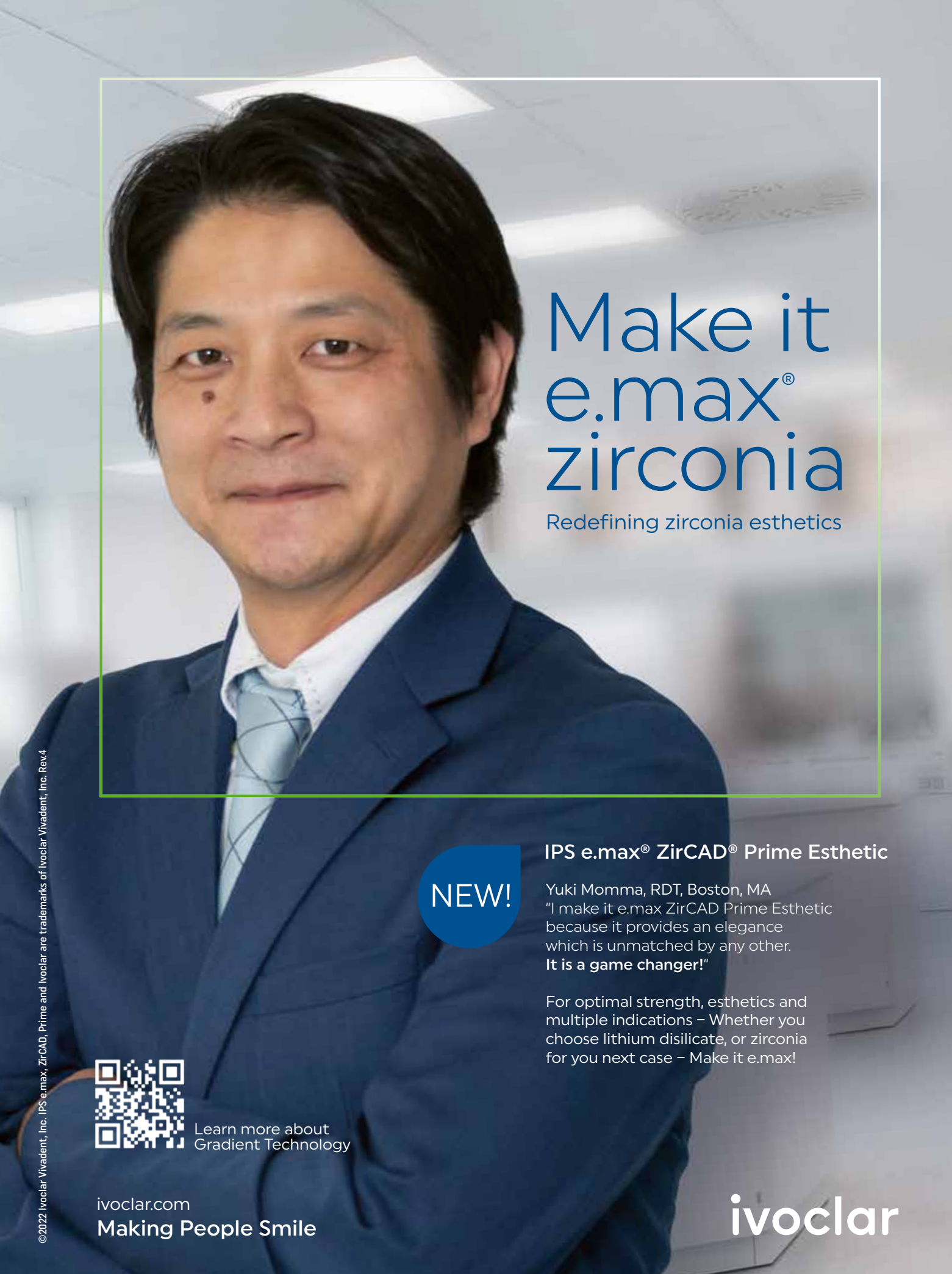
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2023 QDT

QUINTESSENCE OF DENTAL TECHNOLOGY

Editor-in-Chief
Vincent Fehmer, MDT

Clinic for Fixed Prosthodontics and Biomaterials
University of Geneva
Geneva, Switzerland

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Meet the New Editor-in-Chief

QDT 2023 is the inaugural issue with Master Dental Technician Vincent Fehmer at the helm. Under his editorship, QDT maintains its signature look but with a more fluid design and larger images to showcase the beauty of the work. Read on to learn more about our new editor-in-chief. We are excited to see where QDT goes under his direction!

Vincent Fehmer received his dental technical education and degree in Stuttgart, Germany, before completing fellowships in Great Britain and the United States in Oral Design–certified dental technical laboratories. After working several years in such a laboratory in Berlin, he received his MDT degree and became the chief dental technician at the Clinic for Fixed and Removable Prosthodontics in Zurich, Switzerland. Since 2015, he has been a dental technician at the Clinic for Fixed Prosthodontics and Biomaterials in Geneva, Switzerland. He also runs his own laboratory in Lausanne.

Vincent Fehmer, MDT, on the lecture circuit.

Mr Fehmer is a Fellow of the International Team for Implantology, an active member of the European Academy of Esthetic Dentistry (EAED), and a member of the Oral Design group as well as the European Association of Dental Technology (EADT) and the German Society of Esthetic Dentistry (DGÄZ). He is a sought-after international speaker and has received many honors for his work, including the Kenneth Rudd Award from the American Prosthodontic Society. He has published more than 50 articles in peer-reviewed journals within the field of fixed prosthodontics and digital dental technology, contributed to many books, and recently coauthored the book *Fixed Restorations: A Clinical Guide to the Selection of Materials and Fabrication Technology* with Irena Sailer and Bjarni Pjetursson. Mr Fehmer also serves as Editor-in-Chief for the *International Journal of Esthetic Dentistry*, Section Editor for the *International Journal of Prosthodontics*, and Co-Chair for the 26th International Symposium on Ceramics (June 2023).

QDT 2023

QUINTESSENCE OF DENTAL TECHNOLOGY
Volume 45

“It is an honor to continue the legacy of such a unique publication...”

EDITORIAL: SIMPLICITY MEETS ESTHETICS

As the new editor-in-chief of QDT, I am following the vision and work of the outstanding previous editors—Prof John A. Sorensen, Prof Avishai Sadan, and Prof Sillas Duarte—who developed QDT over the last 44 years into a one-of-a-kind, cutting-edge annual publication. Like them, my aim is to connect the leading experts in the field of restorative dentistry and dental technology to elevate this unique publication to the highest standard in our profession.

Important to *my* vision for QDT is the feasibility of the presented work and its actual application to daily practice. My hope is that the articles in these pages inspire clinicians and technicians to apply the techniques they see here for the benefit of all their patients. Therefore, the motto “simplicity meets esthetics” is more than just a connection of words; I truly believe it is essential to take dentistry and dental technology to its next level. The beautiful outcomes we strive for in our daily practice and routines should be made available to as many of our patients as possible—not just the ones who have the financial means to afford comprehensive treatments. As a realist, of course I understand that there will always be certain limitations to this. However, advancements in digital technology, workflows, and highly esthetic dental materials continue to bring this dream closer to reality. And we should embrace that.

You might ask yourself now if there will be any changes to the previous format and style of QDT. The short answer is no. It is an honor to continue the legacy of such a unique publication with its extraordinary and highly visual content; any major changes would eliminate important parts of QDT DNA. So the only change you will experience over the coming years is a greater variety of international authors. Some of them may even be new to you, but I promise that you will not regret reading and marveling at what they have to share. Finally, and most importantly, I hope to encourage more female dental technicians and clinicians to submit their outstanding (but clearly underrepresented) work to QDT.

Having said all this, it gives me great pleasure to invite you to enjoy this 45th volume of QDT. Stay healthy!

Sincerely yours,

Vincent Fehmer
vincent.fehmer@unige.ch

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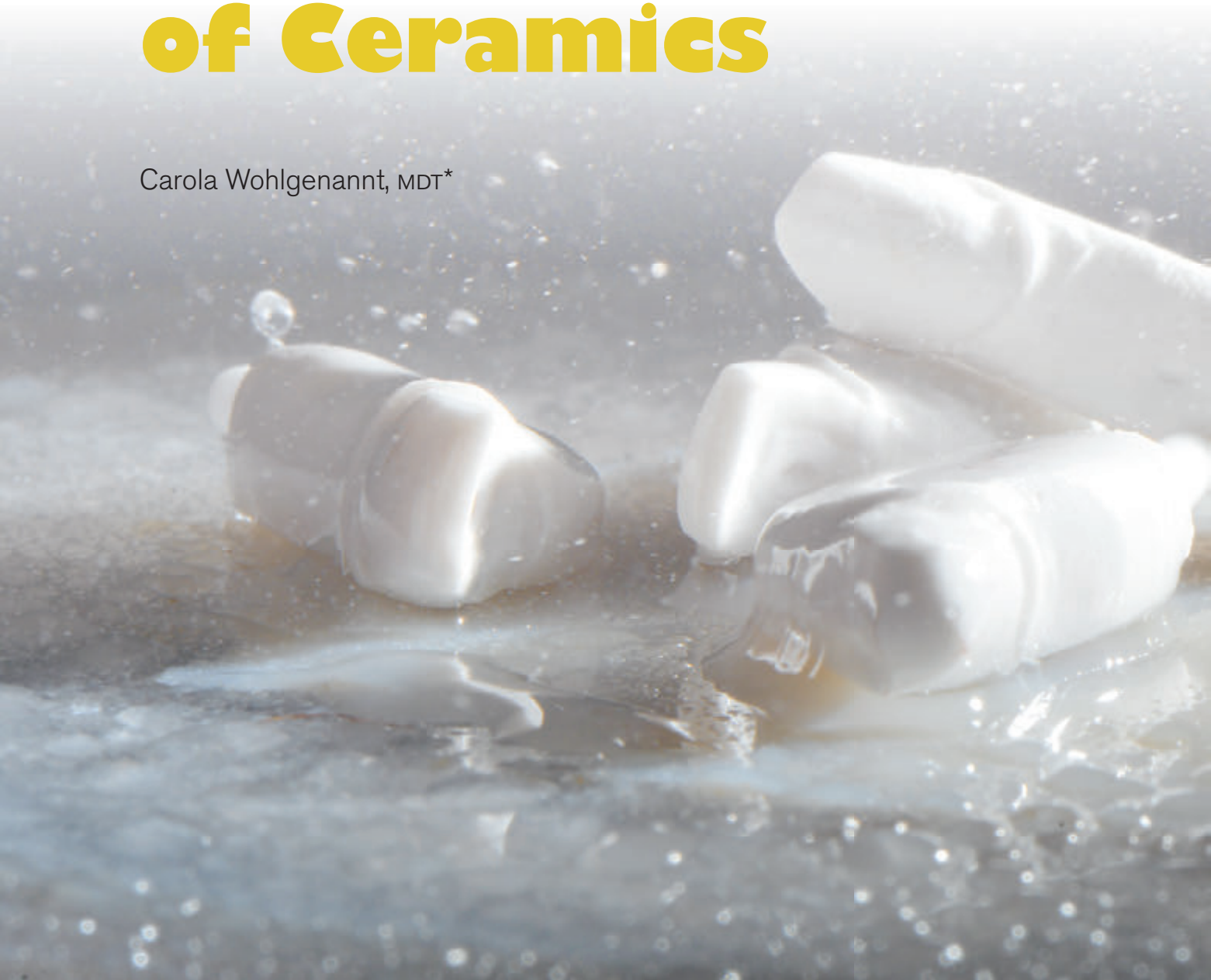
Enhancing Anterior Esthetics:

A Patchwork of Different Types of Ceramics

Carola Wohlgenannt, MDT*



One of our tasks as dental technicians is to have sufficient knowledge and command of the materials that we use in our practice to achieve an esthetically integrated solution for our patients.

In the case described here, I felt that the most sensible thing to do was to use a variety of different ceramic materials because I had to take three different dental substrates into account.

INITIAL SITUATION

The patient complained of pain on the maxillary right lateral incisor. She was also dissatisfied with the appearance of the post-retained crown on the contralateral left lateral incisor. To make matters worse, the central incisors were different shades following endodontic treatment on the left central incisor in the past (Figs 1 to 3). In addition, she had a slight crossbite in the region of her mandibular right canine and first premolar. These minor issues together considerably affected her overall esthetic appearance.

What made this case particularly challenging was the fact that this patient worked as a dental hygienist at her dentist's practice and could spot all the minute details of the soft tissues and teeth that the untrained will not see. Her expectations were therefore high for me and for her boss.

FIRST APPOINTMENT: DESIGNING THE MOCK-UP

After taking the first impression, I created a wax-up (Fig 4). In the process, I paid particular attention to establishing a symmetric balance and determining the amount of space needed for esthetic improvement in the given clinical circumstances. Therefore, I extended the crown length toward the apical with gingivectomy and modified the labial arch to such an extent that I could correct the crossbite. With the help of a silicone key, these modifications could then be transferred directly to the patient's mouth (Figs 5 and 6).

This kind of mock-up gives me the advantage of being able to immediately assess if the planned modifications will lead to a harmonious integration into the overall appearance. Compared with digital before-and-after visualizations, the mock-up enables the patient to see how the new dental situation looks and feels and also allows her to speak normally.

In this case, the patient was pleased with the new esthetics and feel right away. The slightly extended labial arch of the maxilla suited her, and the optimized proportions of the central incisors with gingivectomy were equally successful. We both agreed to the plan to reconstruct all six maxillary anterior teeth.

The central incisors and canines would be restored with veneers to increase their volume slightly and to redress the slight crossbite on the right side. The maxillary lateral incisors would receive crowns, but the right lateral incisor would first need to be replaced with an implant due to extensive tooth resorption (Fig 7).

*Dental technician, Dornbirn, Austria
Correspondence to: Carola Wohlgenannt, team@wohlgenannt-zt.com

Figs 1 to 3 Initial situation. Note the different shades of the central incisors in the oblique view.

Fig 4 Wax-up.

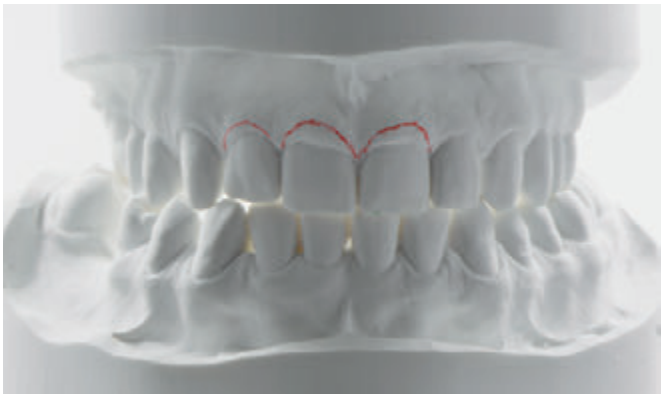


Fig 5 Gingivectomy planning.

Fig 6 Placing the mock-up in the patient's mouth.

Fig 7 Radiograph of the maxillary right lateral incisor showing extensive root resorption. This tooth must be replaced with an implant prior to crown restoration.

SECOND APPOINTMENT: PLACING THE IMMEDIATE IMPLANT

The maxillary right lateral incisor was removed surgically, and an implant was placed immediately into the extraction socket (Figs 8 and 9). The implant (Camlog Screw-Line Promote Plus, 3.8 × 13 mm) was placed slightly to the palatal, and the gap between the buccal bone wall and the implant was filled with a heterologous bone mixture (OsteoBiol MP3) and collagen (Fig 10). After careful wound closure, a glass fiber–reinforced Maryland bridge was placed (Fig 11). Just to be prudent, we prepared this bridge prior to the second appointment (Figs 12 to 14).

This choice of treatment provided our patient with some crucial advantages: *(1)* It eliminated the need for a palatal plate, and *(2)* it prevented any shifting movement from occurring and therefore protected the newly placed implant effectively.

Figs 8 and 9 The implant is placed slightly to the palatal. Note the gap between the implant and the buccal bone wall.

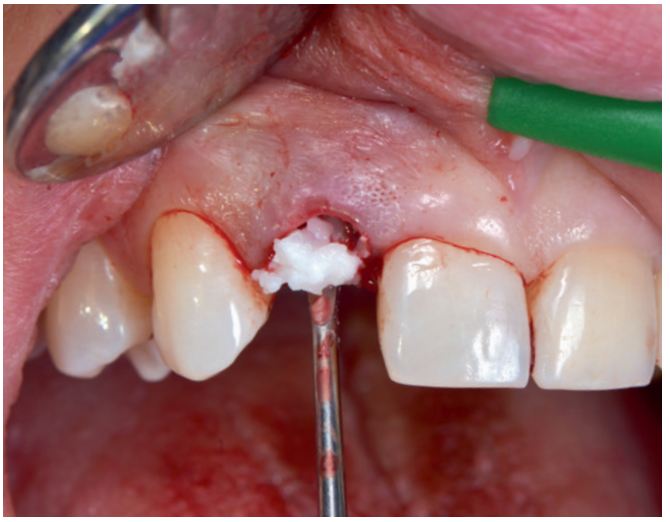


Fig 10 The gap is filled with a heterologous bone mixture (OsteoBiol MP3).

Fig 11 Glass fiber–reinforced Maryland bridge in situ.

Figs 12 to 14 Laboratory fabrication of the glass fiber–reinforced Maryland bridge with SR Ivocron prior to the second appointment.

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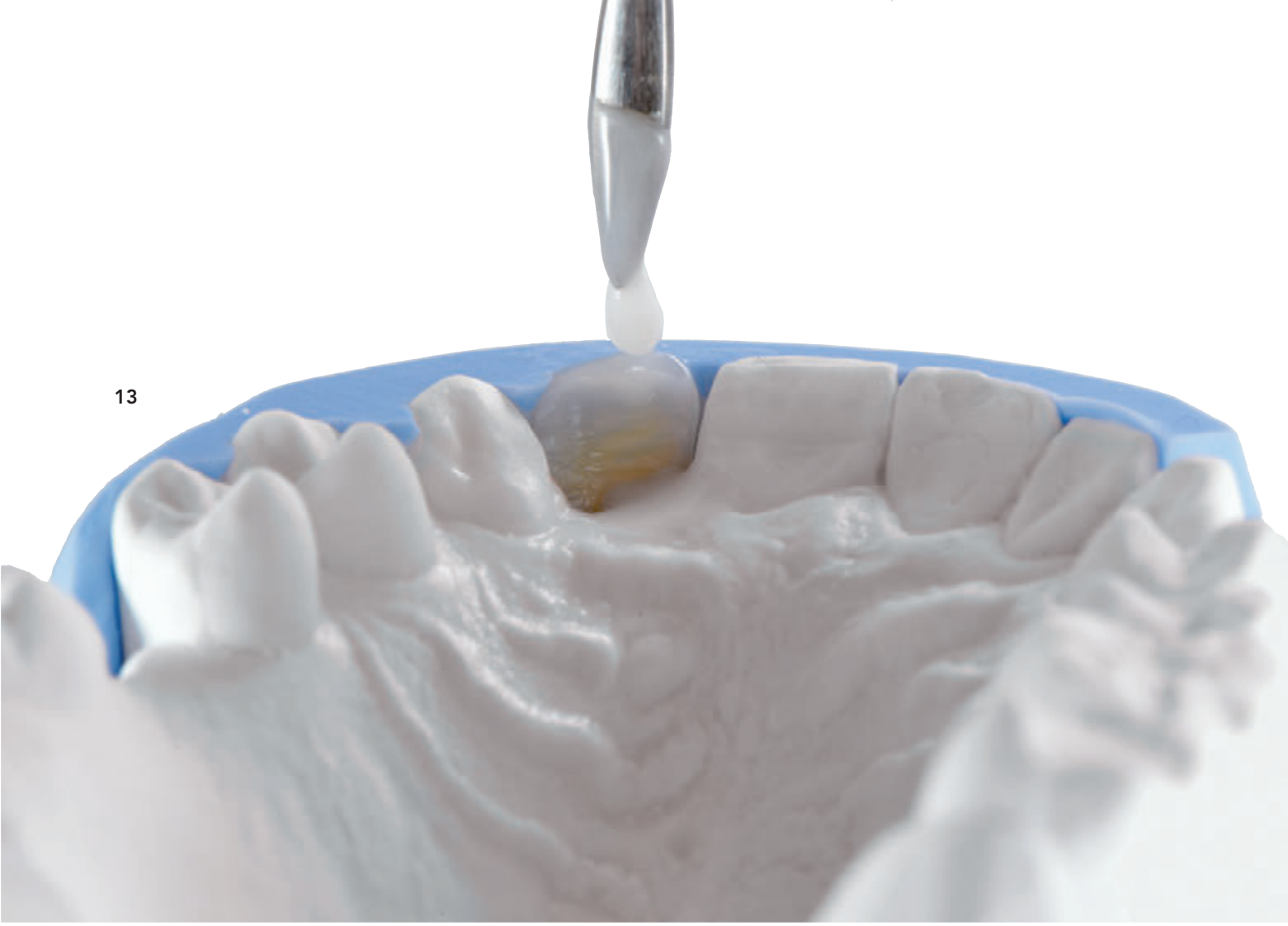

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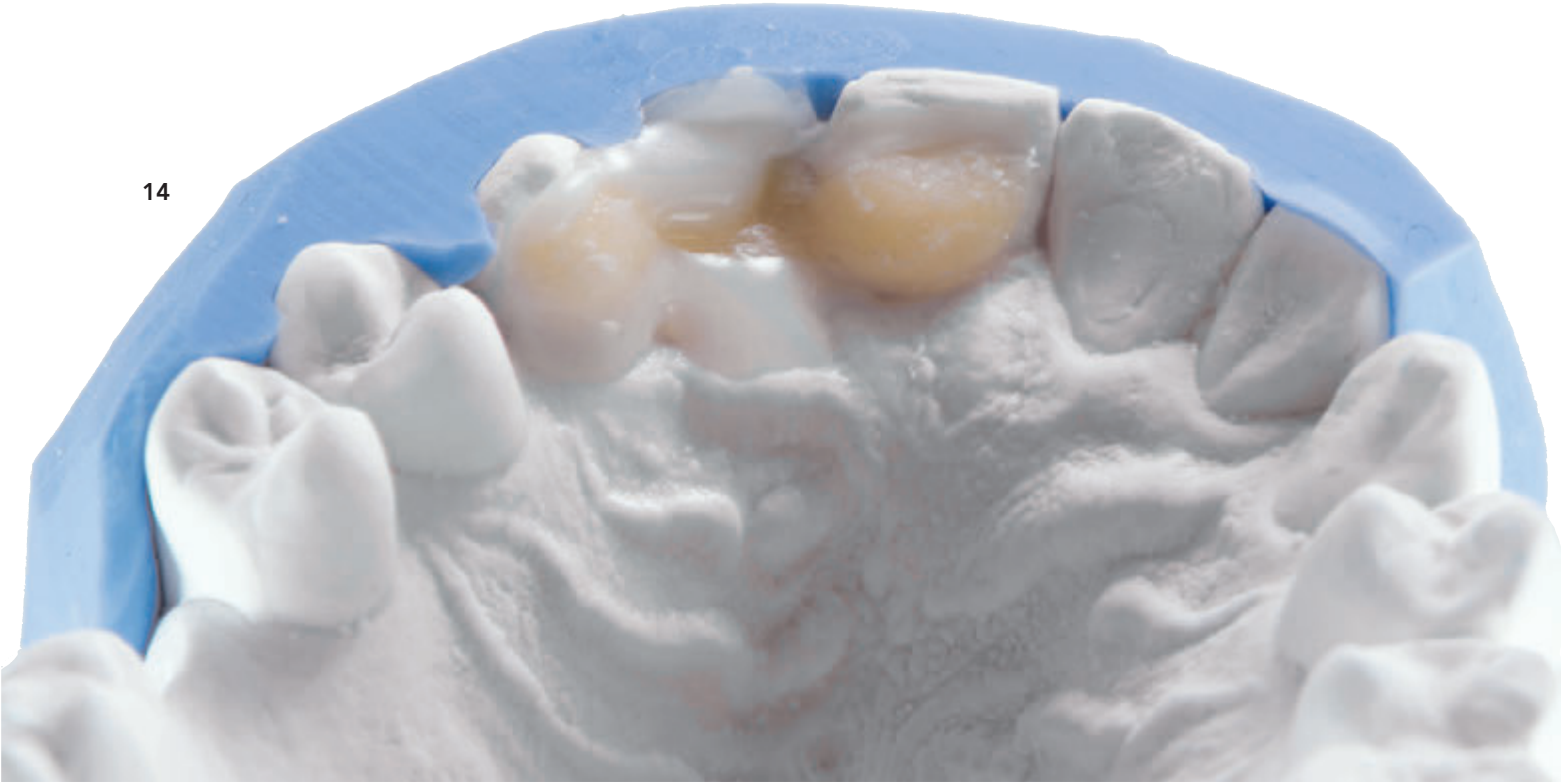

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UNCOVERING THE IMPLANT

Following a 3-month healing phase, the implant was uncovered and provided with a 4-mm cylindric gingiva former (Figs 15 and 16). In the process, a gingivectomy procedure was performed using an electrotome (Fig 17), and the labial frenulum was moved toward the apical region (Fig 18).

An improvement in the esthetic appearance of the patient could be observed already at this stage.

PRELIMINARY WORK IN PREPARATION FOR IMPRESSION TAKING

The gingiva former was left in place for 4 weeks before it was replaced with a customized abutment to help establish the emergence profile. The implant was restored with a temporary crown milled from acrylics (Figs 19 and 20). The crown was given a completely nonoccluding design to protect the implant from any unnecessary stresses.

PREPARATION

The teeth were prepared utilizing a supragingival, minimally invasive approach. This step was performed with the help of the silicone key derived from the wax-up (see Fig 21). Because all the teeth involved in the restoration were being slightly augmented, precious tooth structure could be preserved. In my opinion, however, preparing appropriate interdental spaces was indispensable in this case. I was able to design the contact areas in a targeted fashion and achieve a clean transition between the veneers and the tooth structure by lightly preparing the contact areas in the dorsal area.

Fig 15 Uncovering the implant.
Fig 16 Healing cap.
Fig 17 Gingivectomy using an electrotome.
Fig 18 Cutting the labial frenulum.

Figs 19 and 20 The temporary crown is built up.

The available space was assessed (Fig 21), the teeth were prepared (Figs 22 and 23), and a customized impression post was placed (Fig 24). Subsequently, an impression was taken (Fig 25), and a temporary restoration was placed (Fig 26).

Fig 21 Space available prior to preparation.

Fig 22 Preparing the two central incisors.

Fig 23 Completed preparation.

Fig 24 Completed preparation with individualized gingiva former and customized impression post for impression taking.

Fig 25 Impression.

Fig 26 Temporary restoration in situ.

PLANNING THE PROSTHETIC RESTORATIONS

In this case, the challenge was to achieve a harmonious esthetic appearance of six teeth, four of which contained widely different substrates. It was the dentist's and patient's preference that all the restorations should be made of all-ceramics.

Specifically, the base shade of the two central incisors differed from one another because the left central incisor was devitalized. Another tooth had been restored with a full-coverage crown on a metal post, and in the region of the right lateral incisor, an implant had been placed following tooth extraction.

The first step in the laboratory was to create a model. I usually use the Giroform model system (Amann Girrbach) to achieve this. This device offers two advantages: First, the rigid baseplate counteracts the contraction of the plaster. Second, the duplication flask supplied with the device enables me to fabricate my refractory dies with accuracy and comparative ease (Figs 27 to 30).

Fig 27 Preparation cast in plaster.

Fig 28 Duplicating the veneer preparations.

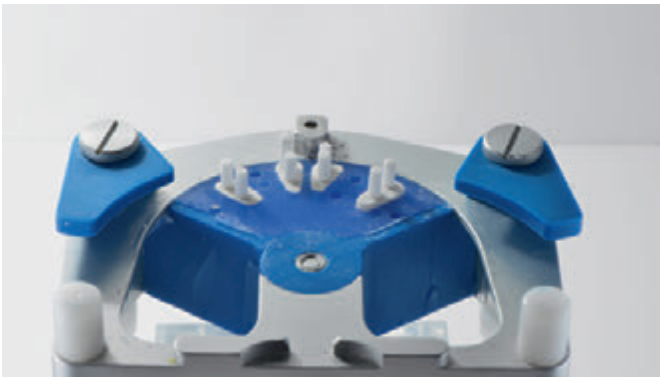

Fig 29 Casting the dies using refractory die material.

ALL-CERAMIC SOLUTION

I now had to figure out a way to establish a common base from which to proceed with my restoration work.

Consequently, I decided to restore the two lateral incisors with copings made of IPS e.max Press lithium disilicate (LT A1, Ivoclar) placed on customized implant abutments milled from zirconia (e.max ZirCAD Prime, BL4). This is how the framework was given strength (Fig 31).

To create ultrathin veneers and natural shade effects, I often opt for IPS Style Ceram (Ivoclar), a metal-ceramic material that comprises a unique blend of leucite, fluoroapatite, and oxyapatite crystals. This combination adds brilliance and vibrancy to the restorations. The shade ranges of IPS e.max Ceram and IPS Style Ceram are coordinated with each other.

After I designed and pressed the two lithium disilicate copings using IPS e.max Press in shade LT A1 (Ivoclar), I built up both lateral incisors (IPS e.max Ceram) in a targeted fashion using the wax-up created before as a reference (Figs 32 and 33).

Fig 30 Refractory dies placed in their exact position.

Fig 31 Completed pressed frameworks made of IPS e.max Press.

Fig 32 Adapting the shape and shade of the framework to match the preparation.

It was especially important to support the brightness (value) of the restoration, so I applied a thin layer of Deep Dentin DD BL4 and, directly on top of it, a layer of Power Dentin PD in tooth shade PD A1 (Fig 34). I designed the incisal plate using Incisal I1, and then I contoured the mamelons on top (Fig 35). Next, I applied thin alternate layers of different materials. Then, I applied a small quantity of Impulse Opal Effect OE4 and OE3-OE5 to achieve the bright target shade and to make sure that the value was maintained on the surface (Fig 36).

Having reconstructed the size and shape of the two lateral incisors, I was now ready to focus on the two central incisors and the canines.

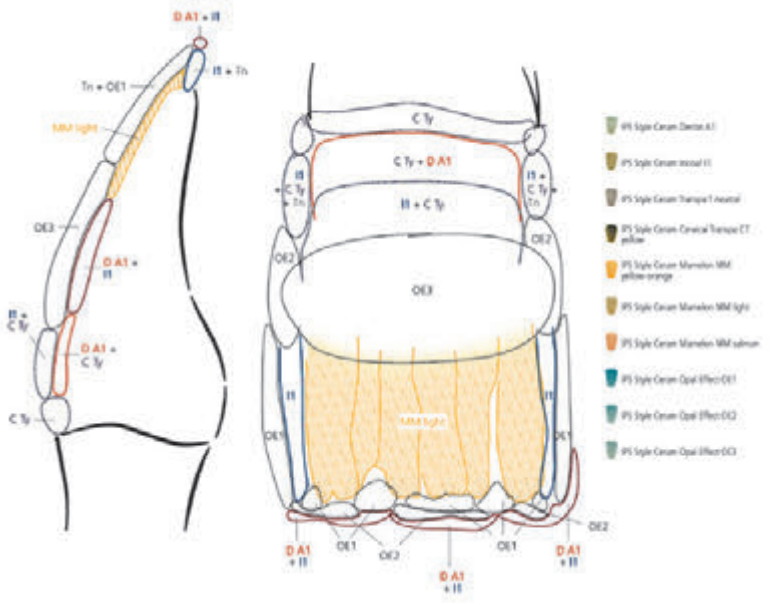

Fig 33 Layering and color mapping.

Fig 34 Building up the dentin.

Fig 35 Building up the incisal plate.

Fig 36 Completing the tooth shape using Effect and Incisal material.

REFRACTORY DIES

To create the refractory dies, I took advantage of my flask to duplicate the two incisors and canine preparations and then pour them using Sherarefract refractory die material (Shera). It is essential to thoroughly soak the refractory dies in water before applying the wash (Fig 37). The moist surface prevents the formation of bubbles and prevents the surface from drying prematurely during the subsequent layering procedure.

After soaking the dies, I applied IPS Style Ceram Cervical Transpa Yellow CT, mixed with a small amount of dentin, to the cervical area to make sure that the ceramic material would not delaminate along the margins at the second firing.

I then began the layering process by applying a wash (Fig 38). First I applied a thin layer of IPS Style Ceram Opal Effect OE1 and then I fired this layer. To build up the incisal area, I applied a thin layer of Opal Effect OE1 along the margin and a 50:50 blend of dentin and cervical Transpa material to the cervical area. Then the restoration was fired again.

It was now time to adjust the dentin. In the present case, I first covered the left central incisor with pure Dentin A1 to mask the discolored nonvital tooth. I then continued to build up the dentin, now using a blend of dentin and the matching incisal material (Fig 39). Without this method, there is a risk that the veneers layered with IPS Style Ceram may appear too opaque.

Similar to the IPS e.max crowns, the incisal plate extended from the dentin. In other words, I extended the incisal portion in the direction of the incisal surface but not toward the labial surface. This is important to have enough space to create the internal customizations of the tooth. To complete the buildup, I created the internal structures using mamelon materials (Fig 40). This was followed by alternate layers of different incisal materials in line with the specific requirements of the clinical case (Fig 41). In the present case, this meant using a lot of Opal Effect OE2, OE3, and Transpa Incisal TI.

Bright strips of Opal Effect OE3, mixed with a small amount of OE5, were applied to lend a touch of warmth to the restoration at corrective firing (Fig 42). This way, I achieved the bright Bleach Effect requested by the patient, without incurring the risk of creating a cold, unnatural white shade.

Fig 37 Soaking the refractory dies in water.