## GC get connected 5 Your product and innovation update

### ,'GC','

-





### GC Initial® IQ Lustre Pastes NF from GC,

the universal 3D paintable ceramic

### Two systems – One approach Paint your Red & White aesthetics

### Step-by-step

Advertorial



With the Lustre Pastes NF (based on fine ceramic particles) the steps to complete your crown and bridgework remain identical, regardless of the technique you use to create ceramic-based restorations.

Do you need to change the colour, the brightness, the grey value or the surface gloss of your layered crowns and bridges? You can use the Lustre Pastes NF on all ceramics in the GC Initial range.







Do you prefer to press your ceramics  $\dots$  using the GC Initial IQ - One Body, Press-over-systems or use lithium disilicate as a base, and then paint the characteristics at a later stage.







This system allows you to individualize your crown and bridgework AND to create a lifelike transition from the crown margin to the gingiva ... just by painting.







Paint your ceramic

aesthetics with Lustre Pastes NF from GC

<sup>for both</sup> red & white aesthetics

## Contents

### Welcome to GC 'get connected', GC Europe's newsletter that showcases our latest product innovations, techniques and trends in restorative dentistry.



| 1. Welcome word M. Puttini  | 4  |
|---|----|
| 2. Changing mindset towards simplified procedures with universal bonding systems by Dr. Serhat Köken  | 6  |
| <b>3.</b> Simplifying direct adhesive restorations with GC Essentia composite by Dr. Gianfranco Politano  | 10 |
| <ol> <li>Tooth Wear Management by Minimal Intervention<br/>by Dr. Shamir Mehta</li> </ol>   | 14 |
| 5. Healing deep caries lesions in the posterior region<br>with the new micro-laminated glass ionomer cement<br>by Dr. Anja Baraba and Prof. Ivana Miletić | 21 |
| 6. New fluoride varnish MI Varnish by GC by Dr. Birgit Riebeling  | 25 |
| 8. Luting navigation chart  | 28 |
| 7. Cleaning agents and disinfectants guidelines   | 31 |
| 9. Pre-treatment procedures for indirect restorations   | 32 |
| IO. Clinical evaluation of CERASMART, a new hybrid ceramic CAD/CAM block<br>by Dr. Mete Fanuscu and Dr. Ahmet Turan                                       | 33 |
| <ul> <li>II. GC INITIAL – Progress and success</li> <li>by MDT Michael Brüsch</li> </ul>  | 38 |
|   |    |

### GC get connected Your product and innovation update



### **Dear readers** Welcome to the 5<sup>th</sup> edition of GC's Get Connected newsletter.

The first edition of what you could say is the "post-IDS 2015"-era. This global dental fair, which is held in Cologne every two years, was a huge success in terms of attendance (Around 138,500 visitors from 151 countries, +11% compared to 2013) and in terms of GC sales (almost doubled). The live demonstrations by some of our most prominent KOL's were well-attended, as was the GC press conference presenting all new products. I'd like to take this opportunity to thank everyone involved as well as those who came to visit our booth.

Thanks to all these new product introductions we are looking at another successful year, and many enthusiastic customers. During this fiscal year, GC has presented about 12 new important products such as:

- Equia Forte, the successor of our flagship restorative glass inomer Equia.
- Essentia, a composite restorative material based on a unique shading concept.
- Initial LiSi, a new member in the popular ceramic line of Initial. This new ceramic is the specialized veneering ceramic designed for lithium disilicate frameworks.
- Initial IQ Lustre Pastes NF, a unique 3D paintable ceramic to bring aesthetics to all your precious works just by painting.
- Optiglaze color, a light-cured characterization coating for composite and acrylic indirect restorations.
- G-Premio BOND, a one-bottle universal bonding compatible with all etching modes and which can be used not only for direct bonding, but also for repair cases & hypersensitivity treatment. Offering all the advantages of a universal, with top performance in all situations.
- And much more

The company has also invested in the field of digital dentistry. The intra oral scanner (IOS) and Aadva Lab scanner (ALS) are two major products that GC has presented here.

This big number of past & future product launches shows GC's vitality and drive towards innovation.

Of course there's life after IDS and we'll be present on numerous other events near you so you can discover these and other products first-hand. Don't miss us at in the near future at this year's CED-IADR Meeting in Antalya, Turkey (October 15-17), the BDIA Showcase in Birmingham (UK) or the ADF Congress in Paris (24-28 November); and many more local events!

Our booths at these events will be easily recognizable, as the Metro-map approach and visuals we introduced at IDS will be further expanded on a local level. Many of our booth visuals and communication materials will be adapted to help our customers to see the entire workflow, and not only focus on single solutions without their relations to the entire treatment process.

If you want to further deepen your knowledge of GC products, there's the possibility to do so via the usual channels, either in real life or online. In conclusion, we also have in 2015 an exciting line-up of trainings all over Europe. Check our new educational website campus.gceurope.com to see if one of these trainings would interest you or if you want to register for a CE marked webinar.

Enjoy reading the 5<sup>th</sup> edition of GC Get Connected

### Michele Puttini

President, GC Europe

### Let's get social

As part of our service to customers to keep them up to date about our products and to help them use our products in a correct way, GC has an extensive presence across the social media channels. Be sure to connect with us here:





### Subscribe to the GC YouTube channel

| Like us on Facebook |
|---------------------|
| GC Europe HQ        |
| GC Iberica          |
| GC UK               |
| GC Nordic           |
| GC France           |
| GC Austria and      |
| Switzerland         |
| GC Israel           |
| GC EEO Bulgaria     |
| GC Russia           |
| GC EEO Romania      |
| GC EEO Slovakia     |



GC Europe

GC Benelux GC UK GC Iberica

Follow us on Twitter



Follow GC on LinkedIn

### Tell us what you think!

How did you find out about GC Get Connected? Do you have any article suggestions? We want to hear from you! Please send your comments and feedback to marketing@gceurope.com

## Changing mindset towards simplified procedures with UNIVERSA bonding systems

A clinical case report by Dr. Serhat Köken



Dr Serhat KÖKEN

Born in the central Anatolian city Eskisehir, Serhat Köken graduated from Marmara School of Dentistry (Istanbul) in 1998. Since 2001, he has practised general dentistry at his private clinic in Istanbul. Over the years, Dr. Köken has focused on direct composite resin applications and dental photography and presented at national meetings on both the technical and artistic aspects of anterior direct resin restorations. Dr Köken has also presented numerous hands-on courses in Istanbul on composite resin artistry. Serhat Köken is a co-founder of the Instant Composite and Trauoise Study Clubs and is an active member of the Turkish Academy of Esthetic Dentistry and the Kalkedon Advanced Dental Study Group. He is married with two children.

I have been using etch & rinse adhesive systems for many years. I trust their performance, but unfortunately they are clinically more technique-sensitive. In order to be successful with these products, it is necessary to carefully follow the steps and this can be time-consuming. Even small procedural errors can affect the performance of etch & rinse adhesives, and potentially lead to hypersensitivity issues or even cause an adhesive failure. For this reason, I started using "Selective Etch" systems, which have the advantage to be less technique-sensitive while offering easier manipulation. However, I kept using both types of adhesives in my practice, depending on which approach is most suitable to each indication.

Recently, manufacturers developed a new generation of bonding agents described as "universal". Most of these adhesives are offered in a single bottle and are compatible with all etching modes. Moreover, some of these universal adhesives can be used for repair cases and hypersensitivity treatment on top of the usual direct bonding indications. These new innovative products helped me simplify some of my clinical procedures in a convenient way.

I was looking for a product to replace my long-term favourite adhesive, while offering easy handling. And recently, my dealer introduced me to the new universal bonding from GC, G-Premio BOND. This new adhesive contains three different functional monomers: 4-MET, which bonds to enamel and dentin; MDP which bonds to enamel, dentin, zirconia, alumina and non-precious metals; and MDTP\*, a new monomer which has the ability to bond to precious metals. This special combination of monomers gives me great confidence that the product can achieve a high level of performance in a clinically short time. Thanks to this formulation, it is possible to use G-Premio BOND in all etching modes (self-etch, selective etch and total-etch) and for a wide spectrum of indications: direct composite restorations, but also repair and hypersensitivity cases.

This is overall beneficial for the practice, as it is not needed anymore to keep several types of products for rare cases such as repair or hypersensitivity treatment.

The following clinical case presents some of the clinical advantages of G-Premio BOND .

Changing mindse towards simplified procedures with universa bonding systems























(Figure 1a). A picture with artificially increased saturation (Figure 1b) can help to assess the chroma of the dentin, while a black & white picture (Figure 1c) will be useful to define the value of the enamel. The shade assessment should be done prior to the bonding step, as the placement of the rubber dam will lead to the dehydration of the teeth and alter their natural shade.

Figures 1a, 1b & 1c Initial situation

**Figure 2** Pre-operative situation after placement of the rubber dam. Isolation is strongly recommended to achieve an efficient and long-lasting adhesion to the tooth structure.

**Figure 3a & 3b** Minimally invasive preparation using fine burs on the enamel surfaces.

**Figures 4a & 4b** Selective etching of the prepared enamel surfaces with 37% orthophosphoric acid for 15 sec.

**Figures 5a, 5b & 5c** Rinsing the surface for 15sec and drying it with cotton pellets. The surface is now ready to bond.

GC get connected

### Changing mindset towards simplified procedures with universa bonding systems







8





10b

Overall, G-Premio BOND offers an easy procedure with a low techniquesensitivity, and enables to reduce the time spent on the bonding step. G-Premio BOND is likely to become my go-to product for most of my cases, as I believe it offers an excellent clinical performance while minimizing the procedure time and the risk of mistakes.

**Figure 6** Dispensing G-Premio BOND onto a micro-brush. It is particularly easy to dispense the product drop-by-drop.

**Figures 7a & 7b** Applying G-Premio BOND onto the tooth structure with a micro-brush until all bonding surfaces are fully covered, and leaving it to react for 10 sec. The control of the application is very convenient thanks to the yellowish colour of the bonding. The material behaves like water on the tooth, making it easy to apply in a uniform way.

**Figure 8** Drying the bonding for 5 sec. at MAXIMUM air pressure. This maximum air flow is a very important step as it enables to efficiently remove all solvents and achieve a very thin film thickness. Once dried, the bonded surfaces should not be yellowish anymore; this helps me to determine if the drying step has been carried out successfully and all solvents have been removed.

**Figures 9a & 9b** Light-curing for 20 sec. using a LED device (Figure 9a). The bonding layer is now completely invisible (Figure 9b).

Figures 10a, 10b & 10c Placing the composite resin (GC G-ænial JE on the palatal side, G-ænial AO2 opaque dentin, G-ænial A2 dentin and GC Kalore WT enamel). Thanks to the very thin film thickness of G-Premio BOND, the bonding layer is not visible.



9a





### Dare to go for...

, 'GC',

Zero debondings Zero discolorations Zero post-op sensitivity Zero mistakes Zero hassle Zero waste

### G-Premio BOND from GC

One-component light-cured universal adhesive

## Believe in zero compromises

#### GC EUROPE N.V.

Head Office Researchpark Haasrode-Leuven 1240 Interleuvenlaan 33 B-3001 Leuven Tel. +32.16.74.10.00 Fax. +32.16.74.11.99 info@gceurope.com

## Simplifying direct adhesive restorations with **GC Essentia** composite

A clinical case report by Dr Gianfranco Politano, Italy



#### Dr Gianfranco Politano, DDM, MSC

Gianfranco was born in 1971 in Crotone, Italy. He finished dental school at Modena University, in the north of Italy. Founder member of Bio-Emulation group with Dr. P. Bazos and Dr. J.T. Guadix. Active member of S.I.D.O.C. : Italian society of conservative dentistry. Active member of "warm gutta-percha study club". Gianfranco lives and works in Rome, in "studio Calesini - Roma". He focuses on adhesive restorative dentistry and endodontics. He is an international lecturer and he published several articles in restorative dentistry. A patient came to the office due to pain when eating sweet food after the recent placement (less than six months before) of two adhesive restorations (Figure 1). After clinical evaluation, it became evident that this pain was probably caused by marginal gaps on 36 and 37. It was thus decided to replace both restorations, and to use for this purpose GC's new composite, Essentia.

### Simplifying direct adhesive restorations with GC Essentia composite

The teeth were first isolated using a rubber dam (Figure 2), which is a crucial prerequisite to guarantee the success of the subsequent adhesive procedure. The rubber dam also makes it easier to evaluate the quality of the tissues to be bonded, and to finish the preparation in the most adequate way.

The teeth were prepared (Figure 3) by removing all the infected tissues that remained from the previous restorative procedures, and finishing the cavity margins using low granulometry instruments. The residual tooth tissues were then in the optimal state to perform the hybridization procedure.

After performing the adhesive procedure using a threestep bonding system, the Dark Dentin (DD) shade of the Essentia composite system was used to build up the dentin structure (Figure 4), following the tri-laminar technique model: concave dentin and convex enamel. In a very simple way and using a single mass, Essentia Dark Dentin is the perfect solution to replace any dentin in the posterior area, thanks to its high chroma. Combined with Essentia Light Enamel, it will provide a very natural effect to any posterior restoration.

This completely eliminates the problem of choosing the right shade and opacity of the composite masses used during a posterior layering procedure. As shown in Figure 5, the Dark Dentin shade build-up provides chromaticity to the overlaying layer of achromatic enamel. The Light Enamel mass is able to modulate the way this chromaticity is transmitted, depending on the thickness of the layer. The overall tooth anatomy was reproduced using the "Successive cusp build-up technique", finishing with a layer of Light Enamel LE.











**Figure 1** Initial case. The patient is complaining about pain, apparently due to an issue with the margins of the existing restorations.

**Figure 2** Isolation using a rubber dam. This is a crucial step to guarantee an efficient adhesive procedure.

Figure 3 Cavity preparations. All infected tissues were removed.

Figure 4 Dentin build-up using Essentia Dark Dentin (DD), creating a concave structure.

**Figure 5** Vestibular view, showing the transmission of chroma between the Dark Dentin and the Light Enamel layer.

### Simplifying direct adhesive restorations with GC Essentia composite

In order to ease the final polishing steps, it is recommended to eliminate the air inhibition layer present on the surface of the composite restorations. For this purpose, I like to apply GC Gradia Air Barrier on the whole surface of the restoration, and polymerize the composite again for 40 seconds under this layer of glycerin (Figure 6).

With Essentia, I find it very easy to achieve a nicely polished surface in a simple way. This composite was developed to simplify the polishing procedure by using ultra-fine fillers in the enamel shades, and this is obvious when polishing it: a simple rubber cup for composites and a prophylaxis polisher (Figure 7) are enough to obtain a long-lasting gloss and to provide a natural look to the restorations. Thanks to this good polishability of the material, it is easier and faster to achieve a very smooth surface, which will also prevent plaque accumulation and potential secondary caries. After rubber dam removal, a good initial integration of the restoration can already be noted (Figures 8 & 9). **Most importantly, this very natural and aesthetic result was obtained using only two different masses - one dentin (DD) and one enamel (LE), showing it is possible to achieve a mimetic restoration while avoiding complex and time-consuming layering steps.** This is beneficial for clinicians, who can speed up the layering procedure and spend more time on other crucial steps such as the adhesive procedure. It also enables dentists to shorten the time necessary to create a restoration, thus optimizing the cost linked to this procedure.

After 10 days, the patient came back for the control appointment (Figure 10); he was very satisfied both in terms of functionality (no pain or discomfort) and aesthetics.

This natural color match was obtained in the simplest way, using two shades: what more can I ask from a composite system?



**Figure 6** Polymerization of the final restoration through a layer of glycerin gel, to eliminate the air inhibition layer.









**Figure 7** Easy polishing procedure in two simple steps: rubber cup followed by a prophylaxis polisher.

Figure 8 Completed restorations after rubber dam removal.

Figure 9 The vestibular view shows a very natural integration.

**Figure 10** Control visit after 10 days, with a very satisfying result in terms of functionality and aesthetics.



### Essentia<sup>™</sup> from GC

Open the door to simplification

Follow your intuition

GC EUROPE N.V. Head Office Researchpark Haasrode-Leuven 1240 Interleuvenlaan 33 B-3001 Leuven Tel. +32.16.74.10.00 Fax. +32.16.74.11.99 info@gceurope.com http://www.gceurope.com

## Tooth Wear Management by MINIMAL INTERVENTION

### Clinical case report by Dr Shamir Mehta



### Shamir Mehta BDS BSC MClinDent(Prosth)(Lond).

Shamir obtained his BDS from King's College London in 1996. He currently is a partner in two dental practices in North-West London. He is also a Senior Clinical Teacher/Deputy Programme Director for the MSc in Aesthetic Dentistry, Dept. Conservative & MI Dentistry, King's College Dental Institute. His areas of interest include the management of tooth wear, cracked tooth syndrome and adhesive dentistry. He has co-authored several peer-reviewed articles on these subjects. With an aging population retaining their teeth into advanced years, coupled with more recent lifestyle and habit changes, the presentation of a patient with 'excessive for age' (pathological) tooth wear is by no means an uncommon occurrence. Whilst many of these patients may be successfully treated in a 'passive manner', involving the implementation of an effective preventative care programme and proactive monitoring, a proportion will require 'active' restorative intervention. This latter group of patients may have aesthetic concerns, functional issues, or symptoms of discomfort arising from their wearing dentition.

Restorative protocols for the treatment of tooth wear should aim to restore health, function and aesthetic form with contingency planning in mind. Traditionally, such cases have been treated by the means of conventionally retained crown and onlay restorations. However, these restorations are irreversible and biologically invasive with concomitant risks of pulp tissue damage. There is also the matter of laboratory fees and the need for provisional restorations to consider.

As our knowledge of adhesive dentistry has increased in the recent past, **it is now possible to treat these cases to not only fulfill the above restorative goals, but with concomitant minimal intervention principles, thus offering biological**  conservation and the possibility of treatment reversal, should the proposed changes prove to be beyond the acceptance or adaptability of the patient.

Success with minimal intervention techniques, when providing care for patients with tooth wear does however require an appreciation and a clear understanding of the fundamental concepts of occlusion, aesthetics, adhesive dentistry and dental materials science.

The case report below illustrates an example of pathological tooth wear treated by minimal intervention. An array of materials have been prescribed to meet the functional and aesthetic demands of the patient, utilizing an evidence-based approach.

### **Case Report**

A 37 year-old male patient presented with moderate to severe pathological tooth wear, due to a combination of a parafunctional tooth grinding habit and extrinsic erosion (Figures 1-5). An occlusal examination revealed a freeway space (FWS) of 6mm (Turner Category 1).

The objectives were to restore the worn teeth in a re-organised manner, involving an increase in the occlusal vertical dimension by 3mm so as to provide the necessary intra-occlusal clearance for the prescribed materials to restore form and function, in an 'additive manner', whilst retaining a physiological FWS.

An initial intraoral 'dry and try' mock-up was performed (Figure 6), by placing a quantity of translucent composite Gradia Direct Anterior NT – Natural Translucent (GC Corporation, Tokyo, Japan,) to determine the ultimate morphology and tooth proportions in relation to established dento-facial aesthetic parameters. Photographs and impressions were taken. The use of a translucent material not only enables the patient to visualise the quantity of material being required to restore the worn dentition, but also provides a useful guide to the desired aesthetic changes when fabricating the diagnostic wax-up.

An occlusal scheme was prescribed that would provide even centric stops between each of the occluding pairs, canine guidance upon mandibular protrusive and excursive movements, and shared anterior guidance between the anterior teeth upon protrusion (mutual protection). The aesthetic and occlusal information has been applied when forming the diagnostic wax-up as depicted by figures 7A-E.

The diagnostic wax-up was subsequently duplicated in stone, and a silicone index formed accordingly. In order to verify acceptance of the aesthetic form, an intraoral mock-up was performed. The patient's teeth were lightly lubricated using petroleum jelly and a bis-acryl resin placed into the index (Protemp<sup>™</sup> 4, 3M ESPE, St. Paul, MN, USA) and carefully positioned into the patient's mouth.

Having obtained consent, a silicone key was constructed from the wax-up using a transparent silicone material,

which permits transverse light-curing (Figure 8). The material used was Memosil® 2 (Heraeus Kulzer GmbH, Hanau, Germany). The purpose of the key was to allow for the process of resin layering, in a manner so as to duplicate the pre-determined occlusal prescription, and achieve the desired aesthetic outcome.

Treatment commenced with the restoration of the anterior dentition, at an increased occlusal vertical dimension, with the concomitant establishment of the desired anterior occlusal scheme.

The mandibular anterior teeth were first restored. Isolation was obtained using OptraGate (Ivoclar Vivadent, Schaan, Lichtenstein). Teeth were cleaned with a slurry of pumice and water. In order to prevent interproximal excess, adjacent surfaces were isolated using a generic cellulose acetate strip. Teeth were etched for 30 seconds using orthophosphoric acid, which was subsequently washed and dried. OptiBond Solo Plus (Scafati, SA, Italy) was applied using a microbrush, gently air-dried to permit solvent evaporation and light-cured for a period of 30 seconds.

The silicone key was positioned against the lower teeth, and a desirable quantity of pre-warmed G-ænial Anterior AE light-cured radiopaque composite restorative (GC Corporation, Tokyo, Japan) applied against the silicone key whilst in-situ. Resin composite was adapted using a combination of proprietary resin composite instruments and a resin applicator brush (Brush Flat No.1, GC Corporation, Tokyo, Japan), taking care to avoid the interproximal areas. Following light-curing for 30 seconds, the key was removed, and the 'palatal shell' completed by forming the interproximal pillars. This was achieved by using the aforementioned shade of resin, placed against a cellulose acetate matrix. Minor corrections were performed using G-ænial Universal Flo (GC Corporation, Tokyo, Japan).

G-ænial Anterior A3 dentin shade was placed into the enamel shell and sculpted. Finally, G-ænial AE was added to restore the labial surface and light-cured for 30 seconds.

Gross finishing was achieved initially using a needle-shaped diamond bur, followed by a selection of tungsten carbide composite finishing burs (Komet Dental, Brasseler GmbH,











Figure 1 Pre-operative, frontal view. Figure 2 Pre-operative maxillary occlusal

Figure 3 Pre-operative view of the lower

Figure 4 Right-hand side lower;

Figure 5 Left-hand side lower;

Figure 6 Intraoral mock-up using

Figure 7A Diagnostic wax-up. Patient has

Figure 7B Labial view.

Figure 7C Occlusal view.

Figure 7D OVD increased by 3mm.

Figure 7E Frontal view.

Figure 8 Transparent silicone key in situ















16 /

### Tooth Wear Management by Minimal Intervention

Lemgo, Germany), Dura-Green and Dura-White Stones respectively (Shofu Dental Corporation, CA, USA). Interproximal polishing was carried out using Epitex strips (GC Corporation, Japan).

Polishing was carried out using a selection of micro-fine diamond impregnated silicone points (Optrapol Composite Polisher, Ivoclar Vivadent) and a high-gloss polishing system comprising of fibres impregnated with silicone carbide, Astrobrush (Ivoclar Vivadent).

The immediate post-operative result is shown by Figure 9. Minor corrections were then perfomed using G-ænial Universal Flo, and the restorations were coated with a thin layer of Optiglaze (GC Corporation), a nanofilled light-cured protective coating which was then light-cured for 30 seconds, to permit polymerisation of the surface layer. The definitive restorations have been depicted by Figure 10.

The anterior maxillary teeth were then restored during the subsequent visit in an analagous manner, as shown by Figures 11 & 12. The worn buccal cusps of the maxillary molar and premolar teeth were also restored in the same way (Figure 13).











GC get connecte

Figure 9 Lower anterior restored using

Figure 10 Post-operative lower anterior,

Figure 11 Post-operative labial view of

Figure 12 Right-hand side – Resin applied

Figure 13 Labial view – buccal cusp tips

Following the restoration of the worn anterior teeth, the resultant gain in intra-occlusal clearance in the posterior segments (Figure 14), was used to provide the necessary space for indirect adhesive onlay (occlusal veneer) restorations, to replace the lost occlusal tissue with minimal subtraction.

Cervical lesions were initially 'blocked out' using direct resin composite (G-ænial Anterior A3), to reduce the need to extend preparations further labially. Tooth preparations were limited to the placement of an appropriate margin, positioned 1.0mm apical to the occlusal surface. Marginal design and width varied from a 1.0mm margin for ceramic restorations (e.max lithium disilicate, lvoclar Vivadent) planned for the premolar teeth, to a 0.3-0.5mm chamfer margin for the Type III gold adhesive onlays for the affected molar teeth. The preparations for the right-hand side are shown by Figure 15.

Impressions were taken in custom trays using Aquasil Ultra (Dentsply DeTrey GmbH, Konstanz, Germany) (Figure 15), and provisional onlay restorations fabricated using a custom direct technique from an index constructed from the diagnostic wax-up, using Protemp 4 (3M, ESPE). The latter were cemented using Poly-F<sup>®</sup> Plus (Dentsply). Occlusal records were taken to permit the use of a semi-adjustable articulator.

Ceramic and gold onlay restorations were subsequently cemented using Variolink (Ivoclar Vivadent), and Panavia 2.0F (Kuraray, Japan) respectively.







Figure 14 - Anterior guidance restored. OVD increased. Space created to restore posterior teeth using a combination of ceramic and Type III adhesive gold occlusal veneers fitted.

Figure 15A &15B - Preparation views (right-hand side) – Enamel ring present for predictable bonding.

The post-operative results can be seen on Figures 16-21, where the patient has been provided with an occlusal scheme which demonstrates the presence of centric stops between each pair of occlusing teeth, canine-guided disclusion and evenly shared contacts amongst the anterior teeth during protrusive movements.

The patient was provided with a full coverage, maxillary hard acrylic occlusal splint to provide protection for the newly fabricated restorations, prescribed for nocturnal use.





















Figure 16 Right-hand side - Occlusal

Figures 17A & 17B Left-hand side

Figure 18A Restored lower arch using

Figure 18B Facial view.

Figure 19 Occlusal view. Centric stops

Figures 20A & 20B Inter-cuspal position.

Figures 21A & 21B Canine-guided

# Restoring Smiles with an injectable composite? Now possible with **G-ænial® Universal Flo** from GC

As a dentist, you might be **puzzled** while trying to find a **material that perfectly adapts itself in deep or narrow cavities and can be used up to the occlusal surfaces**. Thanks to its injectable viscosity, G-ænial Universal Flo is bringing a good answer to many difficult cases where you do not want to compromise between perfect placement and strength.

By using a unique filler dispersion technology, a higher filler load can be achieved. The result: an injectable material, as strong as any other posterior composite, but with increased usability: ideal for class I, II and cervical restorations.



SEM Picture showing completely homogeneous dispersion for increased wear resistance, high gloss retention and flexuralstrength Source: GCC R&D

The following pictures show the creation of two cervical fillings in teeth 13 and 14 on a 56 year-old patient. Thanks to its non-dropping viscosity, G-ænial Universal Flo can be applied in small increments, directly according to the final tooth morphology, so that very limited corrections have to be done during the finishing phase in direction of the gingival tissue.





In the above clinical situations, it is advised to prepare a conservative cavity, also often very narrow. In order to ensure proper adaptation in deep and narrow places, dentists often use flowable composite as a base, followed by a regular composite on the occlusal surface. G-ænial Universal Flo now makes it possible to use only one material from the bottom of the cavity to the occlusal part. The material is layered in increments, and its unique thixotropic behavior makes it possible to directly create anatomic cusp morphology.



Finally... the flowable composite category has evolved.

| Filler Type  | Gloss<br>Retention | Polishability | Flexural<br>Strength | Wear<br>Resistance |
|--|--------------------|---------------|----------------------|--------------------|
| Nano-hybrid<br>(homogeneous dispersion)<br>in <b>G-ænial Universal Flo</b> | ++                 | ++            | ++                   | ++                 |
| Nano   | +                  | ++            | -                    | +                  |
| Micro  |                    |               |                      | -                  |
| Nano Cluster   | -                  | +             | -                    |                    |



Never before has a material with the handling of a flowable been combined with the strength and aesthetics of a universal composite. No other material offers all of these advantages.

Get a chance to try G-ænial Universal Flo! Request a free sample at www.gaenialuniversalflo.gceurope.com/sample (subject to participating countries)

## Healing deep carious lesions in the posterior region with a **new micro-laminated** glass ionomer cement

A clinical case report by **Asst. Prof. Dr. Anja Baraba & Prof. Dr. Ivana Miletic**, Department of Endodontics and Restorative Dentistry, School of Dental Medicine, University of Zagreb, Croatia.

> Glass ionomer cements (GIC) are unique dental materials due to chemical adhesion and properties similar to hard dental tissues, their bioactivity and moisture tolerance<sup>(1)</sup>. Since their development in 1972 as materials recommended for the restoration of cervical lesions <sup>(2)</sup>, many attempts have been made to improve their properties, especially mechanical strength. Recently there have been attempts to improve the strength of glass ionomers like zinc reinforcement or improving the glass fillers themselves. One of the more clinically documented systems has been the micro-lamination technique of glass ionomer (marketed as the EQUIA restorative system), introduced in 2007 in Europe. Gurgan et al. <sup>(3)</sup> showed in their clinical study, comparing the micro-laminated glass ionomer restorative system with a micro-filled hybrid composite in posterior teeth, similar and clinically successful performance after six years. Other studies have also confirmed the longevity of micro-laminated GIC in the posterior region, showing clinical success of restorations after a period of one to six years <sup>(4-7)</sup>. Another study comparing the EQUIA system with Riva GIC (SDI) showed that the micro-laminated GIC system was more successful than the conventional GIC system regarding color-match and retention rate after a six-year clinical period <sup>(8)</sup>. The same study also concluded that despite minor reparable defects, the overall clinical performance of the micro-laminated GIC (EQUIA) was excellent even in large posterior Class II restorations after a period of six years.

### Healing deep carious lesions in the posterior region with a new micro-laminated glass ionomer cement

Recently a new generation of glass ionomers has been introduced by GC. They call it Glass Hybrid technology. According to the manufacturer, **the new glass filler matrix combines fillers (fluoro-alumino-silicate glasses) of different sizes in a way similar to hybrid composites.** 

The restorative system marketed as the EQUIA Forte restorative system combines the use of EQUIA Forte Fil (micro-laminated GIC) with EQUIA Forte Coat. The more voluminous glass fillers of EQUIA Forte Fil (approx. 25µm) are supplemented by smaller (approx. 4µm), highly reactive fillers that strengthen the restoration. The advantage of adding the highly reactive smaller fluoro-alumino-silicate glasses is that it increases the reactivity of the glasses by releasing metal ions, which support the cross-linking of polyacrylic acid<sup>(9)</sup>. EQUIA Forte Fil also adopted high-molecular-weight polyacrylic acid, which makes the cement matrix stronger and chemically more stable<sup>(9)</sup>. Its impressive performance parameters can be documented not only descriptively but also quantitatively: the filling component EQUIA Forte Fil by itself achieves 10% more flexural strength than the standard combination of EQUIA Fil plus EQUIA Coat. In combination with the EQUIA Forte Coat composite coating, the flexural strength increases by 17% and flexural energy by almost 30% compared to standard EQUIA. EQUIA Forte Coat is based on the same technology as EQUIA Coat, featuring

nano-fillers uniformly dispersed in the coating liquid, together with the addition of a new multifunctional monomer with efficient reactivity. This monomer makes the coating layer harder and smoother. Adding a multifunctional monomer to EQUIA Forte Coat increases surface hardness by almost 35% and wear resistance by more than 40% compared to EQUIA Coat. In addition to the physical properties, the handling of the material has been optimized for the dental practitioner.

Thanks to improved mechanical properties, well known remineralization potential, lack of shrinkage stress and placement in bulk, GICs are very suitable for application in deep cavities in the

A patient, aged 23, came to the dental office because of a deep carious lesion on the right lower first molar (figure 2). A radiograph was taken to check the depth of the carious lesion (figure 3). After the application of local anesthesia, caries were removed using the modified ART technique, excavating only infected dentin (figure 4). After conditioning the cavity with Dentin conditioner (GC, Tokyo, Japan) for 20 seconds, EQUIA Forte Fil (GC, Tokyo, Japan) material was placed (figure 5). After finishing the restoration, EQUIA Forte Coat (GC, Tokyo, Japan) was applied on the surface and light-cured for 20 seconds with a D-Light DUO LED curing device, (figure 6, figure 7).



### posterior region as they can heal damaged and demineralized hard dentin tissues.

Dentin caries lesions can be divided into two layers <sup>(10)</sup>. It is generally accepted that inner 'infected dentin', which is a soft layer of dentin rich in bacteria and incapable of being remineralized<sup>(11)</sup>, needs to be removed. Closer to the pulp, 'affected dentin' with the potential to be remineralized should be retained  $^{(11)}$ . Affected dentin is often dark and stained but vital and minimally affected by bacteria. In order to enable distinction between these two layers, hand instuments (excavators) instead of rotary burs should be used towards the pulp. The use of hand instruments for removal of carious tissue is characteristic of the atraumatic restorative treatment (ART) technique, which was developed in the 1980s. In the modern dental medicine, usually modified ART is practised, as rotary instruments are used to open the cavity and to clean the side walls of the lesion. In this way, excessive cavity preparation and opening of the vital

and uninflamed pulp can be avoided. If the tooth is vital and asymptomatic, even some soft infected dentin may be left on the bottom of the cavity. When bacteria are deprived of their food source by sealing the cavity with a bioactive material like GIC, the caries progression will arrest and might even regress. GIC is a water-based material with ion migration within the material and it acts as a fluoride reservoir, with a continuous release and uptake process, increasing fluoride levels in saliva, plague and hard dental tissues <sup>(12)</sup>. Fluorides are released rapidly from GIC at first, followed by a rapid reduction <sup>(13)</sup>. As well as food deprivation when placing GIC to seal deep carious lesions, the initial fluoride effect will help to further reduce the viability of bacteria and start the remineralization of hard dental tissues <sup>(14)</sup>. Besides the role of fluorides in remineralization, there is also evidence of the transfer of calcium, phosphate and strontium ions from GIC deep into the demineralized dentin and surrounding enamel<sup>(15)</sup>.

### Healing deep carious lesions in the posterior region with a new micro-laminated glass ionomer cement

One of the main advantages of GIC is the chemical bond to hard dental tissues through an ion exchange mechanism. Adhesion between tooth structure and the material occurs due to the release of calcium and aluminium ions from the cement and calcium and phosphate ions from enamel and dentin, creating an ion-enriched interfacial layer <sup>(16)</sup>. The bond between the GIC restoration and the tooth is so strong that, when the material has matured, any failure will be cohesive within the material. When attempting to preserve pulp vitality and remove only infected dentin, the use of a highly viscous GIC is advantageous as its micro-tensile bond strength to affected dentin is not reduced in comparison to the bond to healthy dentin<sup>(17)</sup>, while composite resin materials show lower bond strengths to caries-affected dentin<sup>(18)</sup>.



Ketac Molar and Ionostar are not trademarks of GC.

GC get connected

of other glass ionomers

### Healing deep carious lesions in the posterior region with a new micro-laminated glass ionomer cement



**Anja Baraba** is assistant professor at the Department of Endodontics and Restorative Dentistry at the University of Zagreb in Croatia. She graduated from the School of Dental Medicine, University of Zagreb, was a student assistant at the Department of Histology and Embriology and received Dean Awards as well as two national scholarships. She has worked as a young researcher and a senior assistant at the Department of Endodontics and Restorative Dentistry since 2007. She obtained her PhD degree in 2011 and became assistant professor in 2014. She completed her specialty training in endodontology and restorative dentistry in 2013. She has published scientific and other articles in journals indexed in Current Contents and other journals. She is a member of Croatian Chamber of Dental Medicine, Croatian Endodontic Society, Croatian Medical Association, European Endodontic Society and IADR. She is the secretary of the Croatian Society for Minimum Intervention Dentistry.



**Ivana Miletić**, DMD, PhD was born in 1971 in Zagreb. She graduated at the School of Dental Medicine, University of Zagreb in 1995. Since then, she has been working at the Department of Endodontics and Restorative Dentistry in the University of Zagreb, where she gradually became full Professor (in 2008) and actively participates in teaching in clinic, pre-clinic and continuous education. She is also head of postgraduate and PhD courses. She got her master degree in 1998, PhD in 2000; and passed the specialist exam in endodontics and restorative dentistry in 2004. She is an author and co-author of four coursebooks and many more scientific, review, educative and specialized articles which are also cited in many international journals and course books. She is particularly specialised in the field of Endodontics, where she actively worked on various scientific projects from 1996 till today. She has been participating in many national and international congresses, and has held many lectures. She is an active member of Croatian Chamber of Dental Medicine, Croatian Endodontic Society, Croatian Medical Association, European Endodontic Society, ORCA and IADR. She is the president of the Croatian Society for Minimum Intervention Dentistry.

### **References:**

- 1. Coutinho E, Yoshyida Y, Inoue S, et al. Gel phase formation at resin-modified glass ionomer/tooth interfaces. J Dent Res. 2007; 86:656-661.
- 2. Wilson AD, Kent BE. A new translucent cement for dentistry. The glass ionomer cement. Br Dent J 1972:132:133-5.
- 3. Gurgan S et.al, Six-year randomized clinical trial to evaluate the clinical performance of a glass ionomer restorative system. CED-IADR, Antalya abstract
- Friedl K, Hiller KA, Friedl KH. Clinical performance of a new glass ionomer-based restoration system. Dent Mater 2012:27:1031-7.
- Klinke TU, Daboul AA, Biffar RH. Randomized clinical trial in the field: longevity after 48 months. Klinke et. al, P39 abstract Conseuro, London.
- Diem VTK, Tyas MJ, Hien CN, Phuong LH, Khanh ND. The effect of a nano-filled coating on the 3-year clinical performance of a conventional high-viscosity glass ionomer cement. Clin Oral Investig 2014;18:753-9.
- Basso M, Ionescu A, Gone Benites M. 48-month, multicenter, clinical evaluation on 304 glass ionomer permanent restorations. Abstract 192686, IADR-PER, Dubrovnik 2014.

- Turkun LS, Kanik O. Clinical evaluation of reinforced glass ionomer systems after 6 years. CED IADR, Antalya Turkey, 2015 (Abstr).
- Miletic I. Modern solutions for direct posterior restorations. GC get connected 2015;4:32-6.
- Fusayama T. Two layers of carious dentine: diagnosis and treatment. Oper Dent 1979;4:63–70.
- Holmgren CJ, Roux D, Domejean S. Minimal intervention dentistry: part 5. Atraumatic restorative treatment (ART)

   a minimal intervention and minimally invasive approach for the management of dental caries. Br Dent J. 2013;214:11-8.
- Exterkate RA, Damen JJ, Ten Cate JM. Effect of fluoride-releasing filling materials on underlying dentinal lesions in vitro. Caries Res. 2005;39:509–13.
- Wiegand A, Buchalla W, Attin T. Review on fluoride-releasing restorative materials-fluoride release and uptake characteristics, antibacterial activity and influence on caries formation. Dent Mater. 2007;23:343–62.
- Freedman R, Diefenderfer KE. Effects of daily fluoride exposures on fluoride release by glass ionomer-based restoratives. Oper Dent. 2003;28:178–85.
- 15. Ngo H, Marino V, Mount GJ. Calcium, strontium, aluminium, sodium and

fluoride release from four glass ionomers. J Dent Res 1998;77:641 (Abstr 75).

- Hewlett ER, Mount GJ. Glass ionomers in contemporary restorative dentistry - a clinical update. CDA J 2003;31:483-92.
- Burrow MF, Bokas J, Tanumiharja M, Tyas MJ. Micro-tensile bond strengths to caries-affected dentine treated with Carisolv. Austral Dent J 2003;48:110-4.
- Nakajima M, Kunawarote S, Prasansuttiporn T, Tagami J. Bonding to caries-affected dentin. Japanese Dent Sci Rev 2011:47:102-14.

## NEW FLUORIDE VARNISH Marnish by GC

### A clinical case report by **Dr Birgit Riebeling**, Germany



### **Dr Birgit Riebeling**

Since 2014 Self-employed in private practice

2012-2013 Employed as dentist in General Dental Practice in Regensburg

2011 Free employee of IAADD Barletta , Southern Italy

2009-2011 Employed as dentist in Implantology Oriented Practice in Dortmund Many patients suffer from hypersensitivity. There are as many triggers for this as there are benefits of a product that can be used not only as an optional fluoride treatment to fight caries, but as an effective treatment for hypersensitivity: fluoride varnish. The author of the following appraisal chose to use the new fluoride varnish **MI Varnish by GC to treat and prevent hypersensitivity in patients caused by erosion or recession, or following professional tooth cleaning.** Here she describes her experience of using the product.

In my professional practice, I focus on conservative tooth maintenance and aesthetic dentistry. Before I became aware of MI Varnish through my dental depot in summer 2014, I had stocked up on several desensitisers by different companies, as well as a fluoride varnish, in my practice. In my day-to-day practice, I always apply fluoride varnish to caries predilection sites or exposed dentin following professional tooth cleaning.

### I enjoy using MI Varnish because of its high transparency and good adhesion. Moreover, it is very easy to apply, doesn't clump and has a pleasant strawberry or mint flavour.

### **Material properties**

According to the manufacturer's specifications, MI Varnish is a 5% fluoride varnish with a fluoride content of 22,600 ppm sodium fluoride<sup>[1]</sup>. It also contains RECALDENT<sup>™</sup>, a CPP-ACP complex (casein phosphopeptide – amorphous calcium phosphate). This complex is known to bind to the biofilm, plaque matrix and pellicle and to deposit calcium and phosphate ions in the acidic environment. These ions then get into the porous tooth enamel<sup>[2.3]</sup>. This reduces demineralisation of teeth caused by acid attacks (as a result of bacterial metabolism in the plaque) and boosts remineralisation. The interaction between CPP-ACP and fluoride,

GC get connected

### New fluoride varnish MI Varnish by GC









Figure 1: MI Varnish (GC) in unit dose containers with disposable brush.

#### Figure 2: Before...

Figure 3: During...

**Figure 4:** And after application of MI Varnish with the disposable brush.

Pictures courtesy of Dr Dana Adyani-Fara

26 / GC get connected

with the fluoride having an additive effect in combination with the CPP-ACP, further boosts remineralisation <sup>[3]</sup>.

MI Varnish seals the open dentinal tubules, which, according to Brännström, are assumed to be the cause of hypersensitivity <sup>[4]</sup>. MI Varnish also forms a thin protective layer to prevent direct contact with external irritants and reduce hypersensitivity of the tooth in conjunction with the aforementioned desensitising ingredients.

MI Varnish does not require any prophylactic treatment before use. It is quick, simple and hygienic to apply and offers particularly good adhesion, even on moist surfaces. It hardens when it comes into contact with water or saliva. MI Varnish is not sticky when applied, but has a smooth, creamy texture. **Once applied to the tooth, the neutral shade of the varnish, with its natural translucency, does not experience any change in colour and the thickness of the film is described as comfortable, even after several applications.** 

Another advantage is its high initial fluoride release compared to other products.

### Indications and contraindications

MI Varnish is intended for the treatment of hypersensitivity resulting from exposed dentin. It must not be used in patients with ulcerative gingivitis or stomatitis. A further contraindication is a milk protein allergy owing to the casein phosphopeptide, a derivative of milk casein, the varnish contains. The indications of fluoride varnish are not, however, limited to desensitising exposed dentin. The caries-preventing effect of fluoride has been scientifically proven for decades. That's why I also use fluoride varnish to remineralise initial lesions, prevent caries in the long term and protect against erosion.

### **Experience**

The type of packaging used for MI Varnish is more than sufficient for a full set of teeth (Fig. 1). When you open the blister pack, you will find that the varnish has a smooth consistency. Although phase separation of the ingredients has so far never occurred with me, you can resolve this, according to the instructions for use, simply by stirring the MI Varnish using the disposable brush before applying. I prefer to use a disposable brush to apply the varnish. In principle, you do not need to clean the tooth surface beforehand because the CPP-ACP complex adheres to the dental plaque, as described at the beginning. However, I prefer clean surfaces. A further advantage is that the varnish only needs to be applied very thinly (Fig. 2-4). The low viscosity of the material also makes it easier to apply to crown margins. If MI Varnish is applied thinly, it is (practically) invisible. I have not observed any discolouration of the varnish after a few hours, or any discolouration of ceramic restorations or filling margins.

I always blow the applied varnish lightly using the multipurpose attachment. This is quick and works well, without clumping. The varnish does not harden until it comes into contact with saliva or water.

Experience has so far shown very good patient compliance. They were pleasantly surprised by the mild, fruity flavour of the product, particularly the children. For adults, the appearance of the varnish is more important; many patients do not want to have a yellowish fluoride varnish, especially on their front teeth, even just for a few hours.

I recommend applying the varnish only very thinly. I store the unit doses at room temperature so that applying the varnish to tooth necks is more comfortable. I also open the container in front of the patient first and allow him or her to smell it. Most patients are then completely at ease and look forward to the fluoride treatment as a kind of "dessert" after professional tooth cleaning.

### Role of varnish in the MI concept

With the aim of supporting patients and practices, the company GC has implemented a comprehensive action plan against caries, and in doing so is promoting oral health from early childhood right through to old age: the minimum intervention (MI) concept is based on identifying individual caries risks, caries prevention and (minimally invasive) preparation and restoration if teeth are already decayed, and

### incorporates risk-dependent recall management as part of the MI treatment plan.

Depending on the individual risk profile of the patient, Dry Mouth Gel, Tooth Mousse, MI Paste Plus and Fuji Triage can all be incorporated into prevention: – as the second pillar of the concept – as complementary treatments for normal oral hygiene.

Within this context, MI Varnish is also part of the MI treatment plan. Although patients should not use any high-dose fluoride products, such as fluoride gel, on the same day as an in-office application of MI Varnish, and although regular use of fluoride tablets should be stopped for a few days, normal oral hygiene routines at home can be resumed after just four hours. If patients also want to use products enriched with CPP-ACP at home, the Tooth Mousse and **MI Paste Plus mentioned previously** are suitable for continuous use. myself also enjoy using Tooth Mousse in my practice after whitening teeth, for caries prevention in IPs (Individual Prophylaxis) or for treating white spots.

### **Application**

Before applying the varnish, I clean the tooth surfaces that are about to be treated. I then dry them and keep the oral cavity relatively dry using dental rolls and the saliva ejector. I apply a

## If MI Varnish is applied thinly, it is (practically) invisible.

single, very thin layer of MI Varnish using a soft disposable brush (not a microbrush), avoiding the gingival margin and interdental spaces. Using the multipurpose syringe, I blow the varnish with a light airstream towards the sulcus and interdental space. If necessary, I put an extra drop of varnish onto a piece of dental floss and apply it to hard-to-reach interproximal space. Once all necessary surfaces have been treated, I allow the patient to carefully rinse out his or her mouth. Lastly I tell the patient to avoid sticky food, alcohol and oral hygiene activities for four hours.

### **Summary**

MI Varnish is for me an ideal fluoride varnish because it is easy to use in two main respects: it does not require any prophylactic treatment before application, the unit dose containers are easy to open and contain enough varnish for a complete set of teeth. It offers excellent adhesion and colour retention. Patients benefit not only from its neutral shade but from its pleasant taste.

### **References:**

- Manufacturer's specifications for the product at http://www.gceurope.com/ products/detail.php?id=178.
- 2. Robertson MA, Kau CH, English JD, Lee RP, Powers J, Nguyen JT: MI Paste Plus to prevent demineralization in orthodontic patients: a prospective randomized controlled trial. Am J Orthod Dentofacial Orthop. 2011; 140 (5): 660-668
- Stößer L, Manton DJ.: Kariesprotektive Eigenschaften des durch Caseinphosphopetid amorphen Calciumphophat-Nanokomplexes (CPP-ACP). DZZ 2007; 62(9): 579-588
- Brännström M, Linden LÅ, Åstrom A: The hydrodynamics of the dental tubule and of pulp fluid. A discussion of its significance in relation to dentinal sensitivity. Caries Res. 1967; 1(4): 310-317

GC get connected

## **GC Luting Cements**

|               | Temporary<br>cementation   | Long-term temporary<br>cementation  |   |
|---------------|--|---|---|
|               | Zinc oxide cement  | Conventional<br>glass ionomer cement                                      | Conventional<br>glass ionomer cement  |
|               | Freegenol  | Fuji Temp LT  | Fuji l  |
|               | All purpose temporary solution   | Assured retention and retrievability                                      | 25 years of documented use<br>in routine luting procedures  |
| Description   | The paste-paste <b>eugenol free</b><br>cement for temporary<br>luting  | The paste-paste glass ionomer<br>cement for long-term<br>temporary luting | The ideal solution for <b>routine</b><br><b>luting procedure</b> of<br>metal-based and high<br>strength ceramic restorations<br>(e.g. Zirconia)   |
| Delivery mode | 1-1 tubes, handmix   | Paste-paste dispenser (clicker),<br>Handmix                               | Powder/<br>Liquid Capsules  |
| Main features | <ul> <li>Eugenol free: no negative effect on polymerization of resin-based permanent cements</li> <li>Adjustable consistency and setting time</li> <li>Easy removal of excesses</li> <li>Radiopacity</li> <li>Ideal also for temporary cementation of permanent crowns on implant abutment.</li> <li>Cost effective solution</li> <li>No pre-treatment or bonding agent needed</li> <li>Moisture tolerant</li> <li>Strong for most routin needs</li> <li>Excellent radiopacity</li> <li>Good marginal sealing</li> <li>High biocompatibility</li> <li>No post-op sensitivity</li> <li>Capsules: exact ratio &amp; perfect consistency</li> </ul> |   | <ul> <li>Cost effective solution</li> <li>No pre-treatment or<br/>bonding agent needed</li> <li>Moisture tolerant</li> <li>Strong for most routine<br/>needs</li> <li>Excellent radiopacity</li> <li>Good marginal sealing</li> <li>High biocompatibility</li> <li>No post-op sensitivity</li> <li>Capsules: exact ratio &amp;<br/>perfect consistency</li> </ul> |

## SELECTION GUIDE

| Permanent cementation  |  |   |   |  |  |
|--|--|---|---|--|--|
| Resin-modified gla   | ss ionomercement   | Self-adhesive   | Injectable<br>light-cured composite   |  |  |
| Fuji PLUS  | FujiCEM 2  | G-CEM   | G-CEM LinkAce   | G-ænial Universal Flo  |  |
| The benchmark resin-modified glass ionomer cement  | Latest technology in<br>resin-modified glass ionomer<br>cement     | The reliable solution for a broad range of luting indications   | The reliable solution<br>for a broad range of luting<br>indications   | The aesthetic solution already at your fingertips  |  |
| The best balance between resin<br>for a wide range of indications<br>cementation procedures  | and glass ionomer cements<br><b>s, especially for your routine</b> | Dual-cure self-adhesive resin cement: The <b>ideal solution for a</b><br><b>wide range of indications, especially for aesthetic restorations</b><br>(e.g e.max <sup>*1</sup> , IPS Empress <sup>*1</sup> , etc)                           |   | The perfect combination of<br>easy handling, high physical<br>properties and excellent<br>aesthetics for <b>a safe and easy</b><br>cementation of veneers  |  |
| Powder/<br>Liquid Capsules   | Paste-paste cartridge (clicker or syringe), Handmix & Automix      | Capsules  | Automix syringe   | Syringe  |  |
| <ul> <li>No need for etching or<br/>bonding steps</li> <li>High retention for a wide<br/>range of indications</li> <li>Rubbery consistency for<br/>easy clean-up of excess</li> <li>No post-op sensitivity</li> <li>Capsule: exact ratio &amp; creamy<br/>consistency</li> <li>Available in 4 shades<br/>including translucent</li> <li>No need for etching or<br/>bonding steps</li> <li>High retention for a wide<br/>range of indications</li> <li>Rubbery consistency for<br/>easy clean-up of excess</li> <li>No post-op sensitivity</li> <li>Comfortable and versatile<br/>handling: handmix or<br/>automix with the same<br/>cartridge</li> </ul> |  | <ul> <li>No need for etching or<br/>bonding steps</li> <li>Strong and stable adhesion<br/>to all materials, including<br/>zirconia</li> <li>High color stability for<br/>long-term aesthetics</li> <li>No refrigeration needed</li> </ul> | <ul> <li>No need for etching or<br/>bonding steps</li> <li>Thin film thickness (3µm)</li> <li>Highly efficient self-cure<br/>mode, important feature<br/>when light transmission is<br/>limited</li> <li>Strong adhesion to all<br/>materials including zirconia.</li> <li>High color stability for<br/>long-term aesthetics</li> <li>Comfortable handling:<br/>ideal consistency and easy<br/>excess removal</li> <li>No refrigeration needed</li> </ul> | <ul> <li>Easy placement and<br/>positioning of the veneers<br/>thanks to its thixotropic<br/>consistency</li> <li>High wear resistance and<br/>polishability for excellent<br/>marginal integrity in time</li> <li>High color stability for<br/>long-term aesthetics</li> <li>One of the lowest values<br/>of shrinkage stress among<br/>flowable composites</li> <li>Multipurpose= easy and<br/>safe way to streamline your<br/>inventory</li> <li>15 shades available in three<br/>different translucencies</li> </ul> |  |

### For each indication, find the right cement

|  | Fuji I Fuji PLUS          |   | FujiCEM 2              | G-CEM LinkAce<br>G-CEM Caps | G-ænial<br>Universal Flo |  |
|--|---------------------------|---|------------------------|-----------------------------|--------------------------|--|
|  |                           | Metal/ Meta   | al based               |                             |                          |  |
| Inlays/onlays                                      |                           |   |                        |                             | -                        |  |
| Crowns/ bridges                                    |                           |   |                        |                             | -                        |  |
| Endodontic Posts                                   |                           |   |                        |                             | -                        |  |
|  | Feldspathic               | & leucite-reinforced ce   | ramics (low strength   | ceramics)                   |                          |  |
| Inlays/onlays                                      | -                         |   |                        |                             | <b>√</b> <sup>1</sup>    |  |
| Crowns/ Bridges                                    | -                         | -   | -                      |                             | -                        |  |
| Veneers  | -                         | -   | -                      | -                           |                          |  |
|  | Lithiu                    | m disilicate (e.g. e.max®   | »- high strength ceram | nics)                       |                          |  |
| Inlays/onlays                                      | -                         |   |                        |                             | ✓1                       |  |
| Crowns/bridges                                     | -                         |   |                        |                             | -                        |  |
|  | Zi                        | rconia and Alumina (hi  | gh strength ceramics)  |                             |                          |  |
| Crowns/ Bridges                                    |                           |   |                        |                             | -                        |  |
| Endodontic posts                                   |                           |   |                        |                             | -                        |  |
|  |                           | Compo   | site                   |                             |                          |  |
| Inlays/onlays                                      | -                         |   |                        |                             | <b>*</b> <sup>1</sup>    |  |
| Crowns/ Bridges                                    | -                         |   |                        |                             | -                        |  |
| Fiber Posts  | Fiber Posts -             |   |                        |                             | -                        |  |
| Veneers  | -                         | -   | -                      | -                           |                          |  |
|  |                           |   |                        |                             |                          |  |
|  | Fuji I Fuji I<br>P/L CAPS | Fuji Fuji Fuji<br>PLUS PLUS PLUS<br>P/L P/LEWT <sup>*2</sup> CAPS | FujiCEM 2              | G-CEM G-CEM<br>CAPS LinkAce | G-ænial<br>Universal Flo |  |
| Mixing time<br>min/sec                             | 20 10 sec                 | 20 20 10<br>sec sec sec   | 10-15 sec              | 10 sec 10-15 sec            | N.A.                     |  |
| Working Time<br>min/sec                            | 2 min 2 min 15            | 2 min<br>30 3 min<br>30 2 min                                     | 2 min 15               | 2 min 30 2 min 50           | N.A.                     |  |
| Final finishing from<br>Commencing Time<br>min/sec | 4 min 30 4 min 30         | 4 min 5 min 4 min 30 45 15  | 4 min 30               | 4 min 4 min 30              | N.A.                     |  |

\*1 For indirect restorations with thin thickness ( $\leq$  2mm) that enable the use of a purely light-curing technique \*2 EWT: Extended Working Time: perfect for the cementation of bridges

## Cleaners & disinfectants

### FOR CAVITIES AND PREPARATIONS PRIOR TO RESTORATIVE PROCEDURES

Cleaning the preparation prior to cementation of indirect restorations is the first step of an effective bonding technique. Removal of grease, debris and remnants of provisional cement can be easily done using pumice slurry.

Current thoughts suggest that the cleaning step should also provide the disinfection of the cavity. This would supposedly reduce the possibility of bacterial growth under the restoration. Actually, the need for a disinfectant prior to bonding procedures is not well established and remains an open question. As some of these disinfectants may negatively influence the bond strength of luting cements to the dental surface, guidelines are important to avoid the failure of the treatment which can even lead to loss of retention of the indirect restoration. In all cases, after cleaning, always rinse and dry.

| Product                           | Composition  | Effect/Action  | Glass Ionomer<br>Fuji I  | Resin modified<br>glass ionomer<br>Fuji Plus & FujiCEM 2  | Resin composite<br>G-CEM caps. & G-CEM<br>LinkAce |
|-----------------------------------|--|--|--|---|---|
| Pumice slurry                     | Abrasive paste   | Cleaning effect  | 1  | <ul> <li>Image: A start of the start of</li></ul> | 1   |
| Hydrogen Peroxide                 | Up to 5% hydrogen Peroxide                             | Disinfecting and hemosthatic effect  | 1  |   |   |
| Sodium hypochlorite               | Sodium hypochlorite                                    | Disinfecting effect  | 1  | ~   | 1   |
| EDTA                              | Up to 5% Ethylenediamintetraacetic acid                | Demineralizing effect  | <ul> <li>Image: A second s</li></ul> | <ul> <li>Image: A start of the start of</li></ul> |   |
| Alcohol                           | Ethanol  | Disinfecting and dehydrating effect  |  |   |   |
| Ultracid F<br>(Ultradent)         | EDTA, Benzalkoniium Chloride,<br>1% Sodium Fluoride    | Demineralizing and disinfecting effect with<br>some obliteration of dentin tubules | ✓  | ~   |   |
| Tubulicid Blue<br>(Global Dental) | 2% EDTA, Benzalkoniium Chloride                        | Demineralizing and disinfecting effect   | ✓  | ~   |   |
| Tubulicid Red<br>(Global Dental)  | 2% EDTA, Benzalkoniium Chloride,<br>1% Sodium Fluoride | Demineralizing and disinfecting effect with<br>some obliteration of dentin tubules | ✓  | <ul> <li>Image: A start of the start of</li></ul> |   |
| Consepsis<br>(Ultradent)          | 2% Chlorexidine  | Disinfecting effect and inhibition of MMP  | 1  | ~   | 1   |
| Consepsis scrub<br>(Ultradent)    | 2% Chlorexidine in abrasive paste                      | Disinfecting effect and inhibition of MMP  | 1  | <ul> <li>✓</li> </ul>   | 1   |
| Cavity Cleanser<br>(Bisco)        | 2% Chlorexidine Digluconate                            | Disinfecting effect and inhibition of MMP  | 1  | 1   | 1   |

• Hydrogen Peroxide releases oxygen, which inhibits the polymerization of resin-based cements.

Alcohol should not be used since it dehydrates the surface, which can cause post-operative sensitivity and decrease of bond strength.

EDTA promotes the partial removal of the smear layer. It does not affect the bond strength of GIs and RMGIs.
 GC Dentin Conditioner, Cavity Conditioner and Fuji Plus Conditioner can be used for the same purpose with the advantage of improving the bond strength of GIs and RMGIs to dentin and enamel.

• 2% Chlorexidine inhibits the action of metalloproteinases, host-derived enzymes responsible for the degradation of the bonding interface over time.

Ultracid F, Tubulicid Blue, Tubulicid Red, Consepsis, Consepsis scrub and Cavity Cleanser are not trademarks of GC





### Support, replenish and protect with the stroke of a brush





GC EUROPE N.V. Head Office Tel. +32.16.74.10.00 Fax. +32.16.40.48.32 info@gceurope.com http://www.gceurope.com



## **Indicated pre-treatment** OF INDIRECT RESTORATIONS FOR LUTING

| Types of materials for indirect restorations:  | Pre-treatment in the luting procedure for<br>resin-modified glass ionomer and resin cements:  |  |  |  |  |
|--|---|--|--|--|--|
| Glass-ceramics   |   |  |  |  |  |
| <ul> <li>Feldspathic ceramics</li> <li>Leucite-reinforced ceramics (e.g. IPS Empress)</li> <li>Lithium disilicate ceramics (e.g. e.max)</li> </ul> | <ol> <li>Etch with hydrofluoric acid<sup>*1</sup>, rinse and dry</li> <li>Clean with alcohol (if possible in ultrasonic bath)</li> <li>Apply Ceramic Primer II &amp; dry</li> </ol>   |  |  |  |  |
| Polycrystalline ceramics   |   |  |  |  |  |
| <ul> <li>Zirconia (e.g. GC Initial Zirconia Disk, Procera,<br/>Lava Plus &amp; BruxZir)</li> <li>Alumina</li> </ul>                                | 1. Sandblast $(Al_2O_3 \le 50\mu m, 1-2 bars)$<br>2. Clean with alcohol (if possible in ultrasonic bath)<br>3. Apply Ceramic Primer II & dry  |  |  |  |  |
| Hybrid ceramics  |   |  |  |  |  |
| • GC CERASMART   | <ol> <li>Sandblast (Al<sub>2</sub>O<sub>3</sub> ≤ 50µm, 1-2 bars)<br/>Note: if you do not have a sandblaster,<br/>apply hydrofluoric acid for 60 seconds</li> <li>Clean with alcohol (if possible in ultrasonic bath)</li> <li>Apply Ceramic Primer II &amp; dry</li> </ol> |  |  |  |  |
| Composite  |   |  |  |  |  |
| • <b>Composite</b> (e.g. Gradia)   | 1. Sandblast (Al <sub>2</sub> O <sub>3</sub> $\leq$ 50 $\mu$ m, 1-2 bars)<br>2. Clean with alcohol (if possible in ultrasonic bath)<br>3. Apply Ceramic Primer II & dry   |  |  |  |  |
| Metal based  |   |  |  |  |  |
| <ul> <li>Metal</li> <li>Porcelain-fused to metal (PFM)</li> </ul>  | 1. Sandblast (Al₂O₃ ≤ 50μm, 1-2 bars)<br>2. Clean with alcohol (if possible in ultrasonic bath)<br>3. Apply Metal Primer II (if you wish to obtain extra<br>bond)   |  |  |  |  |
| GC Fiber post  | 1. Clean with alcohol<br>2. Apply Ceramic Primer II and dry   |  |  |  |  |

#### Note: In any case, we recommend to follow the instructions for use of the manufacturer.

<sup>\*1</sup>The following etching times should be observed: feldspathic and leucite-reinforced ceramics: 60 sec.; lithium disilicate: 20 sec. IPS Empress, e.max, Procera, Lava Plus & BruxZir are not trademarks of GC.

## Clinical evaluation of **Cerasmant**, a new hybrid ceramic CAD/CAM block

A clinical case report by Dr. Mete Fanuscu and Dr. Ahmet Turan

As digital dentistry rapidly takes centre stage in modern dental practices, advances in material science force dentists to make difficult choices to match each case with the most suitable dental restorative material. In this daily struggle for the perfect indication, few materials step up as the dentist's best choice in terms of their aesthetic properties, physical characteristics and long-term reliability.

In our practice, restoring posterior teeth with inlays, onlays and single crowns using CEREC CAD/CAM is the standard protocol. For fabricating indirect partial restorations (inlays/onlays), our primary choice of material has generally been leucite-reinforced glass-ceramic, which offers adequate physical strength (160 MPa) and great aesthetic results due to its chameleon-like effect. **Problems** with leucite ceramic blocks in our experience over years of clinical use include chipping around the margins and breakage in the isthmus areas during the milling phase due to the brittle nature of the material. In order to bulk up the material in these critical areas, further tooth preparation is needed, which in turn compromises tooth

structure. These blocks also require timeconsuming oven firing for correction and characterisation. In our observation, some cases where preparation guidelines were less stringently followed did not perform well enough to withstand occlusal forces, yielding early failures.

In cases like crowns and onlays with functional cusps where restorations will be subjected to greater forces, we have preferred to use blocks made of lithium disilicate ceramic because they offer greater strength (360 MPa) and satisfying aesthetic results. However, using lithium disilicate blocks has its own set of drawbacks. **Because they require a crystallisation firing and often some** 

Clinical evaluation of CERASMART, a new hybrid ceramic CAD/CAM block

correction/characterisation firings, the extra-oral time needed for the treatment increases significantly. As a consequence, these blocks are seldom used as a chairside solution. We recently had the chance to try the new hybrid ceramic blocks, CERASMART (GC). These hybrid blocks combine the advantages of ceramic materials with the versatility of composites. They offer sufficient strength (231 MPa) to withstand occlusal forces and their flexibility promises a great advantage over brittle ceramic blocks. Their unique physical properties allow for faster milling with less bur wear. These blocks are less prone to marginal chipping during milling and cementation. Both extra- and intra-oral corrections can be readily made on the CERASMART restorations thanks to its composite chemistry. We have observed that this hybrid ceramic material also has a chameleon effect with inherent opalescence and fluorescence and that chairside characterisation with a simple staining technique is very practical.

Below we present to you our inlay and single crown cases restored with CERASMART hybrid ceramic blocks. According to our clinical experience, we believe that **CERASMART is a true contender as a dependable restorative material for versatile indications.** 

### **Patient 1: Crown case**

Tooth number 85. Persistence of deciduous molar due to agenesis of secondary premolar tooth. Patient asked for occlusal offset to be fixed.





Preparation according to CERASMART guideling





### Clinical evaluation of CERASMART, a new hybrid ceramic CAD/CAM block



Restoration design.





#### Milled restoration



#### Try-in and contact adjustments





Before characterisation with GC Optiglaze



Characterisation by application of GC Optiglaze COLOR, nano-filled glazing liquic







Cementation using an adhesive resin cement and finishing







### Patient 2: Inlay case

Tooth number 46. Failing composite restoration due to marginal leakage and existing secondary caries.

Initial case, marginal discoloration of the old composite filling indicating micro-leakage and secondary caries.







Preparation of the inlay cavities according to CERASMART guidelines.



Existence of approximal carie on tooth number 45.





Restoration of caries using Iowable composite.





Restoration design.



### **Dr. Ahmet Turan**

Dr. Turan graduated from Ege Univercity Faculty of Dentistry in 2008. He worked as general dentist in various clinics with developing curiosity for digital and implant dentistry. He is currently practicing with Dr. Mete FANUSCU in his private clinic in Istanbul furthering his skills and knowledge of digital dentistry, advanced prosthetics and implant dentistry. Apart from participating in different national and international congresses, Ahmet Turan is a member of various international organisations including the International Congress of Oral Implantologists and The European Association for Osseointegration.



### Clinical evaluation of CERASMART, a new hybrid ceramic CAD/CAM block

#### Milled restoration.



Restoration after try-in and contact adjustment. At this stage, patient and doctor were satisfied with colour match and it was decided that further characterisation was unnecessary.



Preparing restoration for cementation. Sandblasting with aluminum oxide under 1,5 atm pressure and steam cleaning





Applying GC Ceramic Primer



Cemented restoration showing good colour match









#### Dr. Mete Fanuscu

Graduated from University of Istanbul Faculty of Dentistry in 1990, Dr. Fanuscu was honored as 'Young Scientist of the Year' award in 1991 by



International Society of Dental Ceramics for his ceramics research done at the Ivoclar R&D Laboratory (Liechtenstein) and Zurich University. He completed his specialty training in Prosthodontics in 1994 and subspecialty in Maxillofacial Prosthetics and Implants in 1999 both at University of California, Los Angeles School of Dentistry (UCLA). He also received the 'Annual Research Grant' award in 2000 from the American Academy of Implant Dentistry for his work on implant biomechanics. Until he returned to Turkey in 2005 he was the director of Advanced Dentistry section at UCLA. He practises at his private clinic in Istanbul and teaches part time at UCLA as associate professor. He has published numerous articles and given lectures worldwide.



### LiSi from GC

Master your lithium disilicate challenges

### GC EUROPE N.V.

GC EUROPE N.V. Head Office Researchpark Haasrode-Leuven 1240 Interleuvenlaan 33 B-3001 Leuven Tel. +32.16.74.10.00 Fax. +32.16.40.48.32 info@gceurope.com http://www.gceurope.com

, 'GC, '



Clinical case report by **MDT Michael Brüsch**, Germany



For over 12 years now, GC has been supplying us technicians with the globally widespread Initial veneering ceramic for our daily use. From the very outset, we have been able to use this high-quality product line to cover the entire range of applications from monochrome solutions to bioaesthetic restorations.

The system approach of the GC Initial product portfolio – from IQ One Body to polychrome layering techniques – enables dental labs to calculate very finely differentiated prices and exercise a high degree of flexibility without having to make sacrifices in terms of material quality.

The overall concept includes and caters for ongoing further development and additions in keeping up with the current market situation and the wishes of the users. For IDS 2015, and at the express request of users, GC has launched two new sensational innovations following this concept. The new veneering ceramic **Initial LiSi** and the **Initial Lustre Pastes NF - Gum Shades**.

The very compact **Initial Lustre Pastes NF** - **Gum Shades Set** is the perfect answer to the needs of the market whilst at the same time being a logical extension of the Lustre Pastes philosophy and the successful IQ product line.

This compact set encompasses both the simple, monochrome and the complex polychromatic-layered gingival areas and unites the elementary parts of both areas.

### The Initial Lustre Pastes NF - Gum Shades

are extremely easy to use and provide an almost unlimited range of options for creating natural-looking gingival areas from just a few shades.

The aesthetic result is every bit as good as a polychrome-layered gingiva.

A particular benefit is that the Initial Lustre Pastes NF - Gum Shades are designed for universal use and are compatible with nearly all ceramics available on the market.

In addition to the effect stains included in the set, all Initial stains are also fully compatible and can be mixed directly into the Lustre Pastes to enable even more individualisation.

Below, I would just like to highlight some of the possibilities offered by this new Gum set. As a representative example standing for all framework types and ceramics, a zirconia superstructure on GC Aadva implants using the IQ ONE BODY technique is presented here. Only two materials are used to build up the shape and provide functionality – in this case the **Initial IQ**, **One Body**, **Layering-over-Zircon** and a gum base material.

The two ceramic materials are layered together and finished by firing.

The final aesthetics are created with the Lustre Pastes NF - V-Shades and the new Lustre Pastes NF - Gum Shades.



The framework is prepared according to the manufacturer's specifications and the Initial Zr Light Reflective Liner / Initial Lustre Pastes NF - Gum Shades or Frame Modifiers are applied in thin layers and then fired.

In a similar way to the Initial MC/Zr-FS Gum layer build-up technique which has proven itself over many years, the new **Initial Lustre Pastes NF - Gum Shades** and the **Initial Lustre Pastes NF - V-Shades** are applied at the same time in a simple **IQ** technique and fired together.











The tooth-coloured ceramic material such as Initial IQ, One Body, Layering-Over-Zircon and the gum-coloured base ceramic Gum-23 are applied and fired together.

### A truly uncomplicated, predictable and time-saving process.

The Lustre Paste colours are applied step by step and after just a single glaze firing and using just two layering materials, this system gives us excellent results!



A painter speaks in terms of colours, light and shade – an architect expresses himself through materials, shapes and textures – IQ combines both these forms of art in dental technology in a stunningly simple way!

My second new love bears the name **Initial LiSi.** 

### The new Initial LiSi veneering ceramic was developed exclusively for lithium disilicate frameworks and fine-tuned precisely for this material.

In view of the increasing popularity of this base material, GC is now launching a veneering ceramic especially for it and which offers impressive features previously unobtainable on the market in terms of handling, firing characteristics and impressive aesthetics.

The development of Initial LiSi fulfils the users' long-standing desire for cost- effectiveness, workability and above all, aesthetics. Another innovative feature is that there is no longer any need for large complete sets. Starting from the basic set, the user can easily put together his own customised assortment.

The familiarisation period is also guaranteed to be short, since the new **Initial LiSi** is based as far as possible on the proven handling and layering technique of the Initial concept. In the same way, if required, the familiar **Initial Lustre Pastes NF** and **Zr-FS Stains** can be applied for added individualization. There are currently three different recommended layering/build-up variants (Initial LiSi "One", "Classic" and "Expert") and a monolithic technique for lithium disilicate frameworks and crowns. By using these techniques, we can easily fulfil our patients' most demanding aesthetic requirements. Of course, this concept embodies unlimited freedom to go beyond this.













The basis is provided by **Initial LiSi "One"**, the very reliable, popular and effective variant based on the cut-back technique. **Initial LiSi "One"** is minimalist in concept and based on a first opaque firing and colouring of the only partially reduced lithium disilicate framework with a final complete layer of veneer built up with enamels.

Optionally, this variant can also be refined by using opal/transpa materials.

A very simple process, but one that produces impressive results.



A thin first opaque firing is recommended. Any ceramic powder from the Initial LiSi range (except COR and GL) can be used for the first opaque firing. Alternatively, the Initial Lustre Pastes NF - V-Shades can be applied thinly over the whole surface.



The final shaping is carried out with standard Enamel E-57 to E-60.









Any corrections after the first firing that may be necessary can be made with standard Enamels / Transpa materials.



In the second variant suggested - **Initial LiSi "Classic"** - the structure of natural dentition comes even more clearly into focus.

Through the partial use of highly fluorescent dentins, highly chromatic inside materials, opalescent enamel and transpa materials, **Initial LiSi "Classic"** here begins to exploit the exciting, fascinating interplay of light dynamics of natural teeth.



With this build-up technique, only the most important elements of the structure of natural teeth are copied and yet, together with the Opal/Fluo/INside materials, it produces a high degree of natural light dynamics.



**Michael Brüsch** trained as a dental technician from 1976-1979, after which he was employed as a dental technician working mainly with gold and ceramics. In 1986 he completed his Master Dental Technician degree in Düsseldorf and then became a laboratory director focusing on all-ceramic restoration work. In 1989 he set up his own, privately based dental laboratory specialising in functional and aesthetic prosthetics with a focus on multichromatic-additive veneering techniques for composite and porcelain, precision fabrication methods for crowns, inlays, onlays and veneers made from composite and all-ceramic restorations. He has become well-known for his exceptional 3D presentations. He is an active member of the German Association for Aesthetic Dentistry (DGÄZ) and the Dental Excellence- International Laboratory Group and has been a specialist in Dental Techniques at EDA since 2008. He is considered to be an authority on the subject of all-ceramic and biomaterials and functional restoration work and regularly presents workshops and publishes papers.





10

... is built up with Dentin if necessary and then extended by adding a thin even layer overall and at the incisal edges using Clear Fluorescence (CL-F).

The final shape is built up with an Enamel mixture made from standard Enamels and Opal Enamels ...



11



... which gives much brighter light dynamics. Any corrections necessary after firing can, in most cases, be made with the Enamel/Opal mixture previously used.



A very easy to make, vibrant and very natural-looking restoration.



The **Initial LiSi "One"** and **Initial LiSi "Classic"** variants are also ideally preferable for posterior use. They represent an aesthetic option as an alternative to purely monolithic and only superficially coloured lithium disilicate restorations.

In the typical constellation of monolithic, partly veneered to fully veneered restoration illustrated below, the **Initial Lustre Pastes NF** reveal the full spectrum of the effects they can achieve, saving a considerable amount of time in comparison with conventional processes.



The Initial Lustre Pastes NF Neutral and the Initial Lustre Pastes NF Body colours are first applied over the whole of the monolithic lithium disilicate parts after these have been sandblasted at 1 bar.



The veneer surfaces are then coloured and individualised using the same Initial Lustre Pastes NF - V-Shades, which at the same time take on the function of the recommended first opaque firing.



If any further characterisation is required, additional INvivo stains can be used.





As already seen with the Initial LiSi "One" Anterior, here the partly veneered area is layered exclusively with Enamel/Transpa materials.

With this type of indication, the Initial Lustre Pastes NF - V-Shades have a dual function as an advanced glaze firing on the monolithic parts and at the same time as a first opaque firing on the veneered surfaces, and can be fired together.

Once the monolithic surfaces have

received the final glaze firing together with the veneered parts, there is no need for time-consuming physical polishing.

The fully contoured pressed monolithic restorations are directly glazed in the same firing as the first opaque firing of the veneered crowns. The aesthetic result of this glaze firing is a welcome visible support for the parts still to be veneered. The build-up of layers in the posterior area depends on the procedures indicated in the anterior region and rewards our efforts with great results and amazing, dense surfaces.







The layering parameters of the Initial LiSi "Classic" are largely the same for posteriors and anteriors.

















Up to this point, Initial LiSi is already a truly unprecedented class of its own!





But... even these results can be bettered... **Initial LiSi "Expert".** The epitome of bioaesthetics and the utmost in efficiency. Here all the parameters relevant to the biological structure of natural dentition are perfectly integrated into the layering.

I would like to use the following images to give you a brief overview of the full glory of the bioaesthetic build-up and the exceptional result.



























Next to Nature

My first, very complex case, dating back to the later stages of development of **Initial LiSi**, was solved at first attempt. I was easily able to transfer my experience with other Initial ceramics to this case.

But even better than the direct fabrication was the fulfilment of a lifelong dream.

All the restorations shown here were made with the same **Initial LiSi ceramics**, including the upper/lower anterior veneers, which were fired onto a fireproof material (GC COSMOTECH VEST)!







The dull colour and surface structure of the initial situation. The young patient suffers from amelogenesis imperfecta, a malformation of the enamel which is in most cases hereditary.













The upper and lower anteriors received minimal invasive treatment but a hybrid preparation had to be chosen for the premolars. Upper and lower anteriors were prepared for the fabrication of sintered ceramic veneers, duplicated and then fabricated again from a fireproof material (GC COSMOTECH VEST).











The result of an Initial LiSi "Expert" layering in the anterior area and a an Initial LiSi "Classic" build-up for the premolars.

Before ...



...after.











A very natural, vital improvement of the initial situation and a delighted patient. The first difficult case was easily solved.



### This just shows how simple the life of a dental technician can be.

3

Do you want more ...? I cordially invite you to the Initial World of GC. It is worthwhile getting to know this fascinating combination of high quality materials and almost unlimited aesthetics.

The handling and layering of the new Initial LiSi harmonises perfectly – and this is something we are especially proud of – with the fabrication techniques used for all other Initial ceramics with great success over the last 12 years.

From low-cost to high-end, from metal-based restorations to the new Initial LiSi, we can keep up the rhythm of our daily work and focus on creating fine restorations because we have a consistently perfect basis to work on.

Such reliability enables this concept to fulfil the highest requirements a system can offer a dental technician.

GC BENELUX B.V.

Edisonbaan 12 NL-3439 MN Nieuwegein Tel. +31.30.630.85.00 Fax. +31.30.605.59.86 info@benelux.gceurope.com http://benelux.gceurope.com

#### GC NORDIC AB

Finnish Branch Vanha Hommaksentie 11B FIN-02430 Masala Tel. & Fax.+358.9.221.82.59 info@finland.gceurope.com http://finland.gceurope.com

### GC AUSTRIA GmbH

Tallak 124 A-8103 Gratwein-Strassengel Tel. +43.3124.54020 Fax. +43.3124.54020.40 info@austria.gceurope.com http://austria.gceurope.com **GC EUROPE N.V.** • Head Office • Researchpark Haasrode-Leuven 1240 • Interleuvenlaan 33 • B-3001 Leuven Tel. +32.16.74.10.00 • Fax. +32.16.40.48.32 • info@gceurope.com • http://www.gceurope.com

### GC UNITED KINGDOM Ltd.

12-15, Coopers Court Newport Pagnell UK-Bucks. MK16 8JS Tel. +44.1908.218.999 Fax. +44.1908.218.900 info@uk.gceurope.com http://uk.gceurope.com

#### GC NORDIC AB

Danish Branch Harbour House Sundkrogsgade 21 DK-2100 Københamn Tel. +45 23 26 03 82 info@denmark.gceurope.com http://nordic.gceurope.com

### GC AUSTRIA GmbH

Swiss Office Bergstrasse 31a CH-8890 Flums Tel. +41.81.734.02.70 Fax. +41.81.734.02.71 info@switzerland.gceurope.com http://switzerland.gceurope.com

### GC FRANCE s.a.s.

9 bis, Avenue du Bouton d'Or – BP 166 F-94384 Bonneuil sur Marne Cedex Tel. +33.1.49.80.37.91 Fax. +33.1.49.80.37.90 info@france.gceurope.com http://france.gceurope.com

#### GC NORDIC AB

Box 703 96 SE-107 24 Stockholm Sweden Tel: +46 8 506 361 85 info@nordic.gceurope.com http://nordic.gceurope.com

#### GC IBÉRICA

Dental Products, S.L. Edificio Codesa 2 Playa de las Americas, 2, 1°, Of. 4 ES-28290 Las Rozas, Madrid Tel. +34.916.364.340 Fax. +34.916.364.341 info@spain.gceurope.com http://spain.gceurope.com

### GC GERMANY GmbH

Seifgrundstrasse 2 D-61348 Bad Homburg Tel. +49.61.72.99.59.60 Fax. +49.61.72.99.59.66.6 info@germany.gceurope.com http://germany.gceurope.com

### GC ITALIA S.r.l.

Via Calabria 1 I-20098 San Giuliano Milanese Tel. +39.02.98.28.20.68 Fax. +39.02.98.28.21.00 info@italy.gceurope.com http://italy.gceurope.com

### GC EUROPE N.V.

East European Office Siget 19B HR-10020 Zagreb Tel. +385.1.46.78.474 Fax. +385.1.46.78.473 info@eeo.gceurope.com http://eeo.gceurope.com

