IPS Empress® Direct

The highly esthetic composite

Tips & Tricks

from Dr Eduardo Mahn

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passion vision innovation

Introduction

Dr Eduardo Mahn

In my position as head instructor of practical courses on IPS Empress® Direct I have been asked certain questions related to routine clinical practice over and over again. In my many exchanges with colleagues in which we tried to come up with an optimal solution for specific cases, I learned many exciting ways of using this highly esthetic composite system. My aim in this publication is to answer the countless questions I have been asked in the past and provide some helpful tips and tricks. Numerous case studies, illustrations and step-by-step instructions clearly show how easy it is to use this system. I believe that IPS Empress® Direct will unlock the artist within every dentist and equip them with the tools that they need to restore the smiles of their patients.

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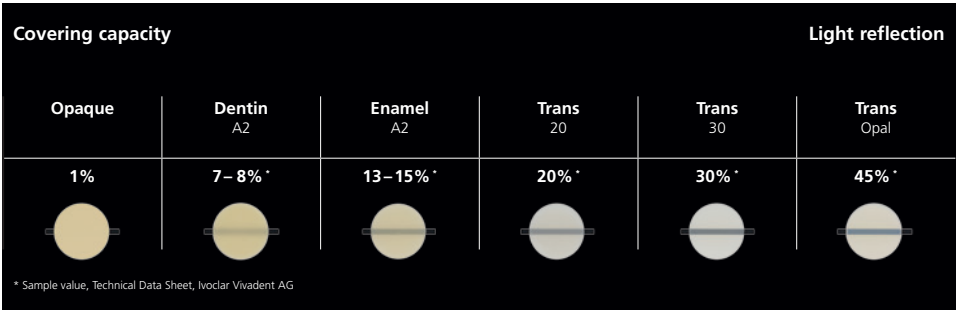
The IPS Empress® Direct System

There are basically two possibilities of imitating the colour and light properties of natural teeth with a composite resin system. The first option involves using a shade system based on the colour value. In this case, the dentin core is considered to be an important element in influencing the tooth colour. The dentin part determines the shade (hue) and the colour saturation (chroma) of the tooth. The enamel is responsible for imparting the tooth with the desired brightness (value).

The second option relies on the A–D shade system. This system offers the dentist various dentin and enamel materials that all have the same chroma. The colours merely differ in their level of opacity.

The value-based system produces very lifelike results. Nevertheless, experience has shown that in most cases, it is extremely difficult for the clinician to judge the opacity of the enamel accurately. Consequently, most of the systems available today do not rely on the value-based system alone. They also take into consideration different levels of colour saturation of the enamel. Overall, it is much easier to work with a composite resin that is based on the A–D system.

IPS Empress Direct uses the A–D system. The layering scheme is straightforward and easy and therefore allows dental professionals to work intuitively.



The IPS Empress Direct system comprises 32 colours: 13 dentin shades, 16 enamel shades and 3 translucent materials for the incisal areas. This opens up a wide variety of solutions to satisfy different clinical colour situations and light-optical properties.

In addition, IPS Empress Direct features three flowable Effect materials: Trans 30, Trans Opal and Enamel Bleach XL. These products allow you to optimally imitate the individual characteristics of natural teeth – e.g. “halo” effect or lifelike translucency of incisal edges.

Build-up in five steps

In order to obtain successful results with IPS Empress Direct, I recommend the following easy five-step build-up technique. This approach can be adjusted depending on the particular case.

1

Build-up of the palatal wall with IPS Empress Direct Enamel (e.g. Enamel A1)

2

Build-up of the dentin core with the dentin shade that matches the enamel material; if necessary a nuance darker (e.g. Dentin A1 or Dentin A2). Mamelons are created depending on the indication.

3

Optional incorporation of special effects, e.g. with Effect Trans Opal between the mamelons or with IPS Empress Direct Color.

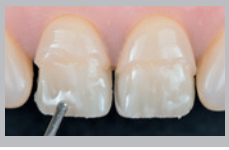
4

Create contours with a flowable composite resin, e.g. Tetric EvoFlow® A1.

5

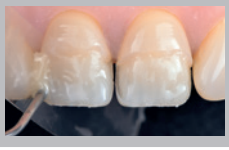
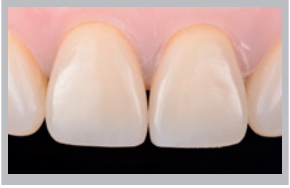
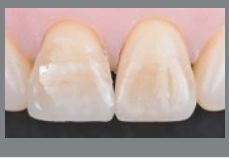
Coat the tooth with the corresponding enamel material (e.g. Enamel A1) and/or an additional thin layer of Trans 30.

The five steps can be minimally adjusted depending on the complexity of the case at hand. The procedure is suitable for straightforward treatments (standard restorations in three steps) as well as for demanding anterior restorations involving several shades and translucency levels.

	Step 1 **Build-up the palatal wall**	**Step 2** **Build-up the dentin core**	**Step 3** **Incorporate optional effects**
Standard restoration	Enamel (e.g. Enamel A1) 	Dentin (e.g. Dentin A1 or darker, e.g. Dentin A2) 	n/a
Extended method	Enamel (e.g. Enamel A1) 	Dentin (e.g. Dentin A1 or darker, e.g. Dentin A2) 	Trans Opal/Effect Trans Opal 
Demanding restoration	Enamel (e.g. Enamel A1) 	Dentin (e.g. Dentin A1 or darker, e.g. Dentin A2) 	Trans Opal/Effect Trans Opal **AND** Color 

This approach fulfils all the prerequisites for a practice-oriented build-up technique:

1. It is easy and simple to reproduce.
2. It is fast and efficient.
3. It is suitable for all types of clinical cases and can be adjusted to the indication being treated.

Step 4 **Complete the contact points with a flowable composite resin (e.g. Tetric EvoFlow®)**	**Step 5** **Cover with a layer of enamel material**	**The result**
	Enamel (e.g. Enamel A1) 	
	Enamel (e.g. Enamel A1) 	
	Enamel (e.g. Enamel A1) **AND** Trans Opal or Trans 30 in the incisal edge  	

Depending on the age of the patient, I recommend the following variations:

	Young patients	Middle-aged patients	Older patients
General age-related tooth structure	– Minimally worn incisal edge – "Halo" effect and mamelons are usually very distinct – Minimally worn enamel layer	– Slightly worn incisal edge – Less distinct "halo" effect and mamelons	– Considerably worn incisal edge – Proportions of enamel-dentin layers: • Thin enamel layer • Dentin is clearly visible
Build-up scheme	**5 shades** – Enamel – Dentin including mamelons – Characterization – Coating of the middle third with an enamel layer – Incisal edge with Trans 30	**4 shades** – Enamel – Dentin including mamelons – Light characterization – Coating with an enamel layer	**3 shades** – Enamel – Dentin – Enamel

FAQs

1. IPS Empress Direct comprises a wide spectrum of shades. How is the most suitable enamel and dentin shade determined?

Due to the intuitive shade system of IPS Empress Direct the following **rule of thumb applies**: Dentin shades are used to reproduce dentin and enamel shades to recreate enamel. For example, if Enamel A1 is used to build up enamel tooth structure, Dentin A1 can be used to form the dentin core in most cases.

Many people believe that the easiest way of selecting the dentin shade is on the basis of the cervical third of the canine, since the enamel layer is thinner here than in other teeth. This approach is assumed to be least susceptible to other influences. The enamel shade, however, should be selected on the basis of the incisal third of the tooth that is to be restored.

IPS Empress Direct makes the shade selection process very easy: The dentin and enamel shades are best selected according to the middle third of the canine. The influence of the gingival tissue on the tooth shade would be too high in the cervical region. The colour of the incisal area may appear too greyish due to the lack of dentin. If the tooth colour is determined on the basis of the middle third of the canine, the same IPS Empress Direct dentin and enamel shade can be used. If the colour of the natural tooth is located between two shade groups (e.g. A1.5), a combination of Dentin A2 and Enamel A1 is used. The following **general rule applies**: Select a slightly darker hue for the dentin than for the enamel.

- Shade selection on the basis of the middle third of the canine
- Use the same colour for the dentin and enamel
- In cases of doubt, choose a dentin material with a darker hue than the enamel

2. How can an incorrect colour choice be rectified?

In many cases, too much importance is attributed to the shade selection process in trying to achieve the desired esthetic appearance of a restoration. A small colour error will remain undetected if other criteria, such as brightness, shape and surface structure, are properly balanced. Therefore, the following two aspects are the most important ones to take into consideration when selecting the tooth colour: brightness and hue (A = reddish, B = yellowish, C = greyish, D = brownish). Establishing the correct level of brightness is of utmost importance. Most patients will immediately see if a restoration is either too light or too dark. Nevertheless, certain colour nuances, are very difficult to see for the untrained eye. As a result, I recommend arranging the shade guide from light to dark colours. This will simplify shade selection enormously.

Furthermore, it is important to remember that the overall brightness and translucency of the restoration is greatly influenced by the tooth shape (See Question 3). Therefore, it is important to closely imitate the thickness of the natural enamel and dentin layers.

IPS Empress® Direct shade guide arranged according to brightness

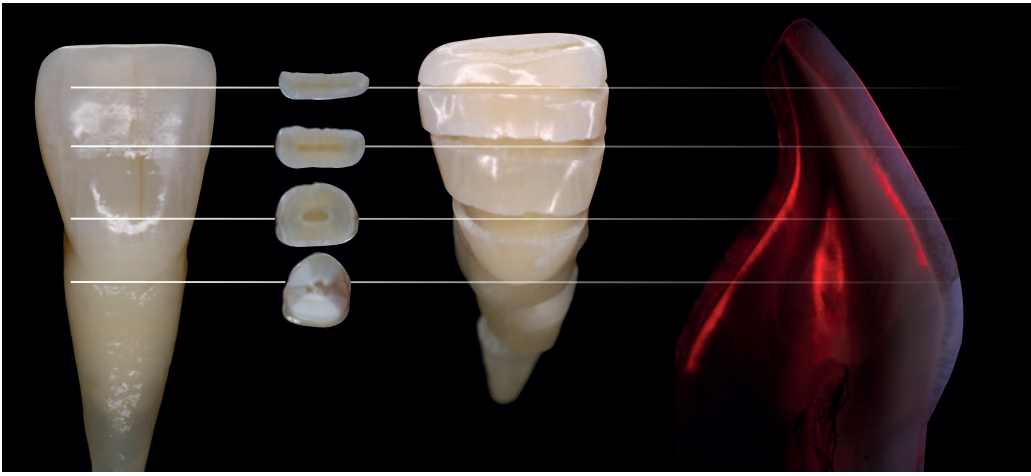
3. How thick should the dentin and enamel layers be?

Choosing the most suitable thickness of the dentin and enamel layers is immensely important for the overall esthetic appearance of the restoration. The thickness of the layers influences the way in which the colour of the restoration is perceived: for example, a filling may look either too grey or too light. The buccal enamel layer of anterior teeth is between 0.3 and 1 mm thick. It is important to take into consideration that the enamel layer is thinner in the cervical third than in the incisal third.

In addition, the build-up of the dentin core significantly influences the translucent properties of the restoration. If too little dentin and too much enamel material is applied towards the mesial aspect and the bevel, the restoration will become very translucent and have a greyish appearance. Furthermore, the bevel or the transition between the tooth and the composite resin could become visible.

Another important criteria to take into account is the patient's age. All the IPS Empress Direct dentin shades have a translucency level of between 7 and 8 percent. In young patients, therefore, the natural thickness of the dentin core should be recreated. With age, the dentin tooth structure becomes more translucent. Therefore, it is advisable to apply a thinner dentin layer in restorations for older patients.

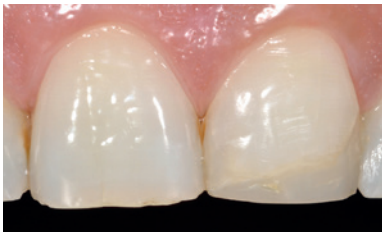
- In older patients, only a very thin dentin layer needs to be applied.
- In younger patients, the natural thickness of the dentin core should be recreated.



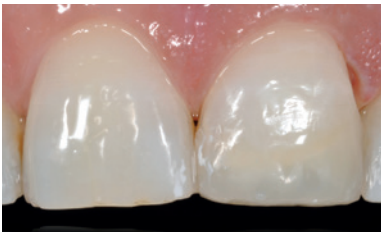
Gradual change of the shape, contours and enamel-dentin proportions

4. Why do some restorations look grey and therefore unnatural?

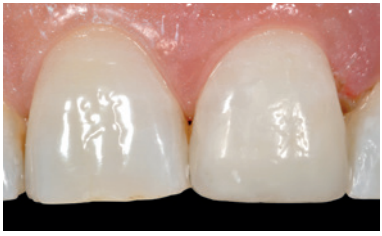
Enamel is more translucent and transmits light more readily than dentin. As a result, the overall appearance of an anterior tooth is considerably influenced by the dentin core. If the dentin core is too thin, more light can shine through the tooth. Consequently, the restoration will be too translucent and have a greyish appearance. The solution is to reinforce the dentin core. A supplementary thin layer of Trans 30 or Trans 20 can be applied. This reduces the overall brightness (value) and makes the tooth colour look natural.



The restoration looks too translucent, since it was placed with a universal material in one colour.



The restoration was replaced, but the dentin layer was applied too thinly. The tooth looks greyish.



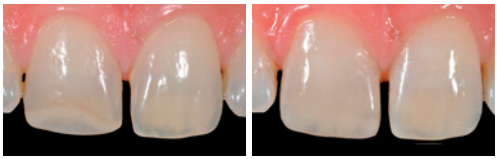
The dentin core was reinforced. Additionally, a long and deep bevel was created and covered with dentin material.

Follow-up after seven years

5. Why do some restorations look too light and therefore unnatural? How can this be avoided?

A very light overall appearance of a restoration may be caused by two reasons. The dentin core may have been created too thickly and/or the enamel layer too thinly. In this case, the thick dentin core masks the dark light in the background. Light is reflected from the dentin layer; the tooth looks opaque. In order to obtain an esthetic overall result, therefore, the dentin core should be reproduced according to its natural dimensions (See Question 3). At the same time, a generous amount of enamel material should be applied, since it will be reduced in volume during finishing and polishing.

The second reason could be that an excessively light dentin material was used. Since dentin is greatly responsible for the general chroma of the tooth, the restoration will look too light in this case. A dentin shade showing low colour saturation (chroma) should be selected and/or a thinner dentin core must be created.



The restoration on the left was too light and translucent. The restoration was adjusted by using the proper amount of dentin material. In addition, Effect and Trans Opal materials were applied.

- If the restoration looks greyish, the dentin core should be reinforced.
- If the restoration looks too light, the dentin core may have been created too thickly.
- Possibly, an unsuitably light dentin material was chosen.

6. Why do the enamel and dentin materials handle differently?

The IPS Empress Direct enamel and dentin materials require somewhat different handling. This is due to the different compositions of the two types of materials. Nevertheless, this aspect of IPS Empress Direct also represents one of its main strengths. The filler composition of a highly esthetic restorative material has to be more sophisticated than that of a universal composite resin. The IPS Empress Direct dentin materials contain a higher percentage of large fillers and prepolymers, which influences their viscosity. The enamel materials, however, have to satisfy different requirements. In order to ensure excellent polishability, long-lasting gloss and satisfactory wear resistance, these materials have to contain fine fillers.

7. How can natural-looking mamelons be created?

In this context, two factors need to be taken into consideration: on the one hand, the shape and number of the mamelons and on the other hand the relationship between the mamelons/dentin core and the incisal edge.

As far as the mamelons are concerned, the dentin core should be moulded in such a way that many irregularly shaped lobes are formed. The neighbouring tooth is used as a reference for the number and (ir)regularity of the lobes. The mamelons are easy to shape and form with a hand instrument, for example, OptraSculpt® with a pointed working end.

If the mamelons have to be accentuated, a small amount of the flowable IPS Empress Direct Effect Trans Opal can be selectively applied between the lobes.

Different possibilities of individually emphasizing the mamelons:

Layering with IPS Empress® Direct Dentin and Enamel

Layering with IPS Empress® Direct Dentin and Enamel and additionally Effect Trans Opal between the mamelons

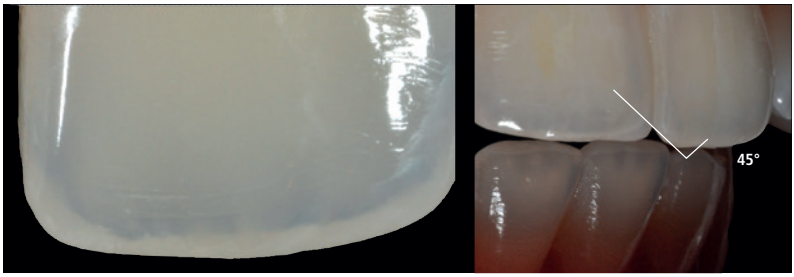
Layering with IPS Empress® Direct Dentin, IPS Empress® Direct Color Ochre and Enamel and additionally Effect Trans Opal between the mamelons

8. How can a natural-looking "halo" effect be achieved?

The "halo" effect is produced by the reflection of the colour of the dentin core in the incisal edge. It appears as an opaque line in the incisal edge.

The physical explanation is as follows: Light in the red-yellow wavelength range is reflected along the inner lingual-incisal enamel surface. The red-yellow light has a flat angle of incidence at the surface. As a result, it cannot penetrate the enamel. Instead it is reflected or scattered by the bucco-lingual incisal surface. The "halo" effect occurs when a buccally facing lingual-incisal enamel surface is positioned at a right angle. Unabraded incisal teeth usually exhibit a "halo" effect. Teeth with wear facets along the incisal edge do not always show this optical effect. The wear facets must be inclined towards the buccal aspect.

IPS Empress Direct Effect Enamel Bleach XL is highly suitable for producing a natural-looking "halo" effect. This Effect material has the proper level of opacity (11 – 12%) for this purpose. Due to its excellent flowability, it can be applied with utmost precision. In order to protect this artificially created effect from wear or occlusal adjustments, a suitably angled incisal restoration margin of approximately 45 degrees should be created.

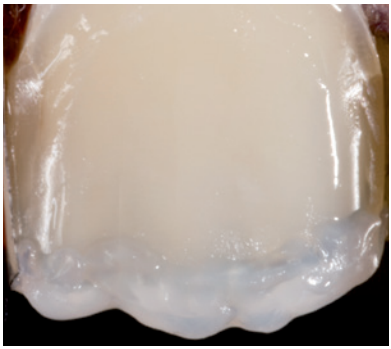


"Halo" and "opal" effect: The "halo" effect is produced by either using a whitish composite resin (IPS Empress® Direct Effect Enamel Bleach XL) or by creating an incisal edge with a 45° angle.

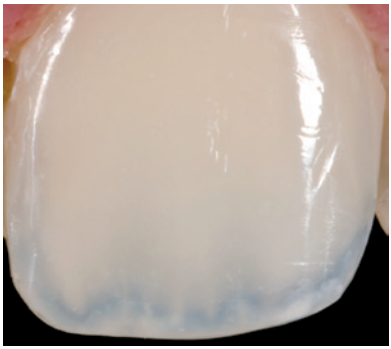
9. What is so special about the Trans Opal material and how is it used for best results?

The material called Trans Opal offers an efficient way of creating the "halo" effect. IPS Empress Direct is one of only a few composite resin systems that comprises an opalescent product. A special "micro-opal" filler is responsible for imparting the natural-looking opalescence to the material. The Trans Opal material is available in a mouldable and a flowable version. It allows you to faithfully imitate the opalescent shimmer of natural incisal enamel. In order to achieve this sophisticated effect you do not have to use various stains or colour combinations.

Additionally, IPS Empress Direct Effect Trans Opal is also very useful for accentuating mamelons. Due to its excellent flow properties, this material can be applied very accurately between the lobes (See Question 7).



Application of Effect Trans Opal



Result after high-gloss polishing

10. What is the difference between IPS Empress® Direct Trans 20 and Trans 30?

The two translucent IPS Empress Direct Trans 20 and Trans 30 materials are very useful as the final layer for Class IV restorations and direct veneers. The translucency level used will depend on the thickness and the brightness (value) of the enamel. As a general rule, Trans 20 is indicated for younger patients and Trans 30 for older people.

A stronger effect is achieved by using Trans 20 or Trans 30 as a thin coating on fissures that have been previously created with IPS Empress Direct Color. This helps to emphasize their appearance compared with when a coating of enamel material is used.

Effect after the application of Trans 20

Effect after the application of Trans 30

11. Which shades from the IPS Empress® Direct system are best suited to obtain certain effects?

The Effect and Color assortments of the IPS Empress Direct System offer an excellent selection of materials for producing exceptionally esthetic effects easily and efficiently. Since the IPS Empress Direct Color materials are unfilled composite resins, these products must be incorporated under the enamel and incisal layers (Step 3 of the five-step build-up technique). In order to further enhance a desired effect, it can be coated with a layer of IPS Empress Direct Trans 20 or Trans 30 (See Question 10). The choice of the shade depends on the indication and the intended effects.

Effect	Indication	Shade
Enamel cracks	Unstained/Lightly stained Severely stained	White, Honey Ochre
Hypocalcification	Light tooth Dark/Yellow tooth	White, Effect Bleach XL Honey
Stains	Fluorosis Masking of dark areas Stained fissures Tea/Nicotine stains Severely stained fissures	White, Honey Opaque Ochre, Brown Grey
Incisal third	Young patients Middle-aged patients Older patients Application/Enhancement of translucency	Trans Opal, Trans 20 Trans Opal, Trans 30 Trans 30 Blue, Violet
Mamelons	Accentuating the interspaces between the dentinal lobes (emphasizing the mamelons)	Effect Trans Opal Blue, Violet
Halo effect	Opaque incisal edge, particularly in younger patients	Effect Bleach XL, White Trans Opal
Cervical areas	A and B shades C and D shades	Ochre Brown
Worn surfaces	Worn and lightly stained Worn and severely stained	Ochre Brown
Dentin core	Accentuation of the dentin core, particularly in posterior teeth	Honey, Ochre

Case 1:
Application of IPS Empress® Direct Color Ochre, White and Effect Trans Opal

Build-up of the palatal wall with IPS Empress® Direct Enamel A1

Shaping of the dentin core with Dentin A2

Application of IPS Empress® Direct Color Ochre

Irregular fine dabbing application of IPS Empress® Direct Color White

Effect Trans Opal on the lower incisal third

The contact points are completed with Tetric EvoFlow® A1 and a final layer of Enamel A1 is applied.

Situation after finishing and polishing

Case 2:
Application of IPS Empress® Direct Color White, Honey and Blue

Build-up of the palatal wall with IPS Empress® Direct Enamel A1

Shaping of the dentin core with Dentin A2

Application of IPS Empress® Direct Color Honey in the middle third of the tooth and Color Blue between the mamelons

Application of IPS Empress® Direct Effect Trans Opal

The proximal contacts are created using Tetric EvoFlow® A1 and a final layer of IPS Empress® Direct Enamel A1 is applied.

Situation before polishing and excess removal

Final situation

12. How can severe stains be successfully covered?

IPS Empress Direct Opaque is highly suitable for masking severely stained tooth structure. For this purpose, a minimal layer of max. 0.5 mm needs to be applied. This is adequate for achieving optimum coverage. Subsequently, the appropriate dentin and enamel layer thickness is built up in order to achieve the desired esthetic appearance of the restoration (See Question 3).

Pre-operative situation

Roughening of the surface with Adhese® Universal

Application of IPS Empress® Direct Color Opaque

The remaining stains can be effectively hidden with Dentin A2.

Application of the final layer of Enamel A2 with the help of OptraSculpt® Pad

Final situation

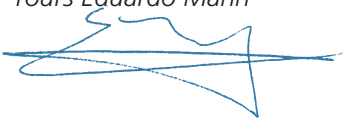
13. What is the best way of polishing IPS Empress® Direct without removing the surface structure?

Due to the special formulation of the enamel materials containing fine filler particles, IPS Empress Direct can be polished easily and quickly. At the same time, IPS Empress Direct exhibits a durable gloss. Since teeth demonstrate a certain surface structure, the polishing instruments used on them should not be abrasive. Rubber polishers (e.g. the OptraPol® one-step polishing system) are recommended. For the subsequent high-gloss polishing step, an average polishing pressure (approx. 2 N) is adequate.

The three-step polishing system Astropol® offers a viable alternative. This system is easy to use and produces excellent polishing results. Every clinician will achieve a high gloss quickly and efficiently. Only 30 seconds are necessary for each polishing step.

I have provided you with a short impression of the great restorative possibilities offered to dentists by IPS Empress Direct. The material represents an excellent symbiosis of esthetics, creativity, accuracy and efficiency. I wish you much pleasure and success in using this intelligent composite resin system. Helping your patients regain their natural, beautiful smile has just become a lot easier.

Yours Eduardo Mahn



Direct Restoratives

IPS Empress® Direct forms part of the "Direct Restoratives" product category. The products of this category cover the procedure involved in the direct restoration of teeth – from preparation to restoration care. The products are optimally coordinated with each other and enable successful processing and application.


OptraGate®


Adhese® Universal


IPS Empress® Direct


Bluephase®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Fluor Protector S

PREPARE | BOND | **FILL** | CURE | FINISH | MAINTAIN

THESE ARE FURTHER PRODUCTS OF THIS CATEGORY:

Adhese® Universal

The universal adhesive

Universal adhesion with advanced delivery

- Efficient delivery – up to 190 single-tooth applications per 2-ml VivaPen®
- Universal applications – for direct and indirect bonding procedures and all etching techniques
- Predictable results – high bond strength on dentin and enamel

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- Every hand – comfortable to hold for men and women
- Every material – universal due to Polywave® LED with broadband spectrum
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Would you like to know more about the products of the "Direct Restoratives" category? Simply get in touch with your contact person at Ivoclar Vivadent or visit www.ivoclarvivadent.com for more information.

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