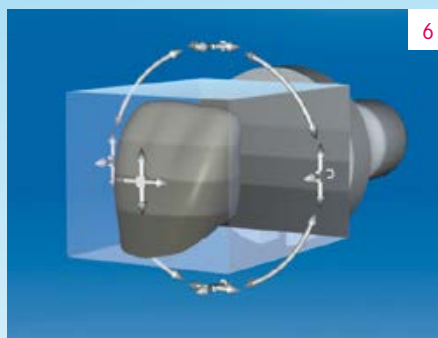


Fig. 6 The shade gradient and translucency can be controlled by positioning the restoration in the block.

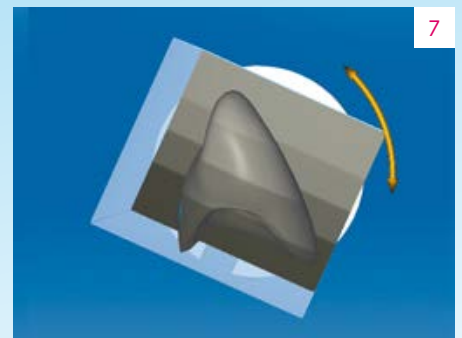


Fig. 7 The restoration can be more or less tilted for a smoother or more pronounced shade gradient.

## INFO: VITABLOCS – PROVEN A MILLION TIMES OVER!

VITABLOCS, tooth-colored feldspar ceramic blanks for ideal shade integration, have been proven a million times over. Over the past 30 years, more than 30 million single-tooth restorations have been fabricated from this material. The material is excellent for treating small defects, as well as creating highly esthetic reconstructions in the esthetic zone.

VITABLOCS blanks are available in the following variations:

- monochrome, tooth shades:  
VITABLOCS Mark II
- polychrome, tooth shades:  
VITABLOCS TriLuxe forte/RealLife

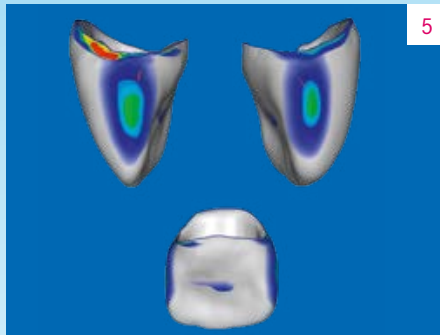


## 2. Tooth shade determination

Correct tooth shade determination plays an essential role in the selection of the correct blank. For this reason, the tooth shade of the neighboring tooth 21 was precisely determined with the VITA Easyshade V spectrophotometer. Defined light was transmitted into the dentin core, the reflected reflectance spectrum was recorded by a measuring probe and the tooth shade 2M1 was determined in the device. Using the block mode in VITA Easyshade V, the suitable VITABLOCS TriLuxe forte could be determined at the touch of a button. In order to visualize the individual clinical situation in relation to the specific tooth shade, a digital photograph was taken with the corresponding shade tabs.



**Fig. 4** The original morphology of tooth 11 was copied for the design.



**Fig. 5** In the CEREC Premium 4.4.4 software, the occlusal and proximal contact point areas could be modified.



**Fig. 8** The monolithic restoration already appeared completely natural on the model.



**Fig. 9** The highly esthetic, monolithic result after full adhesive placement.



**VITABLOCS TriLux forte support natural color effects with their integrated shade gradient.**

### 3. Scan and design

Before and after full crown preparation on tooth 11, the clinical situation was scanned with CEREC Omnicam (Dentsply Sirona, Bensheim, Germany). For the construction of the restoration using the software CEREC Premium 4.4.4 (Dentsply Sirona, Bensheim, Germany), the original morphology of 11 was copied. When the restoration was positioned in the blank, the translucency and shade gradient of the crown could be determined by vertical shifting and rotation. The crown was then fabricated in the CEREC MC XL milling unit (Dentsply Sirona, Bensheim, Germany). The morphology was finished with a fine round diamond.

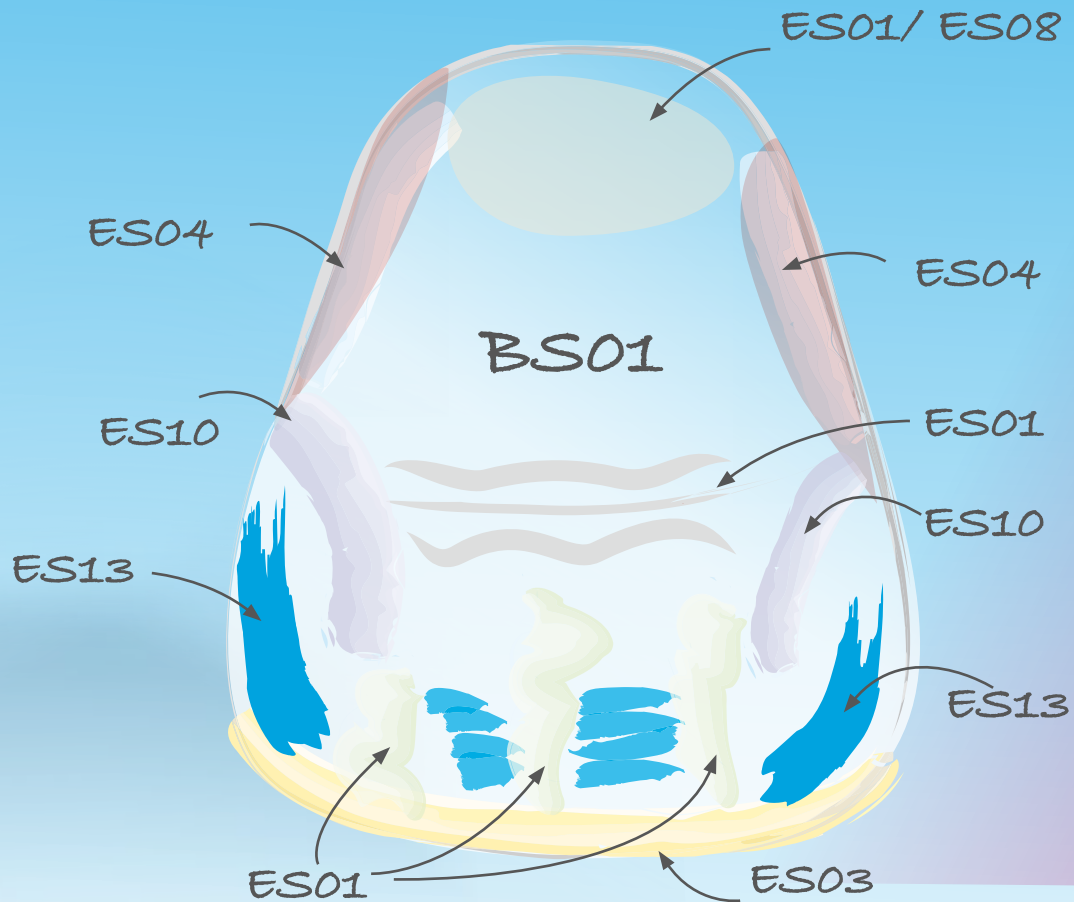
### 4. Characterization and glazing

The monolithic crown was characterized with the VITA AKZENT Plus stains analogous to the natural neighboring tooth. EFFECT STAINS 05 (ES05, orange) increased the chromaticity in the cervical area. ES11 (blue) and ES13 (gray) were characterized for translucency effects in the incisal area. In the middle third of the tooth, a band with cream-colored ES02 was applied. After the fixation firing, the teeth were finally glazed and polished to a high gloss. The clinical try-in was successful, allowing the crown lumen to be conditioned with hydrofluoric acid and silane and the restoration to be fully adhesively fixed. The patient was pleased with the highly esthetic result in only one session.



**RESULTS** By positioning and rotating the crown in the multichromatic VITABLOCS TriLux forte, the translucency and shade gradient could be reproduced.





## Optimum light dynamics in the front, due to highly esthetic glass ceramic



*Dr. Stas Belous  
Moscow, Russia*

VITA SUPRINITY PC provides practices and laboratories with a high-strength, zirconia-reinforced glass ceramic with outstanding optical properties. Opalescence, fluorescence and translucency are integrated in this material. The intelligent composition of the material allows high-strength, monolithic restorations with optimum light dynamics to be efficiently realized with a digital workflow. In the following clinical case study, dentist Dr. Stanislav Belous shows the reconstruction of the front with full crowns made of VITA SUPRINITY PC glass ceramic and a veneer made of VITABLOCS Mark II feldspar ceramic (both VITA Zahnfabrik, Bad Säckingen, Germany).



➔ **INITIAL SITUATION** After pre-prosthetic bleaching, a clear color difference between the composite filling and the tooth structure was visible.

**1. Clinical case and treatment planning**

Several years prior, the 32-year-old patient suffered a trauma where the crown areas at 11, 21 and 41 fractured. Teeth 11 and 41 were then treated with a root canal and rebuilt with composite. After a few years, the avital teeth became discolored. The patient appeared at the practice because he was dissatisfied with the appearance of his teeth. After a diagnosis and comprehensive consultation, a step-by-step procedure was agreed upon, starting with bleaching, a revision of the insufficient root canal fillings and a direct stump build-up at 11 and 41, up to the all-ceramic restoration of all fractured teeth.

**2. Tooth shade determination and material selection**

After successful preprosthetic treatment, CAD/CAM-supported reconstruction of the three anterior teeth was started. In order to select the correct blanks, the tooth shade 0M1 was determined with the VITA Linearguide 3D-MASTER after bleaching. After the shade determination, blanks in the appropriate shade were selected. For tooth 21, minimally invasive preparation for veneer reconstruction was performed in order to make a restoration with highly translucent VITABLOCS feldspar ceramic. For the full-crown preparations on teeth 11 and 41, VITA SUPRINITY PC in the Translucent version was chosen in order to mask the tooth stumps sufficiently well, and to realistically reproduce the natural shade and light play.



**Fig. 2** The VITA Linearguide 3D-MASTER allowed the tooth shade to be precisely determined and the corresponding 0M1 VITABLOCS shade to be selected.



**Fig. 3** After preparation, retraction threads were placed to optimize optical detection.



**Fig. 4** The preparation margins were defined at 11 and 21 in the CEREC software.



**Fig. 8** The designed monolithic crown was fabricated from the zirconia-reinforced glass ceramic 0M1 VITA SUPRINITY PC.



**Fig. 9** The individualized veneer made of VITABLOCS Mark II was incorporated as the first fully adhesive restoration after preconditioning.



**Fig. 10** After crystallization firing, the two glass-ceramic full crowns were tried in.

### 3. Digital fabrication process

The preparation was performed under local anesthesia. After the placement of retraction threads, the dental arches and stumps at 11, 21 and 41 were digitized with CEREC Omnicam (Dentsply Sirona, Bensheim, Germany) and placed in habitual intercuspitation using a vestibular scan. The two crowns and the veneer were designed with the CEREC Premium SW 4.4 software and milled out of the blanks with the CEREC MC XL milling unit (both Dentsply Sirona, Bensheim, Germany). After manual finishing, the three restorations were tried in and subsequently characterized with VITA AKZENT Plus stains.



**VITA SUPRINITY PC showed brilliant light dynamics based on integrated translucency, opalescence and fluorescence.**

### 4. Conclusion

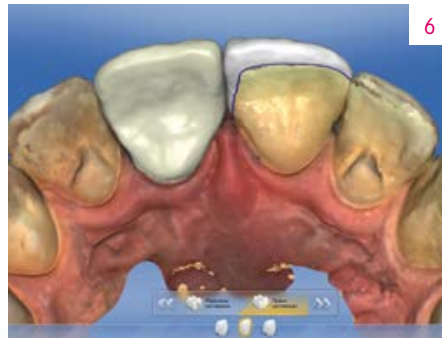
The case shows how important it is to select a specific material for each indication in different clinical situations in order to achieve a highly esthetic result. After the fully adhesive cementation, the crowns and veneers came very close to the natural model in all facets, primarily because of the different materials selected, and were no longer recognizable as restorations. The patient was satisfied with the efficient restoration using a digital workflow, which can be seen in the portrait photo taken a few weeks later.

Report 11/18





**Fig. 5** A full crown made from VITA SUPRINITY PC was constructed on tooth 11 and a veneer of VITABLOCS Mark II on tooth 21.



**Fig. 6** The palatal closure of the veneer restoration can be virtually viewed from the dorsal side.



**Fig. 7** The preparation margin was also determined digitally on the full crown preparation on tooth 41.



**Fig. 11** The VITABLOCS crowns individualized with VITA AKZENT Plus were also fully adhesively cemented.



**Fig. 12** The all-ceramic crown made of VITA SUPRINITY PC is excellently integrated in the remaining tooth substance, in terms of morphology and color.



**Fig. 13** The morphology and surface texture of the two all-ceramic restorations can no longer be distinguished from the natural adjacent teeth.



**Fig. 14** The different choice of material for the upper middle incisors results in a highly esthetic result with a natural play of shade and light.



**→ RESULTS** At the follow-up a few weeks later, the patient was very satisfied.



## Treatment of anterior tooth trauma with the hybrid ceramic VITA ENAMIC



*Dr. Angela Stanislavovna Brago  
Sechenov University,  
Moscow, Russia*

Children's anterior teeth are often affected by fractures. Particularly with regard to mixed dentitions, the question arises as to the ideal treatment of these traumatic defects. The roots have not yet completely formed and the juvenile pulp chamber is highly pronounced, which is why a full crown preparation is contraindicated. If the fragment cannot be repositioned adhesively, a direct composite structure is usually fabricated, which often has to be renewed before the final restoration.

In the following segment, dentists Dr. Angela Stanislavovna Brago and Yulianna Ivanovna Enina demonstrate how these types of traumas are defect-oriented and can certainly be treated with VITA ENAMIC (VITA Zahnfabrik, Bad Säckingen, Germany), due to the dentin-like elasticity of the hybrid ceramic and its ability to be processed to high edge stability.



*Dr. Yulianna Ivanovna Enina  
Sechenov University,  
Moscow, Russia*

### Case study 1

#### Trauma incurred while skateboarding

A nine-year-old patient arrived after falling from a skateboard. The child had a longitudinal fracture in the crown that extended palatally to the subgingival area. Radiological and clinical examinations showed no opening of the pulp, and a physiological movement of the tooth. Vitality was positive and percussion was negative. After applying local anesthesia, the palatal fracture area was exposed by gingivectomy, the fracture was sealed with an adhesive wound dressing and given a provisional treatment. After a healing period of one week, the provisional filling was removed, the fracture lines were finished and the sharp edges were rounded off. This was followed by analogue molding, model creation and laboratory scanning.

#### Defect-oriented, biomimetic reconstruction

As hybrid ceramic allows for delicate reconstructions with wall thicknesses of 0.2 mm and can be reliably fixed to a proven, all-ceramic protocol, an absolutely defect-oriented restoration could be constructed using CAD software. Afterwards, the reconstruction was fabricated using CAM technology, prepared and inserted intraorally. After a minimal modification, the fluorosis of the natural tooth structure was reproduced vestibularly. The surface was preconditioned and characterized with light-curing VITA ENAMIC STAINS and glazed. Thanks to dentine-like elasticity and enamel-like abrasion behavior, the fracture was treated with a functional and long-lasting hybrid ceramic solution.





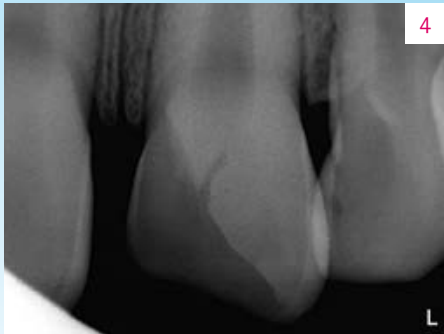
➔ **INITIAL SITUATION** Condition after vestibular trauma following a skateboard accident.



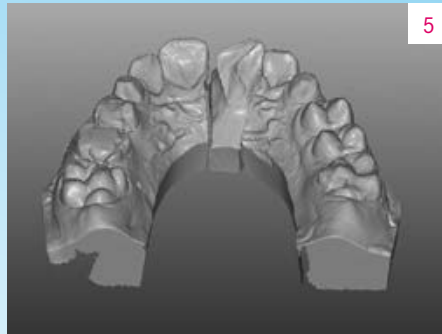
**Fig. 2** The pulp was not opened and could be protected using adhesive wound dressing.



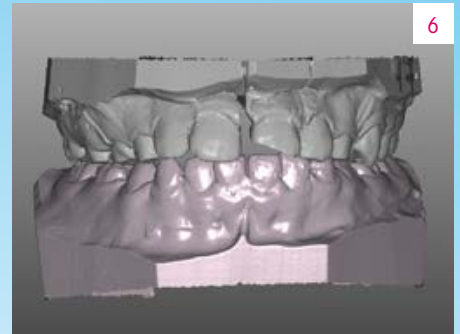
**Fig. 3** The palatal fracture line extended deep into the subgingival area.



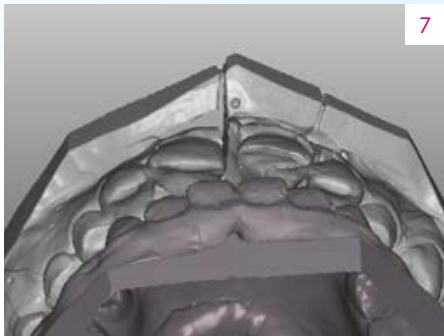
**Fig. 4** A radiological examination showed no opening of the pulp.



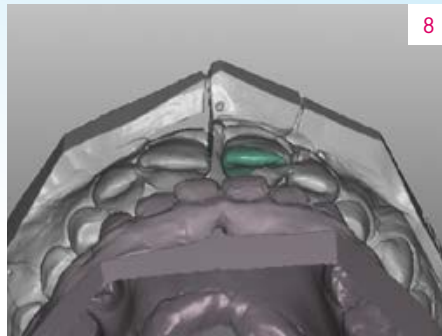
**Fig. 5** The exposed palatal fracture line after gingivectomy in the virtual model.



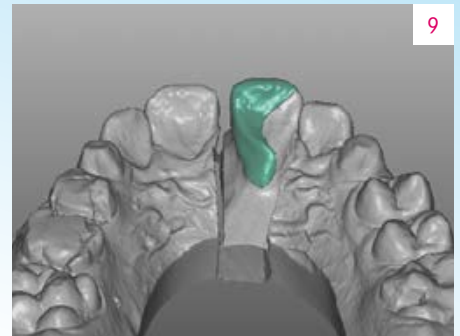
**Fig. 6** The longitudinal crown fracture of the vestibular in the digitized master model.



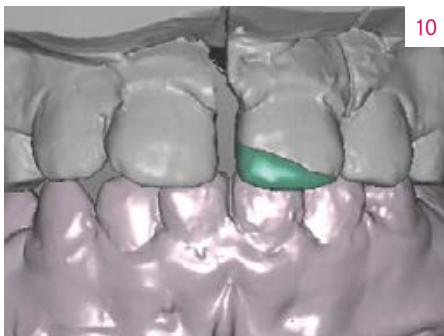
**Fig. 7** The enamel-like abrasion made long-lasting and functional anterior guidance via tooth 21 possible.



**Fig. 8** Thanks to the low minimum layer thickness, it was possible to construct a defect-oriented contact area.



**Fig. 9** The defect-oriented construction of the palatal hybrid-ceramic restoration.



**Fig. 10** The restoration also followed the fracture course from vestibular.



**Fig. 11** Thanks to the precise grinding results, the restoration was perfectly aligned with the defect.



➔ **RESULTS** After characterization with VITA ENAMIC STAINS, the restoration was integrated harmoniously.





→ **INITIAL SITUATION** The palatal fracture line of tooth 22 served as a defect-oriented preparation margin.



**Fig. 2** Tooth 22 after root canal.



**Fig. 3** The minimally invasive marginal preparation enabled long-lasting anchoring of the restoration.



→ **RESULTS** The hybrid ceramic restoration integrated perfectly into the natural dentition.

## Case study 2

### Trauma incurred playing soccer

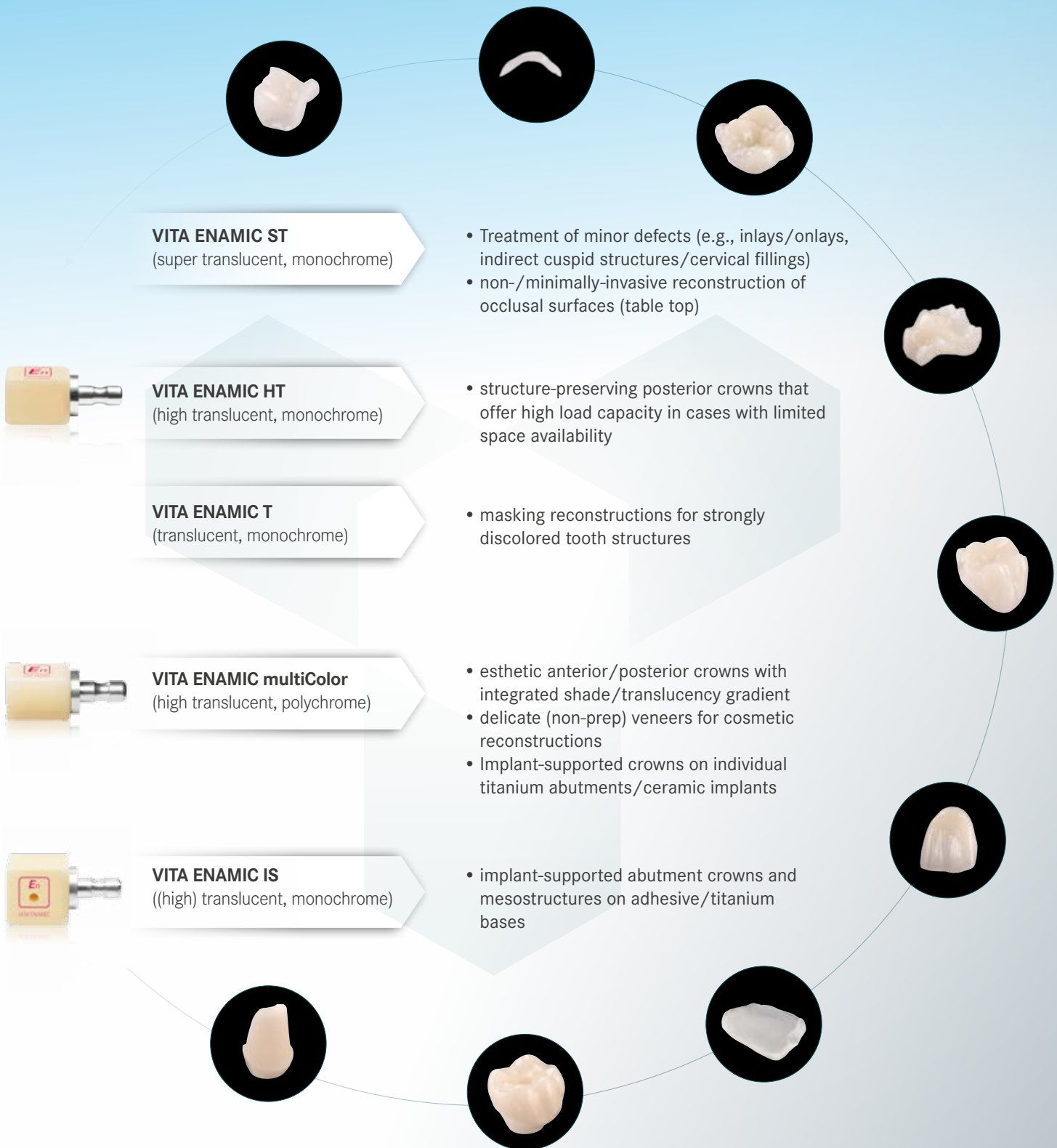
A 15-year-old patient had suffered a crown fracture at tooth 22 during the previous week when playing football and complained of discomfort. The examination diagnosed a deep longitudinal crown fracture without an opening of the pulp. Percussion was negative, tooth movement was physiological. The vitality test showed a clear overreaction of the pulp, and for that reason, irreversible pulpitis was assumed. Since a radiological examination demonstrated completed root development, the decision was made to perform a root canal before the definitive reconstruction. After successful therapy and no complaints of pain, a minimal marginal incision was made for a definitive veneer restoration.

### Minimally-invasive restoration with chameleon effect

Tooth 22 had been severely weakened as a result of trauma and trepanation. For that reason, it became all the more important to take a minimally invasive approach in carrying out the restoration and to use full adhesive to fix the tooth for stabilization. After analog impression, model fabrication and laboratory scanning, a wafer-thin marginal restoration (0.2 mm wall thickness) was designed and manufactured using CAD/CAM technology. Thanks to the high edge stability of the hybrid ceramic, the greatest possible ferrule effect was achieved, while also preserving the remaining tooth structure. The fully adhesive incorporation was carried out according to the tried and tested all-ceramic protocol. The biomimetic properties of VITA ENAMIC, excellent CAM processing capabilities and reliable material conditioning led to the great long-term clinical success for this hybrid ceramic reconstruction. Thanks to the good photo-optical properties of the material, the treatment was integrated harmoniously into the natural dentition.

Report 11/18

## Recommended indications for each VITA ENAMIC variation



# Targeted control of shade effects with VITA AKZENT Plus CHROMA STAINS

It is a familiar situation: The restoration's shade saturation does not match the natural tooth structure during the try-in. In that case, VITA AKZENT Plus CHROMA STAINS (VITA Zahnfabrik, Bad Säckingen, Germany) allow the chroma within a shade group to be increased systematically, helping to achieve the ideal final shade results. The CHROMA STAINS also make it possible to reproduce intermediate shades – as if with a brushstroke – without having to mix two different DENTINE materials. "These stains help me take tooth esthetics to an even higher level," says dental technician Urszula Mlynarska. In the following interview, she explains the reasons behind her enthusiasm, as well as points to consider when applying stains.



ZT Urszula Mlynarska  
Warsaw, Poland



**VITA AKZENT Plus CHROMA STAINS are suitable for all dental ceramic materials.**

**DV:** In what cases do you use VITA AKZENT Plus CHROMA STAINS?

**ZT Urszula Mlynarska:** In general, the CHROMA STAINS allow me to work on a very individual basis and to precisely control the color intensity and shade to meet the expectations of dentists and patients. Being able to precisely control the chroma within a shade group and reproduce even the slightest nuance in shading allows me to reach new levels in restoration production. For restorations with limited space, the stain shades allow me to characterize them internally, helping me to achieve three-dimensional color effects.

**DV:** What was the challenge in this case and how could the new stains help achieve a successful restoration?

**ZT Urszula Mlynarska:** The esthetic expectations were very high in this case. The restorations were supposed to be a bit lighter than the natural teeth. When fabricating the crowns, we wanted to achieve natural light dynamics that matched the appearance of the neighboring teeth.

The brightness was to be retained in the central area, the shade in the cervical area was to be intensified and the chroma of the incisal edge was to be increased. At the same time it was also necessary to reproduce the base tooth shade of the natural teeth.

**DV:** How important is the precise reproduction of chromacity for achieving harmonious, color integration of the restoration?

**ZT Urszula Mlynarska:** Every color is defined by the dimensions of brightness, color saturation and shade. Each tooth shade must be analyzed in the order mentioned, and this hierarchy also needs to be taken into account during the reproduction. The brightness of a tooth is relatively easy to determine. It takes more experience to determine chromacity. Identifying the shade requires an even higher, professional level of experience. VITA AKZENT Plus CHROMA STAINS allow targeted control of the chromacity, helping me to achieve the most individual, lifelike results possible.





**Fig. 1** The initial situation with lifeless, metal-ceramic crowns in the esthetic zone.



**Fig. 2** Full crown preparation for the new, all-ceramic crowns.



**Fig. 3** The situation during the clinical try-in of the raw firing.



**Fig. 4** In the first step, the chroma of crown 21 did not have an optimal match with the rest of the dentition.



**Fig. 5** Perfect color harmony once all the crowns have been characterized with CHROMA STAINS and then glazed.



**Fig. 6** The final esthetic results after the self-adhesive fixation of the crowns.

**DV:** In your experience, how reliably can the shade effect or chromacity of restorations be controlled with the new stains?

**ZT Urszula Mlynarska:** VITA stains provide us with a logical approach to reproducing shade effects. For me, they are tools I can use to precisely reproduce all the nuances of the entire color spectrum of natural tooth structure. CHROMA STAINS allow the chromaticity of a restoration to be controlled easily and precisely, as the change in color is already visible when the paint is applied.

**DV:** Why are VITA AKZENT Plus Chroma Stains the ideal material for any dental technician to help achieve excellent and consistent results?

**ZT Urszula Mlynarska:** The stains allow beginners to achieve the correct shade quickly, easily and predictably. In addition, any experienced ceramist can use them in a more individual and creative way. Because chromacity can be controlled on a very individual level with these stains, which allows for customized characterization and layer protocols.

**DV:** How do you rate the processing properties of the new VITA AKZENT Plus CHROMA STAINS as compared to stains from other manufacturers?

**ZT Urszula Mlynarska:** Application is really easy and you can use the stains in a number of different ways, such as for internal and external characterization. The intensity can be controlled precisely, which makes it possible to apply color efficiently on the restoration surface. The stains only increase the chroma and do not alter the light transmission or UV effects of the restoration. The staining and layering materials essentially merge with each other, resulting in a three-dimensional appearance while not increasing the wall thickness of the reconstruction.

Report 11/18



**Fig. 7** The harmonious integration of the all-ceramic crowns.



## Near-natural, highly individual shade and light play



*ZT Renato Carretti  
Zürich, Switzerland*



*Dr. Denis Schafroth,  
Dietikon, Switzerland*

In this case, the challenge was to reproduce all the nuances and distinct individual characteristics of the natural neighboring teeth. The single anterior crown needed to fit harmoniously into the esthetic zone at the posterior. To achieve this, the distinctive tooth characteristics had to be reproduced with VITA VM 9 veneering porcelain and VITA AKZENT Plus stains (VITA Zahnfabrik, Bad Säckingen, Germany). Below, dentists Renato Carretti and Dr. Denis Schafroth explain their process for treating the patient. The highly individual shade characterization is described in detail.



➔ **INITIAL SITUATION** In order to stabilize tooth 11 long-term, it was prepared for a full ceramic crown.

### 1. Initial situation

A senior arrived with a fractured composite filling on tooth 11. The practitioner and patient decided on long-term stabilization for the tooth with a full ceramic crown. The natural teeth displayed a varied play of shades, with whitish fluorosis and brownish discolorations. The patient found it important for the new reconstruction to achieve a natural appearance. For veneering the planned zirconia substructure, they opted for the highly nuanced VITA VM 9 veneering porcelain together with the VITA AKZENT Plus stains. In the first session, the tooth was prepared, scanned and provisionally restored. The base tooth shade D3 was identified.

### 2. Highly individual veneering

The crown substructure was fabricated of CAD/CAM-supported super-translucent zirconia in order to simulate the light effects of the neighboring teeth as closely as possible. The patient-specific veneering was achieved using a variety of VITA VM 9 dentine and effect materials. After the first dentin firing, a visual inspection took place. Afterwards, the crown was characterized in several steps and the intermediate firing results were checked directly in the patient's mouth.





**Fig. 2** The base tooth shade was determined using the VITA classical A1-D4 shade guide.



**Fig. 3** The results after the first dentin firing in the clinical try-in.



**Fig. 4** The VITA AKZENT Plus stains were applied in several steps and repeatedly fixed with a firing.



**Fig. 5** The characterized and prepared crown during the clinical try-in.



**Fig. 6** After the self-adhesive incorporation of the finished crown, the overall appearance was harmonious.



**Fig. 7** The crown was esthetically integrated into the remaining natural dentition.

### 3. Natural characterization:

In the neck area, yellowish shade saturation was achieved using VITA AKZENT Plus CHROMA STAINS B. In addition, VITA AKZENT Plus EFFECT STAINS 05 (orange) and 06 (rust red) were also characterized here. Fluorosis was increased incisally and a subtle effect was added in the upper cervical third using cream-colored ES02. "I added warm tones to the middle crown area with CHROMA STAINS A. The stains are intense and clearly visible in both the application of the color and the end results," explained Carretti. CHROMA STAINS B ultimately provided more chromaticity in the interdental area. The characterizations were gradually coupled by multiple fixation firings. The status of the optical integration was visually compared on the patient.

### 4. Vibrant 3D shade effect

In order to give the shades an effect from the inside, the central area was coated with the transparent WINDOW and the incisal area was coated with alternating layers of EE9 (bluish translucent) and EE11 (greyish translucent). Carretti was very satisfied with the results after working with a fine diamond and fine-grained sandpaper: "To complete the reconstruction, I only really had to do the glaze firing with the glazing material finishing agent and then polish it with pumice manually!" The multi-faceted restoration integrated itself harmoniously into the esthetic zone. The demanding patient was very satisfied with the highly esthetic result.

Report 11/18



**RESULTS** The detailed view clearly illustrates the recreation of all the nuances of the natural teeth.



## Youthful, lifelike reconstruction of the anterior region with VITA VM 9



*ZT Marcio Breda  
Vitória,  
Espírito Santo, Brazil*

Reconstructing a single, juvenile anterior tooth is challenging for any dental technician. It is important to reproduce the natural play of shade and light with all their multi-faceted nuances in order to achieve highly esthetic results with natural light dynamics. A veneering porcelain system needs to offer a wide range of shade nuances to allow dental technicians to create individualized and lifelike restorations that integrate very well with the neighboring teeth. In the following case, dental technician Marcio Breda describes how he treated the esthetic zone with an all-ceramic crown and a non-prep veneer made from feldspar veneering porcelain VITA VM 9 (VITA Zahnfabrik, Bad Säckingen, Germany).



➔ **INITIAL SITUATION** The initial situation with morphological deficits and asymmetries in the esthetic zone.

### 1. Initial clinical situation

A 27-year-old female patient visited the dental office of Dr. Vitor Padilha de Menezes because she was not satisfied with the esthetic appearance of her middle right incisor in the upper jaw. After a trauma, the tooth had been treated with an all-ceramic crown. The morphology and the photo-optical appearance did not match the neighboring natural teeth. The locally inflamed and irritated gums indicated an insufficient crown margin. The radiographic examination showed a sufficient root canal treatment. For the dentist and dental technician, the aim was to symmetrize the morphology of the two central incisors and to reproduce the tooth shade and individual effects of the neighboring teeth. A non-prep veneer on tooth 21 and an all-ceramic crown on 11 from VITA VM 9 were planned accordingly.

### 2. Systematic tooth shade determination

In order to precisely reproduce the natural tooth structure, the tooth shade was determined using the VITA Toothguide 3D-MASTER. In three steps, the brightness, color saturation and shade were determined. In this case, the shade identified was between 1M1 and 1M2. After applying local anesthesia, the old crown was removed and the preparation was optimized. An analogue impression was taken and a master model was created. A mesial wax-up on tooth 21 was created to visualize the ideal morphology. The model was scanned and a zirconia substructure for tooth 11 was constructed and fabricated using a digital workflow. After sintering, preparation and regeneration firing, the substructure was ready for veneering with VITA VM 9.





**Fig. 2** The crown on tooth 11 was lifeless, showing no photo-optical effects.



**Fig. 3** A CAD/CAM-based zirconia substructure was created.



**VITA VM 9 displays impressive natural shade effects, light dynamics and excellent mechanical properties.**



**Fig. 7** EFFECT OPAL 3 (bluish) was layered mesially and distally in the upper third of the crown.



**Fig. 8** To complete the enamel layer, a 2:1 mixture of ENAMEL (ENL) and NEUTRAL was added.

### 3. Veneering

To integrate warm, fluorescent shades into the crown, a wash firing was performed with VITA AKZENT Plus GLAZE PASTE and applied to VITA VM 9 EFFECT LINER 2 (beige). The dentin core was then successively reproduced in two steps with BASE DENTINE 1M2 and 1M1. After an anatomical cut-back, incisal EFFECT CHROMA 2 (sand beige) was applied. EFFECT OPAL 3 (bluish) was layered mesially and distally in the upper third of the crown. To complete the enamel layering, a mixture of ENAMEL (ENL) and NEUTRAL was added at a ratio of 2:1. After the first dentine firing, the crown was finished with a corrective firing. The restoration was finished with a fine diamond- and a rubber polisher. On a second master model with a refractory stump on tooth

21, the non-prep veneer was prepared using VITA VM 9.





**Fig. 4** The dentin core was first coated with VITA VM 9 BASE DENTINE 1M2.



**Fig. 5** To complete the dentin body, layering was added using BASE DENTINE 1M1



**Fig. 6** After the anatomical cut-back, EFFECT CHROMA 2 (sand beige) was applied to the incisal area.



**Fig. 9** The crown was carefully removed from the master model and the proximal areas were completed.



**Fig. 10** The dental arch harmonized with the curve of the lips.



**Fig. 11** The morphology and texture of the restorations were very natural.

#### 4. Highly esthetic results

To create a natural appearance, the restorations were characterized with VITA AKZENT Plus EFFECT STAINS 01 (white) and 02 (cream) and fixed with a firing. Finally, the glaze firing was performed with VITA AKZENT Plus GLAZE. After the clinical try-in, the non-prep veneer and the crown were fastened with adhesive. The dental arch in the esthetic zone was harmonized with the two different, all-ceramic treatment types and showed a natural play of shade and light. The restorations reproduced all the nuances of the neighboring teeth and integrated themselves harmoniously. The young patient was very happy with the results. Her laughter showed her increased self-confidence after the treatment.



**RESULTS** The patient was very satisfied with the final results of the treatment.

# Systematic shade reproduction using VITA VMK Master Veneering System



*ZT Marcio Breda  
Vitória,  
Espírito Santo, Brazil*

Providing patients with different types of restorations in the anterior area is a big challenge. In such cases, manufacturing processes, framework materials and wall thicknesses must be intelligently coordinated so that the entire restoration is integrated harmoniously into the natural dentition. This requires veneering porcelain that can be applied intuitively, and is flexible with a high shade fidelity. In addition, these ceramics must allow both a simple base layering, as well as the reproduction of all facets of the individual shade and light play. Dental Technician Marcio Breda shows us how he restores the esthetic zone with metal-ceramic crowns and full ceramic non-prep veneers using the ceramic veneering system VITA VMK Master (VITA Zahnfabrik, Bad Säckingen, Germany).





**Fig. 2** The base tooth shade A1 was determined using the VITA classical A1-D4 shade guide.



**Fig. 3** The fluorescence effects were determined using the VITA VMK Master LUMINARY shade guides.



**INITIAL SITUATION** In the initial situation, the metal-ceramic crowns on teeth 11 and 21 showed aesthetic deficits.

### 1. Complex initial situation

A 34-year-old female patient presented in our practice after being referred by Dr. Henrique Breda Rafalski. She was unhappy with the esthetic appearance of her upper front teeth. The metal-ceramic crowns on front teeth 11 and 21 looked lifeless and exhibited a deficient shade integration. The tooth axis, the contour of the incisors and the curve of the dental arch, along with the morphology, did not harmonize. Due to the metallic abutment-stump structure on tooth 11, the central incisors were to be restored with new metal-ceramic crowns. In doing so, the red-white esthetic in the cervical area was to be restored with a ceramic shoulder. In addition, non-prep veneers had been planned for teeth 12 and 22 in order to level the contour of the teeth. The veneering porcelain VITA VMK Master was to be used for fabricating the crowns and veneers.

### 2. Comprehensive tooth shade determination

For systematic shade production, the base tooth shade and additional shade nuances and effects were determined in several steps. In the first step, the base tooth shade A1 was determined using the VITA classical A1-D4 shade guide and photographically recorded. Then, the VITA VMK Master LUMINARY and TRANSLUCENT shade guides were used to determine translucent color nuances and fluorescent effects of the natural dentition. Finally, the crowns on 11 and 21 were slit and removed following local anesthesia. The tooth stumps were prepared and shaped. A master model with fire-proof stumps on the lateral incisors were prepared. After scanning the model, NEM crown frameworks could be constructed on teeth 11 and 21 and ground with the Ceramill Motion 2 made of Ceramill Sintron (both by Amann Girschbach, Pforzheim, Germany).





**Fig. 4** The translucent shade nuances were determined using the VITA VMK Master TRANSLUCENT shade guides.



**Fig. 5** Since tooth 11 had been restored with a metallic abutment-stump construction, we decided on non-precious metal crown frameworks.



**Fig. 9** The dentin core was anatomically reduced and coated with DENTINE A1.



**Fig. 10** Then it was individualized with TRANSLUCENT 5 (T5: light blue) and NECK 4 (N4: orange).

### 3. Two types of restorations, one veneering system

The NEM crown frameworks were thinly coated with VITA NP BOND, which as a CTE buffer, enables a strain-free, durable veneering. For the wash opaque firing, VITA SPRAY-ON OPAQUE POWDER A1 (OP1) was also sprayed on. To control the fluorescence from the depths, the first dentin firing was performed with VITA VMK Master LUMINARY 1 (white) and 4 (light brown-orange). After this, the dentin core was anatomically reduced with layered A1 DENTINE and then individualized with TRANSLUCENT5 (T5: light blue) and with NECK 4 (N4: orange) in the area of the mamelons. The enamel fractions of the crowns were built up with a mixture of whitish ENAMEL 1 (70%) and neutral TRANSLUCENT 4 (30%). For the fabrication of the non-prep veneers using the layering technique, the ENAMEL and TRANSLUCENT materials were also used.

### 4. Characterization and finalization

After the second dentin firing of the crowns, they were finalized with fine diamond and rubber polishers and then characterized with white using the stains VITA AKZENT Plus EFFECT STAINS 01 (ES01) in the incisal area. Shade saturation was increased with ES02 (cream) and ES07 (khaki) approximately. After the stains fixation firing and the subsequent glaze firing with VITA AKZENT Plus GLAZE, final polishing was performed with a fine rubber polisher. The veneers were finalized in a similar way using stains and polishing. After the clinical try-in, the four restorations were fastened with adhesive. The veneer on the metallic crown frameworks and the non-prep veneers from VITA VMK Master were adhesively cemented onto the enamel and resulted in an overall harmonious result in the esthetic zone. The patient was very satisfied with the highly esthetic result.



**Fig. 6** The CTE buffer VITA NP BOND was applied to the non-precious metal substructure and fabricated with the support of CAD/CAM.



**Fig. 7** For the wash opaque firing, VITA SPRAY-ON OPAQUE POWDER A1 (OP1) was also sprayed on.



**Fig. 8** The first dentin firing was performed with VITA VMK Master LUMINARY 1 (white) and 4 (light brown-orange).



**Fig. 11** The enamel was reproduced with a mixture of ENAMEL 1 (70%) and TRANSLUCENT 4 (30%).



**Fig. 12** The final result after further preparation, characterization and glazing with VITA AKZENT Plus and polishing.



**Fig. 13** The symmetrical edges of the incisors harmonized with the curve of the lip.



**Fig. 14** The two different types of restorations showed lively light effects.



**RESULTS:** The lateral view showed a natural surface morphology.

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