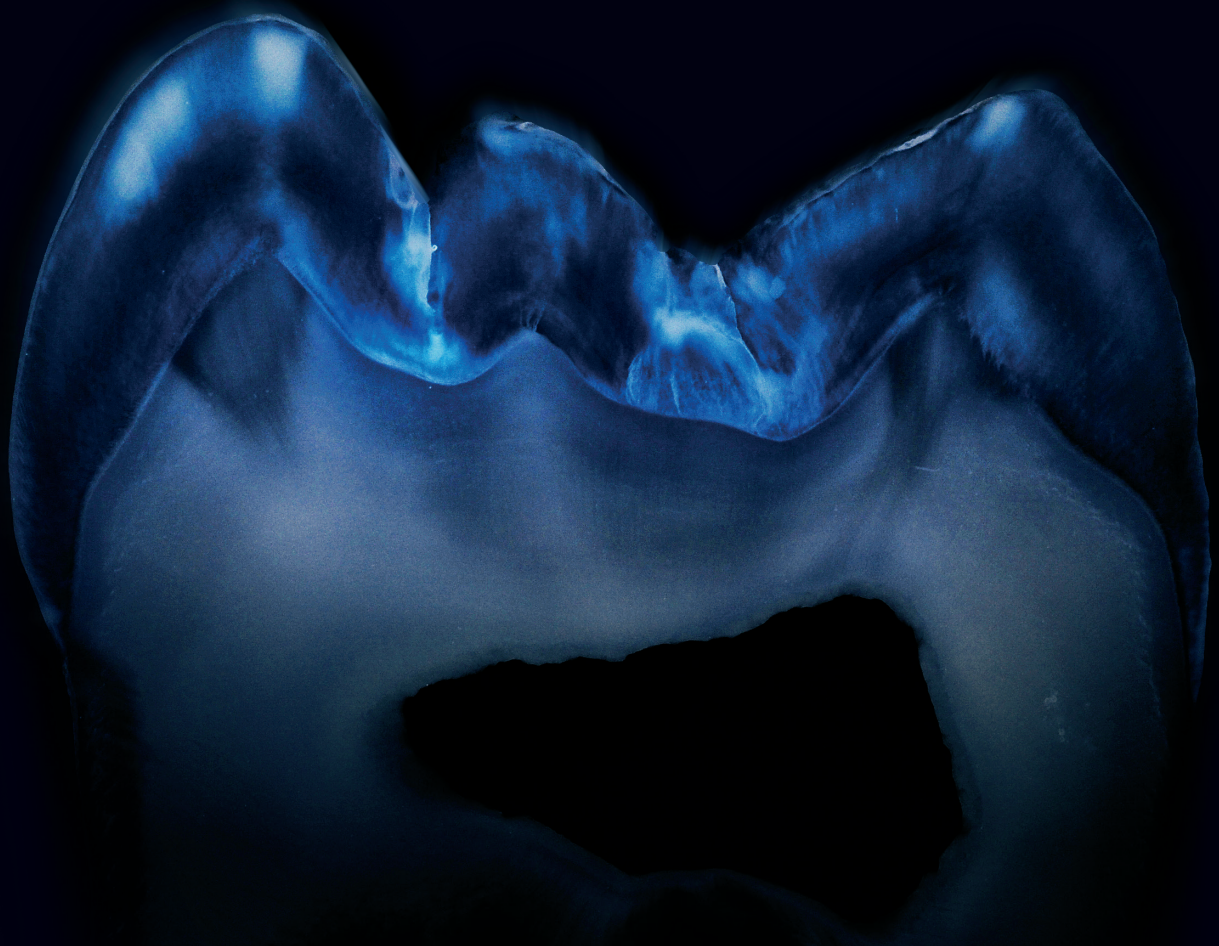


DENTAVANTGART

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INTERVIEW

THE
BOUNDLESS
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**PLANNED,
PRESSED,
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THE AESTHETIC AND FUNCTIONAL REHABILITATION OF THE FRONTAL AREA WITH FULL CERAMIC CROWNS

CASE REPORT

KEYWORDS

INTEGRAL CERAMIC CROWNS | REFRACTORY DIE | AESTHETICS



The restoration of one or several frontal group teeth, especially maxillary teeth, is a procedure of high clinical and technical requirements. The patient's aesthetic expectations are great, and in many cases the outcome heavily depends on the dental technician and the materials used. The technician will often need to spend time with the patient during the execution phases of the restoration. In many cases, the aesthetic requirements of integral ceramics imply certain corrections, personalizations, or even reconstructions of the restorations. Due to these factors, the technician will need to allocate more than the usual time to this type of restoration, in order to satisfy the doctor's requirements and the patient's expectations.

Another aspect that favours the success of the treatment is provisional restoration. This will fulfil, immediately and during the technical clinical stages, both the doctor's and the patient's aesthetic, functional and biological requirements. In this case, time is not an enemy anymore; on the contrary, the situation in which the patient wears a provisional prosthesis allows for social and functional integration, so that the technician is given all the time needed to carry out restorations in a manner that will ensure success from all points of view – , they say:

*„Good
things
take
time”*

The patient, aged 30, was not happy with the unaesthetic appearance of the maxillary incisor group, in what concerned teeth 2.1 and 2.2. The 2.2 lateral incisor featured an old endodontic treatment, having been reconstructed by means of a dental cast metal post, with an integral ceramic crown cover of inadequate emergence profile, colour and marginal adaptation. Chronic gingivitis, a 2mm buccal gingival retraction and a modified zenith were discovered periodontally to 2.2.

At the level of the 2.1 tooth, the discoveries included modified shape and colour, high tensile composite reconstruction inadequate inasmuch as colour, adaptation and finish for a tooth with previous endodontic treatment.

Although tooth 1.1 was not initially included in the prosthetic plan, it was restored by means of a large composite filling, with mesial angle restoration. It required a filling replacement, with suitable adaptation and emergence profile. **(Fig. 1 and 2.)**



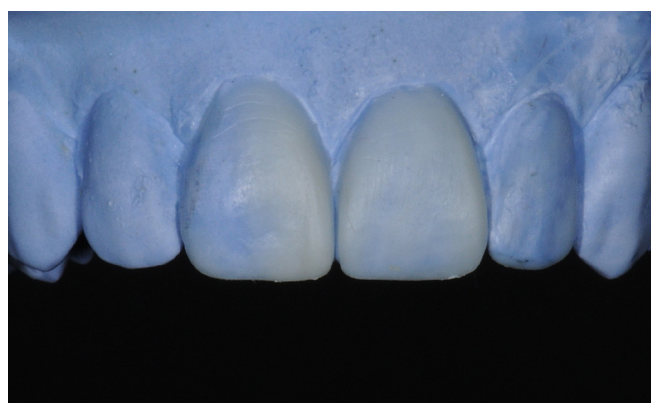
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Clinically, 2.1 and 2.2 underwent endodontic retreatments. Their adhesive reconstruction was carried out by intraradicular retention of the composite mass with glass fibre pins. Subsequently, during the endodontic retreatment of 1.1, the decision was made for endodontic treatment, because of the opening of the pulp chamber. In the end, taking into account aesthetic and resistance issues and technical difficulties, the choice was made, together with the patient, to include 1.1 into the prosthetic plan, thus offering the technician the possibility to redefine the concept of the "smile", casting both lead actors in frontal aesthetics – the central incisors.

In order to simulate the end work and make the provisional practice crowns, the arcades were imprinted, the occlusion and a wax-up **(Fig. 3)** – imprinted on the model – were carried out, and after the preparation of the teeth, the provisional crowns were made by the Scutan method.



3



4

After the preparation of the teeth, the arcades were imprinted and provisional acrylic crowns were made in the lab, by the CAD/CAM method. The third class plaster cast, with no movable abutments, was scanned, and the work was modelled using the CAD. Due to the CAD software and the scanner, for provisional works the work model may be scanned without movable abutments. The Wax-Up model may also be scanned in order to obtain a high fidelity reproduction of the wax work **(Fig. 4).**

Teeth 2.1 and 2.2 were prepared with threshold scaling, a classic for crowns, and 1.1 underwent a modified preparation (veneer-crown prep), which preserved the cingular palatal area with the second-class stop on the tooth. For the rest, at the level of proximal and vestibular surfaces, the preparation adhered to the principles of integral ceramic crowns. The threshold was placed at the juxtagingival level **(Fig. 7)**



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A provisional CAD/CAM work was opted for, so as to obtain a better adaptation and finish, in order to both protect the marginal periodontium and attain superior aesthetics during final restorative work. Like the Scutan crowns, this was cemented with temporary eugenol-free cement **(Fig. 5 and 6)**.

After cementing the PMMA block crowns, their proper adaptation, shape and correct framing may be observed. The shade is not perfect, because the milling blanks come in standard A, B or C shades. The CAD/CAM provisional crown method helps us save time and achieve precision.

The final impression was taken by means of normal grip addition silicone, with two consistencies at a time. The single-stranded method was used for 1.1, while the double-stranded method was used for 2.1 and 2.2 (unimpregnated strands, the second having been removed before injecting the fluid silicone around the preps). The antagonists' impression was taken in condensation silicone, with two consistencies at a time, while the IM was taken with a special silicone for occlusion recording.

The work model was made by the pindex technique, using the JetPin System (Jan Langner) **(Fig. 8)**.

In this case, the most important is the means of obtaining the integral ceramic crowns. Because 12 and 11 were devital, of modified shade and with provisional work, as may be observed in the image, their thickness was minimal. For the $\frac{3}{4}$ crown on 11, the vestibular facet thickness was 0.2mm. The fact that the abutment was the shade of the healthy teeth helped us obtain the final shade easier. We opted for making the crowns by the method of sintered ceramics on refractory die. After being mounted in the articulator, the abutments were sectioned, prepared at prep level and duplicated using the Jan Langner duplication cuvette. This type of cuvette helped us obtain refractory die abutments 100% identical to those of the work model. **(Fig. 9)**



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For ease of work and to make optimal crowns, a gingival mask was also produced, to replace the milled plaster in order to make the movable abutments. The technique of sintered ceramics on refractory die abutments is one of the most difficult methods of obtaining integral ceramic crowns, after the platinum foil technique. At the same time, the aesthetics rendered by it is clearly superior to any pressed ceramics, but inferior to the platinum foil technique. For ceramics sintered on refractory die, we lack the possibility to test at "biscuit" stage, in order to see if the shade is right. One other aspect that makes it difficult to tell the correct shade is that the refractory die mount is white, not identical to the shades of the abutments. This is why an individual colour key is created to test the chosen shade combinations. **(Fig. 10)**



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The chosen shades were nearly identical, so we could go on to sintering ceramics on the refractory die abutments. Before the first wash firing, we needed to carry out a heat treatment of the refractory abutments, consisting of their drying and degassing in an oven, at 1100°C. After degassing, the refractory die pores were closed by wash firing, using a transparent ceramic mass. For teeth 21 and 22, the stratification was carried out with opaque ceramic masses in the beginning, in order to mask the colour of the abutments.



11

The next firing was carried out with dentin masses, and for tooth 11, incisally, with opals. After sintering and after obtaining the shape of the crowns, I manually polished the crowns using rubber wheels and Pumice powder. **(Fig. 11)**



12

To check the shape and texture of the teeth after the final processing, we used a Majesthetik-silver texturpowder to highlight their shape. **(Fig. 12)**



13

Certain of their shape and texture, we may now carry out the glaze firing. After the last sintering, the abutments are sectioned from the refractory die under the facet pack and the extra refractory die is sandblasted using glass pearls. Before sending them to the clinic, the adaptation of the crowns is double-checked on the control model. **(Fig. 13)** Cementing was made by the adhesive technique for integral ceramics described by Pascal Magne.



14

The crowns received from the lab, uncarved, were tested using a transparent glycerine gel in order not to influence their aesthetics and to stimulate cementing. The threshold adaptation was tested along with the points of contact, the static and dynamic occlusal contacts, the emergence profile and, last but not least, the aesthetic framing. After the patient accepted the restorations, the actual cementing began. **(Fig. 14)**

AT THE RESTORATIVE LEVEL

1. The crowns were prepared by being placed in a silicone matrix that made them easier to handle.
2. They were carved in 9.5% hydrogen fluoride for 90 seconds, which was removed under running water.
3. The white precipitate was removed in 37% phosphoric acid stirred with an adhesive applicator, then washed under running water and wiped with an acetone-soaked applicator.
4. After drying and checking the inner surfaces, they were silanised with two-component silane for 60 seconds, then dried with hot air by means of a hairdryer for 120 seconds.
5. The inner surfaces were styled with a fifth generation adhesive, compatible with the dual grip cements. They were then protected from light.

AT THE LEVEL OF DENTAL PREPARATIONS

1. The teeth were properly isolated by the dam system, through the split dam technique, then the dental facets were carved in 37% phosphoric acid, 30 seconds on the enamel and 15 seconds on the dentin.
2. The facets were styled with adhesive without polymerisation.
3. The crowns were filled with translucent dual grip resin cement and then applied over the preparations. After a 2-3 second polymerization, the extra cement in its gel-state was removed marginally and interdentally. In order to avoid oxygen inhibition of the polymerization, the edges were distempere with glycerine. The facets were polymerized for 60 seconds each, then the edges were polished with silicone gums.

(Fig. 15-18)



CONCLUSIONS

The difficulty of the case was that the patient was herself a dentist, so every detail was important. However, due to the mutual trust and collaboration (between dentist-technician-patient/dentist), the result was successful both aesthetically and functionally.

The case was tracked over time. At the one, two and three year check-ups, the result had remained identical.

(Fig. 19–21.)



1 year



2 years



3 years

19–21



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Cristian finished his dental technician studies in 2000.

He has worked as a dental technician in Germany and the USA. He has owned his own lab in Cluj-Napoca, Romania since 2003.

He has gained specialist knowledge, by taking part in lectures held by Prof. Rudolf Slavicek, Masimiliano Trombin, MDT, Achim Ludvig, MDT, Jan Langner, MDT, Haristos Girinis, MDT.

Since 2012, he has been giving presentations and lectures in various cities around the country.

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*We wish all our Readers
a Merry Christmas
and a Happy New Year!*

PHOTO: DR. MENTES ÁRPÁD



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