

DENTAL

1/13

VISIONIST

The CAD/CAM material of the future

Tests underway for a new hybrid ceramic – initial results promising



Prof. Werner H. Mörmann

Hybrid ceramics meet chairside requirements effectively.

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Prof. Michael Swain

A new approach to natural dentistry: "No material comes closer to natural dentition".

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The optimization of materials is moving forward in a positive direction, particularly in the area of CAD/CAM restoration. And yet, the search for the ideal material is not just a question of processing characteristics. Long-term reliability must be ensured, and most importantly, the restoration must inspire a feeling of confidence and comfort in all respects in both users and patients.

In this issue of DENTAL VISIONIST, our focus is firmly on progress in the shape of the new hybrid ceramic: a material that is setting new standards in stability and reliability. Does this make hybrid ceramics the restoration of the future?

Over the next few pages, you will find the answer to this question and more.

DENTAL VISIONIST wishes you an enjoyable read!

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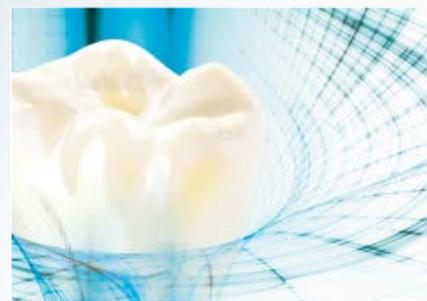
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PLEASE NOTE:

The testimonials by dental surgeons and dental technicians published in this magazine are based on practical experience with VITA ENAMIC gained during the course of pilot testing, and/or on manufacturer information based on the data provided in "Technical and scientific documentation" (VITA Zahnfabrik, Bad Säckingen, Germany). The testimonials from the dental surgeons and dental technicians named reflect the status as valid on July 12, 2012. The testimonials by developers or researchers published in this magazine are based on internal studies conducted by VITA R&D (Bad Säckingen, Germany) and/or the results of pilot testing.



A new definition of load capacity

The benefits of combining strength and elasticity.

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5 top tips for processing

Everything the user needs to know.

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Case study by Prof. Dr. Gerwin Arnetzl

Experiences with hybrid ceramics in the treatment of a patient with amelogenesis imperfecta in Graz, Austria.

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**The ceramic of the future?
The new hybrid ceramic is worth talking about**

**"The requirements of
chairside restoration
are met effectively".**



Prof. Werner H. Mörmann evaluated the hybrid ceramic VITA ENAMIC at the University of Zurich. He has been able to gain experience with the new material, both as part of in-vitro testing and in clinical use. In this interview, Prof. Mörmann looks at the ceramic of the future and reports on his own personal experience with this new generation of materials.

DV: Prof. Mörmann, the success story associated with CEREC systems began over 25 years ago thanks to your pioneering endeavors – and with it, the success of VITABLOCS feldspar ceramics. Now, a hybrid dental ceramic is available for the first time in the shape of VITA ENAMIC. Is this the new generation of materials for the future that a lot of clinicians have been waiting for?

Prof. Werner H. Mörmann: The new hybrid ceramic comes at a time when the range of materials for CAD/CAM technology, from high-performance ceramics to polymer blocks, is well-established.

"Clinical experience in the short-term has been excellent."

In this regard, it is taking up a position midway by making the longstanding dream of elastic, esthetic ceramics a reality. All the available laboratory tests

show that this material meets the requirements of chair-side applications effectively. The goal in the development of CEREC was of course to allow dental surgeons to provide patients with ceramic restorations as quickly and as easily as possible. Could we have expected a ceramic to offer elasticity adapted to tooth substance? This esthetic hybrid ceramic was pioneered by the American dental surgeon Prof. Russell A. Giordano, who has been working on this project at Boston University since 1996.

"Faster milling than with monolithic restorations and composites is possible – with greater shaping precision."

Extremely detailed work was required before the best possible product quality could be achieved. I think that we are surprised and delighted, and waiting with great interest to see how VITA ENAMIC will perform during long-term clinical use. Clinical experience in the short-term has certainly been excellent.

DV: In terms of specifics, what is the difference between what are known as hybrid ceramics and conventional dental ceramic or monolithic material concepts?

Prof. Werner H. Mörmann: Hybrid ceramics are comprised of esthetic silicate ceramics that are fully integrated – homogeneously and isotropically – with a fine polymer network. The polymer network provides the ceramic with a certain amount of elasticity similar to that of dentin. In the case of a full crown that has been bonded using adhesive, for example, this enables signi-

ficantly higher levels of continuous load than conventional ceramics. This has been proven by the continuous load tests conducted by Dr. Petra Güß at the University of Freiburg and by Prof. Robert Kelly at the University of Connecticut.

DV: Which of the material properties offered by hybrid ceramics did you personally find the most impressive during clinical use?

Prof. Werner H. Mörmann: My studies show that with both the fast and normal milling speeds of the CEREC MC XL system, hybrid ceramics can be milled faster than other ceramics for monolithic restorations, and faster than composites – with greater shaping precision. The polymer network also ensures that thin areas at the margins of restorations can be milled into shape without

"Low hardness and a certain amount of elasticity: like many patients, I find that this feels comfortable."

fracturing. When compared with other materials, hybrid ceramics enable diamond milling tools to achieve the longest service life. This greatly increases the efficiency and cost-effectiveness of the CAD/CAM approach, which is important in the practice environment. In addition, the material can be easily processed in the clinical environment and provides excellent polishing results. Overall, these properties meet my expectations of efficient chairside CAD/CAM treatment perfectly.

Number of molar crowns milled with a milling pair (MC XL Software 3.8x)

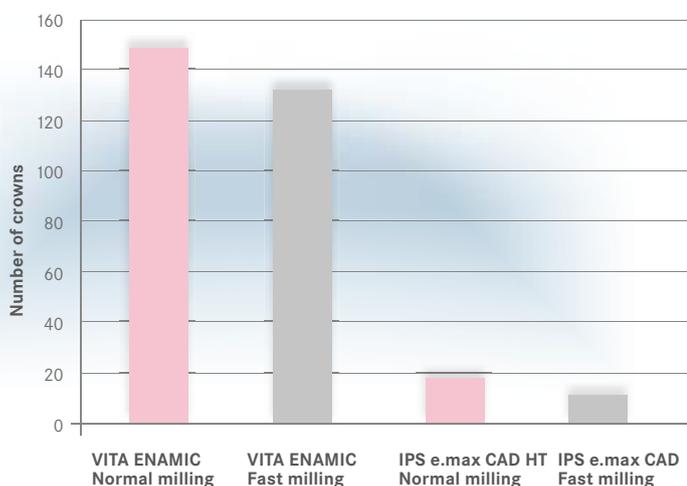


Fig. 1 Source: Internal study, VITA R&D (1)

Two-body abrasive wear

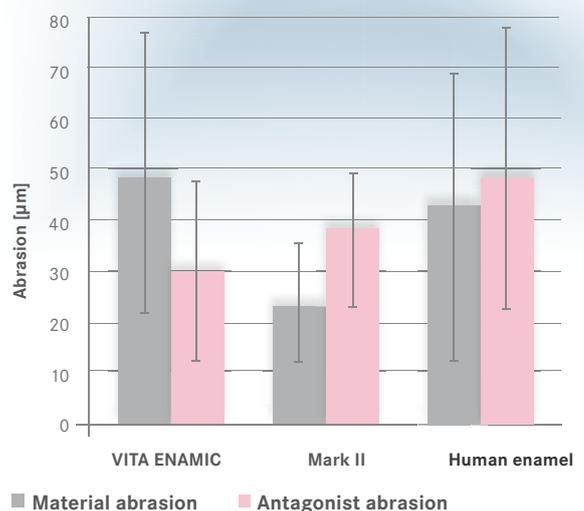


Fig. 2 Source: University of Zurich, Prof. Mörmann (1)

DV: You have not only treated patients with VITA ENAMIC restorations, but have also had an inlay fitted yourself. What kind of feedback have you had from patients so far and what was your own experience?

Prof. Werner H. Mörmann: Patients who have already experienced CEREC restorations find that the reduced hardness combined with a certain amount of material elasticity feels comfortable. This was also my experience as a patient. I presume that the stability of the hybrid ceramic surface corresponds to that of natural enamel. My clinical observations over a period of 4-6 months, particularly the scanning electron microscope findings for abrasion surfaces, have indicated a wear pattern for the hybrid ceramic that is very similar to that of natural enamel. Abrasion wear testing in the articulator confirms this. Accordingly, the occlusal wear of the hybrid ceramic is virtually identical to that of natural enamel. However, the hybrid ceramic is also clearly gentle on enamel.

DV: Let's take a look at the future. Where do you see the VITA ENAMIC hybrid ceramic a few years down the line?

Prof. Werner H. Mörmann: I believe that in a few years, all restorations fabricated using the VITA ENAMIC hybrid ceramic will be in exactly the same location in which they were fitted today. I expect this material to prove its worth clinically, also in the restoration of non-vital teeth, as clearly as has been demonstrated in long-term studies on the restoration of vital teeth using silicate ceramics.



The digital version of the magazine is available at: www.dental-visionist.com

EXPERT OPINION: DR. SADOUN

SO WHAT TYPE OF MATERIAL IS VITA ENAMIC?

"First I would like to emphasize that VITA ENAMIC belongs to a completely new class of materials". These are the words of Dr. Michael Sadoun. He continues: "In my opinion, the most significant innovation developed for this material is its microstructure, which is comprised of a feldspar ceramic network that is fully integrated with a polymer network. Composites on the other hand contain ceramic fillers or fibers.

VITA ENAMIC is comprised of an extensive 3D feldspar ceramic network with a low polymer content. This ensures a significant improvement in mechanical properties such as increased chemical stability, reduced monomer absorption and greater biocompatibility."

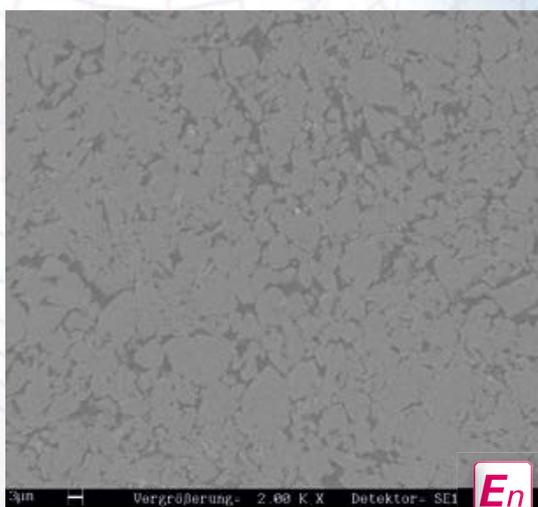


Fig. 1 Source: VITA R&D, hybrid ceramic surface
Hybrid ceramic with "dual-network structure"



Fig. 2 Source: VITA R&D, etched composite surface
Composite: polymer with ceramic filler particles

The SEM pictures are used to illustrate the difference in the material structure of the various materials.

"It feels like
a normal tooth!"

M. Schneider (66)

As part of a pilot study, the hybrid ceramic was used in numerous dental practices and laboratories. Patient feedback so far has been incredibly positive: patients were especially delighted with the excellent shade integration of the restorations into the remaining natural dentition. Also frequently mentioned in this regard was the fact that the surface of these restorations feels like that of a natural tooth.

Our practitioner summarizes: As the occlusal pressure is essentially cushioned as a result of the ceramic-polymer network structure, the hybrid ceramic is also considered ideal for more sensitive patients in whom the level of hardness of conventional ceramics can lead to sensitivity when biting. A further bonus: Patients treated chairside using hybrid ceramics do not have to wait for long periods, as the material is already at full strength. This means that there is no need for firing; all that is required is a quick polish.



PRACTICE REPORT

What are patients saying about VITA ENAMIC?



Dr. Gerhard Werling, Bellheim, Germany

"We have found the feedback from patients who have been treated with VITA ENAMIC to be very positive", reports Dr. Gerhard Werling. "The restorations score highly with this group, both in terms of how they look and how they feel. As this tooth-colored hybrid material offers material properties similar to those of natural dentition, including excellent light refraction, the treat-

ment results are impressive. Patients describe their VITA ENAMIC restorations in terms such as 'very beautiful' and confirm that 'it feels like a normal tooth'. The material, therefore, blends in well with the patient's natural dentition in every respect - just as it is intended to do."



The combination of strength and elasticity provides exceptional benefits!

Test report: new materials

A new definition of load capacity: why hybrid ceramics simply offer more

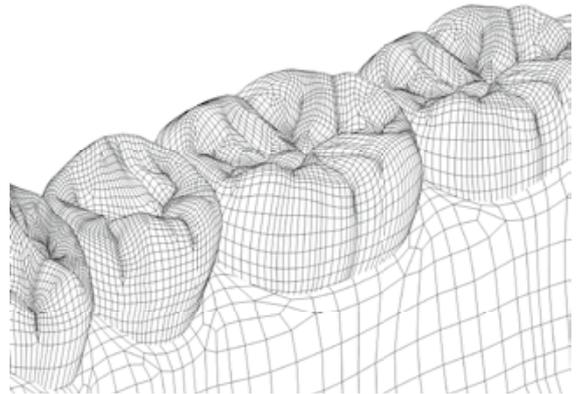
Load capacity or fracture resistance is one of the key criteria in the clinical success of restorative dental materials for CAD/CAM applications. Yet there are a variety of contributory factors that must be taken into consideration when evaluating the stability of a material. However, the good news for dental practices and laboratories that use CAD/CAM technology: the results for the new hybrid ceramic have been extremely promising in a wide variety of tests.

In dentistry, the load capacity of a material often refers to in-vitro fracture testing (what is generally known as flexural strength) that is measured in megapascals (MPa). "However, as studies on the new hybrid ceramic demonstrate, high flexural strength does not always equal high fracture resistance. Thanks to its resilience and elasticity, VITA ENAMIC offers exceptional resistance, even though its flexural strength is lower than that of other CAD/CAM materials". These are the thoughts of Dr. Michael Sadoun of the University of Paris.

High flexural strength does not always equal high fracture resistance.

Intelligently combining strength and elasticity

In this hybrid ceramic, strength and elasticity are intelligently combined to provide dental practices and laboratories that use CAD/CAM technology with an exceptionally fracture-resistant material. The seamless ceramic network structure and organic polymer network structure are used to replicate the structure of natural dentition. According to Prof. Michael Swain of the University of Otago: "It is this combination of modulus of elasticity and high resilience, which is comparable to that of natural dentition, that makes the difference compared with conventional ceramic and composite materials. This means that most ceramic materials offer a higher modulus of elasticity than VITA ENAMIC, i.e. they provide superior stiffness (by a factor of 2 in fact), and typically fail with



Despite a low modulus of elasticity, hybrid ceramics can withstand higher levels of elongation at break (200 - 400 %).

an elongation at break of 0.1 %. However, due to the polymer network that is integrated throughout the material, VITA ENAMIC facilitates levels of stability that are four times higher, despite a lower modulus of elasticity. As a result, VITA ENAMIC can withstand levels of elongation at break that are 200 - 400 % greater than most other ceramics before fracturing. This behavior is particularly significant in the oral cavity where the dentition in the dental arch is primarily responsible for limiting the elongation at break that a tooth can withstand."

EXPERT OPINION: PROF. SWAIN

IS STRENGTH ALONE ENOUGH?

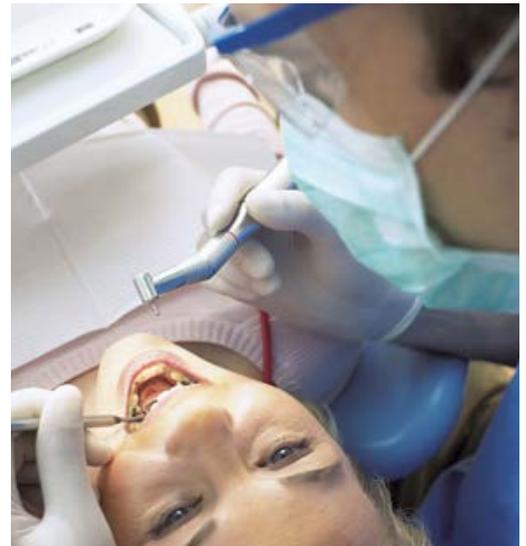
"For too long the dental community has considered strength to be the most significant determining factor in the behavior of a material in the oral cavity", says Prof. Michael Swain. "According to this way of thinking, enamel and dentine, the main constituents of the human tooth, would in fact be unsuitable for their natural function. In my opinion we must give more consideration to the question of whether a restorative material, in terms of its elastic behavior including fracture resistance, is suitable for the structure of the tooth on which it is being used."

Interview with Prof. Swain → Page 13

100% success rate in continuous load tests in the chewing simulator.

Load tests passed successfully

During determination of the static fracture load, the VITA ENAMIC hybrid ceramic proved its exceptional load capacity with a fracture load of approx. 2766 newtons – the highest load value of any material evaluated during this test. The new material also achieved above-average results in testing with the chewing simulator: the hybrid ceramic demonstrated a 100% survival rate both with walls of normal thickness and with those of minimal thickness.



Hybrid ceramic restorations ensure long-lasting load capacity.

Static fracture load in newtons

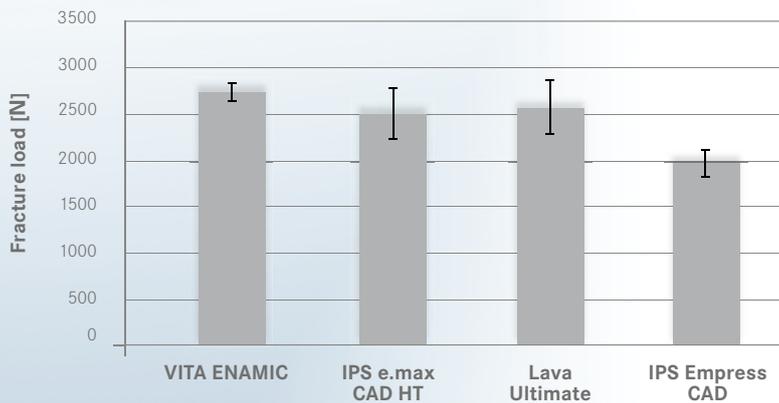
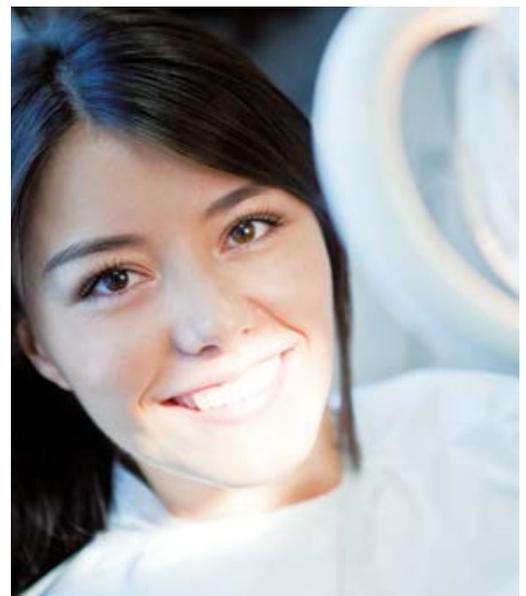


Fig.1 Source: Boston University, Prof. Dr. R. Giordano (1)



Study of dynamic fracture load in a chewing simulator

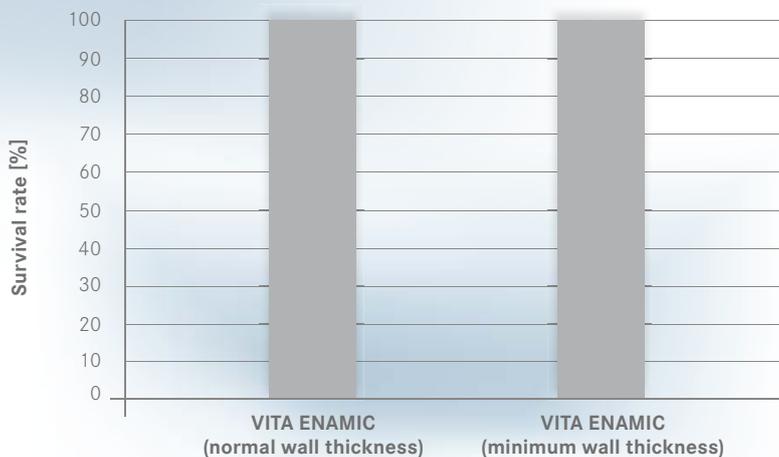


Fig. 1. Source: University of Freiburg, Dr. Güß (1)

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E_n 1) Studies published in "Technical and scientific documentation" 10.13

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Five processing tips

Dental technician Andreas Buchheimer answers the five most important questions when it comes to processing the new hybrid ceramic.

1. What are the hardware and software requirements for processing VITA ENAMIC?

For processing, users ideally require a CEREC/inLab MC XL milling system and the CEREC/inLab 3D software from Version > 4.0. In this regard it is important to note: VITA ENAMIC offers excellent milling properties – it can be processed more quickly, and at the same time, does not wear milling tools to the same extent.

2. How should VITA ENAMIC restorations be polished, and most importantly, what polishing tools should be used?

In order to achieve a natural surface shine, two steps are required. Special polishing instruments are available for this purpose with the VITA ENAMIC Polishing Set. Pre-polishing is performed in this case using the pink polishing tools included in the set (7,000 - 10,000 rpm). High-gloss polishing requires the diamond-coated, grey polishing tools included in the set (5,000 - 8,000 rpm). It is important here to work with reduced contact pressure.

3. Can shade characterization be performed for restorations fabricated using the VITA ENAMIC hybrid ceramic, and if so, how?

Surface characterization can be performed using the VITA ENAMIC Stains Kit, which is a set of light-curing stains. Mixing the shade powder and liquid triggers autopolymerization, with final polymerization being completed following light polymerization.

4. What can dental practices and laboratories do to ensure the required durability of shade characterization in the oral environment?

A surface that has been treated with shade characterization can be sealed with a chemical glaze by using a product called VITA ENAMIC Glaze.

5. How is final intraoral bonding of VITA ENAMIC hybrid ceramic restorations performed?

Adhesive bonding of VITA ENAMIC restorations must be performed using light-curing or dual-curing fine hybrid composites. The self-adhesive composite RelyX Unicem from 3M ESPE can also be used for bonding crowns (dentin adhesion). Adhesive bonding of crowns should preferably be performed using a more flowable, dual-curing composite (depending on the thickness of the layering).



PRACTICE REPORT

VITA ENAMIC and clinical use

- The preparation geometries should have a round shape appropriate to ceramics. Furthermore, a clearly-defined preparation border is required at the cervical margin in order to facilitate shaping of the margins that can be interpreted by CAD/CAM systems.
- In the case of crowns, a chamfer with a broad 0.4 mm horizontal ridge must be prepared.
- Before adhesive bonding, the material must be etched for 60 seconds using a 5% hydrofluoric acid in order to achieve the best possible adhesion to the tooth substance and luting composite.
- In addition, a fine grain size must be ensured when selecting a diamond milling tool if grinding is required.
- Polishing is performed using a polishing set developed specifically for this purpose (after both occlusal and proximal grinding) in order to restore the initial surface quality and shine of the material.
- Do not rework VITA ENAMIC restorations using carbide instruments as these damage the ceramic, causing microscopic cracks.

→ **General rule:** The same basic rules apply for VITA ENAMIC as for all-ceramic restorations, as the material is 86 % ceramic.

Hybrid ceramics: a role model for natural restorations

**"No material comes
closer to natural
dentition"**





Prof. Michael Swain of the University of Otago, New Zealand, has been studying the properties of dental materials for numerous years. In this interview, he explains what users and patients can expect from hybrid ceramics and tells us more about the "new approach to natural dentistry".

DV: You have studied the new hybrid ceramic material. What particular features have you observed and what do your results indicate?

Prof. Michael Swain: I have observed that this material is more similar to natural dentition in terms of its modulus of elasticity and enamel and dentin microstructure than any other existing ceramic material (veneering ceramics, glass ceramics, high-performance ceramics) or any other composite. With its porous ceramic structure that is fully integrated with a polymer, VITA ENAMIC matches natural enamel both in terms of its specific modulus of elasticity as well as its non-linear behavior that results from the proteins that bind the apatite crystals together.

DV: Does this hybrid ceramic mean the return to a more natural approach to dentistry, and what does this involve in concrete terms for practitioners, technicians and patients?

Prof. Michael Swain: The material is closer to nature than most existing restorative dental materials. The modulus of elasticity of VITA ENAMIC is between that of enamel and dentin in terms of elongation at break when a load is applied, and is therefore more comparable to that of natural dentition. This reduces both stress within the structure when a load is applied as well as the stress at the restoration margins and on the bonding surfaces between the restoration and the underlying tooth substance.

DV: What are the benefits of this both in terms of clinical use as well as for processing using CAD/CAM technology?

INFO: MODULUS OF ELASTICITY

The modulus of elasticity is a material parameter used for determining the stiffness or elasticity of a material at deformation. The more resistance a material demonstrates with regard to deformation, the higher the modulus of elasticity. A component comprised of a material with a high modulus of elasticity (e.g. steel) is therefore stiff. A component comprised of a material with a low modulus of elasticity (e.g. rubber) is elastic.

"Hybrid ceramics are comparable to enamel and dentin in terms of their modulus of elasticity and microstructure."



Prof. Michael Swain: The benefits of this ceramic-polymer structure in which both components are fully integrated with one another is that greater stability levels are achieved than compared with polymers or ceramics alone. Merging the networks fully with each other in this way also provides for integrated crack prevention as well as creating a structure that offers greater fault tolerance. This material, which is both softer and more stable than ceramic materials, can not only be milled more quickly using CAD/CAM systems, its edge stability also enables thinner walls to be milled without fracturing.



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Modulus of elasticity

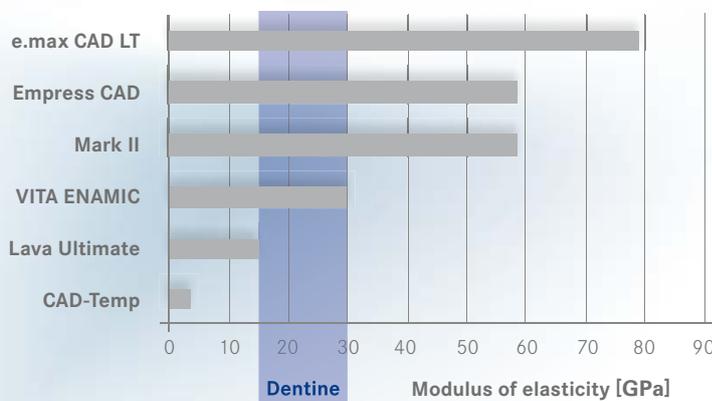


Fig. 1 Source: Internal study, VITA R&D (1)

Note: There are big differences concerning the modulus of elasticity of human dentin in literature.

Source: Kinney JH, Marshall SJ, Marshall GW. The mechanical properties of human dentin: a critical review and re-evaluation of the dental literature. *Critical Reviews in Oral Biology & Medicine* 2003; 14:13-29



- Enamel - enamel-like abrasion behavior
- Dentin - comparable flexibility (modulus of elasticity)
- Pulp

Ensuring safety with hybrid ceramics

While conventional ceramics continue to crack, the polymer network in the hybrid ceramic prevents this from happening.

A new dimension of reliability

There's no doubt about it: modern materials for dental restorations should be reliable or, in other words, long-lasting. In this respect, hybrid ceramics could provide the breakthrough for a new dimension. Here, dental surgeons and dental technicians are demanding materials and processes that they can rely on. So it's a good thing that material reliability does not need to be left to chance but can be determined using corresponding test methods and calculations.

The Weibull modulus: a benchmark for reliability

Material reliability is determined using what is known as the Weibull modulus. In order to determine this parameter, the flexural strength values of at least 30 test rods are evaluated. According to Dr. Norbert Thiel (Division Director, VITA R&D): "Evaluation here is similar to observing a chain that breaks under pressure when the weakest link fails. In other words: a high Weibull value indicates a very reliable material for which outliers that result in lower failure values are essentially excluded." This is a key prerequisite for the successful use of a restorative dental material. Studies in this regard

have shown that with a value of 20, the Weibull modulus for the VITA ENAMIC hybrid ceramic is more than double that of comparable restorative materials. The beginning of a completely new dimension.

Every chain is only as strong as its weakest link.

Cracks don't stand a chance

In the event of microscopic cracks developing following exposure to an external energy source, for example as a result of flawed reworking of a restoration, even the most highly-stable materials could fail. The brittleness of conventional ceramics can prove particularly problematic here. This is not the case with the VITA ENAMIC hybrid ceramic, as the dual ceramic-polymer structure features integrated crack prevention. This can be seen with the Vickers test, for example, where a pyramidal tip is used to make an indentation in a polished material surface in order to determine the hardness of the material. Here, the hybrid ceramic demonstrates

Weibull modulus: material reliability

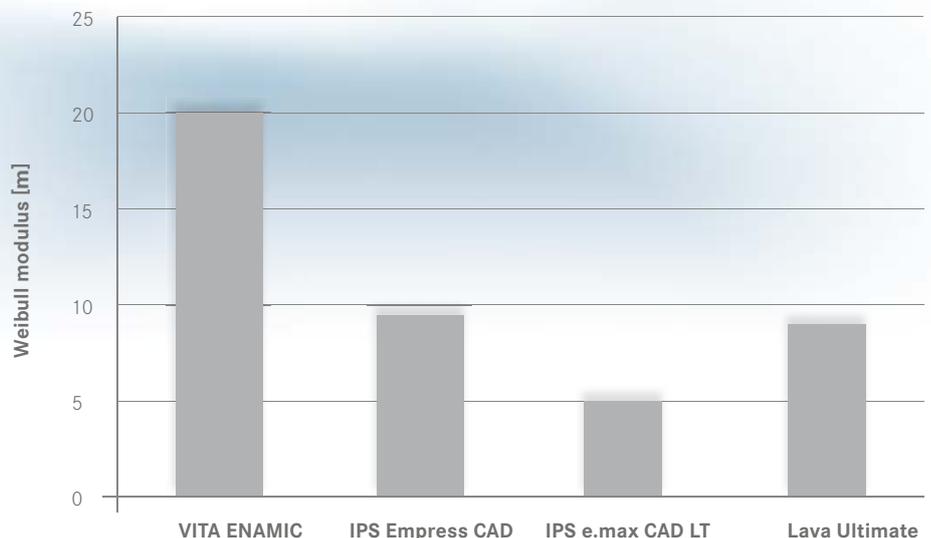


Fig. 1 Source: Internal study, VITA R&D (1)

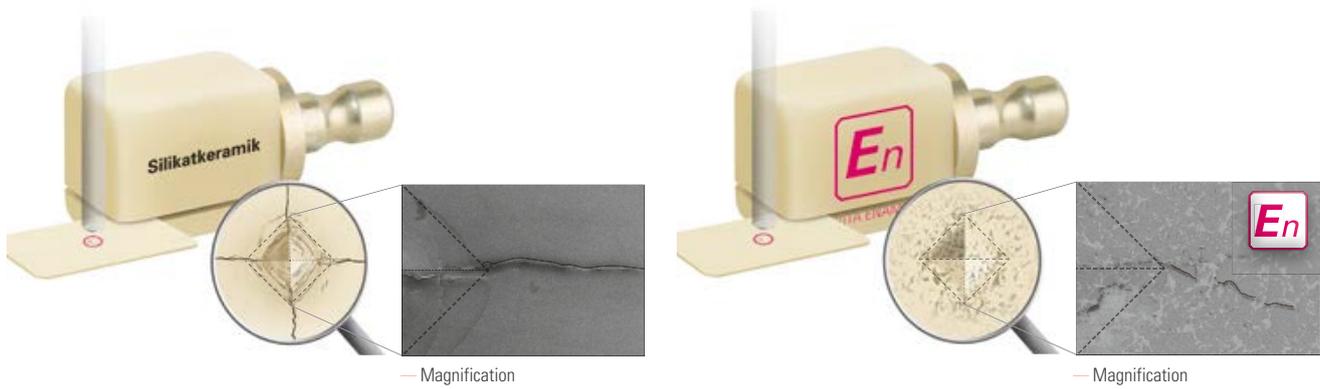


Fig. 1&2 Source: Internal study, VITA R&D, Vickers indentation, left silicate ceramic, right hybrid ceramic (1)

Dental surgeons and dental technicians need materials that offer maximum reliability.

completely different behavior to conventional ceramics. Dr. Enno Bojemüller (Section Manager, VITA R&D) explains: "Unlike conventional ceramics, which in this test showed clearly limited indentation, sharp edges characterized by the formation of cracks, and generally straight continuous cracks, we saw that the hybrid material did not fracture. Instead, it yielded to the load through self-deformation."

Hybrid ceramics don't break - they yield through self-deformation.

In other words: As a result of the hybrid structure comprised of two networks that are fully integrated with one another, the indentation is not limited at the edges but has smooth transition areas. Although VITA ENAMIC does show crack formation typical of ceramic materials in the corners of the indentation, any further extension of the cracking will be prevented by the polymer network.



INFO: WEIBULL MODULUS

The Weibull modulus describes the reliability of a material in a way that cannot be fully described based solely on flexural strength. Outliers due to material faults that reduce the level of reliability are included in the calculation for flexural strength and are qualified, however they do determine the reliability and the probability of survival of the material. The higher the Weibull modulus, the greater the reliability. When evaluating the Weibull modulus, the flexural strength (for VITA ENAMIC e.g. 153.82 MPa (SD 7.56 MPa) and for Lava Ultimate, e.g. 188.42 MPa (SD 22.29 MPa); source: in-house measurements VITA R&D) should always also be taken into account.



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A photograph of a dental patient sitting in a chair, viewed from behind. The patient has dark hair styled in a braid. The dental chair is green and white. A dental light fixture is visible above the patient, casting a warm glow. The background is a blurred dental office setting.

Putting hybrid ceramics into practice

Clinical case study: full mouth reconstruction

1. INITIAL SITUATION

Patient and clinical picture

The patient, a 16-year-old female, was unhappy with the unesthetic appearance of her teeth (see Fig. 1 to 3). This affected her confidence enormously with the result that she generally avoided opening her mouth. She endured pain caused by hot or cold food in silence. Given the situation, a full mouth reconstruction seemed to be the most appropriate and promising treatment option.



In a case study from his dental practice in Graz, Prof. Gerwin Arnetzl describes his practical experience with VITA ENAMIC hybrid ceramics. He provides an overview of the treatment process in the case of a young female patient suffering from congenital amelogenesis imperfecta, for whom he was able to achieve an impressive result using this material.



Fig. 1: Amelogenesis imperfecta



Fig. 2: Labial view of the upper and lower jaw



Fig. 3: Occlusal view of the lower jaw

2. PREPARATION

Planning and preparation of the model

First, a plaster model was made of the initial situation, followed by a wax-up (Fig. 4). This model was then transferred to a thermoforming disc. Using a mock-up, the length and shape of the teeth were planned in consultation with the patient (Fig. 5).

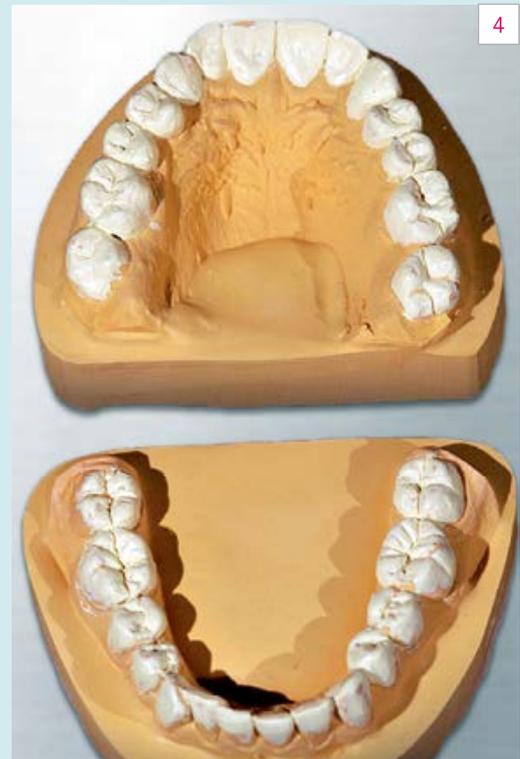


Fig. 4: Wax-up



Fig. 5: Mock-up

3. THE TREATMENT PROCESS

Preparation, verification and raising the bite

It was possible to carry out preparation in accordance with the guidelines for all-ceramics while preserving as far as possible the enamel suitable for adhesion. Before taking impressions using the dual-phase technique, preparation was verified using a thermoforming disc molded using the wax-up (Fig. 6). The bite was raised with CEREC AC using an articulated model and buccal bite imaging.



Fig. 6: Verification of preparation using a thermoforming disc

Modeling, polishing and verification of occlusion

Virtual modeling and milling using Sirona CEREC/inLab was carried out using proven processes. The restorations were then simply polished to a high-gloss finish using the special polishing set tailored to hybrid ceramics. The following images show the occlusal contacts of the lower posterior restorations on the model and in the patient's mouth (Fig. 7).



Fig. 7: Occlusal contacts on the model and in the mouth

4. THE RESULT

Practitioner and patient: absolute satisfaction

The upper restorations were also characterized using light-curing VITA ENAMIC Stains. The stains were bonded to the restoration as part of a polymerization process. The chemical glaze material VITA ENAMIC GLAZE is available for surface sealing. Firing is essentially not required with the new hybrid ceramic as the material is already at full strength. Figure 8 shows the finished crowns on the model. The final result following placement and bonding in the patient's mouth is exceptional, both from an esthetic and a medical standpoint (Fig. 9).



Fig. 8: Characterized upper crowns on the model with backlighting



Fig. 9: Crowns in the patient's mouth showing an impressive end result

Before**After****EXPERT INTERVIEW: PROF. GERWIN ARNETZL**

DV: What do you personally find particularly special about the new dental material?

Prof. Gerwin Arnetzl: There are both advantages and disadvantages associated with all of the characteristics specific to the ceramic and acrylic materials that have been used in dentistry up until now. The traditional disadvantages of ceramic include the risk of marginal fractures and chipping. Issues in the case of acrylics include a lack of shade stability, for example, and a level of dimensional stability that is less than ideal. In order to eliminate the disadvantages in each case, only the benefits of both classes of material were combined in the development of VITA ENAMIC to create a new material.

DV: What are the benefits of hybrid ceramics from your personal perspective?

Prof. Gerwin Arnetzl: Excellent quality is achieved at the margins. The thinner a ceramic becomes as a result of milling, the greater the likelihood that small fractures may occur in the material. VITA ENAMIC, however, supports significantly better precision during milling,

allowing thinner layers to be created. In terms of preparation, this means that an approach can be used that is more gentle on the substance. Thin transition areas can also be achieved, enabling superior esthetic results.

DV: What sort of feedback have you received from your patients regarding hybrid ceramics?

Prof. Gerwin Arnetzl: The response has, without exception, been that VITA ENAMIC restorations offer greater bite comfort and are not as hard as pure ceramics.

DV: How would you judge VITA ENAMIC in terms of cost-effectiveness?

Prof. Gerwin Arnetzl: When processing the new VITA ENAMIC material, milling can be completed more quickly than is the case with ceramics with which we have previously been familiar. And yet, this does not mean that the milling tools used with the selected production unit are subject to greater wear, as you might expect. In fact, the opposite is true: thanks to the excellent milling properties, an extended service life for tools has been observed.



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