# GC get connected <sup>6</sup> Your product and innovation update



2016

## GC get connected Your product and innovation update



## **Dear readers** Welcome to the 6<sup>th</sup> edition of GC's Get Connected newsletter.



#### Dear reader,

Welcome to a new edition of GC Get Connected, the sixth edition already and we're glad to hear you keep enjoying browsing through these pages, keeping up with the latest topics about GC, its people and its products.

This year GC celebrates its 95th anniversary, another milestone on our way to our centennial anniversary in 2021. Since 1921, we've come a long way indeed. Our presence in Europe started in 1972 in Kortrijk, in the south-west of Belgium. Twelve years later, in 1984 this Branch moved to our current site in Leuven. Since then, we've been continuously expanding our presence in surface and numbers. Today, as GC Europe, we cover 84 countries and 2,1 billion inhabitants; representing 35% of the dental consumables market worldwide! It is nice to know that we ship our goods to 75 countries by means of 14000 shipments per year.

As you can see, we've gone through some major changes in the past, but also the present is facing us with a number of challenges. At the same time we are rapidly adapting the organization to face these challenges, successfully entering the field of digital dentistry and transforming the structure of the organization: into a modern functional Matrix system.

Because ... at GC, excellence is not a destination ... it is a continuous journey. From its beginnings in Japan in 1921, GC has made the journey to excellence a hallmark of all its activities and to this day, every new associate is aware of the role that he or she plays in helping the company to achieve this. That is why we embarked in 2006 on the EFQM journey.

Since we have embarked on the EFQM journey for Business Excellence, we have already achieved a number of important recognitions. And our participation to the EFQM Excellence Award, Europe's most prestigious award on Business Excellence / Total Quality Management, in the year we are celebrating our 95th anniversary, means a lot to me and all associates of GC Europe.

I'm sure, that in five years for our centennial anniversary, GC will have overcome the challenges we're facing today and will keep on growing in the same organic way we did until now, serving you and your needs.

In the meantime, we hope that for these next five years you'll keep on reading our Get Connected newsletter, it's easily the most efficient way to keep in touch with GC!

Enjoy the read,

#### Michele Puttini

President, GC Europe

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## Essentia® from GC

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- Active Member of the European Academy of Esthetic Dentistry EAED
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# Full-mouth rehabilitation

using **Essentia** composite and **OPTIGLAZE colour** characterisation material in

characterisation material in combination with a multi-layer thermoforming technique based on wax-up

#### Clinical case report by Dr Iñaki Gamborena

The increasing reliability of composite restorations has made them a genuine alternative treatment for full-mouth oral rehabilitation and a conservative option when recreating to a certain degree the function and aesthetics lost by the patient. Performing a full-mouth rehabilitation with composite represents a great challenge, especially in regard to the creation of interproximal contacts as well as ideal contours and occlusion, while still ensuring a natural integration of the restorations with the original dentition.

#### Technique

This clinical case report outlines a simple technique for full-mouth rehabilitation using a thermoformed tray to create direct composite restorations. This technique consists of creating a full-mouth rehabilitation wax-up, duplicating it in stone and then using a thermoforming device to create a guard that will be used to mold the direct restorations. This guard is obtained using a highly precise transparent PET-G thermoplastic (belonging to the polyester group) and a Biostar pressure-molding (thermoforming) machine, which will heat the sheet of plastic and press it (with 20bar pressure) against the stone duplicate of the wax-up. The advantage of this method is that it provides a reliable duplicate of the wax-up, free of any distortion and precisely reproducing the sculpted anatomy.



Figures 1 & 2 Initial situation: 28-year-old female patient displaying generalised tooth erosion due to gastric reflux and high consumption of carbonated drinks.

#### Patient

A 28-year-old female patient came to the clinic with severe generalised tooth erosion (Figures 1 & 2), essentially due to gastric reflux and the intake of three litres of acidic soft drinks per day. Care was taken to explain to the patient the dangerous consequences this could have on her general condition as well as her oral health. It was mutually agreed that she would stop consuming carbonated drinks during and after the rehabilitation. The patient was offered several alternatives to restore her dentition (lithium disilicate onlays and veneer restorations) but due to financial concerns it was decided to restore her eroded teeth using direct composite and to arrange regular recall visits to monitor the wear.

**Figures 3 & 4** The clinical assessment of the tooth structure loss in the anterior front teeth is performed using a composite mock-up, in order to discuss with the patient the expected aesthetic outcome. This is an important step in the aesthetic evaluation that is necessary to get the patient's approval before any further work is performed.

#### **Treatment**

An aesthetic mock-up was directly performed with an enamel composite (Essentia Light Enamel, LE) in order to restore the missing tooth structure from canine to canine (Figure 3). This allowed the patient to visualise the amount of lost tooth structure and the expected aesthetic outcome to be achieved after completion of the treatment (Figure 4). Once the patient approved the aesthetic result, composite restorations were performed on the lower canines to open the bite and to allow the reconstruction of the posterior occlusal anatomy. This step is also important because it enables us to give the lab technician a precise vertical dimension.





A precise wax bite registration of the centric position and open vertical dimension was then established (Figure 5) and sent to the dental technician along with silicone impressions of the composite mock–ups on the upper and lower arches. In this way, the technician was able to mount with precision the master models (Figure 6) and to recreate the missing tooth structure using wax.

Three different models were produced: one representing the original situation with erosive wear





**Figures 5 & 6** Composite restorations are performed on the lower canines following an ideal occlusal plane, and the vertical dimension is assessed clinically in order to transfer the increased correct centric bite and diminish the posterior occlusal adjustments. Full-contour wax-up of the missing structure is then performed in order to satisfy the functional stability of the rehabilitation.

#### (Figure 7), one showing the wax-up of the missing tooth structure (Figure

8) and the third one duplicating the wax-up in stone (Figure 9).



Figures 7, 8 & 9 From initial situation to diagnostic wax-up and stone duplication. (Dental technician: Dr Iñaki Gamborena)

The upper and lower thermoformed trays (dual-layer) were then fabricated using the pressure-molding machine Biostar. The first thermoforming step was made using Copyplast (0.8mm), a visco-elastic material that does not bond to composite or acrylic. The second thermoforming (made on top of the first one) was performed with Duran (2.0mm), a more rigid material that bonds to acrylic - providing stability and strength to the dual-layer tray (Figure 10). The two-layer thermoformed tray was then tried in the mouth (Figure 11) and relined against the lower arch (Figure 12) with clear acrylic to increase the strength and create pressure through the bite during composite insertion into the tray. The same was done with the lower arch against the upper as shown in Figure 13.



**Figures 10, 11, 12 & 13** Using the stone duplication wax-up, two consecutive vacuum thermoforming steps are performed. This two-layer thermoforming tray is then tried in the mouth and relined against the lower arch with clear acrylic.

In this case, interproximal contacts had been recreated in a previous session, in which caries control was also performed. To maintain the integrity of the interproximal contact points and cervical contour, some Teflon was packed below the interproximal contacts (Figure 14).

Two layers of composite were used, starting with a dentin layer that was placed on all teeth at once on the entire arch. Essentia composite (GC) was chosen for its user-friendly shade selection and its viscosity, which allows an easy application before inserting the tray. When the patient bit on the tray, the anatomy previously created on the wax-up was reproduced by "pressure-molding". After the light-curing step, the tray was removed and some dentin anatomical adjustments were carried out with a bur in order to create more space for the second enamel layer.

Before the enamel layer was applied, the cervical anatomy was finalised with the help of burs, and internal brown stains (OPTIGLAZE colour, GC) were used to provide a more natural look to the final composite restorations. After light-curing the stain, the second layer of enamel composite was applied on the whole arch on top of the dentin. At this stage, care must be taken with respect to the quantity of material applied in order to avoid excesses and bubbles. In this case, Essentia Medium Dentin (MD) was used as the dentin shade and Essentia Light Enamel (LE) as the enamel shade.

Once the full contour with the final layer of enamel composite had been performed and polished (Figure 15), a layer of external stain was applied to create a better blend between the composite restorations and the existing tooth structure. OPTIGLAZE colour was used to emphasise the incisal and interproximal characteristics and provide a more natural look to the restorations (Figures 16, 17 and 18). The same procedure was then performed for the lower arch.



**Figure 14** Some Teflon is packed below the interproximal contacts to maintain the integrity of the interproximal spaces.



**Figure 15** Clinical result after applying two consecutive layers of composite (first dentin, then enamel).



Figures 16, 17 & 18 Application of an external characterisation glaze, OPTIGLAZE colour, to improve the integration of the restoration within the natural dentition.

We can see the final results of the upper and lower arches before and after full-mouth rehabilitation with Essentia composite (Figures 19 & 20) and a close-up view of one of the posterior quadrants (Figure 21).

One crucial step is to carefully handle interproximal contacts; this can be done by defining precisely the marginal crest and delimiting the interproximal contacts on the stone duplicate. Interproximal contacts were polished and recontoured with #15 and #12 surgical blades.



Figures 19a & 19b Upper arch before and after full composite reconstruction using Essentia Medium Dentin MD, OPTIGLAZE colour Brown stain and Essentia Light Enamel LE with White, Lavanda and Olive colours.



Figures 20a & 20b Lower arch before and after full composite reconstruction.



Figures 21a & 21b Close-up characteristics before and after the posterior composite reconstructions using just two layers (dentin, enamel and internal staining).

We can appreciate the advantage of using internal stains on the occlusal surface of posterior teeth, but it is even more eloquent on the palatal view of the upper anterior teeth (Figure 22), and looking at line angles and mamelons. Although no preparation was performed on the







After this rehabilitation, a night guard (Figure 25) was given to the patient to protect the composite reconstructions and to prevent the reoccurrence of wear. The patient will be recalled every six months for us to check the restorations.





**Figures 23a & 23b** Comparison before and after the rehabilitation, showing what composite restorations can achieve, as a simple solution for this type of patient. No preparation was needed, making it a very conservative approach requiring only composite additions based on a precise wax-up and bite registration.



**Figure 24** Final full-mouth composite rehabilitation using Essentia from GC in combination with a powerful tool: the characterisation kit of OPTIGLAZE colour.

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**Figure 25** A night guard was given to the patient after the treatment to prevent the reoccurrence of wear.

## GC Europe Campus: A new standard in training & education

GC has always invested heavily in providing the very best in training and education to all dental professionals. The ability to promote and disseminate knowledge amongst dental professionals is a fundamental principle of our business.

Therefore we invest yearly in new training facilities spread across Europe. At the moment we have three beautiful training facilities in Europe: Spain (opened 2014), Italy (opened 2015), France (opened January 2016) and our main training facility, one of the biggest in Europe, located on our Headquarters in Leuven, Belgium, which opened in 2008.







#### A new standard in training & education

This state-of-the-art environment enables us to exchange knowledge with our worldwide network of dental professionals. Every year this facility hosts more than 2000 trainees from all over Europe: dental technicians, dentists, oral hygienists, students, sales representatives, study clubs and universities. These dental training courses are primarily hands-on; however, lectures on the latest products and techniques precede all sessions. All of our trainers and guest speakers are dedicated to providing the attendees with the necessary practical skills that will allow them to expand their knowledge in key areas of dentistry.

We can organise courses for groups of various sizes ranging from eight to 100 attendees. The course length can vary from half a day up to three days. For groups with a minimum of eight people we can also tailor courses to fit.

#### Let's introduce you to our team in Belgium



Please look at our website (www.gceurope.com) and go to Education for the complete overview and schedule of our courses. Of course our dedicated team is always available to answer your questions directly via campus@gceurope.com.

#### A new standard in training & education

#### Let's introduce you to some of our training possibilities

Courtesy of M. Peumans, Belgium and J. Tapia Guadix, Spain

Karin De Hert (CDT) works as a Meeting & Education Manager for GC Europe where she offers front-line technical support and offers professional training courses on composites and laboratory products at the GCE training facility but also at universities in Europe.

**Dirk Galle (CDT)** works as a Technical & Training Manager and he's a specialist in the field of ceramic and laboratory products. With more than 800 ceramic courses on his record, Dirk is a professional ceramic trainer frequently invited to speak at events worldwide.

Simone Moretto Simone Moretto (DDS, MSc, PhD) works as Technical & Training Manager and is specialized in restorative and digital dentistry. With 14 years of clinical experience, a solid academic background and several presentations at International Congresses, she has joined GC Europe team to contribute with a well-balanced clinical and scientific approach.

**Kaat Michiels** started working for GC Europe in September 2013. She is responsible for organising all travel arrangements, like hotels and flights ensuring a great stay for all GCE Campus visitors. She will make sure your visit is as pleasant as possible.

#### For the dentist

#### 1. Direct composite training:

Would you like to save time and learn stress-saving techniques to master your composite restorations? Join one of our two-day hands-on courses in producing invisible, functional and predictable direct anterior and posterior composite restorations.



#### -2. Luting training:

Enjoy increased predictability and ultimate success with your indirect restorations.

During this two-day workshop we elaborate on various cementation techniques based on contemporary restorative materials.

#### 3. GI training:

Why modern glass ionomers deserve a place in your surgery? During this two-day interactive hands-on training course we discuss all features and benefits of modern glass ionomers from preventive measures to minimal intervention, restorations and cementations.

#### 4. Modern dentistry:

Want to enter the field of digital dentistry? These courses provide knowledge to the whole dental team on digital dentistry, from how to start to more advanced levels.

Please contact our campus team directly for more information.



#### For the dental technician

1. Create your world with Initial:

GC Initial represents a paradigm shift in ceramic systems as it consists of six ceramics in one integrated product line and colour line from metal-ceramic all the way to full-ceramic restorations. Participants will gain the following insights:

- The philosophy of the Initial system
- The essential processes for different ceramic applications
- The principles of the different GC Initial layering approaches
- Explanations of the colour system and different powders
- Useful tips and tricks

#### 2. The simplification of aesthetics:

Do you want to know more about our unique correction powders, which do not alter the colour or the depth of translucency? Take our two-day course on Initial LiSi. GC offers a highly aesthetic feldspar veneering ceramic adapted to the light dynamics of lithium disilicate frameworks.

#### 3. Understanding and using laboratory composites:

GRADIA is a unique light-cured micro-ceramic composite system for crowns, bridges, inlays and veneers, which give s to restorations a colour tone close to that of natural teeth. During this course our experts explain the step-by-step procedures of building up various GRADIA and GRADIA gum shade restorations. The course includes practical tips and tricks and explanations on the technical and clinical aspects of composite restorations.

#### 4. Guidelines for optimal use of stones and investments:

GC's stones and investments are high quality products that have been specifically designed to produce consistently accurate castings and meet the production requirements of the modern dental laboratory. This course will help you understand our GC Fujirock stones and GC Fujivest investments in more detail. You will learn how to avoid mistakes and potential problems by identifying the optimal techniques and by analysing the various problems that can occur if best practice is not followed.

#### 5. Modern dentistry:

Interested in entering the field of digital dentistry? The GC Aadva Lab Scan is a fully automated lab scanner that uses the most recent projection and measurement technology. This high-end dual camera system with blue LED structured light, when combined with GC's implant scan technology, ensures the highest accuracy.

Our digital dentistry courses will teach you how to successfully and efficiently operate the GC Aadva dental CAD software. We also offer advanced training for more complex cases e.g. implants.



#### Clinical case by Dr. Olivier Etienne, Strasbourg

Indirect bonded ceramic restoration is one of the preferred treatment for the loss of tooth structure. Its average success rate at 10 years is estimated at over 95% for pressable ceramic prosthetic elements and over 90% for milled ones <sup>(1)</sup>. Among the success factors identified, the ones considered as crucial are the absence of occlusal parafunctions and the quality of the luting <sup>(2)</sup>.

Thanks to the increase use of aesthetic restorations and non-rententive preparations, the adhesive cements became more popular over the years.

Until recently, adhesives coupled with resin cements were divided into two broad categories: etch-and-rinse systems and self-etching systems. The former were acknowledged for their better adhesion, especially to enamel, the latter in their turn being preferred for their lower risk of post-operative sensitivity <sup>(3)</sup>. In order to combine both advantages, some authors have proposed a method based on selective etching of the enamel prior to the use of a selfetching system <sup>(4)</sup>. In addition to its difficulty, this technique poses a risk of concomitant dentin etching which then alters the quality of bonding and can cause sensitivity.



Dr Olivier ETIENNE is a University Lecturer Strasbourg Faculty of Dental Medicine. He is Doctor of Odontological Sciences (PhD) characteristics and their interaction with biological tissues. His clinical practice focuses on complex prosthetic rehabilitation and aesthetics, on natural teeth and on implants. Alongside his academic activity, he is working since 20 years in a private practice. Author and co-author of several publications as well as of numerous articles and briefings on the topic of cosmetic and implant dentistry, he actively participates in various continuing education societies and is involved in Post-University Degrees in implantology and smile design.

The recent arrival on the market of so-called "universal" adhesives perfectly meets this dual challenge: maximum adhesion and minimum sensitivity. Based on the specific chemical properties of MDP<sup>(5)</sup>, these adhesives can be used in the etch-rinse mode or in the self-etch mode <sup>(6)</sup>. This ability gives them a universality in the choice of protocol. However, the first published studies with these adhesives confirm the superiority of the protocol using orthophosphoric acid etching, particularly on the enamel, and this option should be preferred whenever possible (5, 7).

The clinical application of these new materials is illustrated step by step in the clinical case below.

#### **CLINICAL CASE**

This young patient requires a rehabilitation of her oral cavity whose previous restorations present various defects, loss of marginal sealing and overcontours.



**Figure 1:** Preoperative radiograph of the left maxillary sector. Both molars have already had an indirect restorative treatment by means of ceramic onlays. The second premolar, whose loss of tooth structure is limited, will receive an inlay while the first premolar, devitalised and weakened by a larger defect will be restored with a full crown.

The established indication based on the respective loss of tooth structure of the two premolars is for an inlay on the 25 and a full crown on the 24, both made of ceramic (e-Max Press laminate). The treatment plan initially consists of an endodontic retreatment, followed by an adhesive composite core build-up on 24 (Gradia Core, GC). After contouring the preparations, a partial impression is performed using a double-mix technique and the colour information is sent to the laboratory.



**Figures 2 and 3:** After removal of the temporary restoration on 24 and the temporary composite inlay on 25, the prepared surfaces are cleaned with aqueous solution of chlorhexidine. The inlay is inserted with a glycerine try-in paste. This trial fit step is purely aesthetic and adaptational. No occlusal adjustment can be considered before bonding.

The next clinical session is entirely devoted to luting of the two prosthetic elements. The bonding option is obviously chosen as it helps strengthen the entire tooth restoration. After removal of temporary elements, the cavity is first cleaned before assessing the insertion and quality of adaptation of the inlay (Figures 2 and 3). The rubber dam is preferably individually set up, as not to interfere with the proximal neighbouring surfaces. This option is particularly quick and easy to perform, the next step is to increase the roughness of tooth surfaces by using microsandblasting (Figure 4).



The enamel/dentin etching is then performed (Figure 5), taking care to observe the recommended exposure times in order to minimize any risk of postoperative sensitivity.

**Figures 4a and 4b:** The isolation is in place; a microblasting of the enamel-dentin surface is performed.



Figures 5a, 5b and 5c: Orthophosphoric acid etching is started first on enamel and then on dentin in order to meet the respective recommendations of 30 seconds and 15 seconds for the two tissues. Thorough rinsing and delicate drying complete this stage of preparation of the tooth surfaces.

The Universal adhesive (G-Premio BOND, GC) is then vigorously applied to the prepared area for 10 seconds, then spread with a strong air blow before being light-cured (Figure 6). This immediate light-curing of the



adhesive ensures the presence of an optimum hybrid layer on the surface <sup>(8, 9)</sup>. This approach also avoids the risks of the mixing between the adhesive and luting cement as well as the loss of light-intensity due to





the thickness of the ceramic inlay.

Moreover, G-Premio BOND provides

**Figures 6a, 6b and 6c:** The G-Premio BOND Universal Adhesive is collected by agitating well a microbrush inside the unit dose. The adhesive is applied firmly to make it penetrate well into the etched enamel and dentine surfaces. Finally, after spreading it with syringe strong air blow to avoid accumulation, the adhesive layer is light-cured.

The try-in paste is rinsed off from the inner surface of the inlay, which is then dried and etched with hydrofluoric acid for 20 seconds in order to obtain etching of the glass particles of the lithium disilicate. After careful rinsing, the same inner surface is covered with a silane coupling agent (G-Multi Primer), which is left in place for at least one minute. A final drying ends the treatment of the ceramic surface. The direct application of the adhesive resin cement (G-Cem LinkForce, GC) to the prepared surface and then its insertion in the mouth are successively carried out.



**Figures 7a-7d:** After etching and silanisation of the ceramic inner surface, the inlay is coated with an Adhesive resin cement (G-Cem LinkForce) and positioned using a spatula before wiping the excess resin with a microbrush. The inlay is then firmly pushed in with a flexible end instrument, slight excess of resin cement is intentionally left in place and light-curing is performed while maintaining pressure on the inlay.

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**Figure 8:** After removal of the rubber dam, the finishing of the margins is gently performed and the whole restoration-tooth complex is checked before proceeding to the bonding of the neighbouring prosthetic elementt.





**Figures 9a and 9b:** The luting protocol is the same for the full-countour crown on 24.

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Figure 10: A control at one week confirms the periodontal health and occlusal function.

The excesses are then removed using a wiping technique with a two-stage occlusal support, which optimises the quality of the final joint (Figure 7).

This method of managing excesses avoids the systematic use of glycerine paste since the air inhibited surface layer is removed in the final polishing of the margins, which are perfectly accessible. This finishing is performed before, and then after removal of the rubber dam (Figure 8).

The same protocol is followed for the full-countour crown (figure 9) on 24. The occlusal and radiographic checks complete the session. At the next session, the gingival and occlusal integration and the absence of signs of pulp sensitivity will confirm the quality of the two bonded restorations (Figure 10).

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#### Dr Bill MARAIS

Born in Johannesburg, South Africa, Bill moved to Cape Town at the start of his high school years. In 1993, he graduated as a Registered Dental Technician, after 4 years of study in Dental Technology (recognized Bachelors Degree in Prosthetic Sciences in the USA), from Cape Peninsula University of Technology.

After working in a dental lab in South Africa for 3 years, Bill immigrated to the USA in 1996. In 1999, Bill opened his own lab, Disa Dental Studio, in Santa Monica, California. Bill moved his family and Disa Dental Studio to Portland, Oregon, in January 2011. Disa Dental Studio is a one-man lab focusing on high-end, complex, combination cases. Bill is grateful to be a Key Opinion Leader for GC America. Bill lectures and teaches nationally representing GC America as well as independently. He also teaches Dental Photography classes.

# The Initial Series ... a game changer

#### Clinical case by **Bill Marais**

As a dental technician, my Achilles Heel has always been my artistic ability, always . . . and this definitely includes replicating gingival tissue.

With years behind me in this profession, and the accumulation of experience, I still believed I was lacking in my artistic skills as I struggled to achieve high end results.

The turning point for me came with my being introduced to GC Initial Zr-FS and GC Initial Zr Gum Shade Set, INvivo internal/external stains, GC Initial IQ One Body Lustre Pastes NF and especially the GC Initial IQ One Body Lustre Pastes NF Gum Shades.

A complete game changer for me! For the very first time in my career, what I saw (in existing photographs and the live patient), and what I worked to copy in the lab . . . I achieved those same results! I was able to mimic natural gingiva. I genuinely hope that you are able to follow my simple step-by-step illustrations below and that you are able to achieve customized gingival effects. Please note that my intent with this case was to create ethnic gingival effect using GC Initial products as mentioned above.

#### The Initial series ... a game changer





**Figure 1** Frame directly out of sinter oven. Frame will be lightly sandblasted at pressure of 2 bar with Aluminum Oxide and then steam cleaned so that a foundation of Lustre Paste can be applied (**Figure 2**). Lustre Paste application will serve as a foundation where upon ceramic can be layered as well as for characterization of the zirconia frame.





**Figure 3** Frame is pre-wet using a very thin layer of Lustre Paste Diluting Liquid, and then lightly blown with air, leaving a very thin film. This film of Diluting Liquid helps in the application of Lustre Pastes ... acts a wetting agent.

**Figure 4** Application of Lustre Body Shade A to cervical areas.





**Figure 5** Continuation of application of the Lustre Body Shade A. **Figure 6** Application of Lustre Paste NF Neutral on all monolithic surfaces, as well as all areas to be layered.





**Figure 7** Characterization using INvivo Stains. **Figure 8** Application of Lustre Paste Gum G-23 (Base Light) to the gingival areas.





**Figure 9** Continuation of application Lustre Paste Gum G-23 (Base Light) to the remaining gingival areas. Result of Lustre Paste application after first bake.

**Figure 10** The frame was fired at 850°C due to the mass of the frame - cannot be fired at a "single unit" firing cycle.





**Figure 11** Frame ready to receive second application of Lustre Paste Gum Shades and INvivo Stains in the gingival area. **Figure 12** Second layer of Lustre Paste Gum G-23 (Base Light) is applied.

#### The Initial series ... a game changer





Figure 13 INvivo Stain IV-10 and Lustre Paste Gum G-23 (Base Light) (mixed 50/50) is applied to complete the gingival area. Figure 14 Application of pure INvivo Stain IV-10, INvivo Stain IV-11, INvivo Stain IV-13 and INvivo Stain IV-9 is applied directly into the Lustre Light 23 and INvivo 10 /Lustre Base Light 23 mixed 50/50 Lustre Paste Gum G-36 (Intensive Red) is used to finalize characterization.





**Figure 15** Frame ready to be fired for second time - once again at 850°C. **Figure 16** Result after second firing.





Figure 17 Layering of Zr-FS Powder Cervical Translucent CT-22 (Yellow). Layering of Zr-FS powder Enamel Opal EOP-2 (Red). Figure 18 Layering of Zr-FS powder Enamel E-58 (Blue).





**Figure 19** Final layering and completion of contour with Zr-FS powder Enamel E-58 (Blue). **Figure 20 & 21** Same layering pattern follows on adjacent teeth.





Figure 22 Frame after third firing at 850°C.





Figure 23 & 24 Correction layering with Zr-FS powder Enamel E-58 (Blue) and start of layering Lustre Paste Gum G-24 (Base Dark) (Yellow).

#### The Initial series ... a game changer



**Figure 25 & 26** Final layering of gingival tissue area with Zr-FS powder Gum G-35 (Intensive Cream).

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Figure 27 Frame cooling after fourth firing at 840°C.



Figure 28 Shaping and contouring.



Figure 29 - 32 Final shape and contour checked with Gold Ceramic Detail Enhancer.

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#### The Initial series ... a game changer



**Figure 33** Application of a thin layer of Lustre Paste Gum G-35 (Intensive Cream) on entire gingival area.



Figure 34 Zr-FS powder Gum G-24 (Base Dark) is sprinkled onto the Lustre Paste Gum G-35 (Intensive Cream) 35 layer.



**Figure 35** Excess powder is blown off with air and results are as above.



Figure 36 Final glaze firing at 800°C.

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Figure 37 - 42 End result

Credit to: Beto Macedo, DDS, Ms, PhD, Prosthodontist, private practice Naples/Florida.



# Smart material for smart applications

## Cerasmart

Strength and flexibility blend together with the highest flexural strength in its category and an impressive flexibility to buffer masticatory pressure. Precision and durability unite with fast and precise milling. The nicely balanced fluorescence and opalescence make aesthetics and CAD/CAM connect.



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, 'GC', '

## **Cerasmant** the perfect alternative for cases of erosion and restorations on implants

#### Interview with Christian Thie, CDT, Germany



Dr Christian Thie, CDT 1999-2003 Occupational education to become a dental technician (Best of the Year award of Berlin). After that, worked in the teaching laboratory 2004-2015 Dental technician in the Dental Studio Dörte Thie 2004-2007 Master training in Berlin 2008 Winner of the Klaus Kanter Price award 2009 Third place in the occlusal Kompass competition 2015 Founded his own dental laboratory, Dentaldesign Christian Thie Since 2013 Referent lecturer The development of CAD/CAM technologies in the laboratory has not only improved the comfort and quality of work but also made it possible to work in a more standardised way. New materials such as hybrids have opened up alternative ways to treat complex and difficult cases. One of these materials – Cerasmart – has proven to be very effective in those indications. In this article, Christian Thie, CDT, explains why he chooses to use this material.

Why and when do you use CAD/ CAM restorations in your laboratory? And what do you think are the additional values of CAD/CAM restorations compared to conventional prosthetic treatments?

Most laboratory work can now be done using CAD/CAM technology, thanks to the great range of systems and materials available. It is now easier to plan and design using CAD/CAM, especially large, complex restorations that take considerable skill, time and effort to be modelled by hand. This makes it possible for us to achieve better fit and adaptation than with traditional methods, which are more prone to uneven quality. The results with CAD/CAM are now much more predictable. Cerasmart<sup>™</sup>: the perfect alternative for cases of erosion and restorations on implants





Figure 2a, 2b & 2c Cerasmart restorations after milling





**Figure 3** Observation of the light dynamic on the milled Cerasmart restorations before glazing



**Figure 4** Characterization with Optiglaze Color using the A-plus Body shade for the marginal area



**Figure 5** Covering the entire restoration with the transparent Optiglaze Color Clear or Clear HV for glazing



**Figure 6** Observation of the perfect color match in comparison with Vita shade tab A3.5

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Cerasmart™: the perfect alternative for cases of erosion and restorations on implants





Figure 7a & B Final restorations on model showing a high aesthetic result



**Figure 8** Observation of the light dynamic on the glazed Cerasmart restorations with Optiglaze Color

Our laboratory uses the Zirkonzhan system, which provides a large number of modules and thus different design possibilities. Furthermore, a broad range of materials can be milled, which in turn can be combined with each other.

#### In which cases do you choose to use Cerasmart restorations?

Eroded teeth that also present a loss of vertical dimension require a restorative material with high flexural strength. But if the material is too hard it could be detrimental to the antagonist teeth as well as the TJM because of the high masticatory load.

To treat those cases, the choice fell naturally on Cerasmart, a material that can buffer masticatory pressure, inducing little volume wear on the antagonists, but that still has sufficient flexural strength to prevent reduction of the vertical dimension.

Patients with complex restorations on implants often present a difficult occlusion with only part of the antagonists still in place. Cerasmart is a particularly good alternative in these cases because it produces monolitic restorations with constant physical properties and reduced chipping.

#### What are the advantages of Cerasmart in terms of indication, handling and aesthetic outcome?

As mentioned, the choice of indication is dictated by the physical properties of the material.

Furthermore, Cerasmart is etchable and can therefore be cemented adhesively.

In terms of handling, the material is easy to work with using diamond burs and rubber polishers. A high gloss can then be obtained with DiaPolisher Paste (GC).

As for aesthetics, Cerasmart has proven to be a very versatile product. This hybrid material can be designed to be very thin if necessary and, depending on which aesthetics are wanted, different finishing options are available: it can be polished in the original monolithic shade or individualised with GC Optiglaze Color, or even layered with composite using a cutback technique.

#### Tips on how to make the use of the material easier

To characterise restorations, the surface texture can be created with diamond burs followed by the application of Optiglaze Color. Alternatively, Cerasmart restorations can be created in a monolithic way. Here, the polishing is done with goat-hair brushes and DiaPolisher as the polishing agent. The high-gloss finish remains after steam cleaning.

Thanks to its unique physical properties, Cerasmart is a perfect alternative to ceramics in many difficult cases. Used with Optiglaze Color, it also becomes a very effective and aesthetic alternative that constitutes a new long-term solution for many clinical indications.

# Aadva<sup>TM</sup> Lab Scan

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#### Dr Garlef Roth

1984 - 1988 Dental Technology Instructor 1988 - 1992 employment in various dental laboratories

1992 - 1997 employment in various practical labs

1997 - 2000 employed in the clinical studio of Dr. H. Mayer / ZÄ K. Stryczek (focus on implant restorations) and management of the daily organization 2000 Foundation of Innovative Dental Design in Bad Homburg , where I was employed since 2002 as laboratory manager

2006 Foundation and opening of Mainhattan Dental (focus on Digital Dental Technology, Ceramic aesthetic restorations and implant restorations Working as a consultant for composite and ceramic coatings. 2013 speaker and support of the CAD project for GC GC Aadva Lab Scan technology and software

Methodical approach towards the **Correct CAD/CAM decision** 

Interview with Garlef Roth, Frankfurt am Main



Whether it's desktop scanners, software, grinders or milling devices, whether it's local manufacturing or within a network – making the right choice from everything that's on offer can be difficult. In the following interview, an innovative laboratory owner explains how he chose the right CAD/CAM offer for him and which options it provides him with in terms of manufacturing.

GC get connected / 31

#### GC Aadva Lab Scan technology and software Methodical approach towards the correct CAD/CAM decision

Mr Roth, the offers for the digitally supported manufacture of dental prosthetics are hard to get to grips with. How did you choose the right digital systems or digital components for your laboratory?

Garlef Roth: First of all I wrote a list of which of the prosthetic indications I wanted to manufacture products for using CAD/CAM. This included inlays, crowns, bridges, primary and secondary telescopes and individual implant structures, bars and splints. I also defined the tools I wanted to process for this. Zirconium oxide, plastics and waxes are important for this.

#### You obviously approached the choice of the right CAD/CAM offer in a very strategic manner. You must have thought about the system itself too?

Yes, of course. I had to decide what I wanted and what I didn't want. Since only open systems were a consideration for me, I was able to rule out some offers right from the very start of my considerations.

#### I automatically associate open systems with thoughts of comprehensive laboratory or industrial network manufacturing. How true is that for you?

I want to be able to process the majority of my prosthetic jobs in my laboratory myself in order to get the full value from this. But there is also work that I will gladly take on external manufacturing partners to help me with. If I do that, I want to have the flexibility to be able to pass on the construction data with no limitations.







This is always the case if special indications have to be rehabilitated or specific materials are requested – for example support work on individual titanium structures.

#### Before we come to the CAD/CAM components you chose, I would like to know which other selection criteria affected your decision to buy.

The user friendliness of every dental device is very important to me. It should make my work easier, not more difficult. It's the same for the CAD/CAM devices. But the scope of the indication and the updates to the software were of course also a criteria when I was making my decision.

Since one of the specialisms of my laboratory is implant prosthetics, the software also has to content sensible abutment tools. For me, this also includes extensive Scanflags content for implants from various manufacturers. Last but not least I would also like to mention the technical support of the provider, which is important to me. By that I mean specialist dental support for all my device and software issues. Everything you have mentioned limits the digital technology to a few devices. What was ultimately the critical element that led you to buy a GC Aadva Lab Scan?

What was essential for me was that the Aadva scanner and its software is a really open system. I can send my STL data to other STL data-compatible systems. The precision of the scan data and the resulting perfect fit of the designs won me over. No less crucial was the fact that the follow-up costs were clearly formulated and could therefore be calculated. After buying the system, there are no additional costs for the first year. After that, the system is at my disposal and I can decide which additional services or packages I would like to use. That meant I knew in advance what the system was subsequently going to cost me.

#### For which indications do you use the Aadva Lab Scan and the Aadva CAD software?

As I mentioned at the beginning, software which includes indications

#### GC Aadva Lab Scan technology and software Methodical approach towards the correct CAD/CAM decision

such as inlays, crowns, bridges, primary and secondary telescopes and individual implant structures, bars and splints is important for me. But it is primarily the implant-supported screwed bars, the precision of which continues to fascinate me and which I like to construct in a digitally supported manner using Aadva CAD.

## What special features have you discovered in Aadva compared to other CAD/CAM systems?

I only shortlisted open CAD/CAM systems. Aadva met these and my other requirements fully. It's a really open system. It's not limited. For me, Aadva also provides the best levels of fundamental user friendliness. The highly precise dual camera system in the scanner and its speed also contribute to this. With the GC Scanflags, I can also create highly accurate abutments in just a short time and with a small number of scans.

#### You've mentioned the GC Scanflags several times. What special features do these have compared to conventional scan bodies?

GC Scanflags can be compared using barcodes and GPS systems. In supermarkets, barcodes tell vendors how many items they have where and in which positions. A GPS module shows the exact position of an object. In this respect the GC Scanflags are a combination of a barcode and a GPS system. They show the correct position and the implant type and manufacturer at the same time on the virtual model. With scan bodies, you have to do several scans and then match them

#### GC Aadva Lab Scan technology and software Methodical approach towards the correct CAD/CAM decision

with one another manually, which can lead to inaccuracies. In the field of large-span implant work in particular the user will see the advantage of the GC Scanflags immediately.

#### When you think about your work with Aadva Lab Scan and the Aadva CAD software, which users do you think the system is suitable for?

I think the system is probably too excessive for dental technicians who only want to make crowns and bridges. The system is particularly suitable for all other technicians who are futureoriented and require more functions and want to work creatively with software that is intuitive to operate.

#### In terms of dental CAD/CAM applications, the issue of the precision of the finished work is also important. How would you rate the Aadva system on this issue?

The quality of fit is a very important criterion when assessing work that you've done. Aadva has won me over twice in this respect. Firstly, the Aadva data led to excellent results in my laboratory, which has five CAD/CAM systems, and secondly because I obtain very precise work for my external jobs from the GC CAD/CAM production centre in Leuven, Belgium. This means that for me the Aadva system is the best that's available on the market.

## What services and support do you receive from GC for your Aadva Lab Scan?

I think that technical service for all hardware and support for all software issues is essential for CAD/CAM systems. The path to digital manufacture pursued for a piece of work cannot simply be shifted into an analogue process. You might just think of the different work processes from model preparation such as the preparation of the stumps to manufacture using a casting process. Since my work is generally associated with tight deadlines, any offer that would be attractive to me would also need to offer these services. When I chose Aadva Lab Scan, GC promised me this support. To date I've been very satisfied with the service I've received.

#### To round off the discussion I'd like to ask you for a recommendation for your colleagues.

I would recommend that before buying CAD/CAM components or systems all of my colleagues carefully consider which criteria the offer they are presented with needs to meet for buying that component or system to be the right answer for their laboratory. I also think the provider's level of knowledge is important. How competent is his representation in the dental market and how reliable is what he says? Since digital dental technology changes rapidly, the selection has to be limited to providers who have committed to dental CAD/ CAM technology and are innovative. In GC, I have found my provider and I am extremely satisfied with my choice of the Aadva system.

Mr Roth, thank you for taking the time to talk to us.



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