Discovering the world of dental ceramics

A blog delivers answers to questions about dental ceramics which concern dental laboratories today:

By Ivoclar Vivadent

Ivoclar Vivadent has established a new interactive online platform, whose contents address the challenges currently facing dental laboratories.

In our fast-paced world, dental laboratories are confronted by many questions. They look for enhanced efficiency and cost-effectiveness; for solutions that provide reliable support in their everyday work. Many are unable to keep track of the continuously increasing variety of products, product systems and processes that are entering the market and thus seek direction.

Increasing productivity and efficiency

The new online platform www.worldofceramics.com provides useful tips on the issues that concern laboratory owners. For example, they will learn how to increase the productivity of their lab, what they should pay attention to when selecting a ceramic material or equipment and what the current trends in the field of dental ceramics are. Moreover, they will be given the opportunity to participate in the discussion and contribute their experience as well as provide further tips.

New products in October

But that’s not all. During October, dental technicians will be informed about the new products developed by Ivoclar Vivadent and how these will provide answers to today’s pressing questions for dental laboratories.

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Natural-looking imitation of pink esthetics

Completing a denture base using the IvoBase System

By Carsten Fischer, Germany

Even in the case of complex prosthodontic reconstructions, patients want their dentures to look natural in addition to having the basic functions (speaking, chewing, tasting) returned to their stomatognathic system. Dentures should by no means have an adverse effect on the patient’s esthetic appearance. Esthetic soft tissue design reflects this philosophy.

The IvoBase® denture base system offers an efficient method to create custom-made esthetic soft tissue reconstructions. The patients’ expectations can be ideally met with a flair for esthetic design and a combination of three materials – IvoBase denture base material, SR Nexco® light-curing lab composite (customization) and ideally designed denture teeth.

IvoBase System

The IvoBase System is based on a fully automated injection and polymerization process. All the components (flasks, capsules, injector, etc.) are coordinated with each other. Chemical shrinkage of the resin is compensated during the polymerization process due to thermal management in the flask. As a result, volumetric shrinkage is prevented by the continued supply of additional material during the polymerization process to provide a denture base that demonstrates a high accuracy of fit and an excellent surface finish. Chemically, the IvoBase denture base material falls into the category of self-curing polymers but offer the qualitative advantages of heat-curing polymers. As the self-cure process of IvoBase commences at a starting temperature of 40°C, thermal shrinkage is reduced compared with that of conventional heat-curing polymers. Monomer and polymer are supplied in pre-dosed capsules to ensure an optimal mixing ratio and to eliminate direct skin contact with the monomer.

The IvoBase System results in denture bases that demonstrate lifelike pink esthetics and closely resemble the light-optical properties of the natural gingiva. Characteristics can be easily applied to the denture bases to accommodate the specific expectations of the patient.

Case presentation

A partially edentulous upper jaw was to be restored with a palate-free denture retained with telescopic crowns. The inner (primary) zirconia copings for IPS e.max Press Multi and the outer (secondary) ceramic frameworks for IPS e.max Press Multi from Ivoclar Vivadent were to be merged using an intermediate layer of IPS Empress® Direct resin.

Fig. 1: Esthetic try-in of the wax-up

Fig. 2 and 3: Press-up after successive contouring of the 20

Fig. 4: The teeth are conditioned and the stone parts isolated.

Fig. 5: The infiltrated spacer layer is removed and the framework repolished on the framework.

Fig. 6: The flask and IvoBase mixture are placed in the injector and the program is started.
Fig. 7: Careful deviating after the fully automated polym-erization process.

Fig. 8: Finishing requires only a few steps as the wax-up is processed into the acrylic without loss of accuracy.

Fig. 9: Light-curing SR Nexco compos-ite can be optimally combined with the IvoBase System to characterize the denture base.

Fig. 10: A thin coating of bonding agent is applied to the gingiva-coloured parts...

Fig. 11: ...and cured with light.

Fig. 12: Characterization: subtle stippling and fine red blood vessels enhance the natural appearance of the pros-thetic gingiva parts.

Fig. 13: The individual SR Nexco materials can be adapt-ed using a disposable sponge.

Fig. 14: The tooth replacement harmoniously integrates into the patient’s face.

Fig. 15: Successful interplay between light, shadow and shade. The surface texture modelled in wax has been processed into acrylic without loss of detail using the IvoBase System. The result: Surface-ergonomic properties convey a natural appearance to the artificial gingiva.

teeth no. 15, 14, 15 and 24, 25, 26 were sheathed with electrofor-med copings (secondary parts) attached to a tertiary structure made of base alloy. The electro-formed copings were cemented to the base alloy structure in the oral cavity to ensure a ten-sion-free fit. Tooth setup was performed according to con-ventional prosthetic principles while the static and functional requirements as well as the pa-tient’s individual expectations were taken into account. Tooth position, smile line, lip volume, phonetics and other criteria were checked in the course of an esthetic try-in (Fig. 1) before fabricating the final denture.

Lab procedure

After both the dentist and patient had approved the wax-up, the denture was ready to be pro-cessed into acrylic. To perform this task, I used the IvoBase den-ture base system, which allowed me to transfer the wax-up to the final restoration without loss of detail.

Waxing and boiling out

Both flask halves were identical. Prior to investing the model, I placed the flask lid, access for-
ner half and filter wax compo-nent in one of the flask halves. After applying a thin coating of petroleum jelly to the inner surfaces of the prepared flasks, I soaked the model with the mounted waxed-up denture with water and isolated it with stone-to-stone separating fluid. The model was now ready for being invested in plaster; a Class III dental stone for this purpose. I took care to place the model at the centre of the flask and to ensure a space between the anterior margin of the model and the flask of approx. 10 mm. To create a flush surface between the edge of the model and the flask housing, I moved all surplus plaster whilst it was still soft. The stone surface should be flush with the access forner to allow for a stress-free work flow during spalling during the subse-quent working procedure.

After the stone had hardened, I replaced the access former with the access former full and positioned the prefabricated injection wax component. As a palate-free denture base was fabricated in the present case, the sprues were pressed onto the maxillary tuberosity. I made sure that the sprue was contigu-ous in all areas of the denture base. Then, I attached what are known as insertion channels at the anterior region to vent the wax cavity during the injec-
tion process. These components were also prefabricated and were easy to connect to the dentu-re base. Important: the aeri-
ation channels must not come into contact with the flask hous-
ing. I coated the teeth and gingival areas with a medium-
body addition curing silicone (A silicone of a Shore hardness of 65) and then applied some slip-
ings to the silicone before it had set to create a retentive layer and secure the silicone in the stone. No silicone was applied to the occlusal surfaces and access former. After isolating the stone surface, I positioned the upper half wax and locked the flask halves using the locking clasp. Then, I filled the flask with den-
tal stone (Class III) with the help of a vibration device to avoid air bubbles. Excess stone was skimmed off so that a flush sur-
face resulted between the stone and flask lid. Once the stone had set, the flask was heated in a water bath at 90°C and then the flask halves were sepa-
rate. The wax was now soft and could be easily removed in large pieces. After the full access former (flask lid) was out, the model and teeth were boilt out with clean boiling water to thor-
oughly remove all wax residue.

Resin-bonding

The basal surfaces of the cleaned teeth were roughened with jet medium and mechanical reten-
sions applied with a small round bur. Also, I returned the teeth to the silicone key. Next, I applied a thin coating of Separa-
rating fluid to the stone sur-
faces of the cooled flash halves (Fig. 4). Prior to joining the flash halves, I masked the base metal alloy framework with opaquers. For this purpose, I used a pink opaquer for the gingival areas and a tooth-coloured shade for the areas under the tongue teeth. These materials were first applied as a foundation layer for the gingivae. Then, I placed it on the model and secured with wax (Fig. 5). The aeratation filter, centring insert and fianned were inserted and the flash halves as-
sembled.

The denture base materials are available in seven shades. For the case presented here, I se-
lected IvoBase High Impact in shade 54 V. I removed the mon-
crystalline container from the pre-
dosed capsule, joined the fluid and powdery and mixed the two components to a homogeneous mixture. With a few easy manip-
ulations I attached the centring insert and flask to the capsule and then placed them into the in-
jector according to the manu-
facturer’s instructions. Next, I selected the relevant injection program and then started the in-
jection process (Fig. 6). The pro-
cess was fully automated and, with the RMR function added, took approx. 45 minutes to com-
plete. The RMR function further reduces the already very low contac-
time with the patient to below one per cent. As the injec-
tion and polymerization process were exactly matched to the ma-
terial, chemical shrinkage was completely compensated. Once the program had been complete, I removed the flask and cooled with water. Divesting was per-
formed under a dental press.

The IvoBase System includes a divesting aid to facilitate this process. Having detached the flash halves, I carefully removed the denture from the stone core and separated the wax by using a separating disc (Fig. 7). All wax-up areas were faithfully reproduced in the acrylic.

Completing the denture

Now, I directed my full attention to finishing the denture. The advantage of using this system became most apparent at this stage, as hardly any rework-
ing was necessary. The finely modelled surface structures and textures of the wax pattern were replicated in the acrylic without loss of detail. In a few quick steps, the denture base was ready for final customiza-
tion (Fig. 8). With SR Nexco, the artificial gingiva can be given an individual touch and natural-
looking characterizations to suit the patient’s expectations. SR Nexco ideally complements the IvoBase denture base material (shade 54 V) (Fig. 9).

I applied a light-curing con-
ditioner (SR Connect) to the acrylic surface to create an ad-
hesive interface that would al-
low the application of individual shade characterizations (Figs 10 and 11).

After that, I focused on creating subtle details to re-
produce a natural depth effect. I

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Middle East & Africa Edition | September-October 2015

2C LAB TRIBUNE

DENTAL TRIBUNE Middle East & Africa Edition | September-October 2015
Accurately colour zirconia using the Amann Girrbach colouring concept

By Amann Girrbach

Colour zirconia restorations accurately and reproducibly – this is performed successfully using the Ceramill Colouring Liquids from Amann Girrbach. The colouring liquids were developed and adapted according to the specific material characteristics of the respective zirconia group (LT, HT, SHT) to ensure consistently exact and reliable results based on the VITA classical shade guide. All shades of the VITA classical shade guide can only be reliably matched right away using this optimal harmonisation of material and colouring solution.

Three material-specific Ceramill Liquid sets have been created that are used for easily and precisely customising the milled restorations.

A compact liquid set with 4 basic shades and 2 shade modifiers was therefore developed specifically for the slightly translucent zirconia Ceramill ZI (LT), which only requires an aesthetic basis for the porcelain veneer due to its use as an anatomically reduced framework material.

A clearly designed set of colouring solutions in the 16 VITA classical tooth shades and shade modifiers for the incisal/occlusal surfaces and gingival region is also available for each of the (super-) highly translucent zirconia materials Ceramill Zolid and Ceramill Zolid FX (HT/SHT), which are also used for monolithic restorations. The shades can be applied directly to the restoration without mixing and optimise the reliability and efficiency of the workflow. Both liquid sets provide the maximum degree of aesthetics, customisation and cost-effectiveness as they are coordinated with one another as well as with the specific working and material parameters for Ceramill Zolid and Ceramill Zolid FX.

The Amann Girrbach colouring concept is completed by the Ceramill Stain&Glaze set, which can especially be used to enhance the light dynamics and in-depth shade effect of monolithic restorations.

Ceramill Liquid FX Set including colouring guide

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The Fascination of Simplicity

By Dr. Patrice Lalet, France

A
fter 50 years of research and development, CEREC technology is so highly user-friendly that tasks can be handled quicker, more easily and more successfully. Using dental CAD/CAM technology for the first time is easier than you would think and is worthwhile for all dentists. New software features, which further enhance user comfort and offer additional treatment safety, make the system especially interesting to newcomers of all ages. Starting out in the world of CAD/CAM production is not normally a cause for concern for younger dentists who have grown up using PCs, mobile phones and tablets. And experience has shown that even less technology savvy dentists quickly get used to the computer support - making treatments extremely safe thanks to its intuitive operation. Nevertheless, during this initial period, CEREC training is highly recommended to allow users to learn how to use the system as quickly and safely as possible.

Intuitive user guidance leads to impressive results. CAD/CAM technology is appealing thanks to its impressive results. Its usability means that even dentists who have not grown up as “digital natives” can use CEREC easily. An easy-to-operate camera replaces the conventional impression technique using a tray and impression material. Quick, digital, extremely precise – and no prior powdering is required. The various restorations are then designed with the intuitive CEREC software with user guidance and active feedback. The subsequent in-house production of the restoration ensures precise results and enthusiastic responses from patients. It also increases the value added in the practice. And the possibility of single visit dentistry which leads to more comfort for the patient and the dentist.

Brief case report

A very typical example for CEREC treatment is presented in the following case: A 42-year-old patient came to my practice to improve the look of her anterior teeth. Since the teeth emerged at the age of 6 or 7 years she suffered from a lack of enamel. So we decided to make crowns on lively teeth. With the aid of the CEREC Bluecam we captured the preparation, the antagonist and the bite situation and the 3D preview appeared on the monitor in the CEREC software.

On the basis of these intraoral impressions the software generated a virtual 3D model. When generating the initial proposal for the four crowns, the software used the Biogeneric modelling function. We sent the design of the restorations to the CEREC milling unit and clamped a bloc made of zirconia reinforced Lithium-Silicate. The transparency of the ceramic assured very natural looking teeth. We added stain and glaze to obtain this result. After characterisation, we placed the crowns and the patient could leave the practice with a new nice smile.

Quo vadis, cerec?

Powder-free impressions in natural colors, designing in an intuitive software and the grinding of a wide range of innovative materials - all these treatment steps are possible in every practice with CEREC. It is the only professional CAD/CAM system worldwide, which allows you to offer all-ceramic restorations in a single visit with a clear conscience. Using the latest digital technology there are no limits to construct fully anatomical bridges as well as implant restorations. With the patient specific surgical guides CEREC GUIDE 2 for a safe placement of implants and the CEREC ORTHO software for orthodontic treatments CEREC enables an incomparably broad range of applications to the practitioner and the patient to ensure optimal treatment result.

Experience new freedom in your lab processes breaking the chains of former dependencies with inLab and the new 5 axis milling and grinding unit inLab MC X5. Open for all restoration data, combining the largest material range and the possibility to machine both wet and dry disks and blocks - for no limitations to your production. Enjoy every day.

With Sirona.

INLABMCX5.COM

The Dental Company

Dr. Patrice Lalet has been a CEREC user for 15 years and received his certification as a CEREC trainer from ISCD in 2004. Dr. Lalet is member and co-founder of the French CEREC training team e-dentisterie.